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ATLAS DU SPECTRE SOLAIRE 380 -870 nm tiré du spectre de l'Institut d'Astrophysique de Liège avec identification des raies et des facteurs de Landé

Jean-Marie Malherbe

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ATLAS DU SPECTRE SOLAIRE 380 - 870 nm

compilé par

Jean-Marie Malherbe
Observatoire de Paris

à partir :

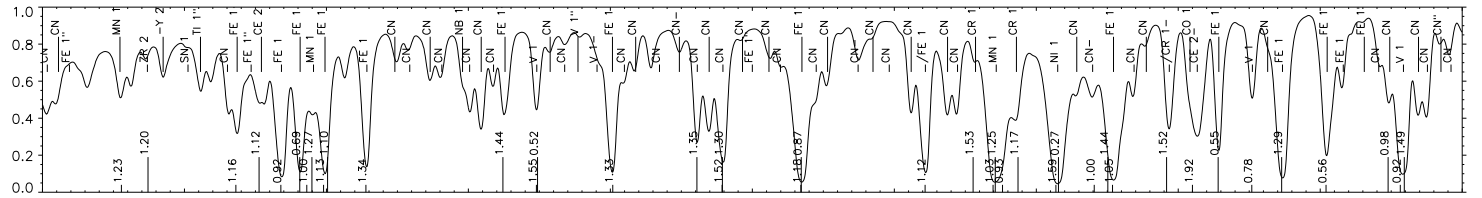
1) du spectre du Jungfraujoch obtenu par

Delbouille, L., Neven, L., Roland, G.
Photometric Atlas of the Solar Spectrum from 300 to 1000 nm,
Institut d'Astrophysique,
Université de Liège
1973-1988

L'unité retenue pour la longueur d'onde est l'Angtröm (10^{-10} m)

2) de la table de Ch. Moore pour l'identification des éléments chimiques à l'origine des raies spectrales (en haut)

3) de la table des facteurs de Lande équivalents (en bas)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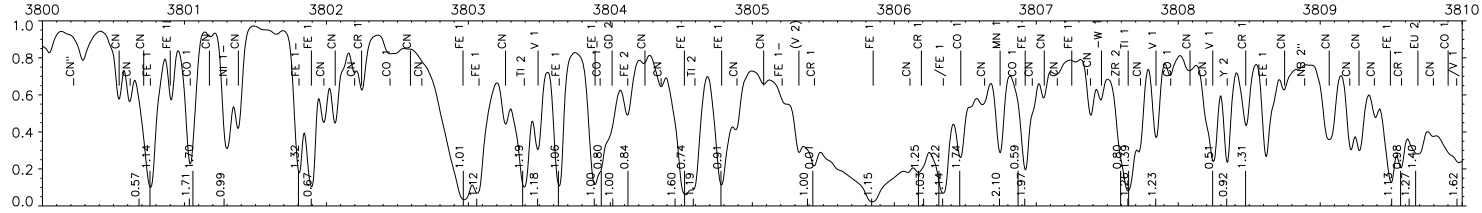
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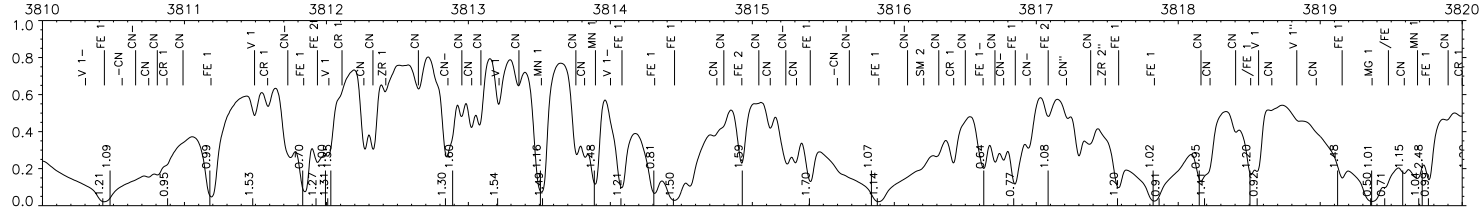
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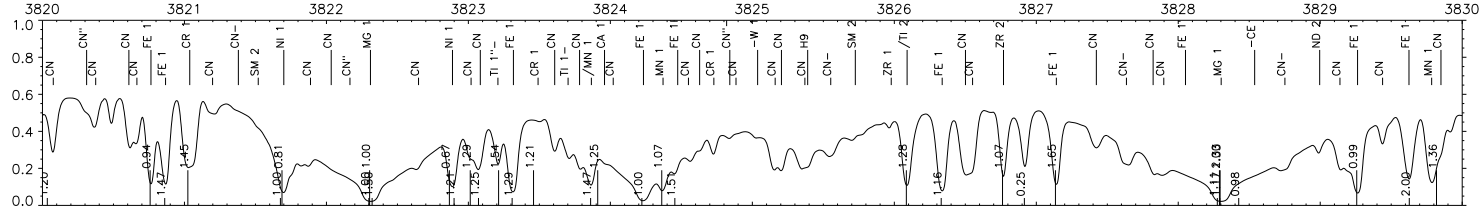
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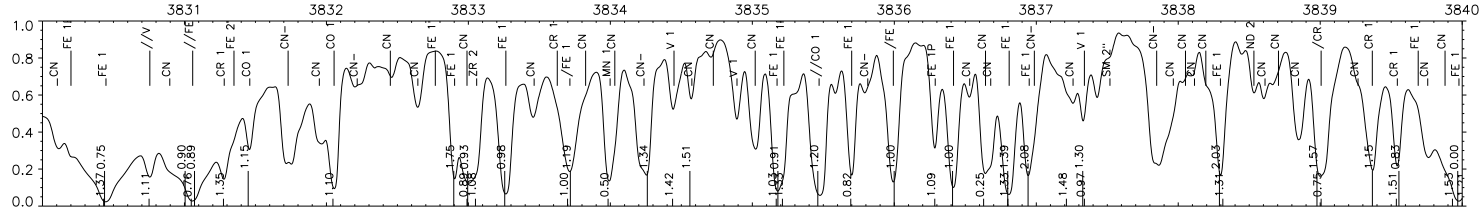
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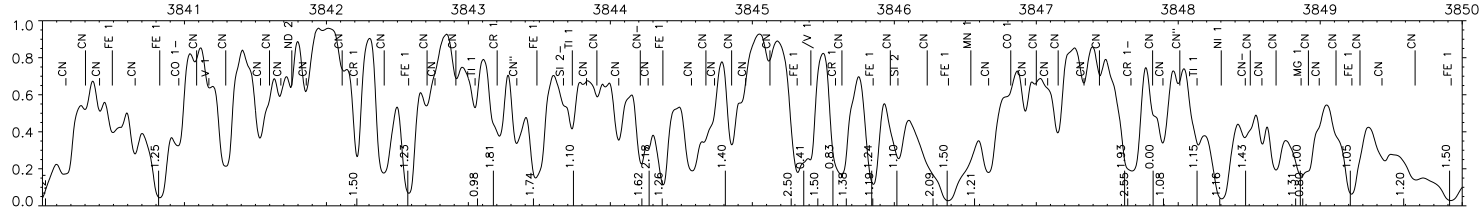
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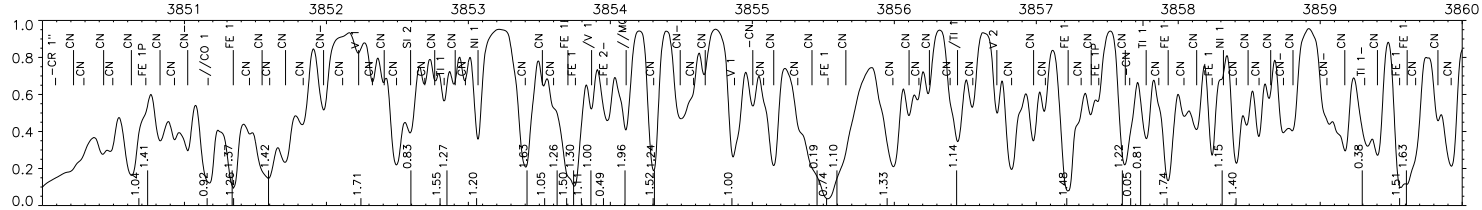
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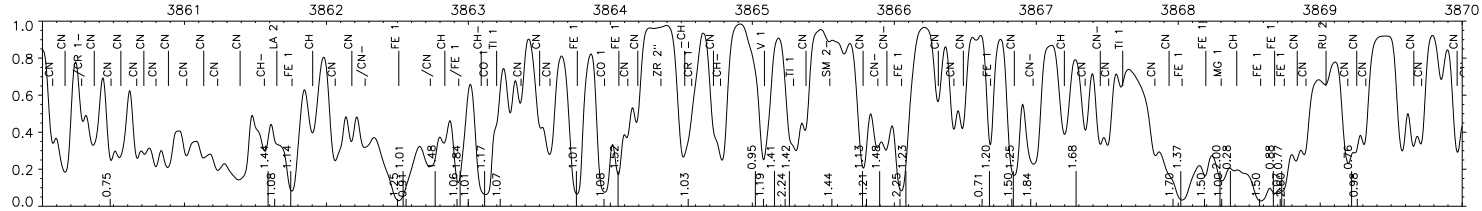
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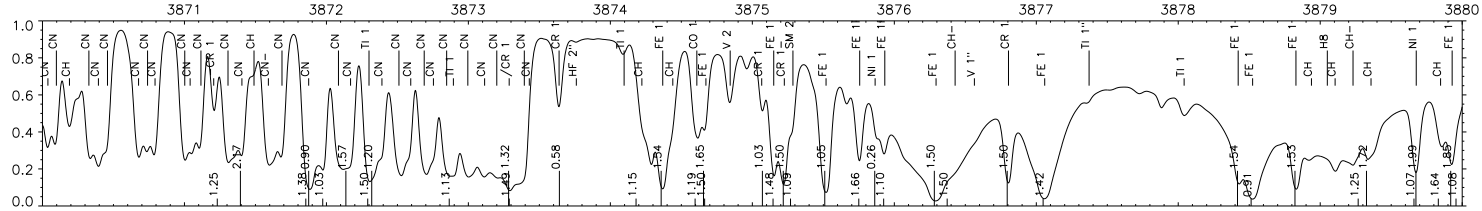
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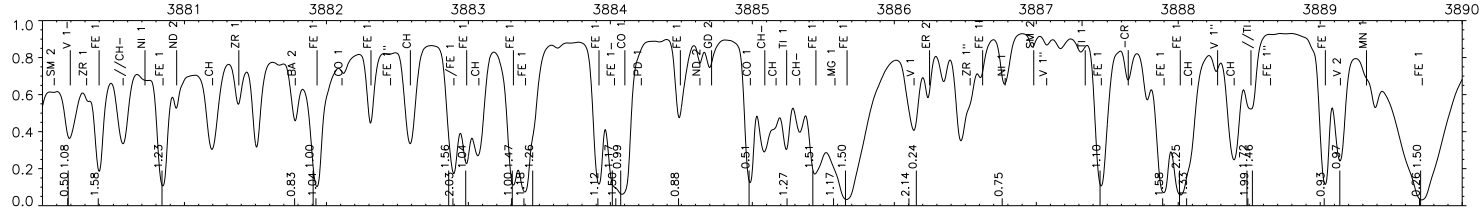
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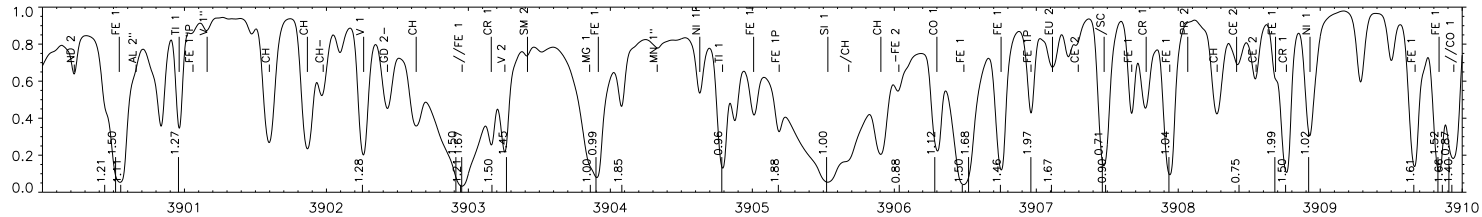
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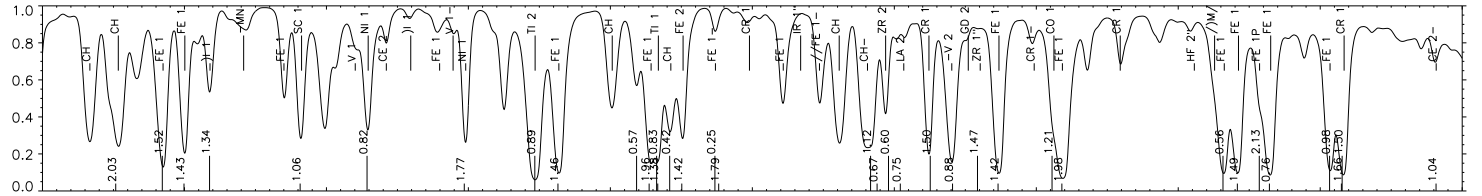
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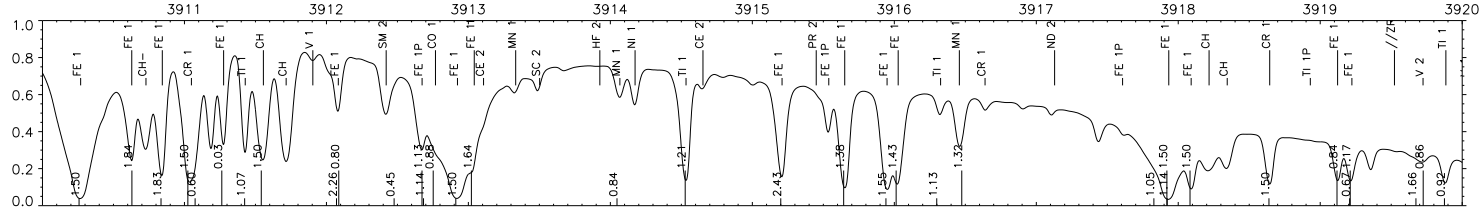
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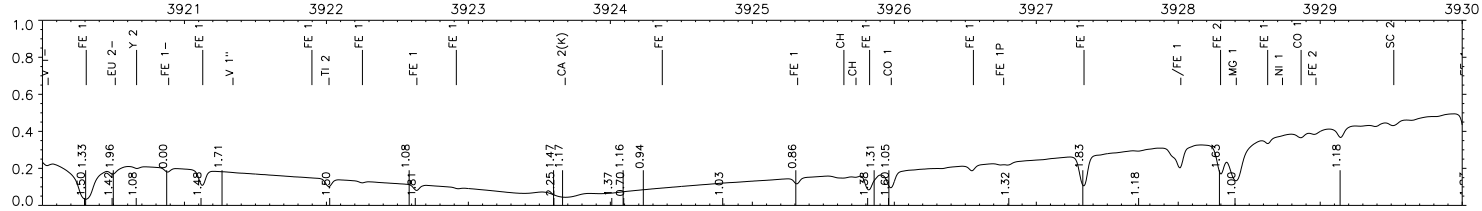
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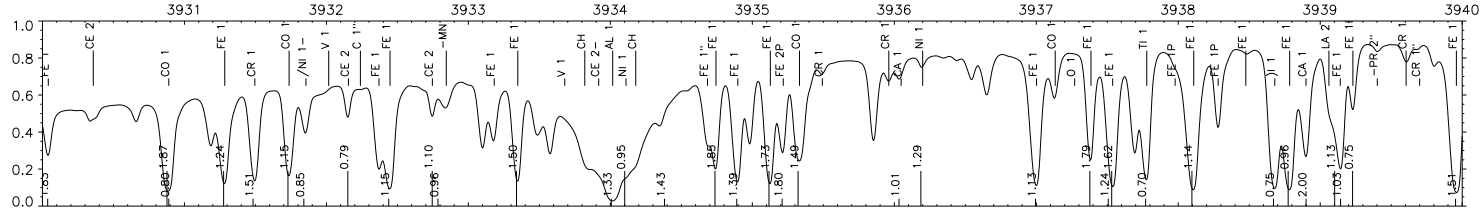
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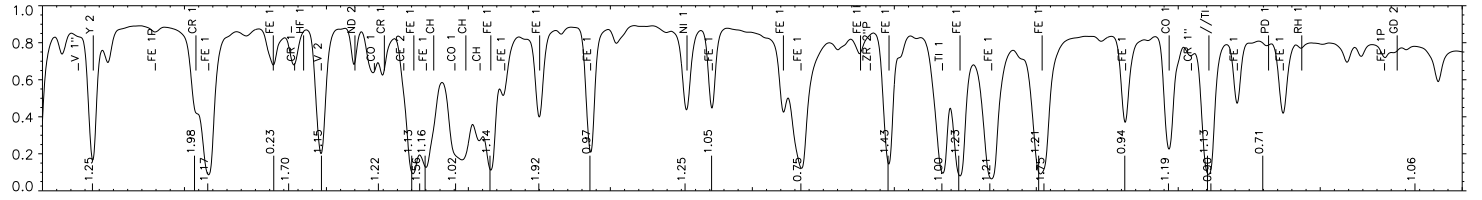
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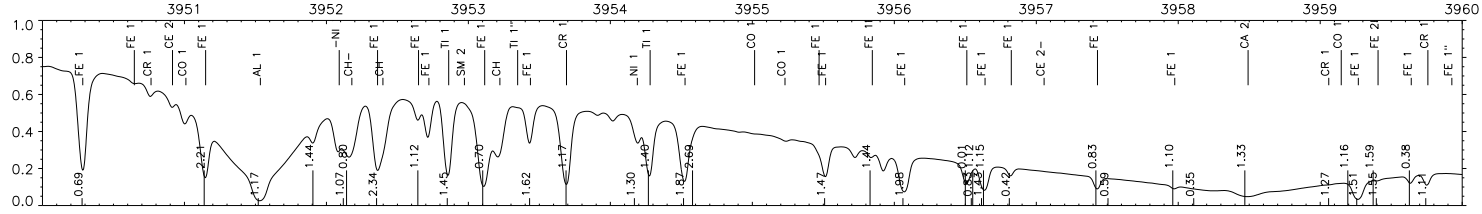
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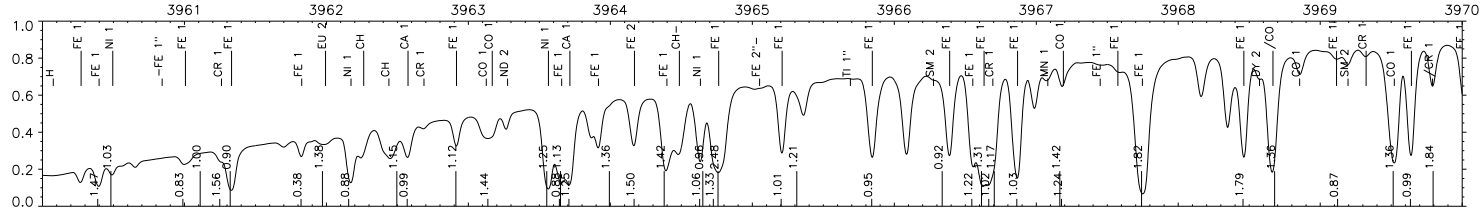
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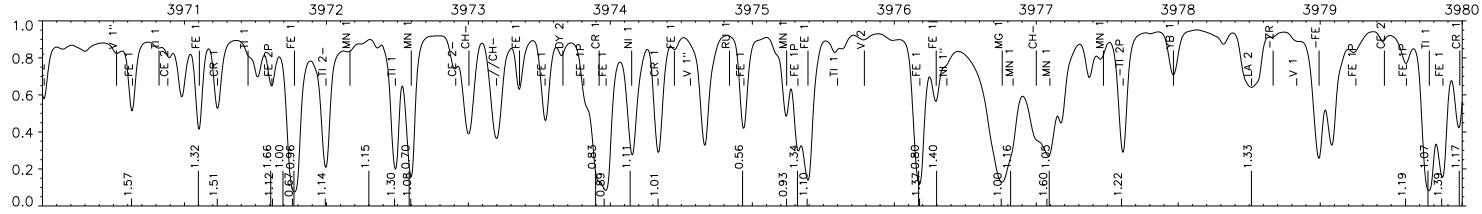
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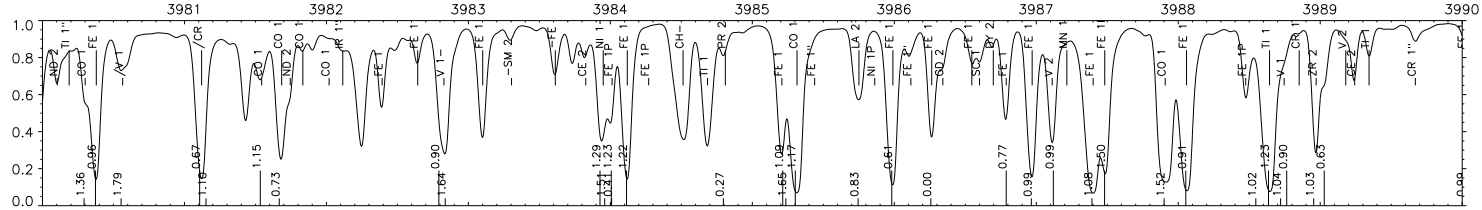
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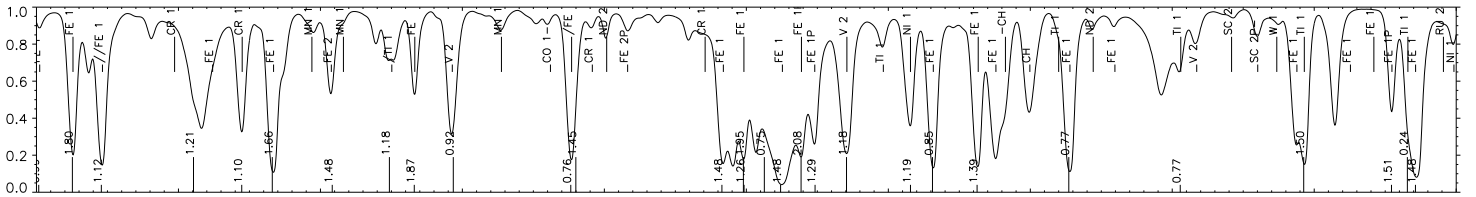
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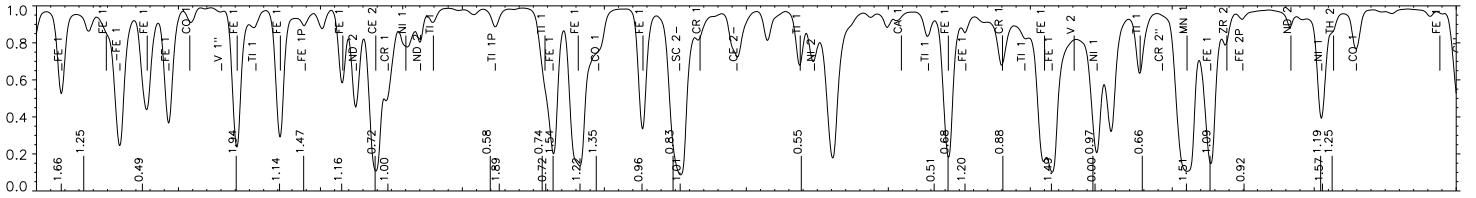
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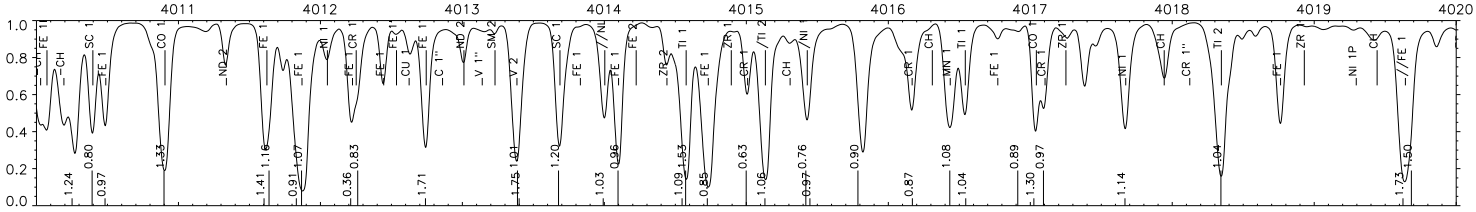
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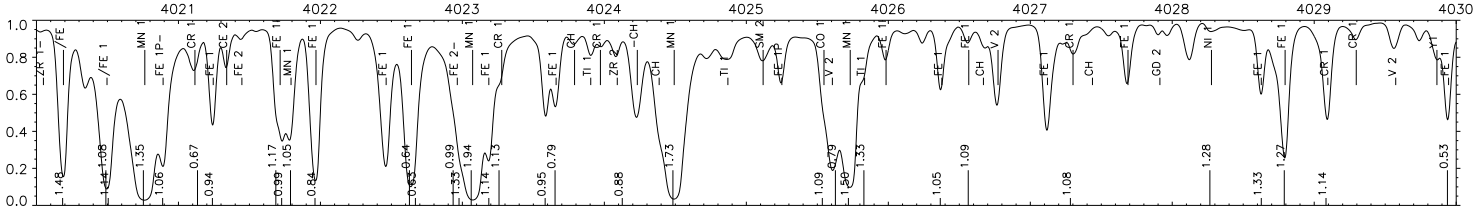
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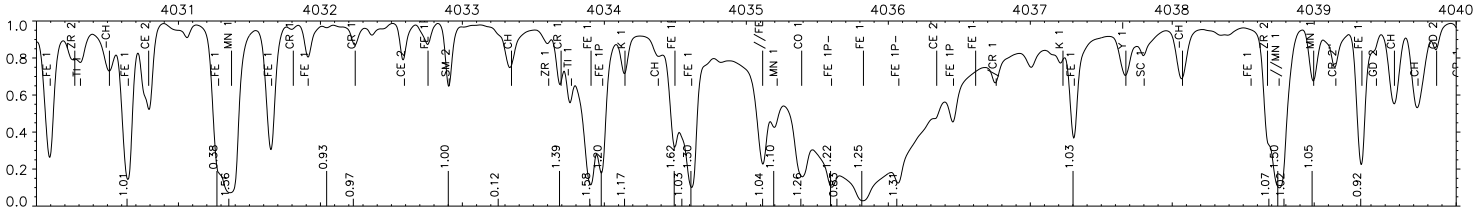
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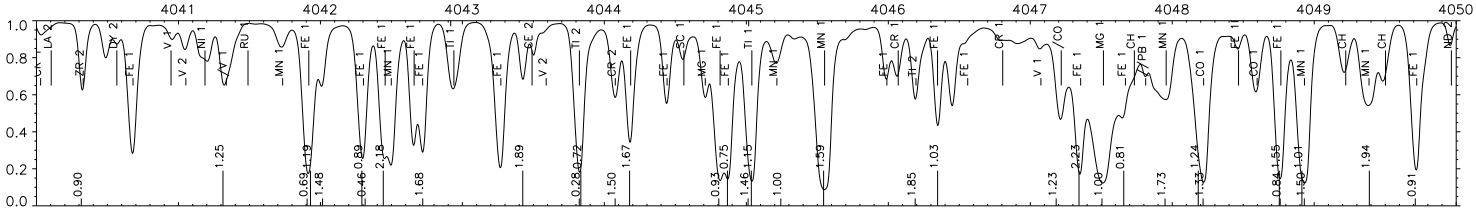
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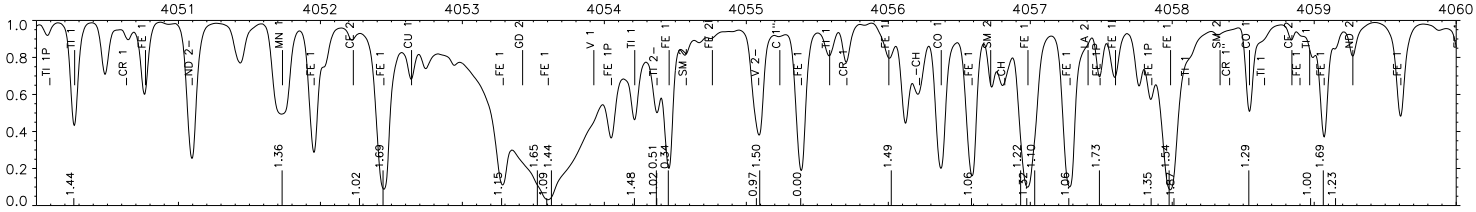
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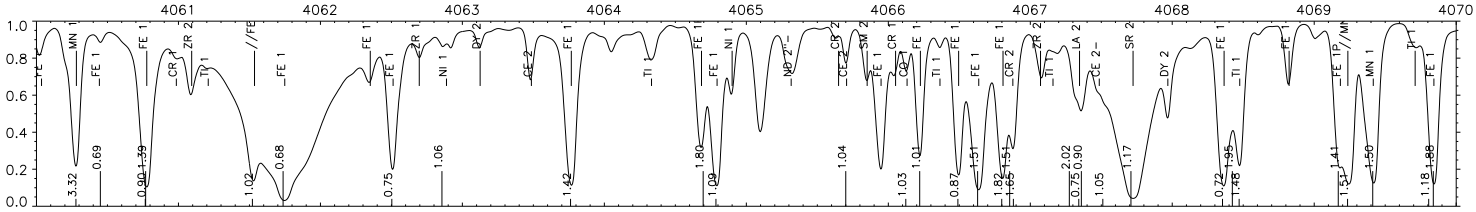
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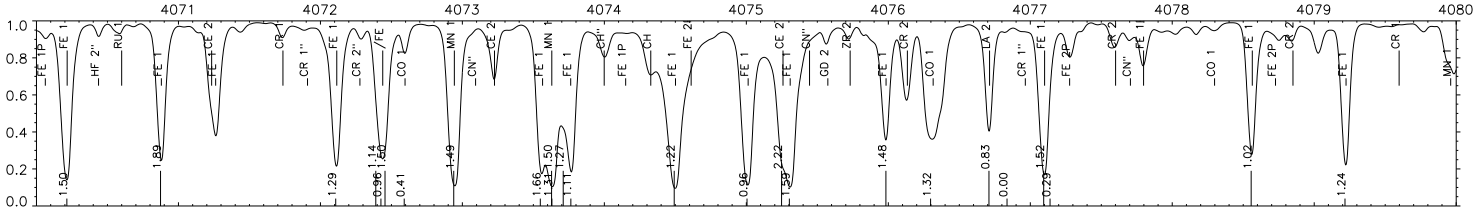
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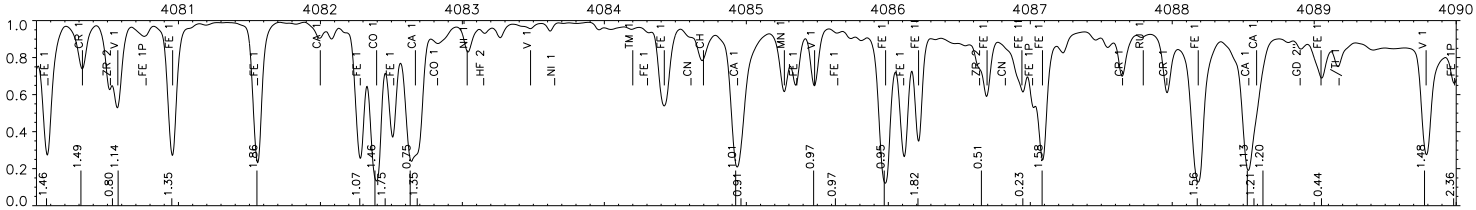
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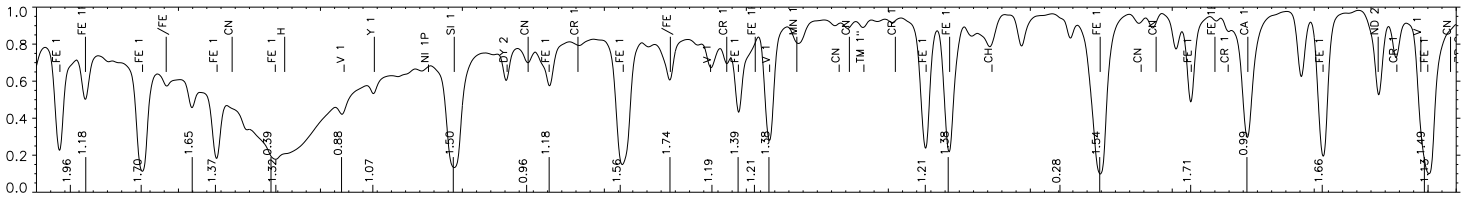
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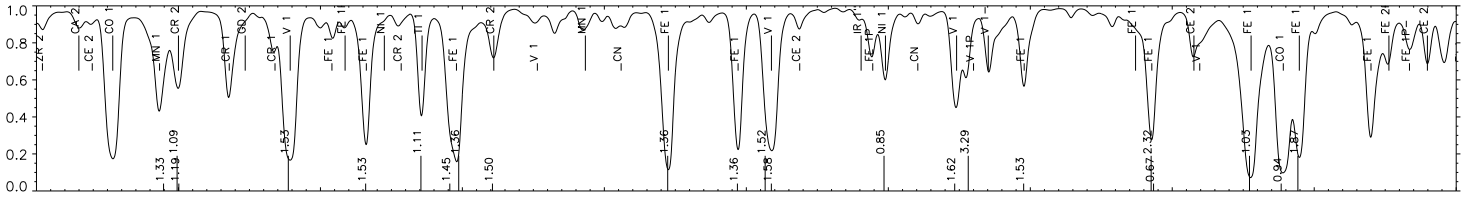
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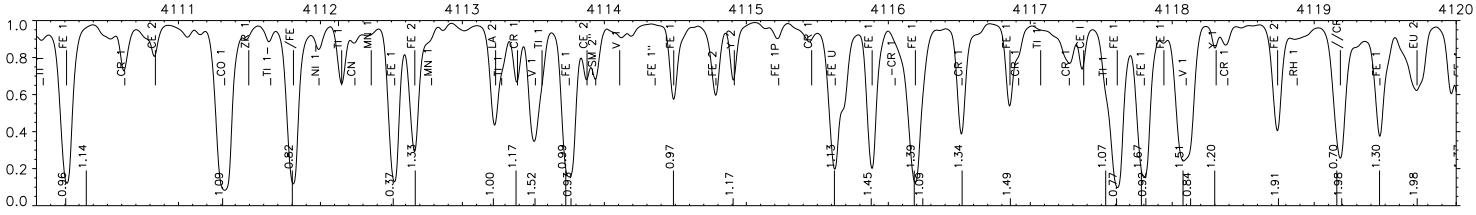
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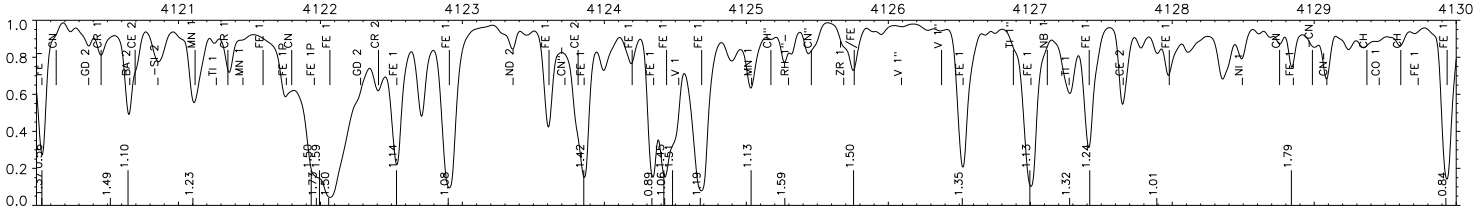
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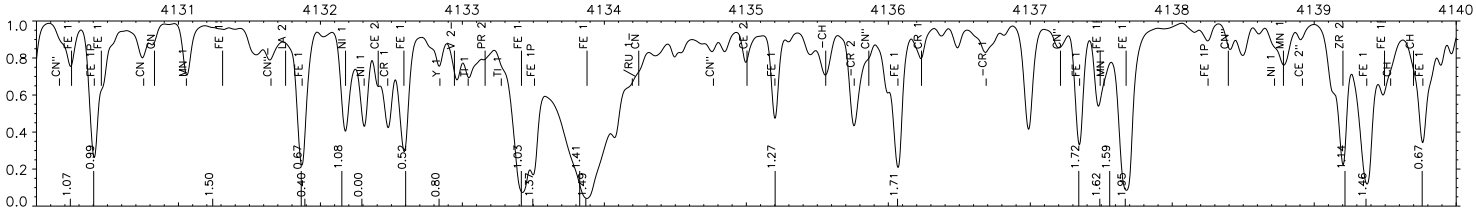
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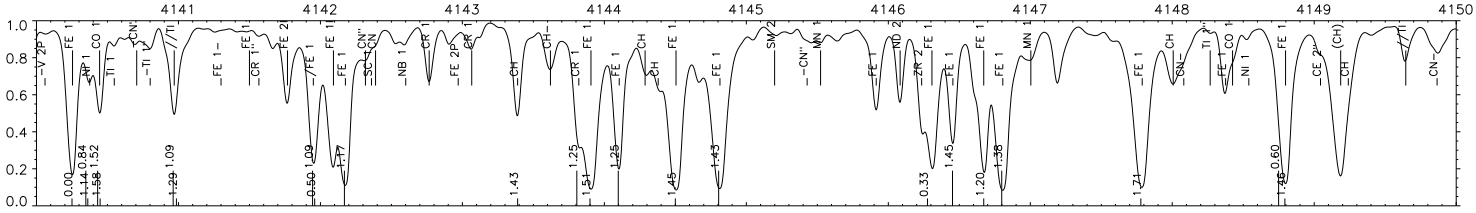
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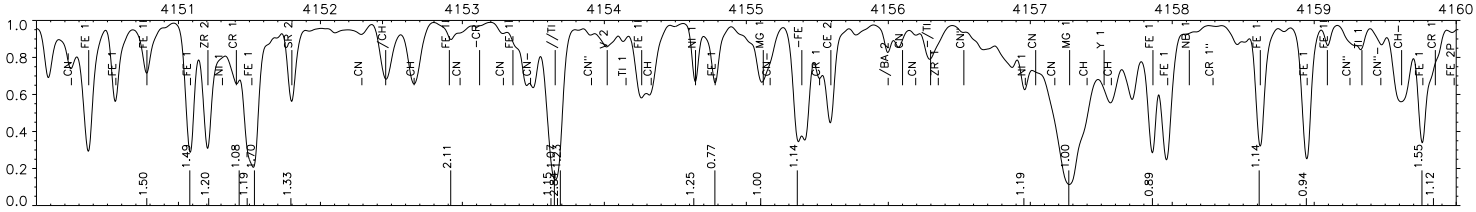
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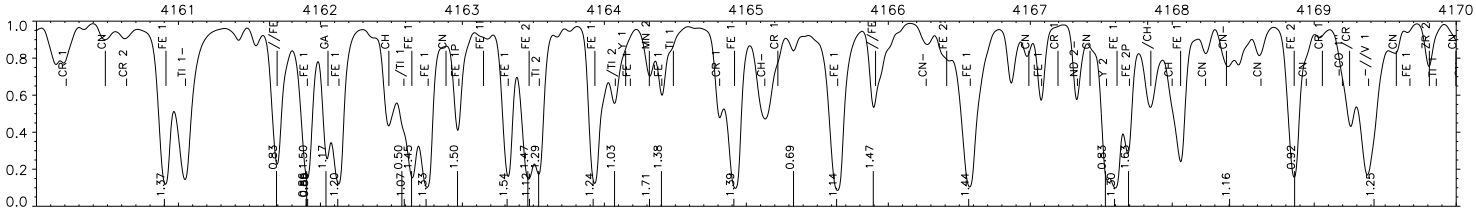
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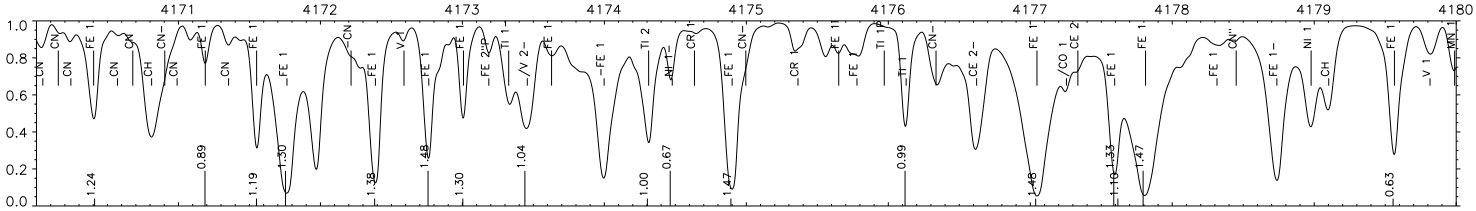
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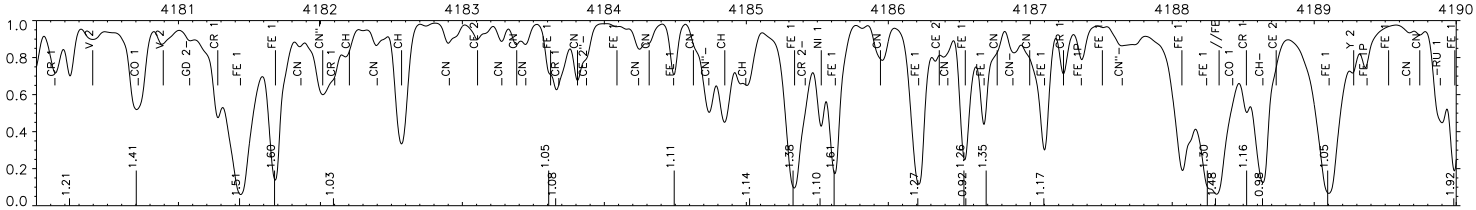
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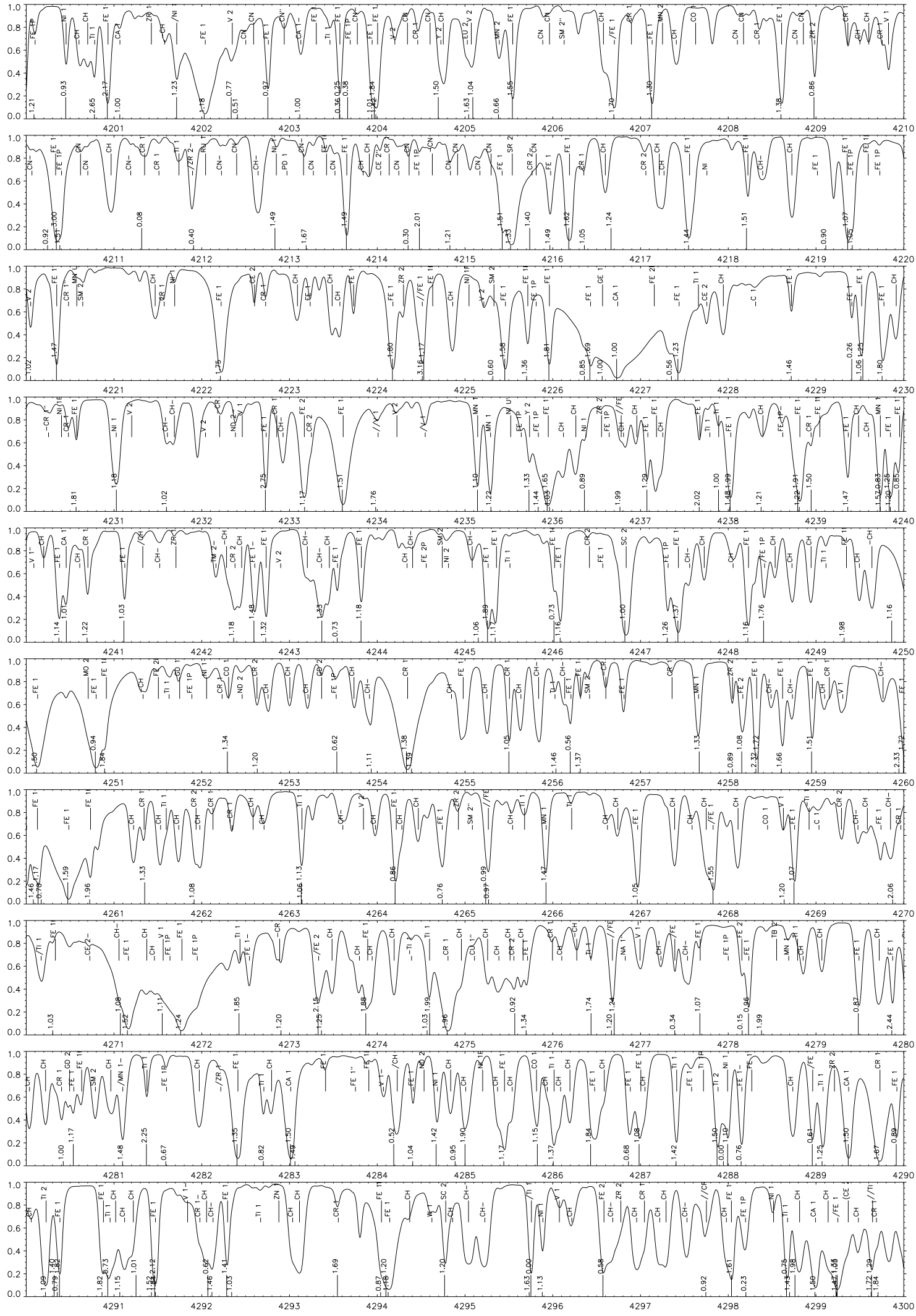

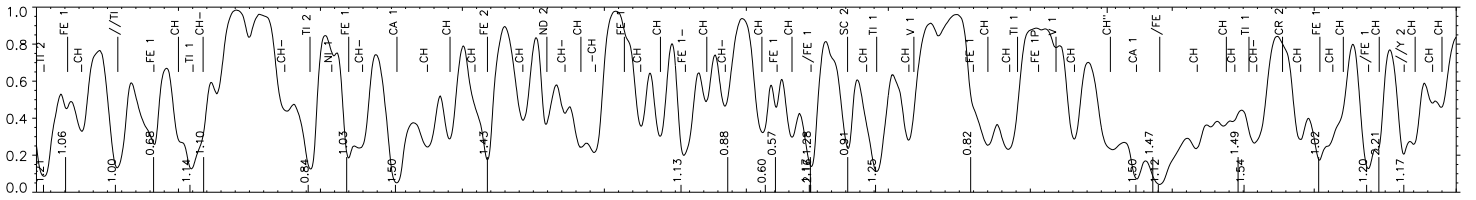
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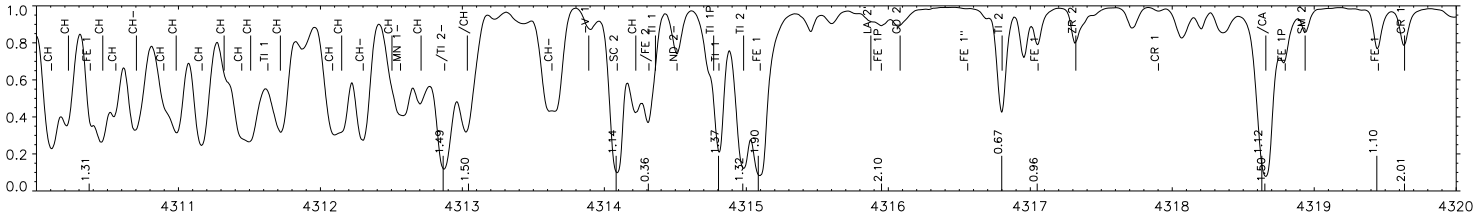
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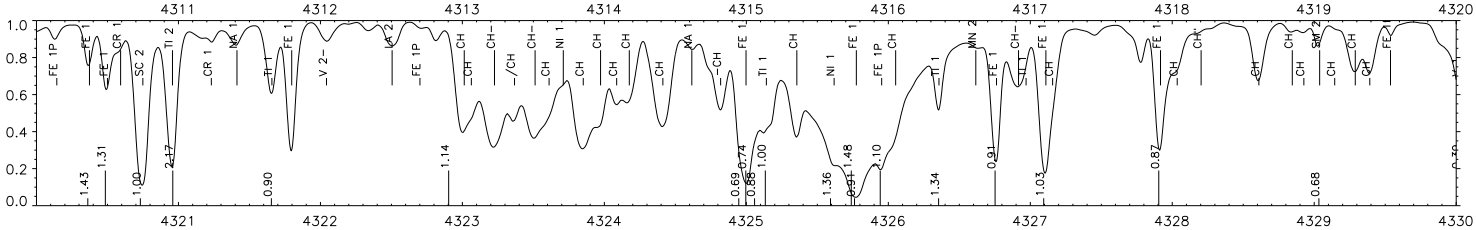
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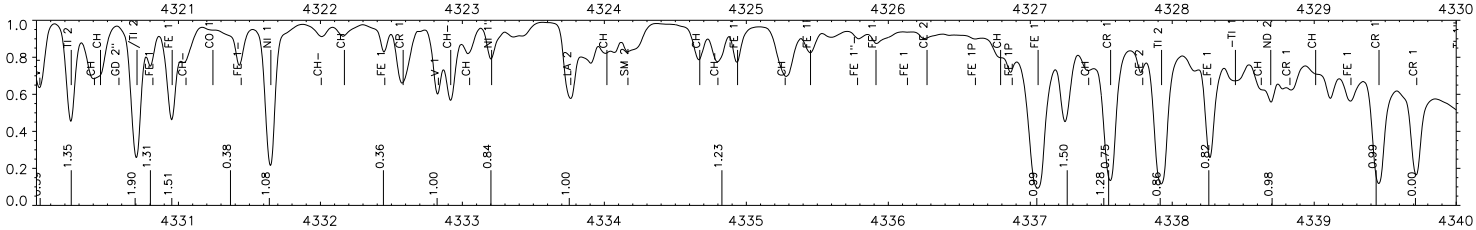
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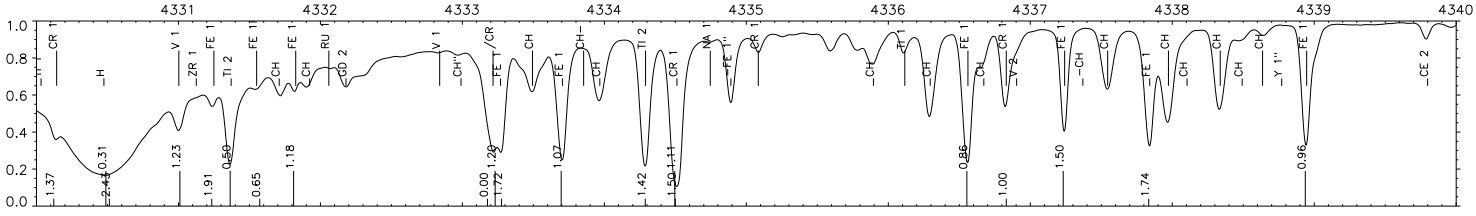
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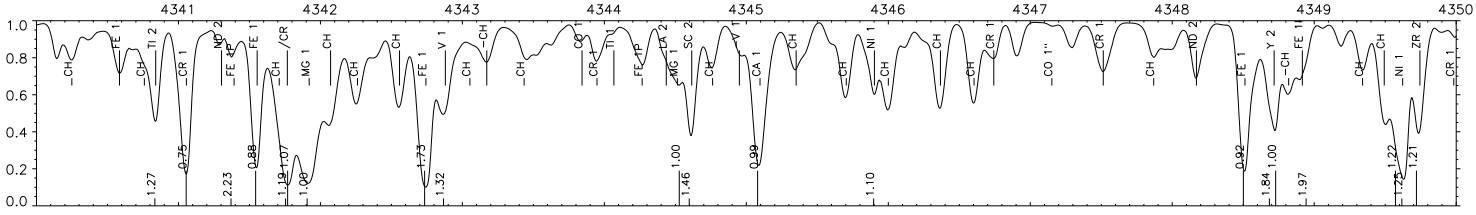
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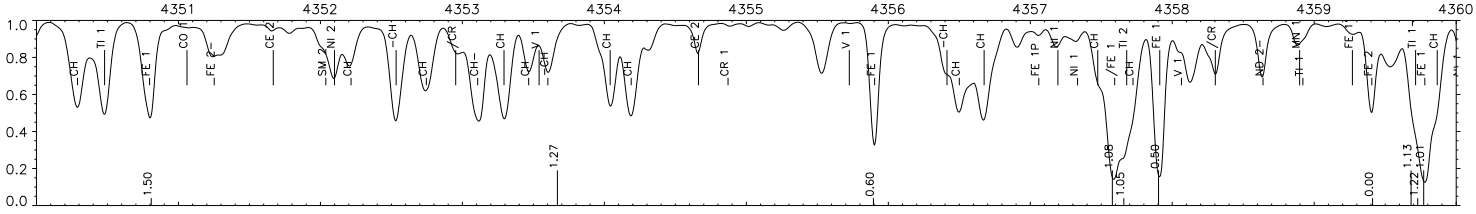
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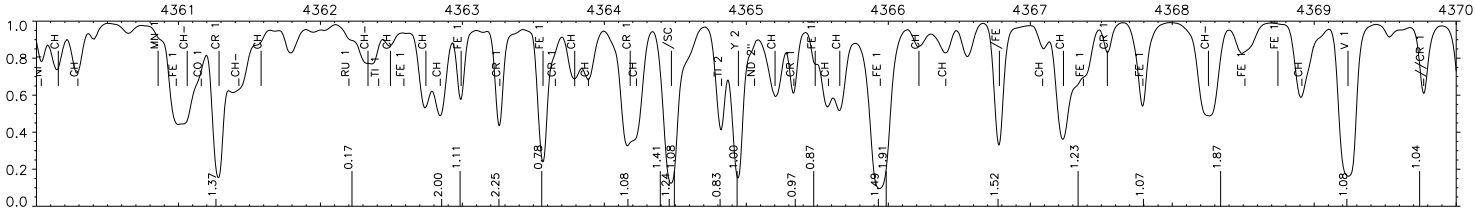
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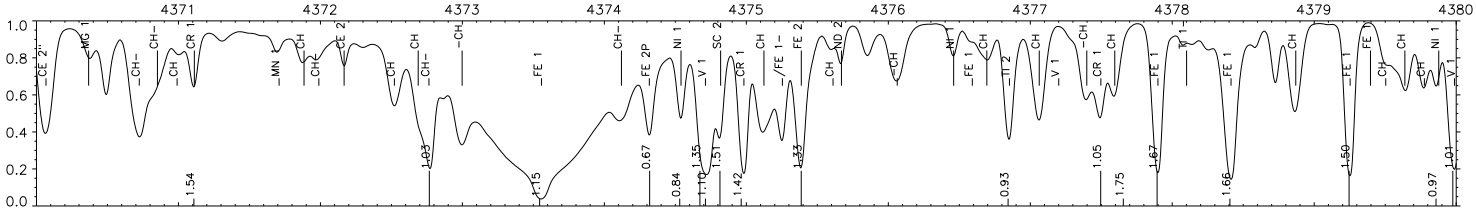
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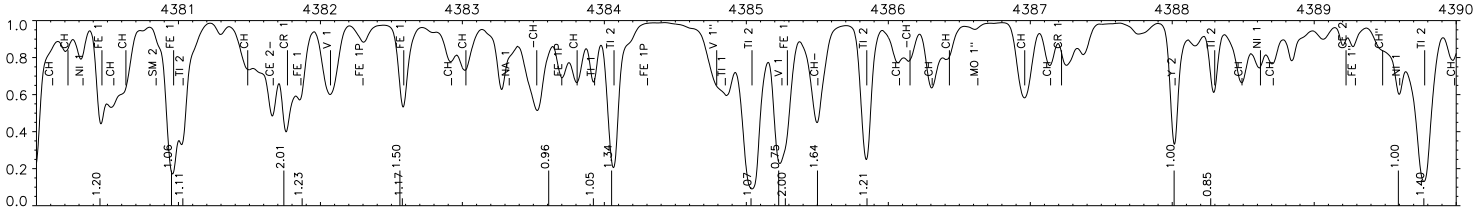
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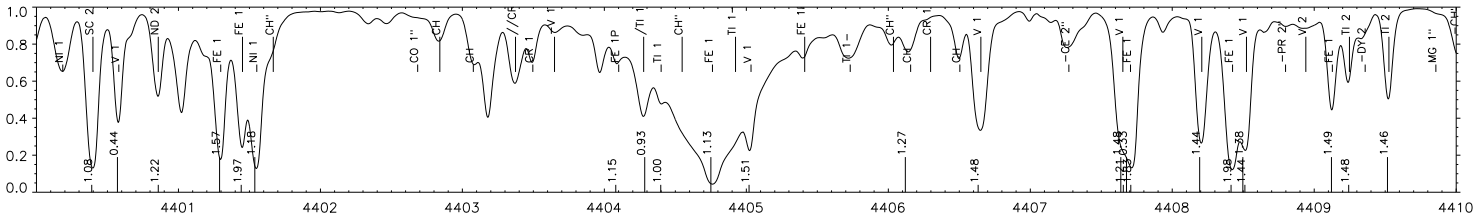
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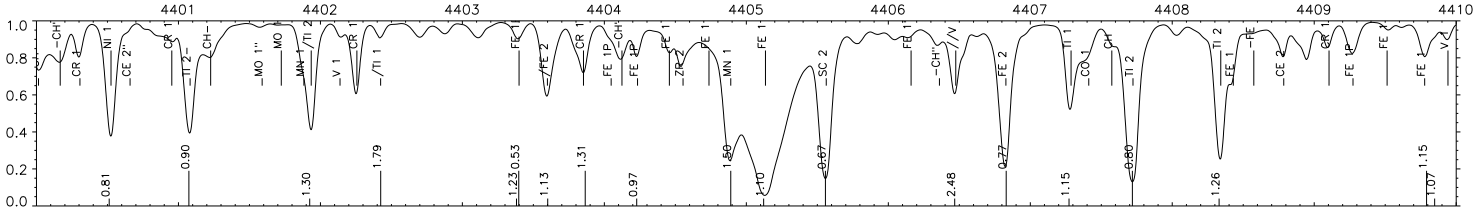
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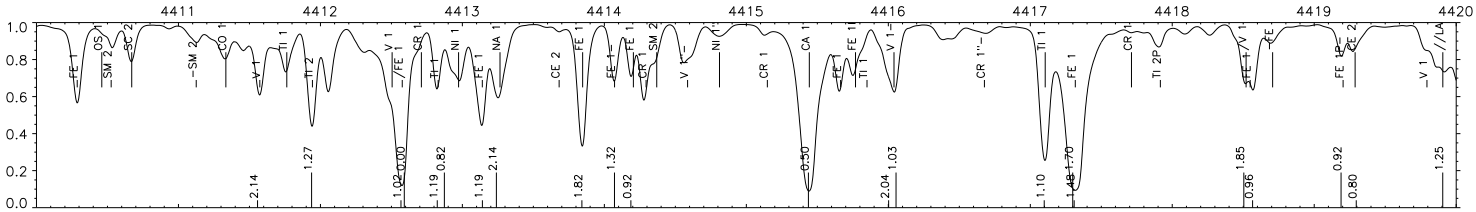
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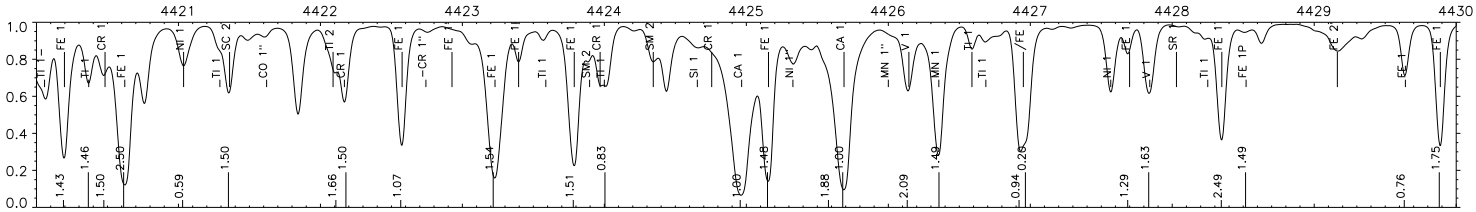
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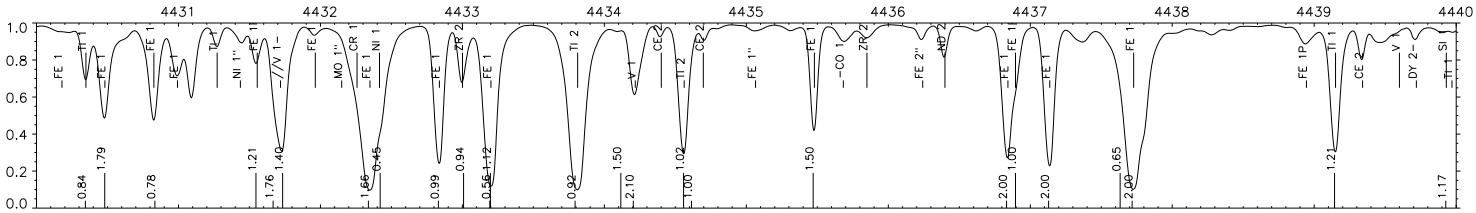
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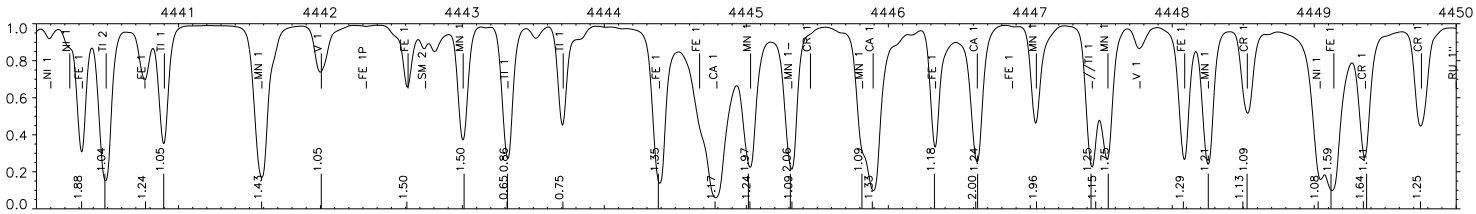
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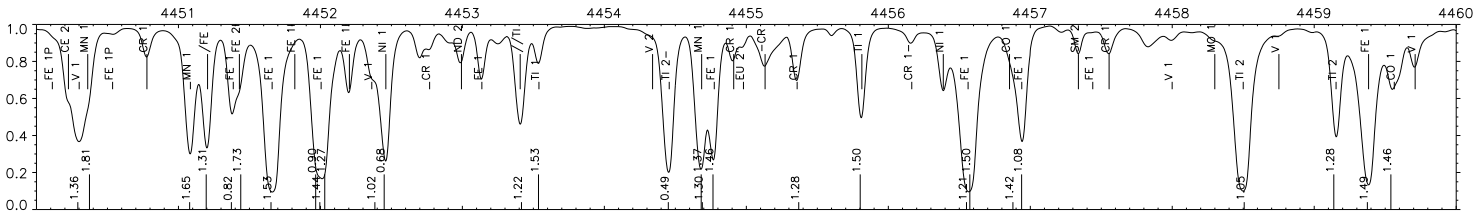
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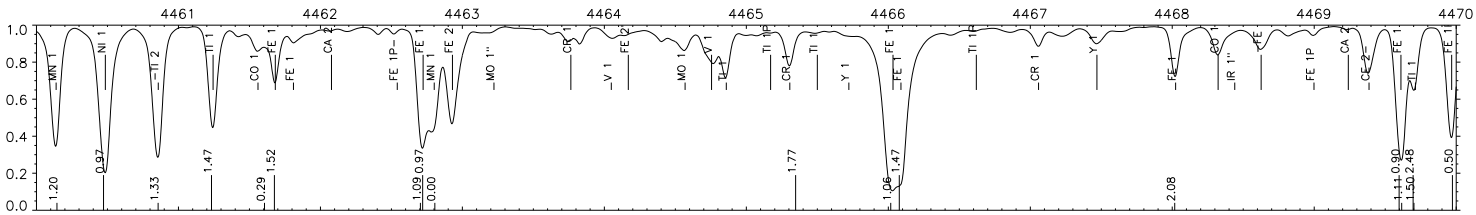
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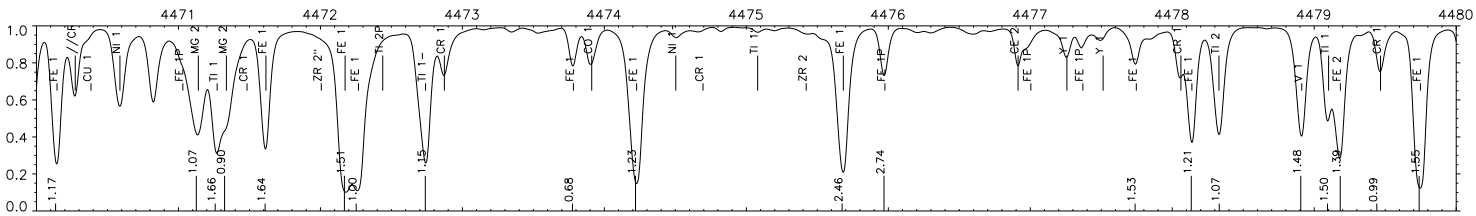
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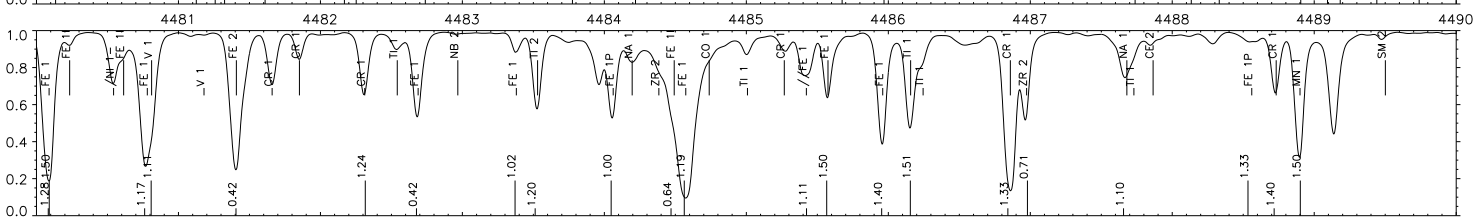
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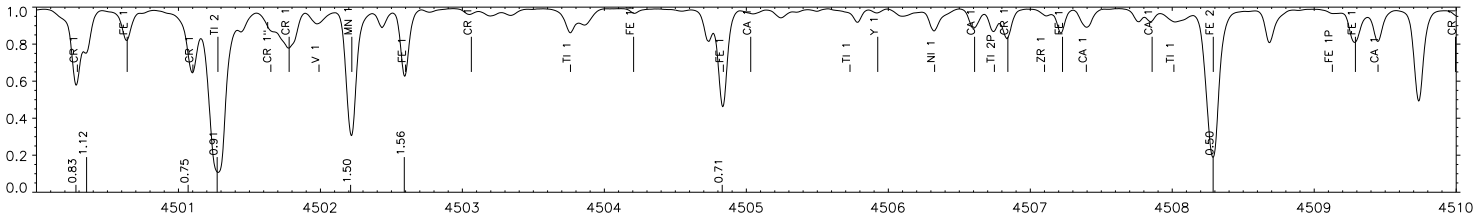
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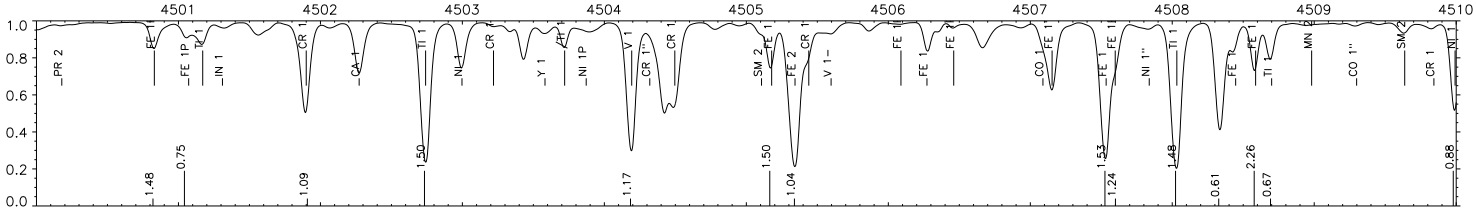
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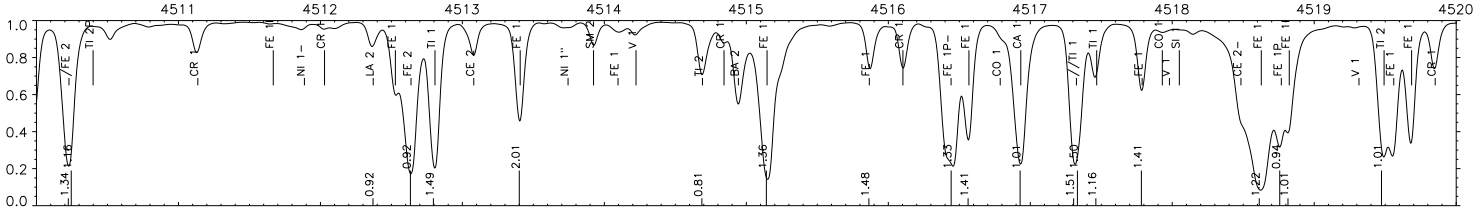
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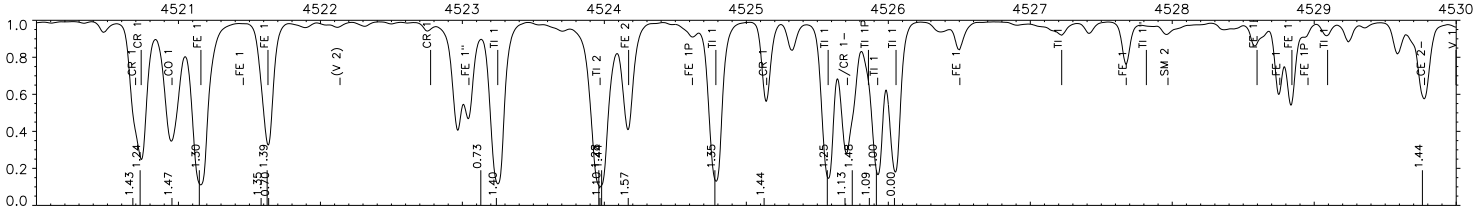
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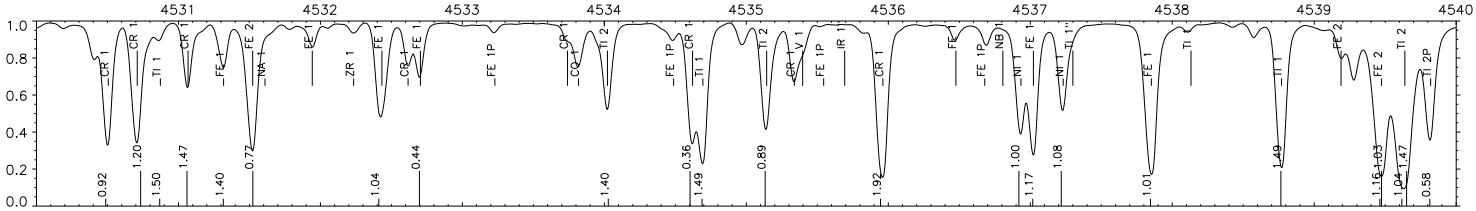
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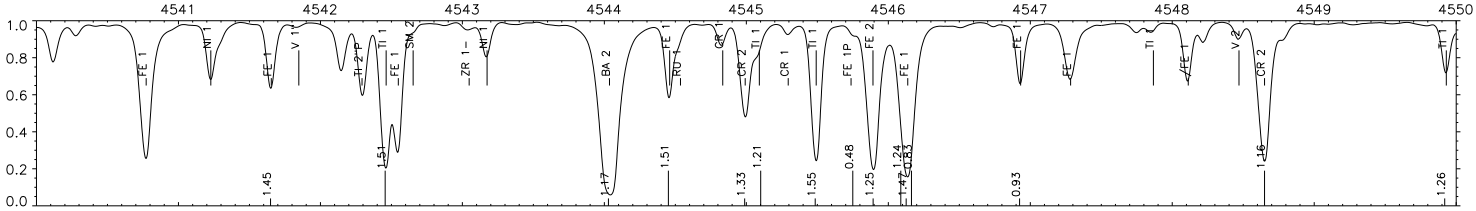
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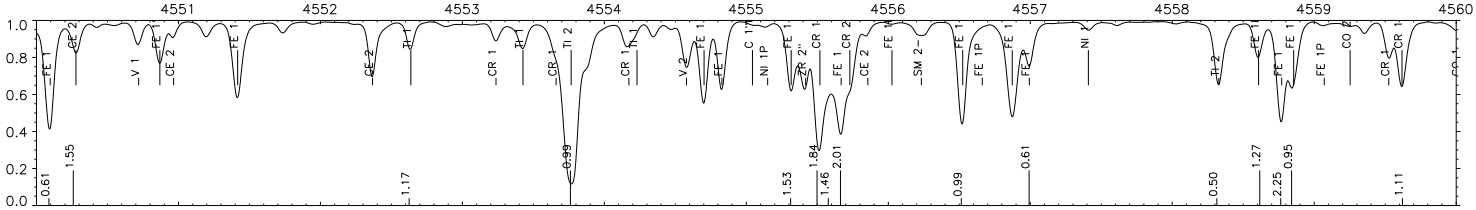
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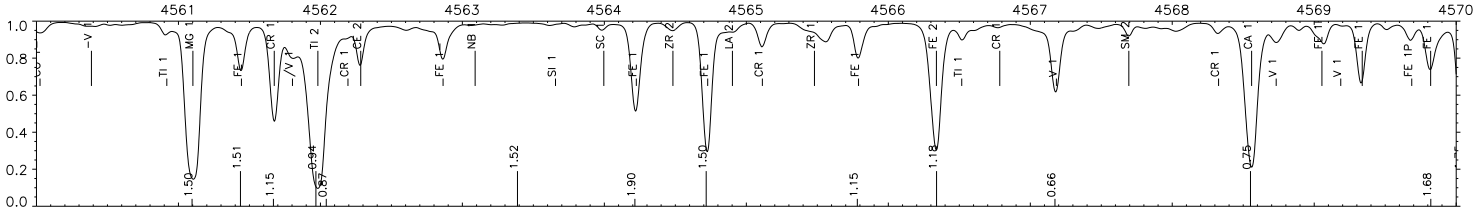
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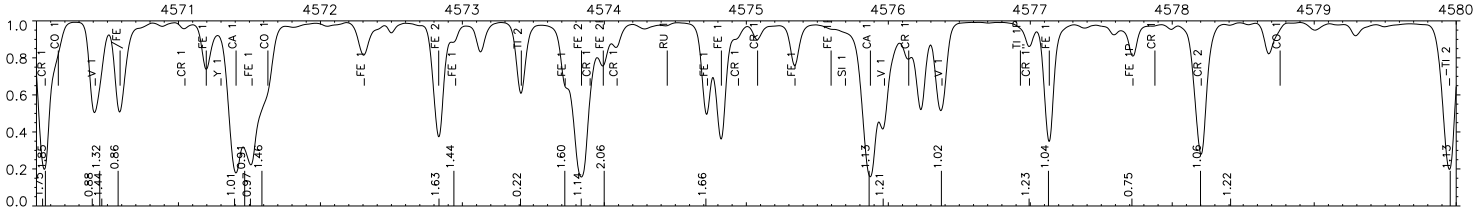
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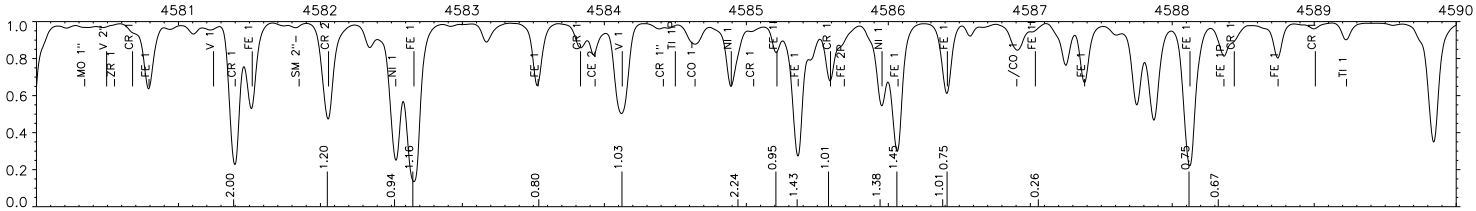
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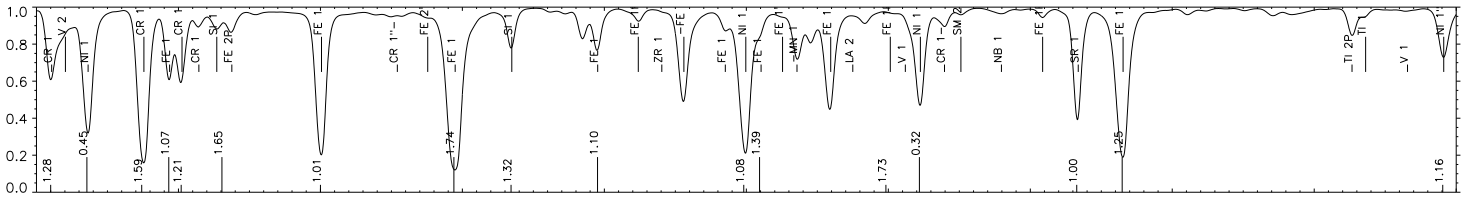
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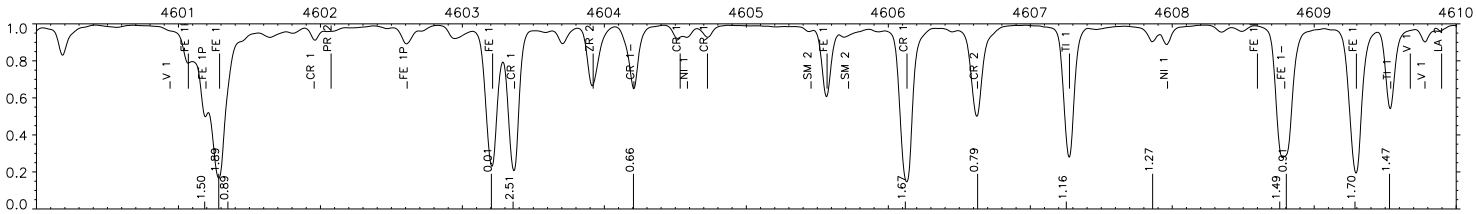
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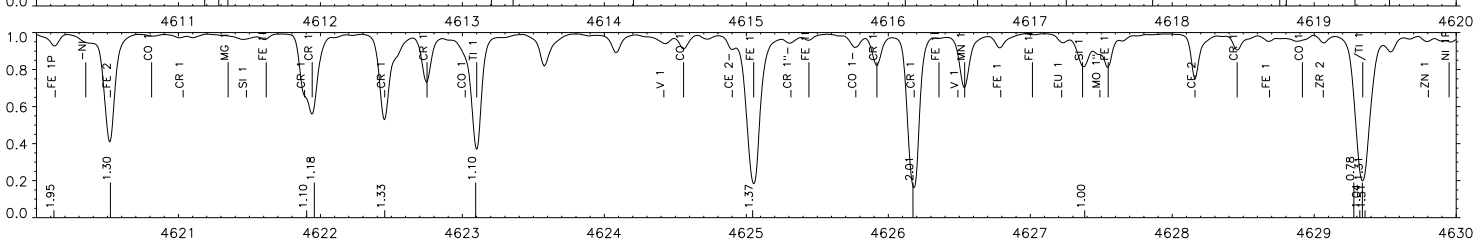
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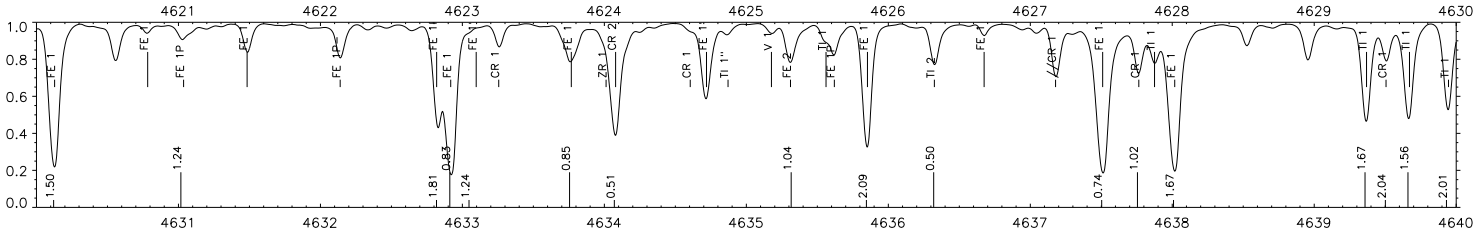
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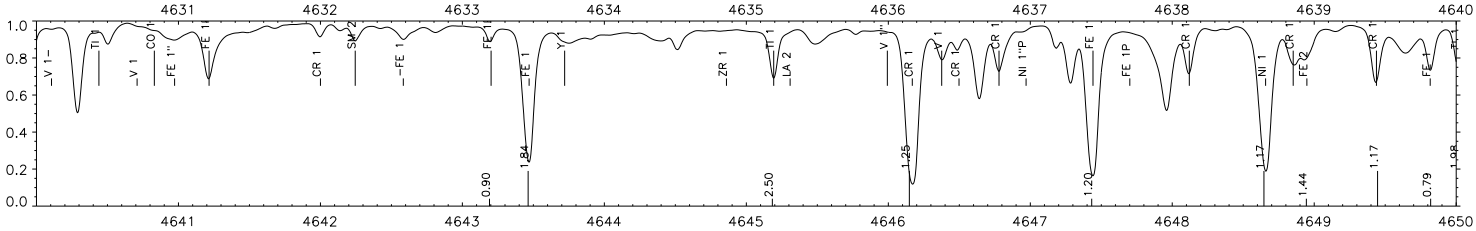
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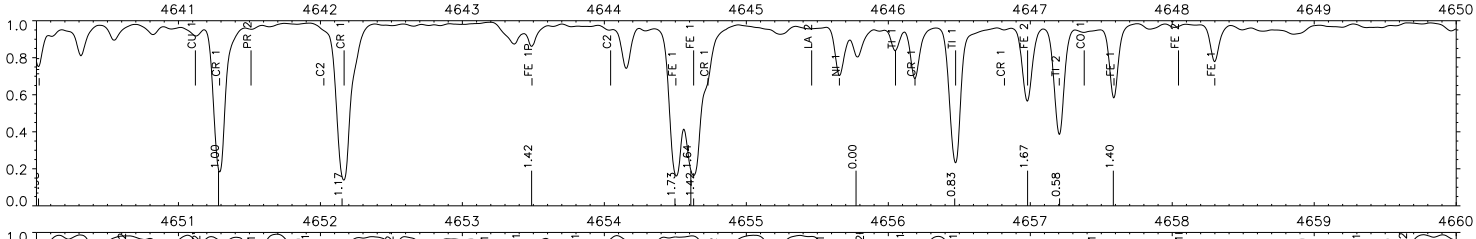
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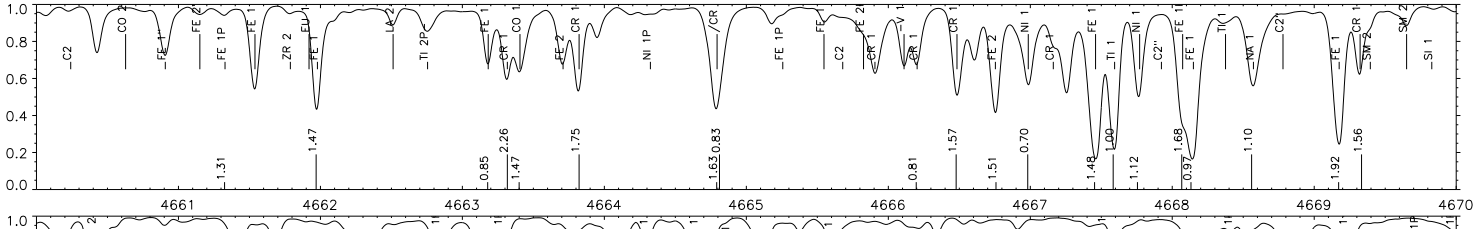
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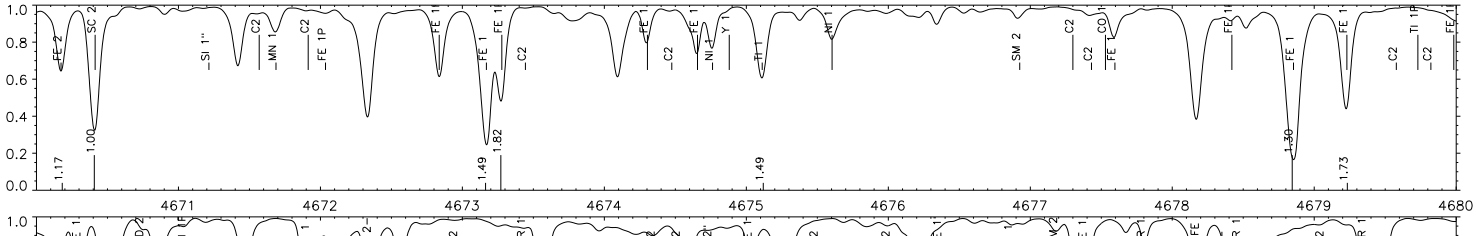
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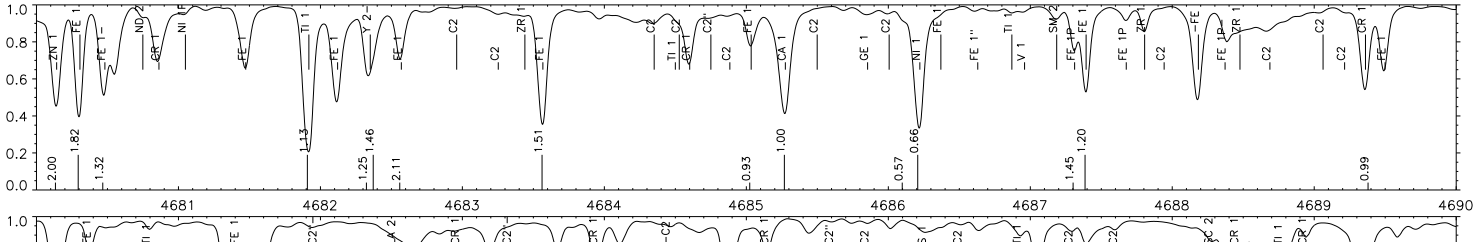
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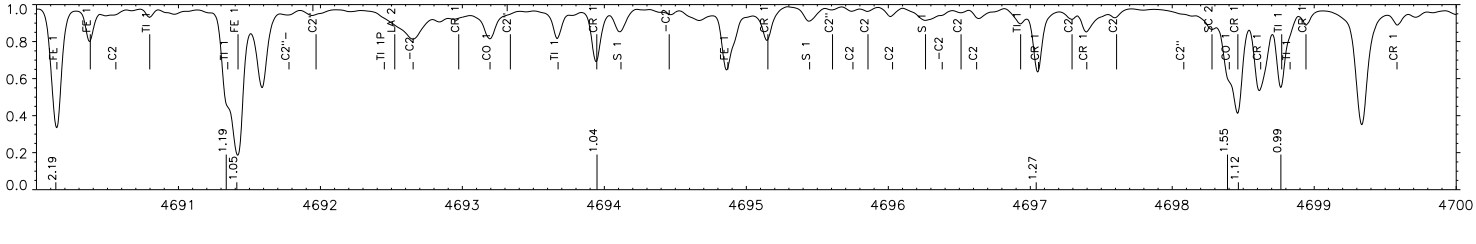
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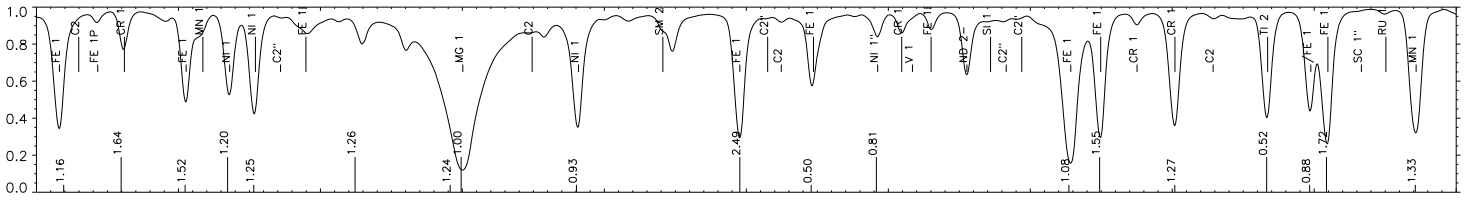
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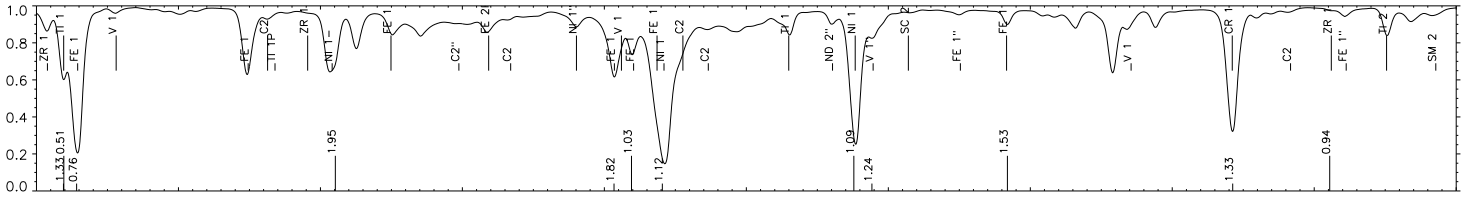
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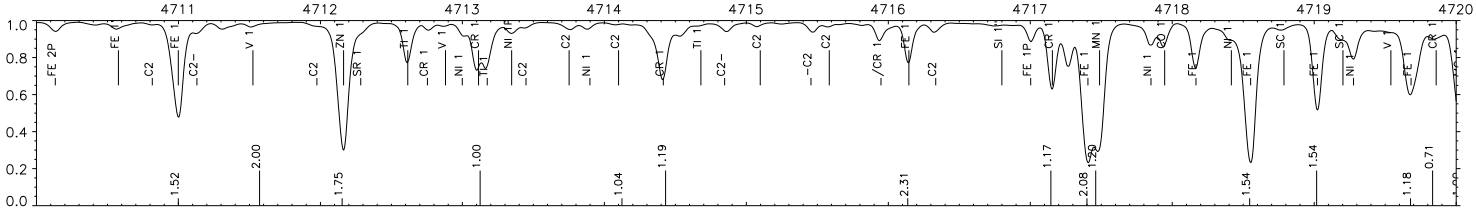
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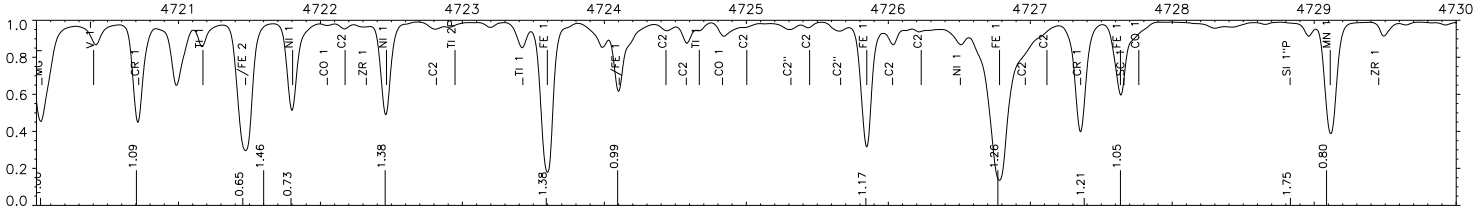
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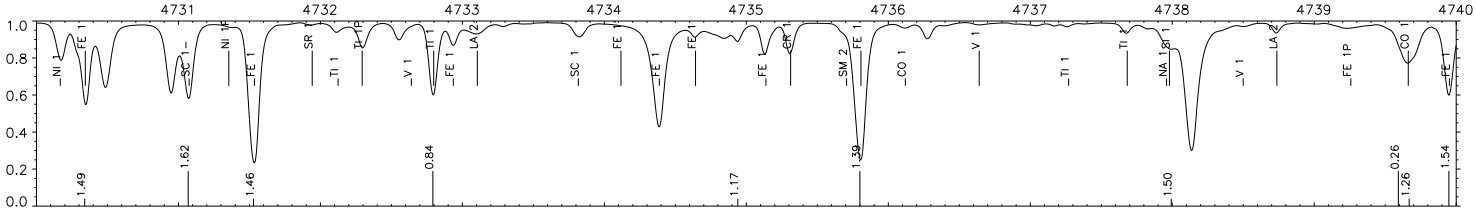
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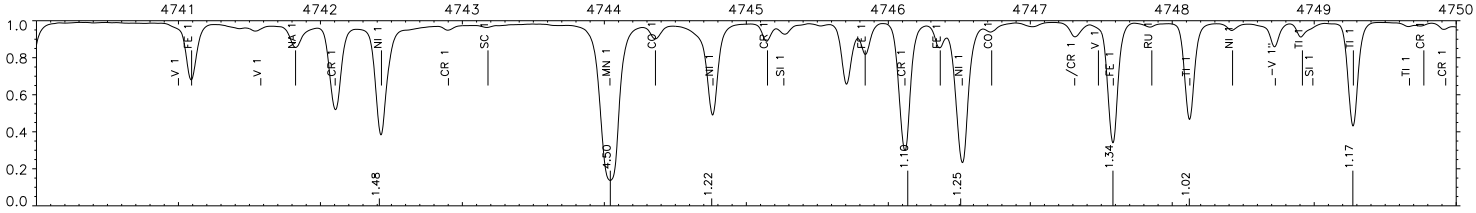
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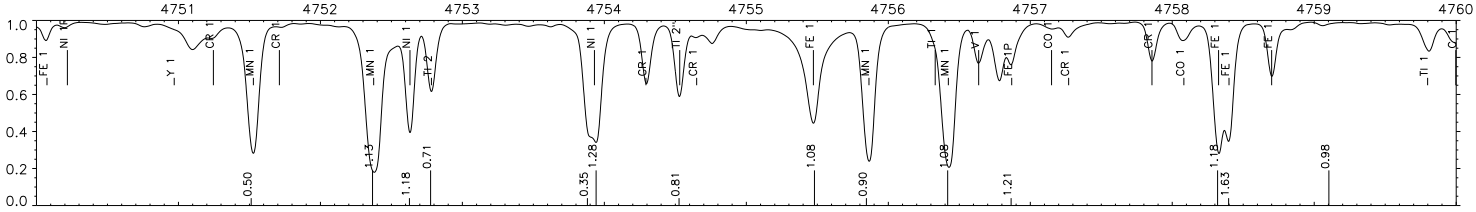
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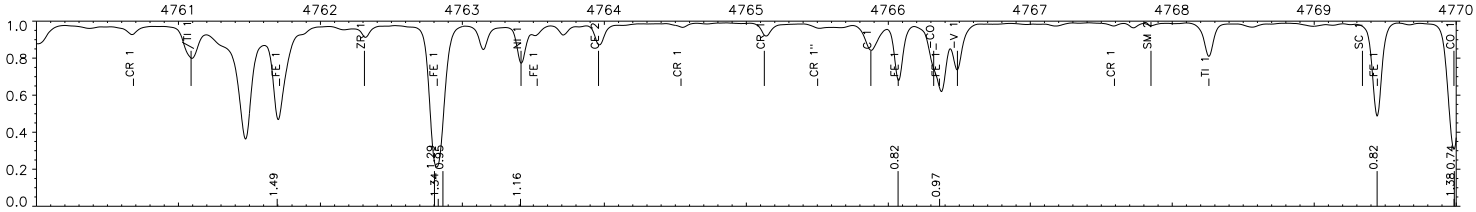
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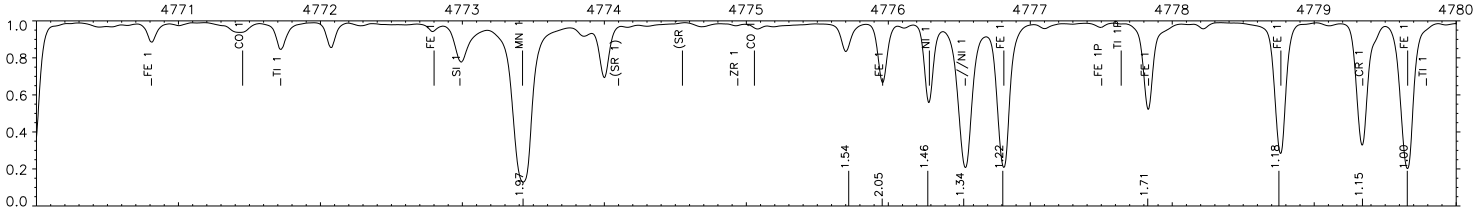
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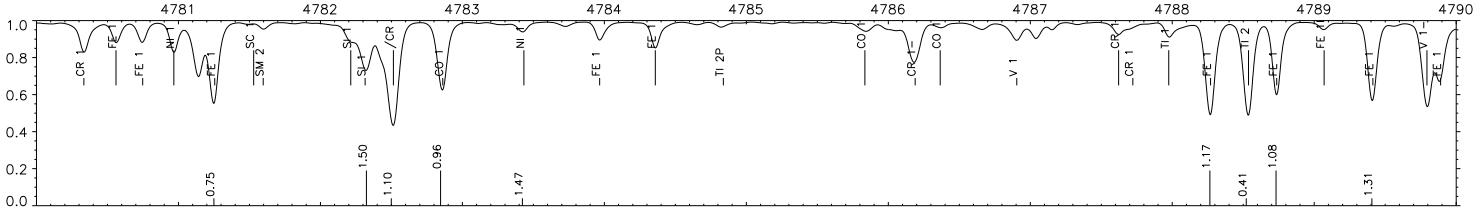
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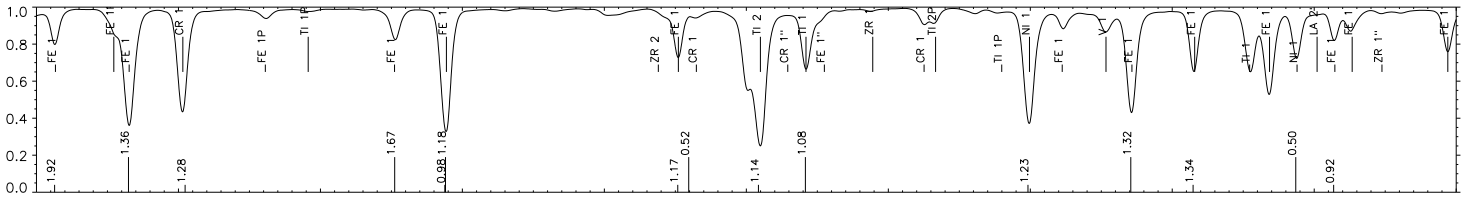
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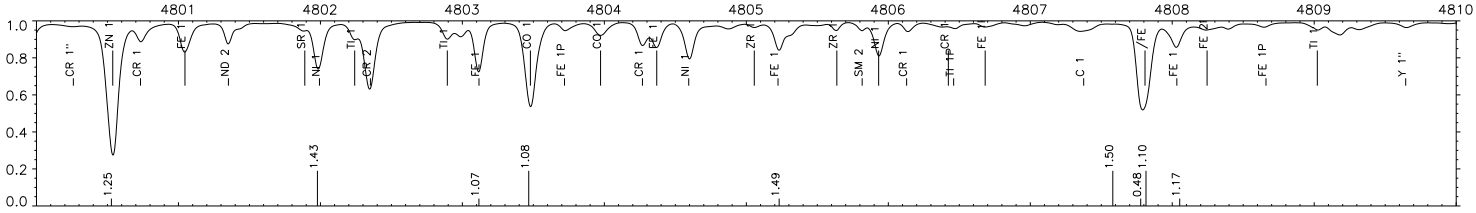
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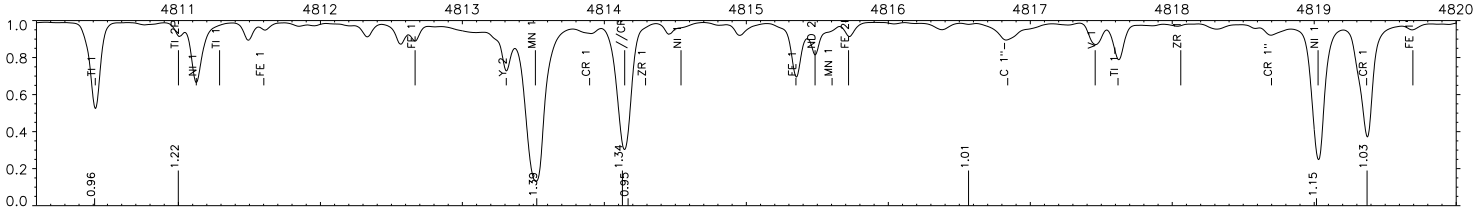
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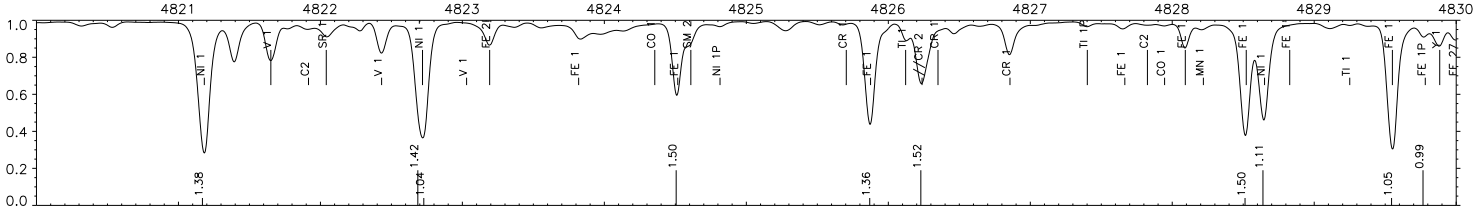
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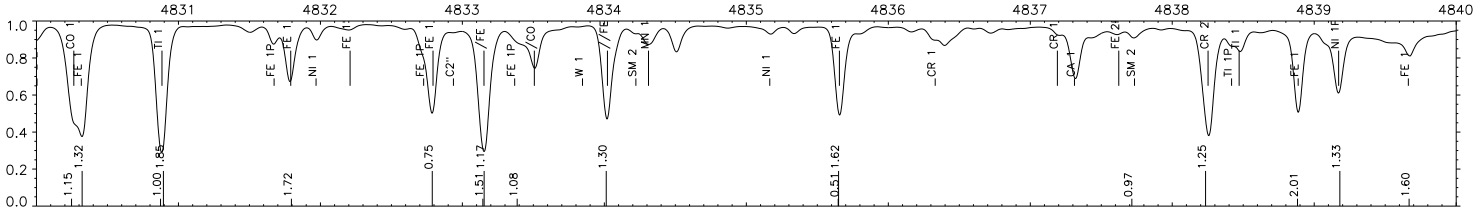
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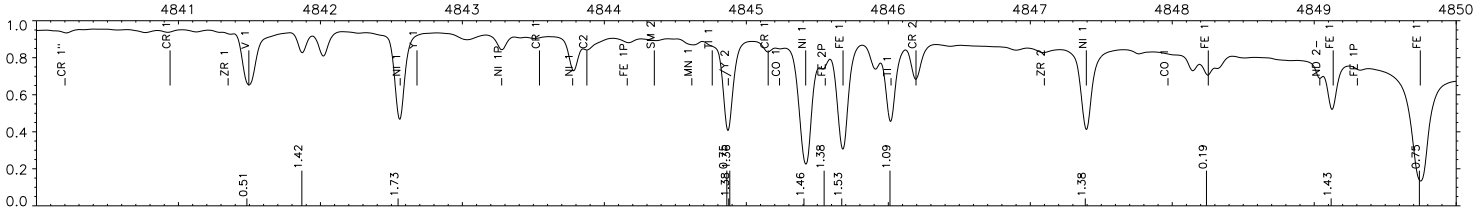
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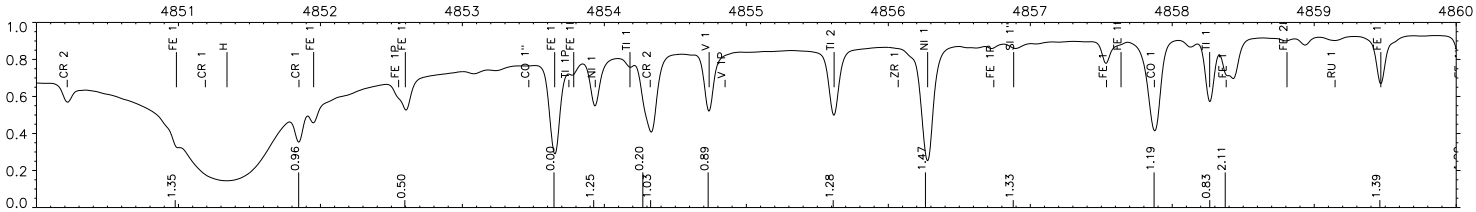
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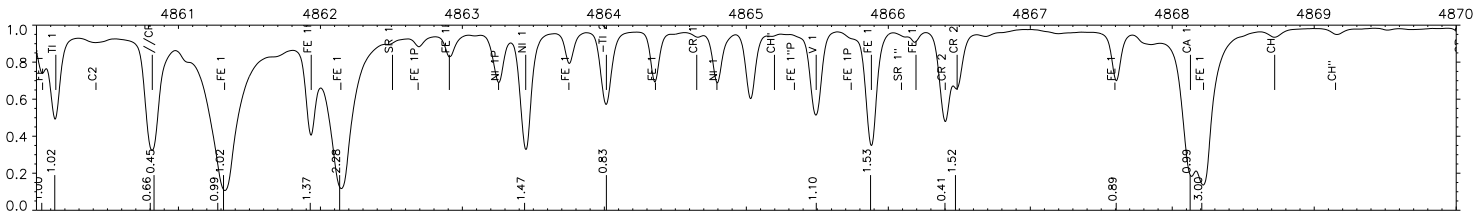
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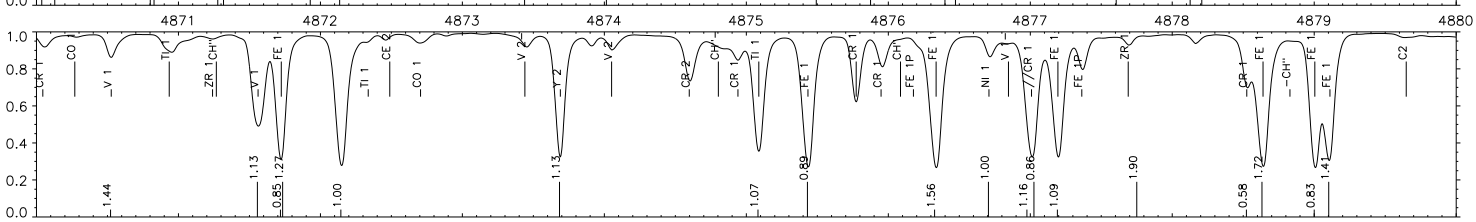
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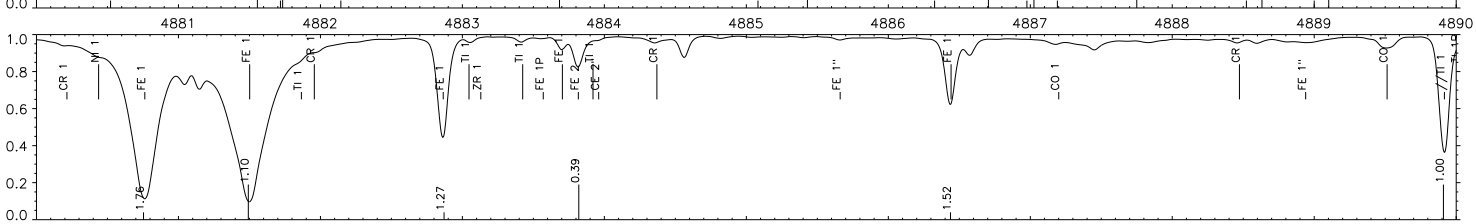
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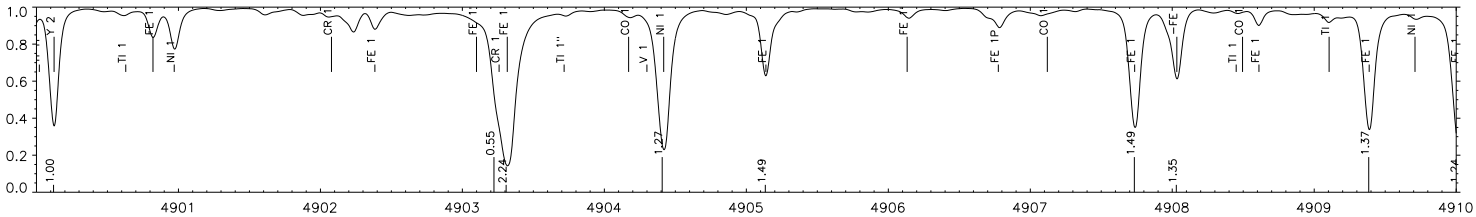
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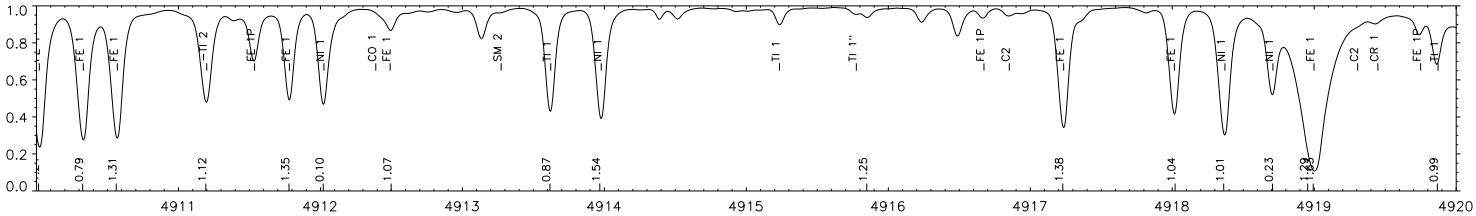
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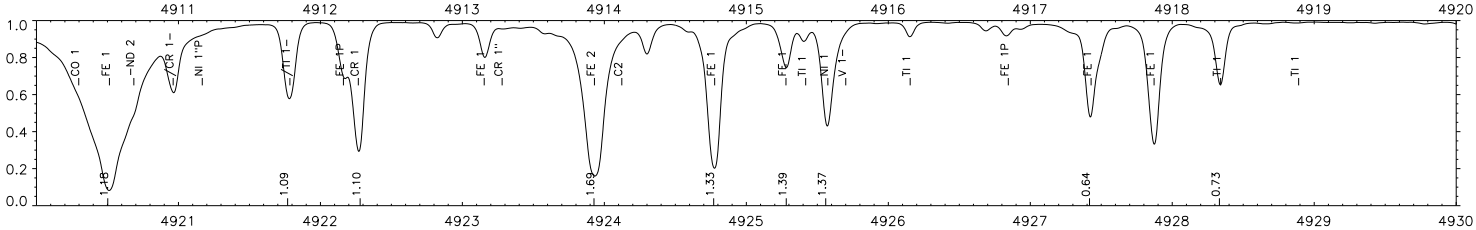
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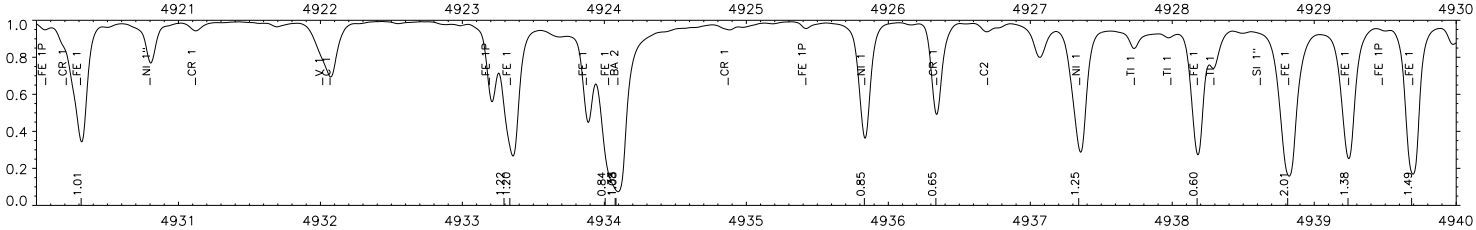
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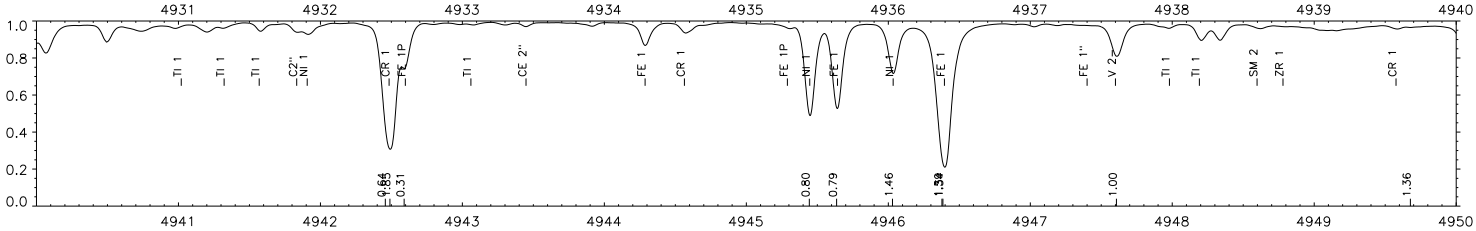
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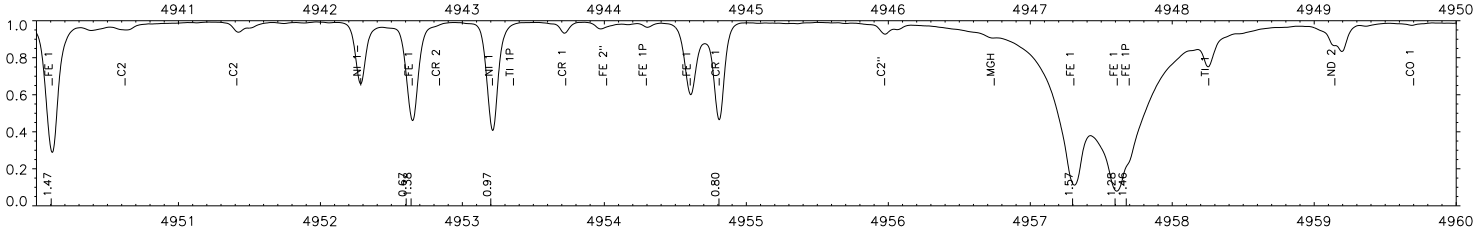
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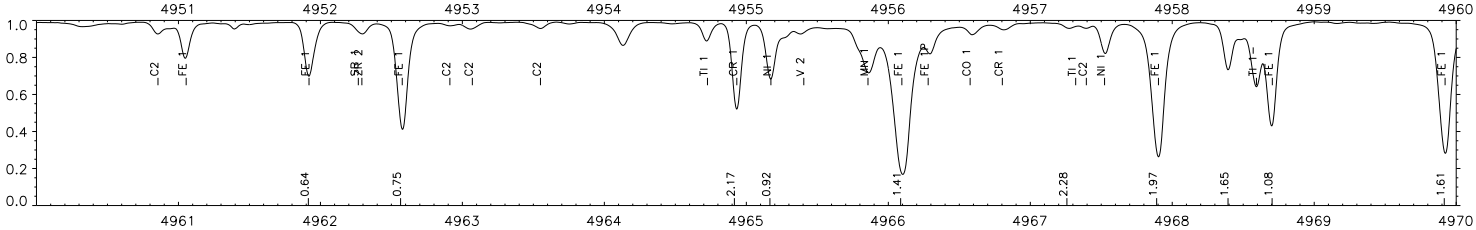
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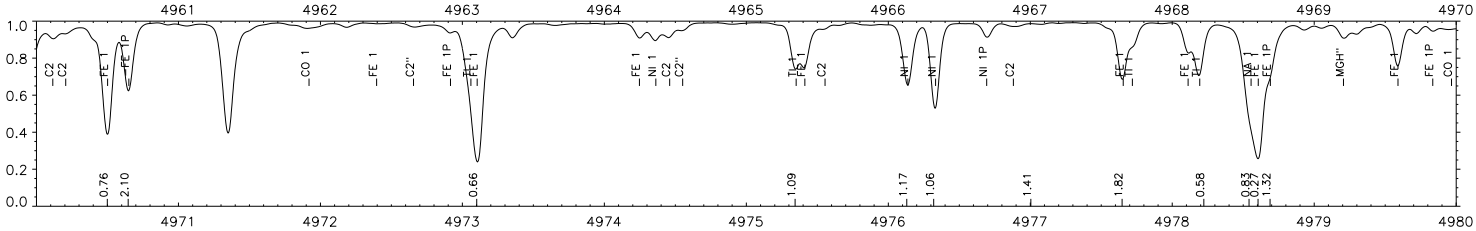
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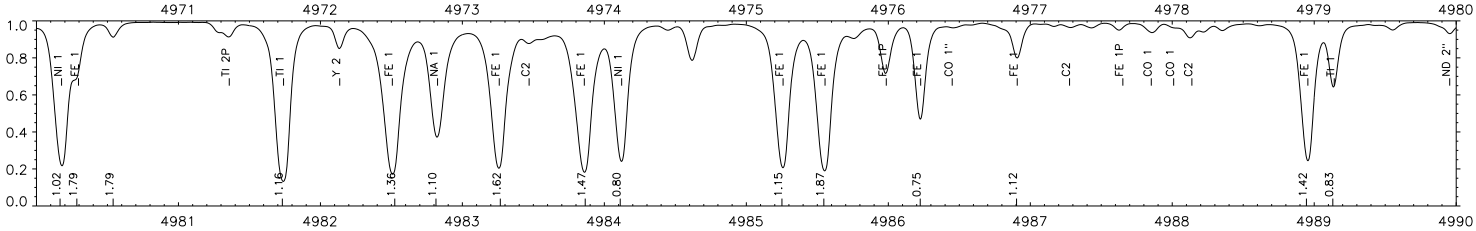
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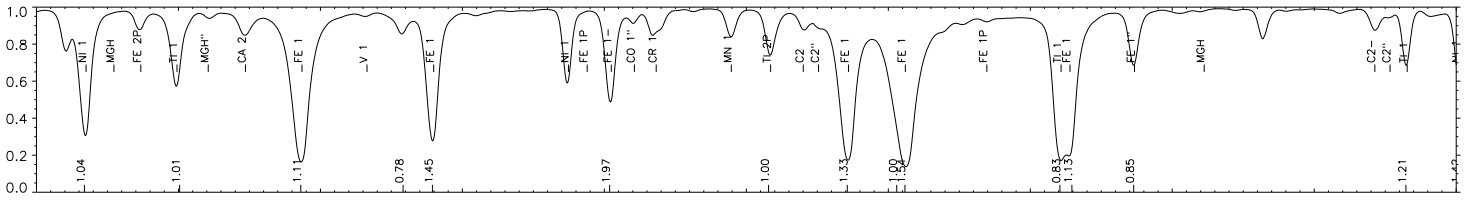
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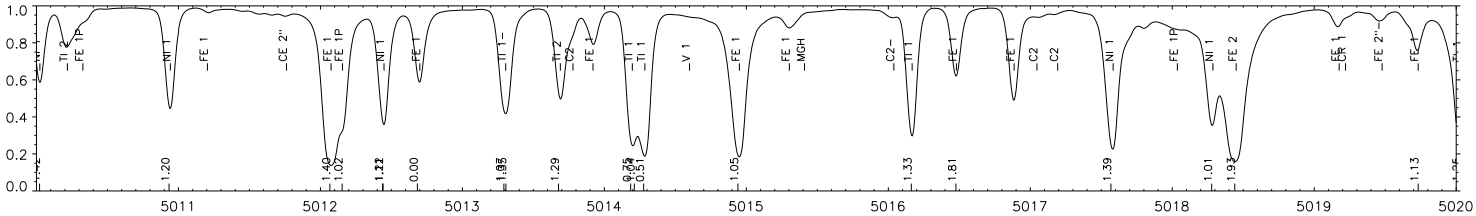
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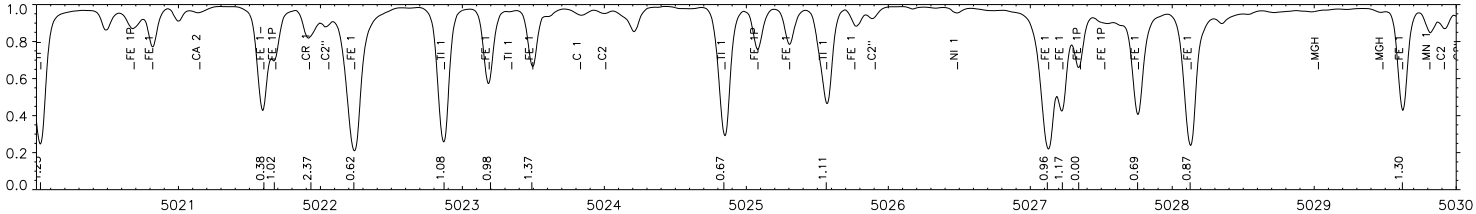
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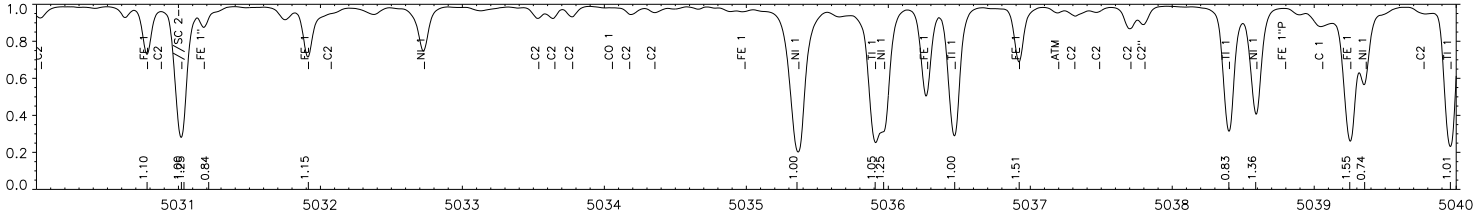
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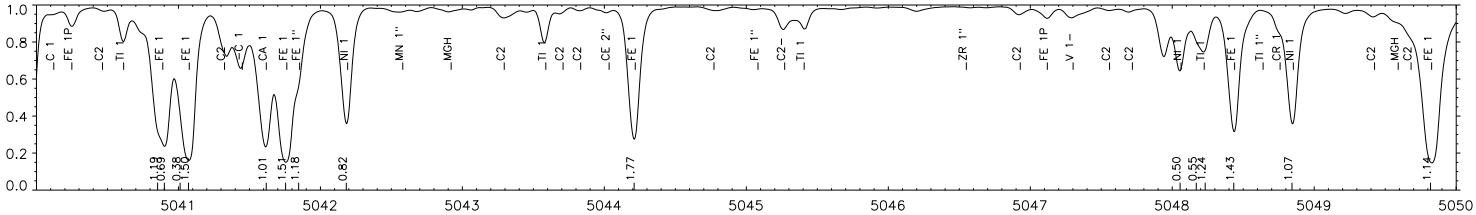
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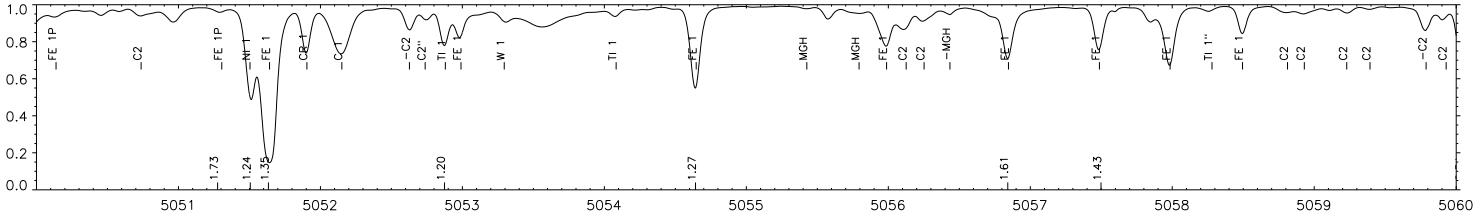
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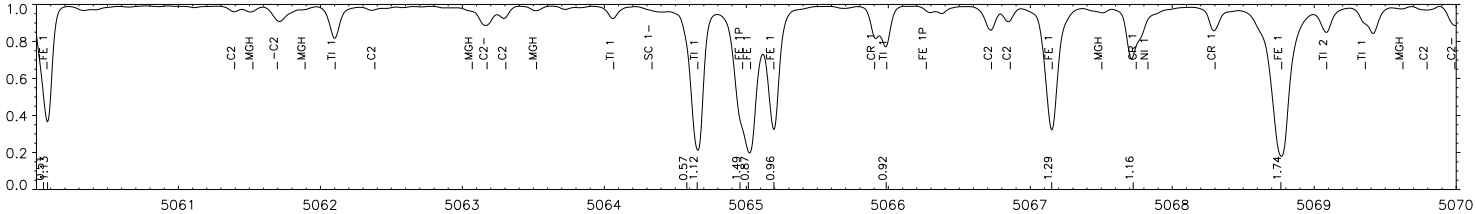
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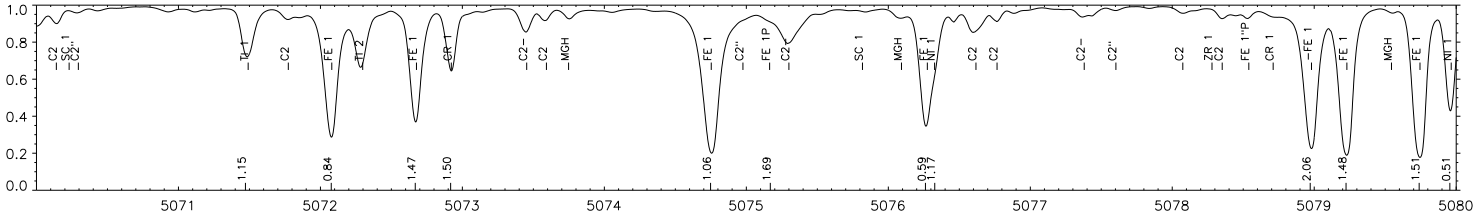
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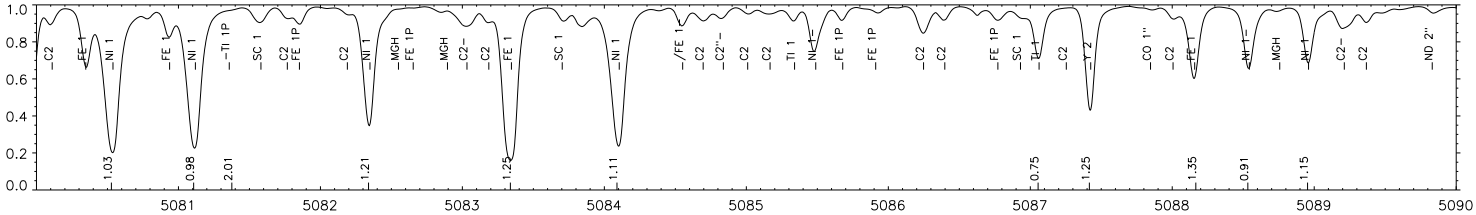
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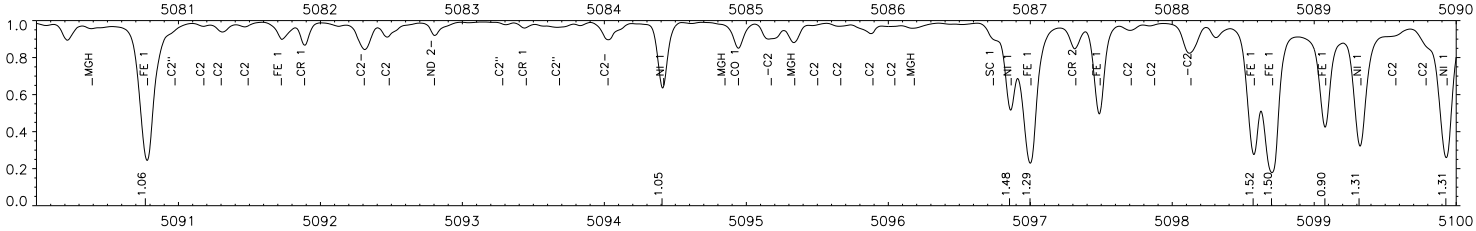
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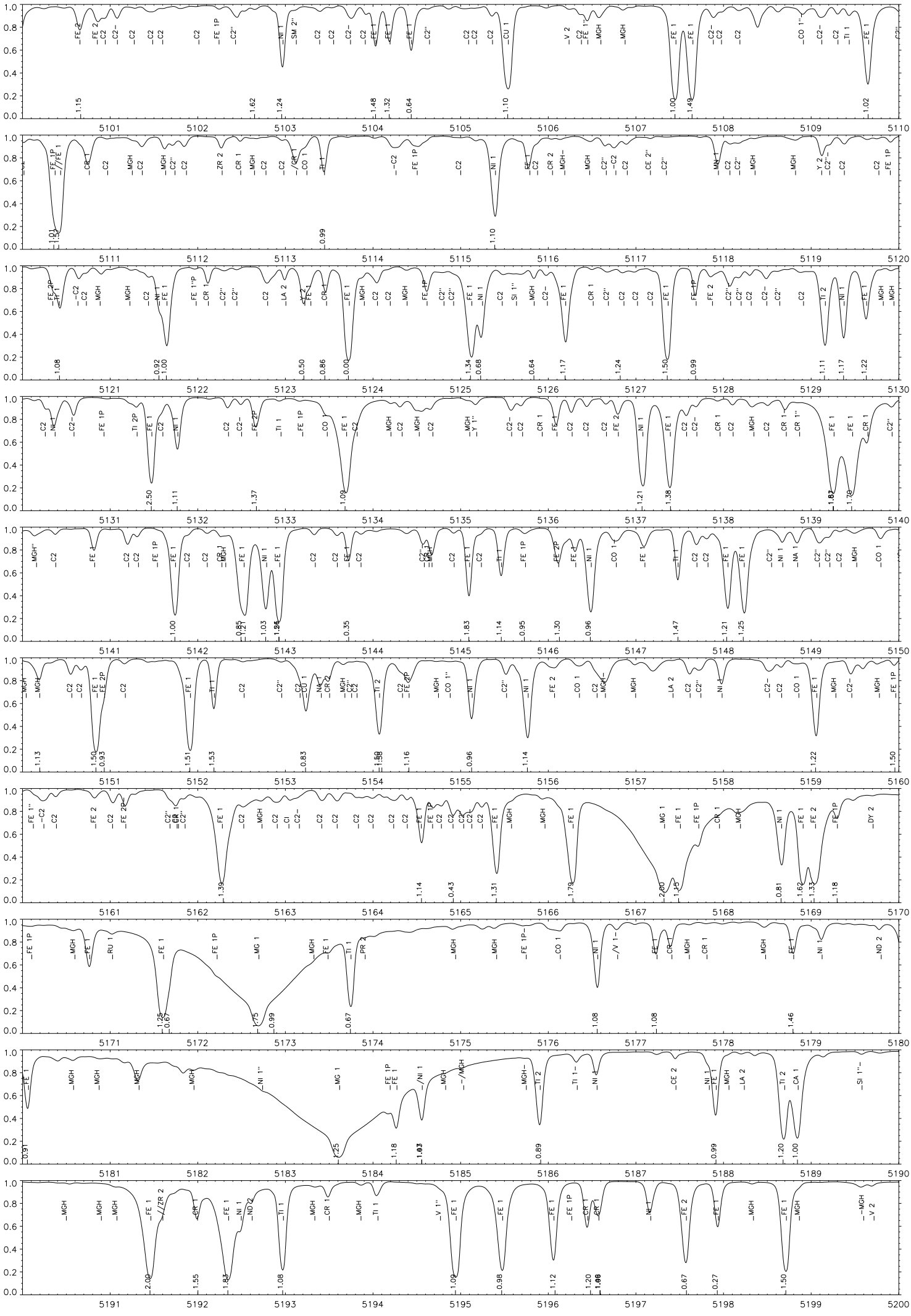

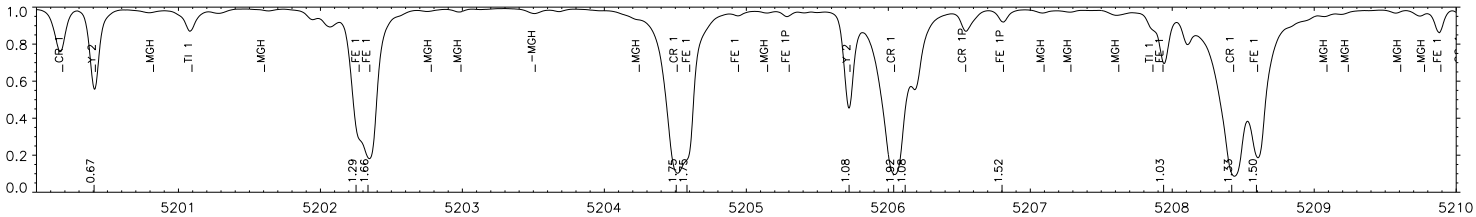
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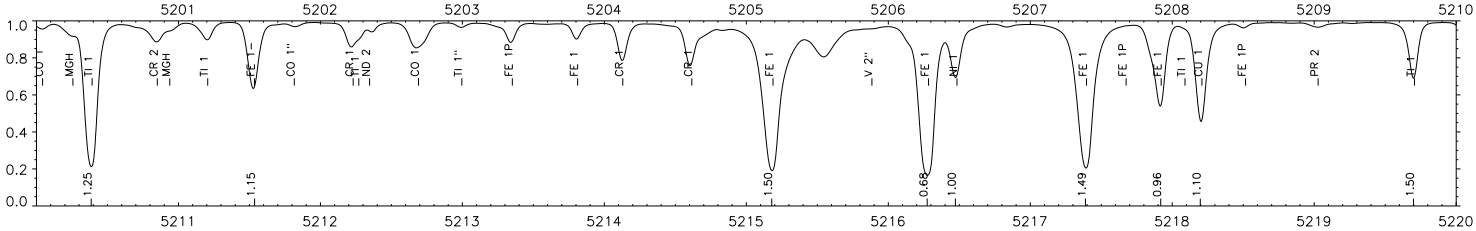
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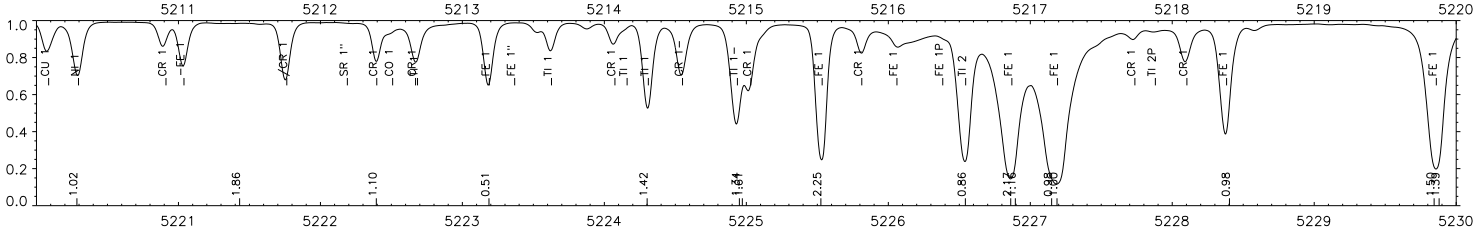
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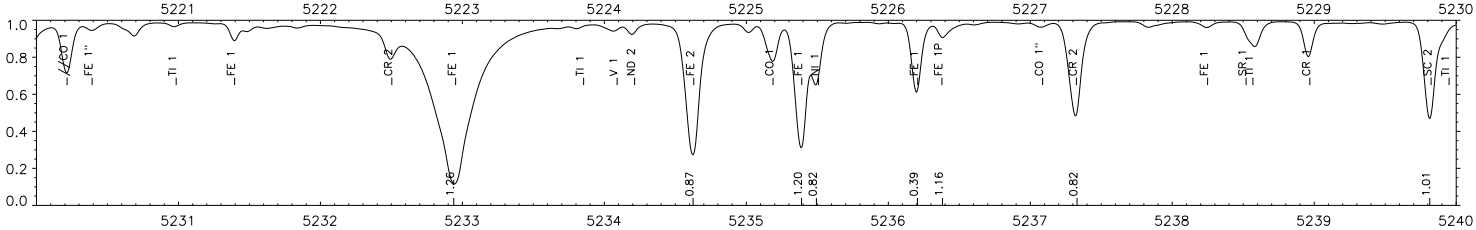
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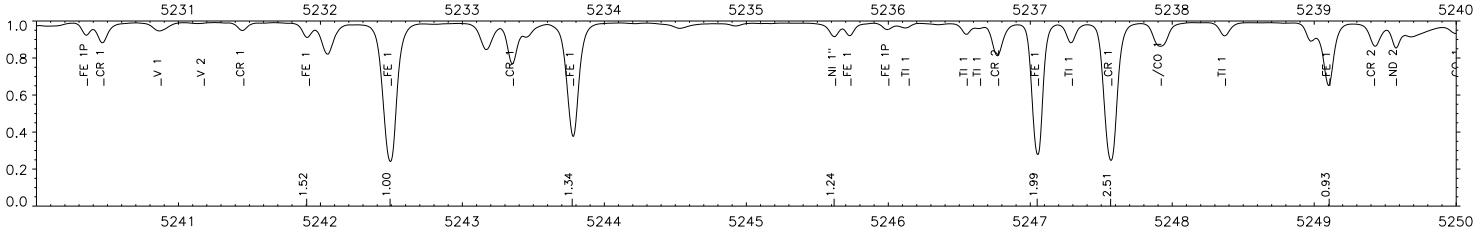
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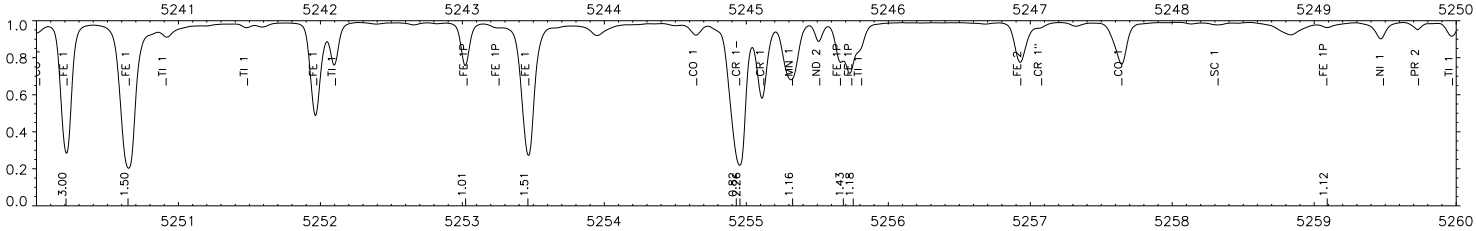
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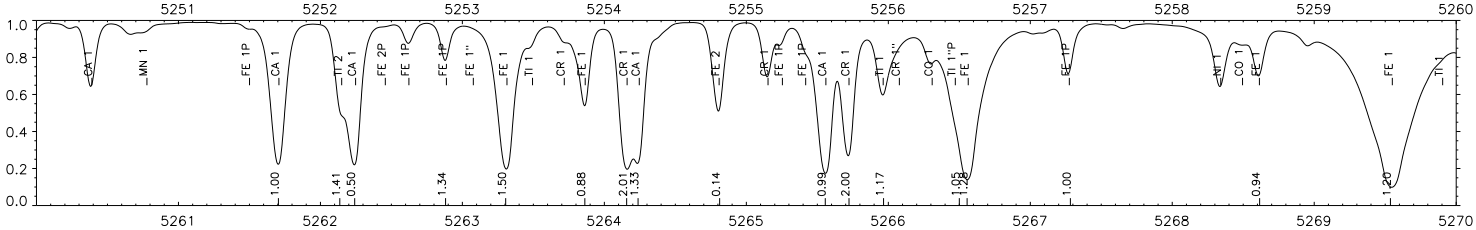
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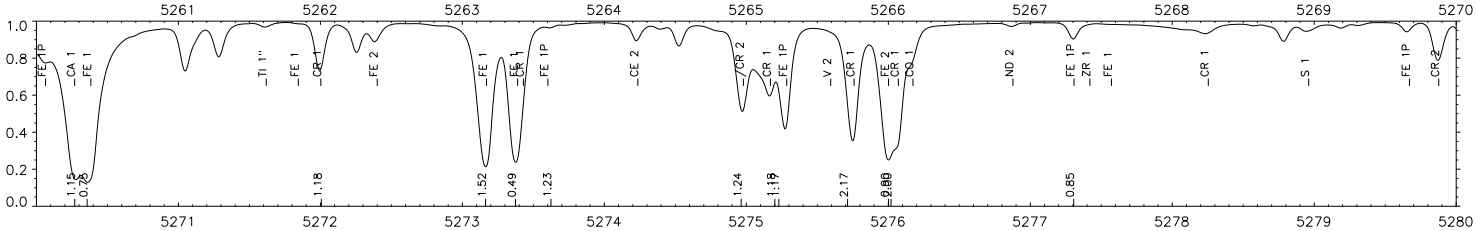
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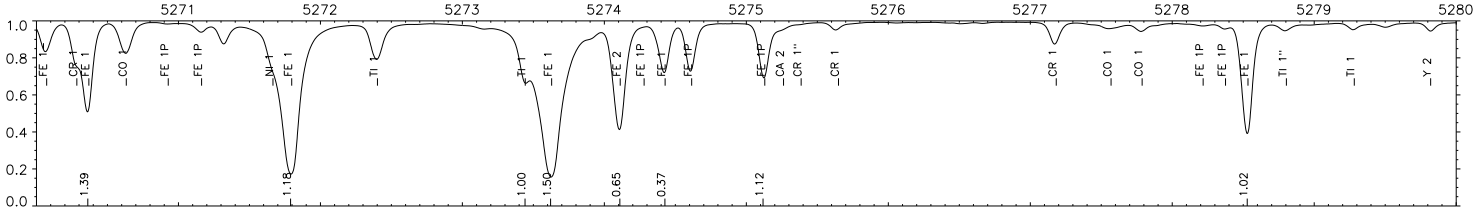
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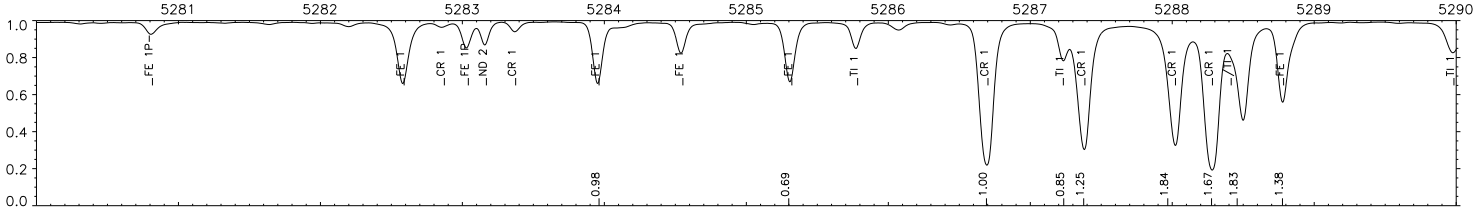
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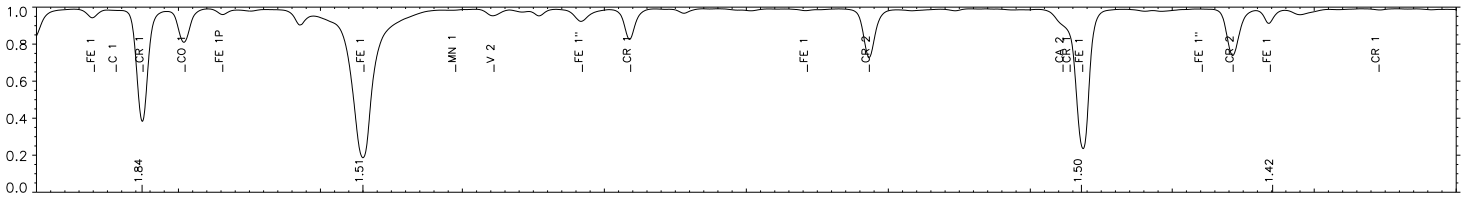
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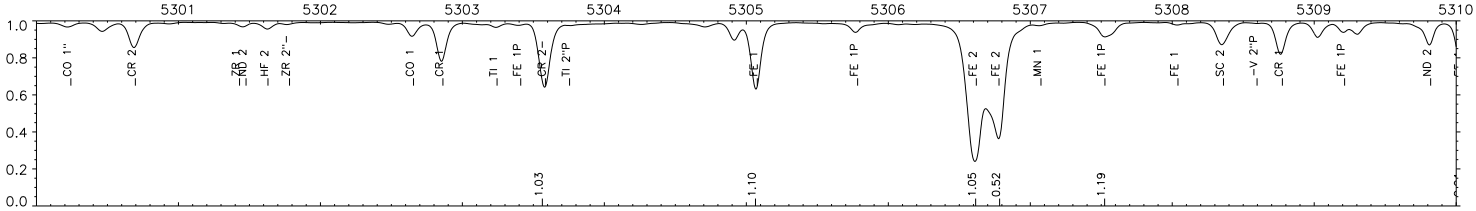
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_FE 2
_FE 2
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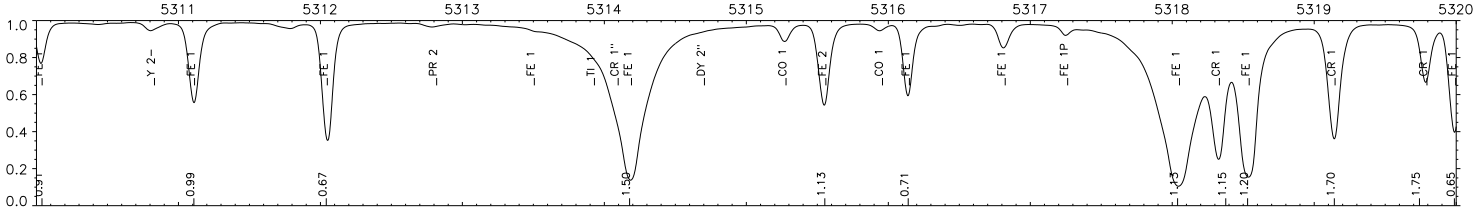
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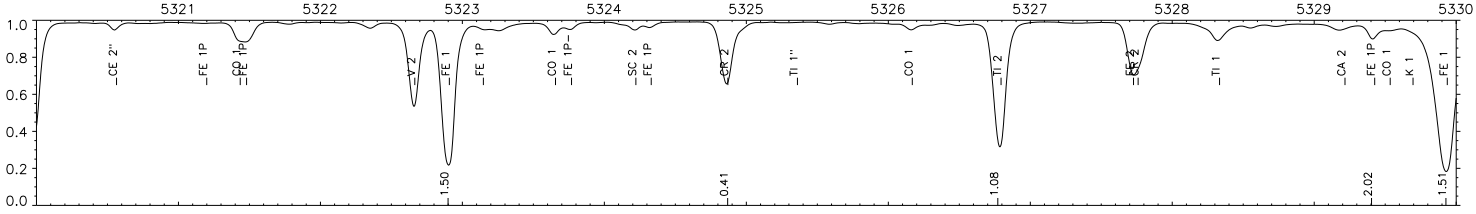
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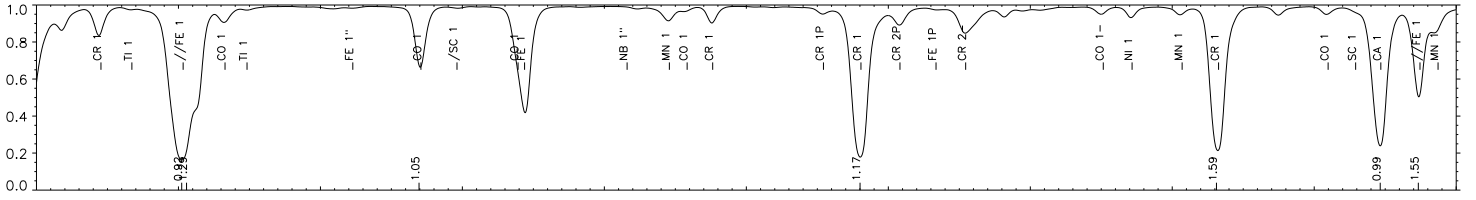
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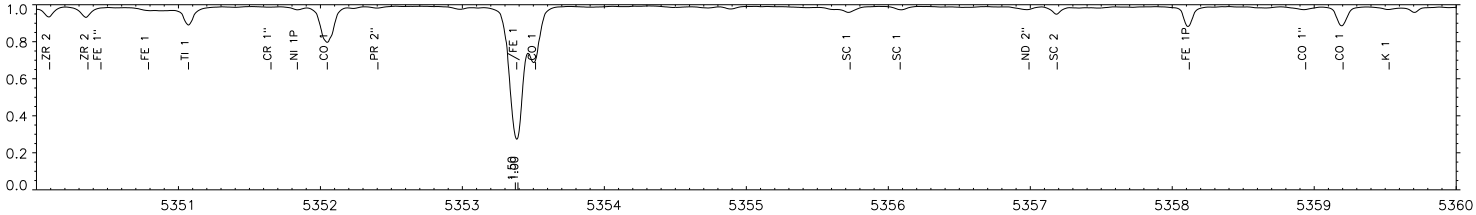
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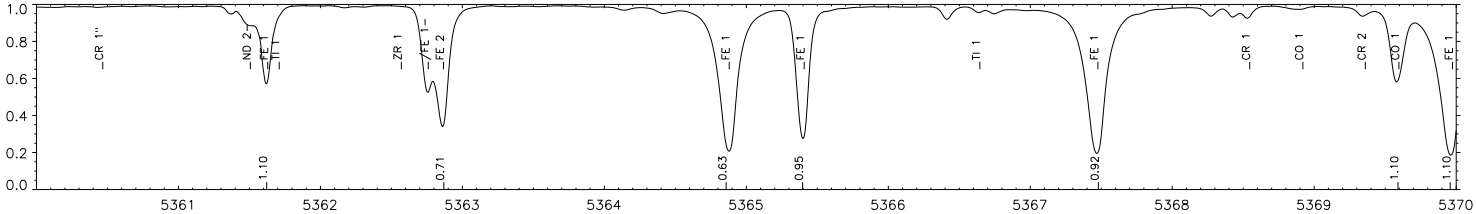
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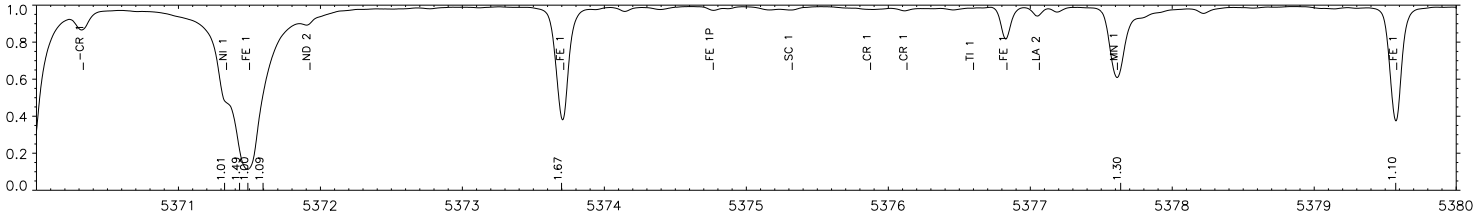
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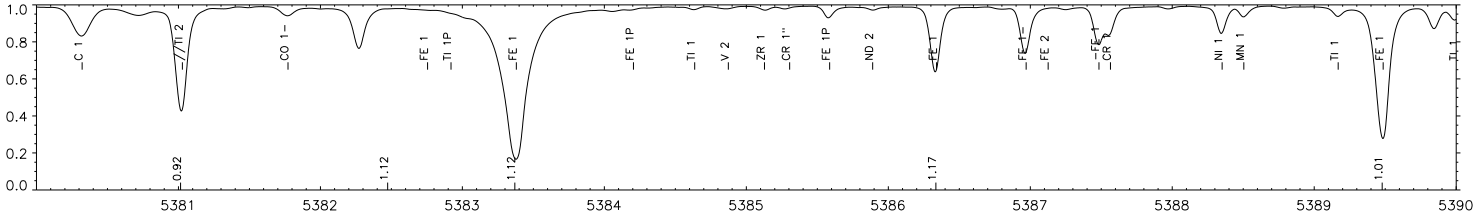
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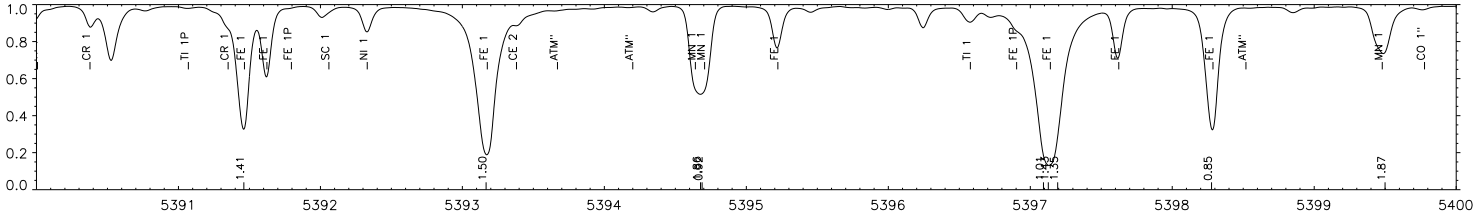
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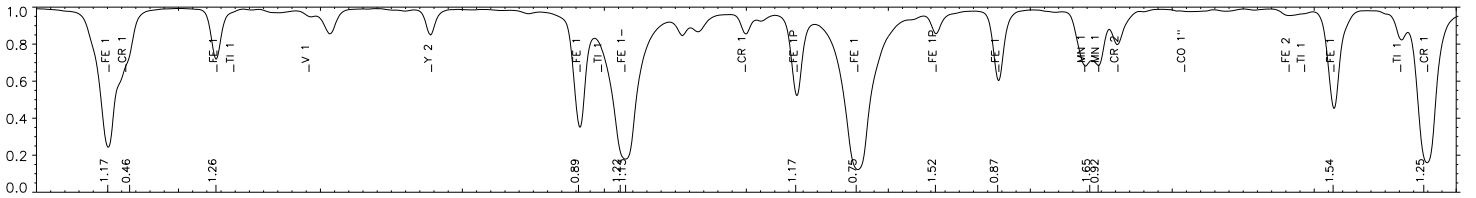
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V 1
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TI 1
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FE 1
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MN 1
MN 1
CR 2
CO 1''
FE 2
TI 1
FE 1
TI 1
CR 1
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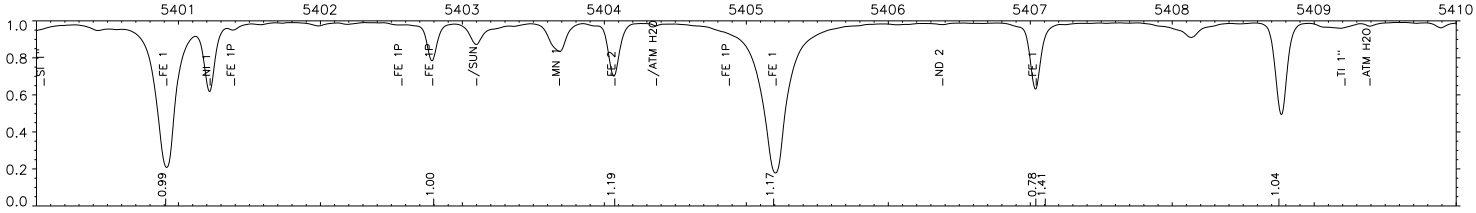
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/ATM H2O
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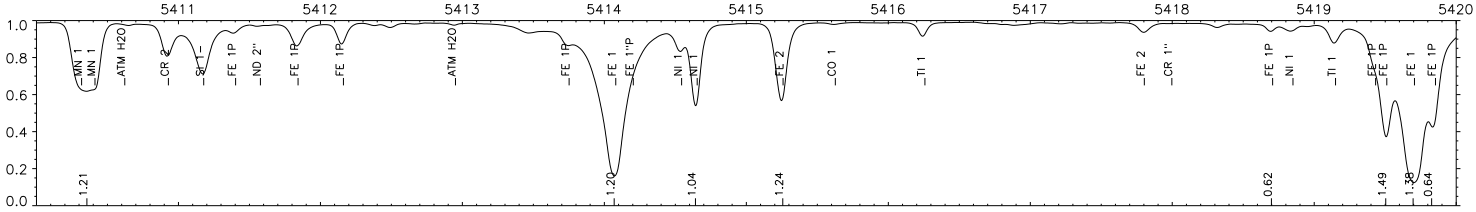
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FE 1P
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ATM H2O
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FE 2
CR 1''
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TI 1
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FE 1P
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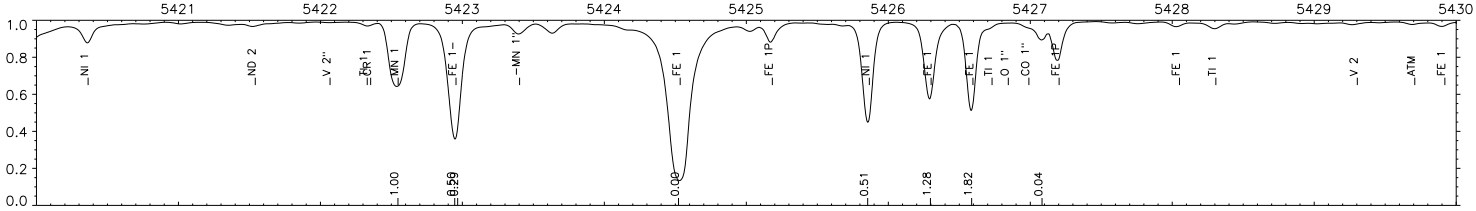
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CO 1''
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FE 1
TI 1
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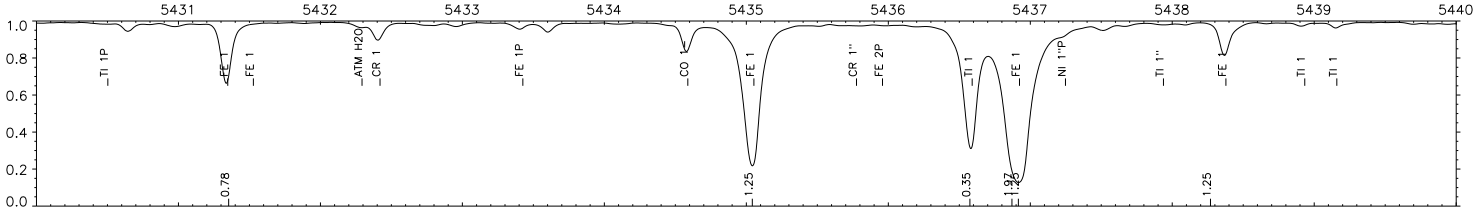
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TI 1
FE 1
NI 1''P
TI 1''
FE
TI 1
TI 1
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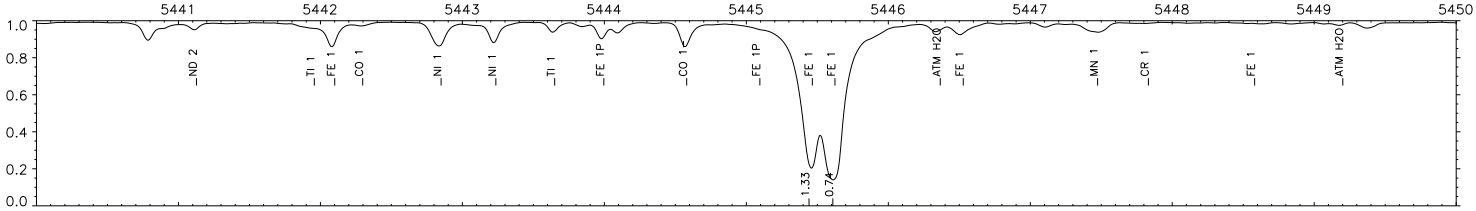
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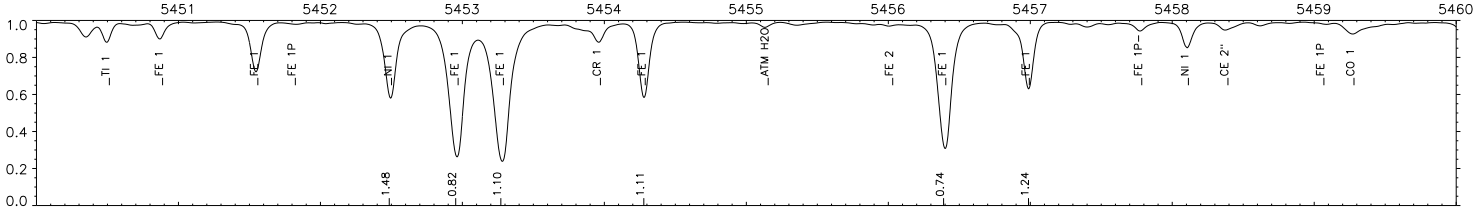
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FE 1
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FE 1P-
NI 1
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FE 1P
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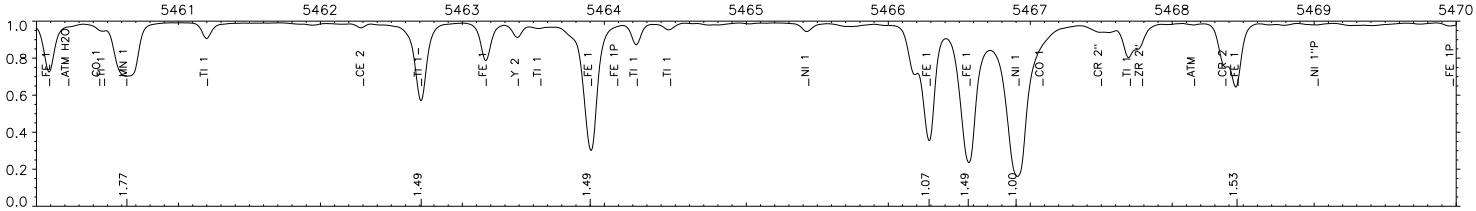
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CO 1
MN 1
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FE 1
Y 2
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FE 1
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TI 1
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NI 1
FE 1
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NI 1
CO 1
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TI 1
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ATM
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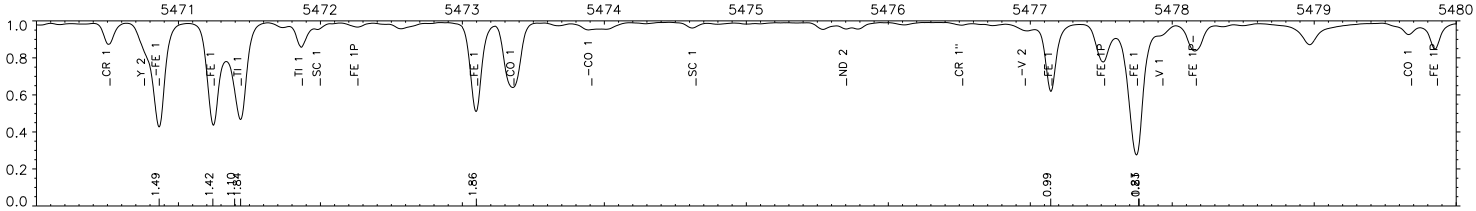
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FE 1
FE 1
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TI 1
SC 1
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FE 1
CO 1
CO 1
SC 1
ND 2
CR 1''
V 2
FE 1
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FE 1
V 1
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CO 1
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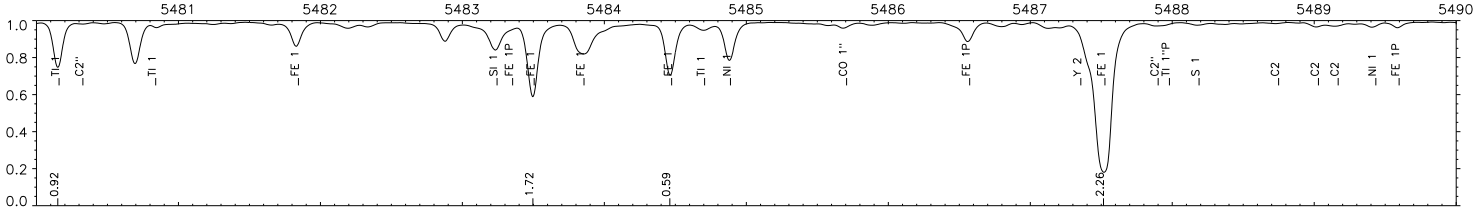
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FE 1
FE 1
FE 1
TI 1
NI 1
CO 1''
FE 1P
Y 2
FE 1
C2''
TI 1''P
S 1
C2
C2
C2
NI 1
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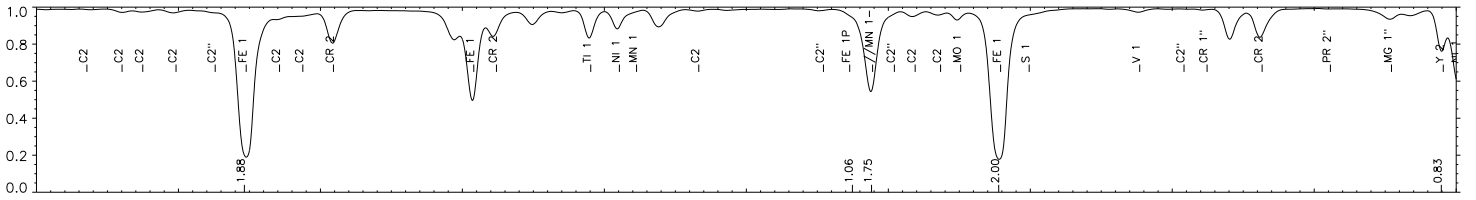
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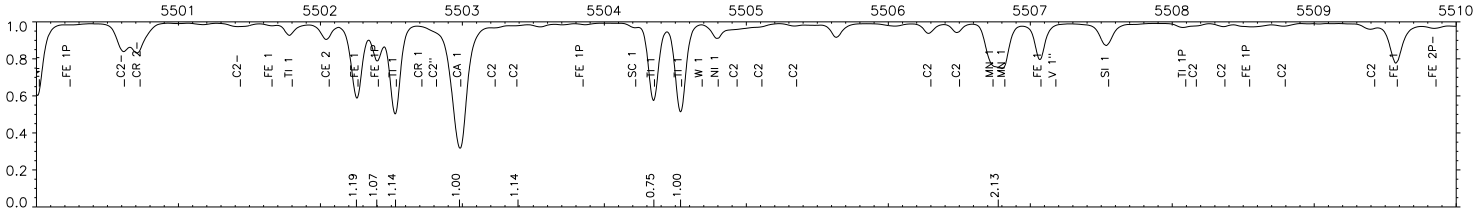
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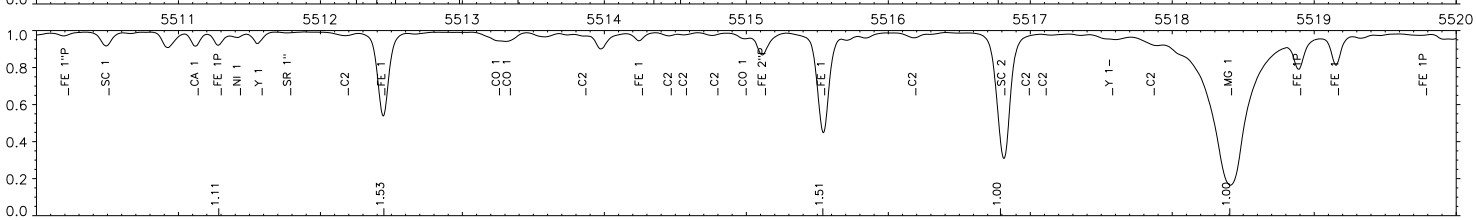
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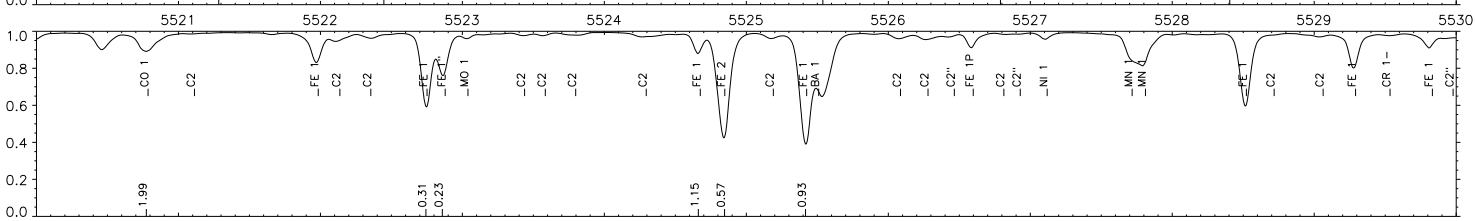
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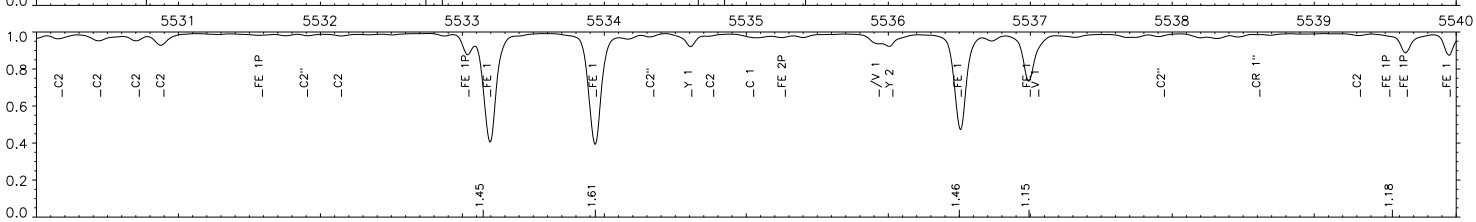
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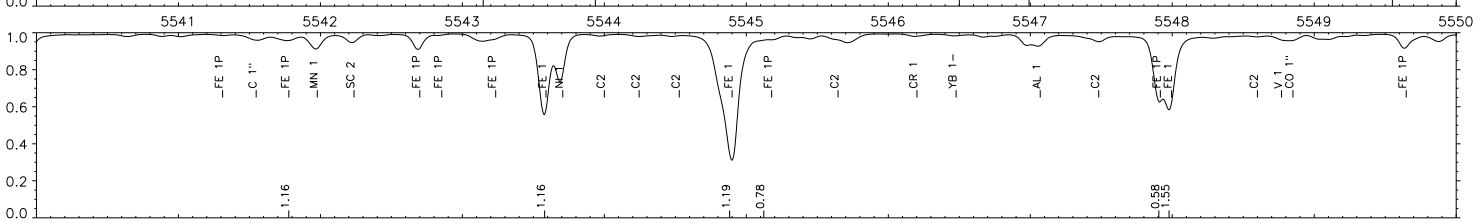
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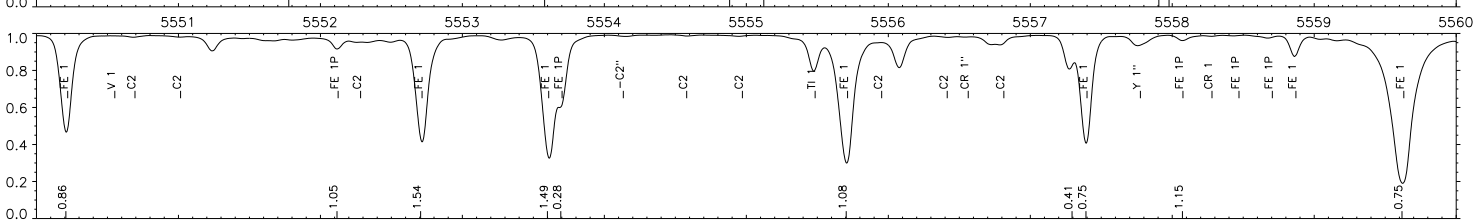
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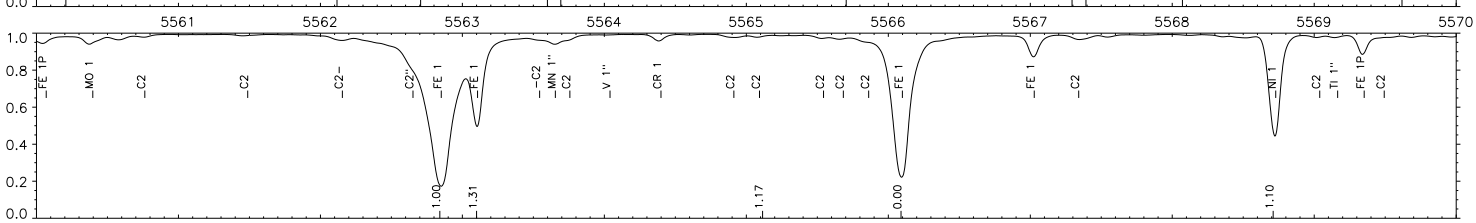
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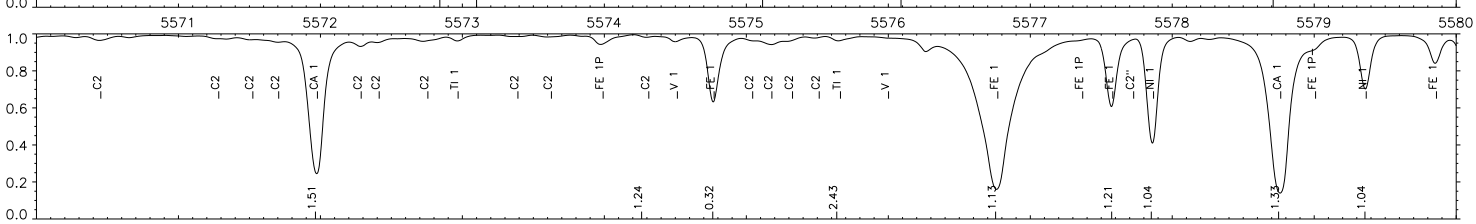
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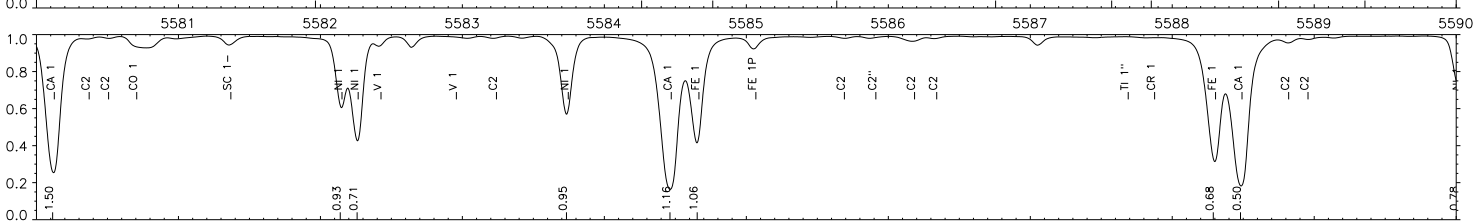
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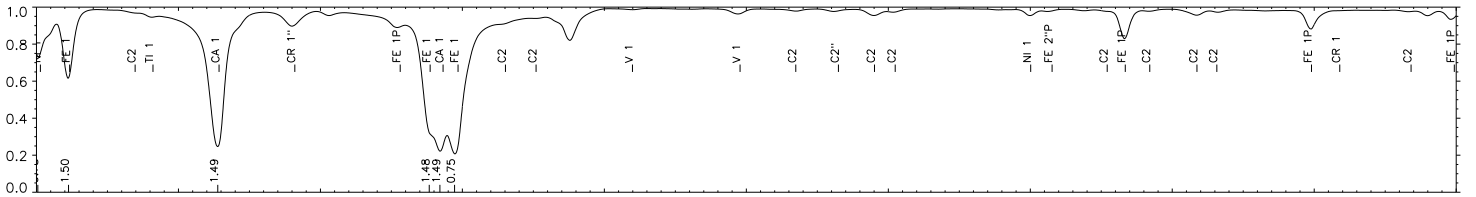
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CA 1
FE 1
C2
C2
V 1
V 1
C2
C2''
C2
C2
NI 1
FE 2''P
C2
FE 1P
C2
C2
C2
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CR 1
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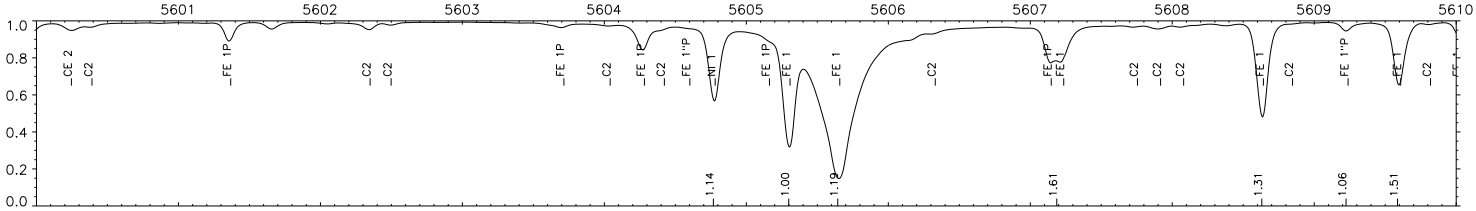
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FE 1P
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FE 1
C2
FE 1''P
FE 1
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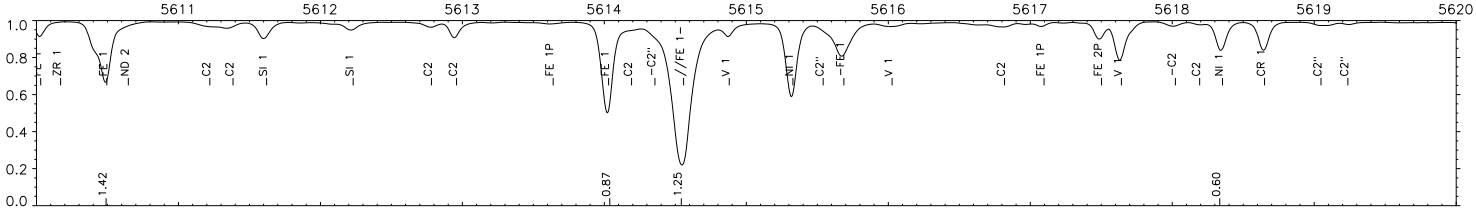
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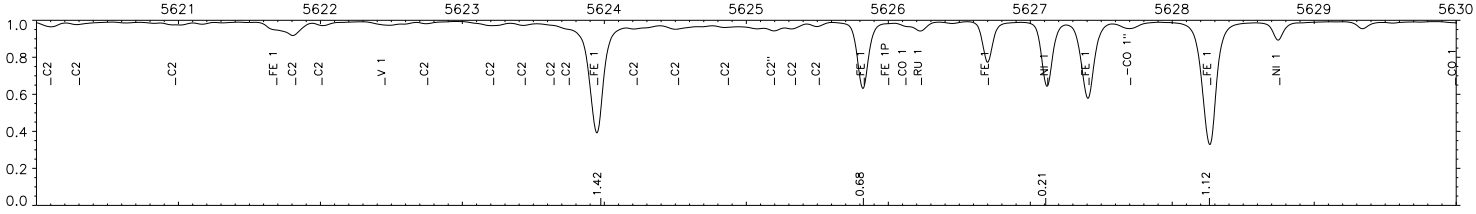
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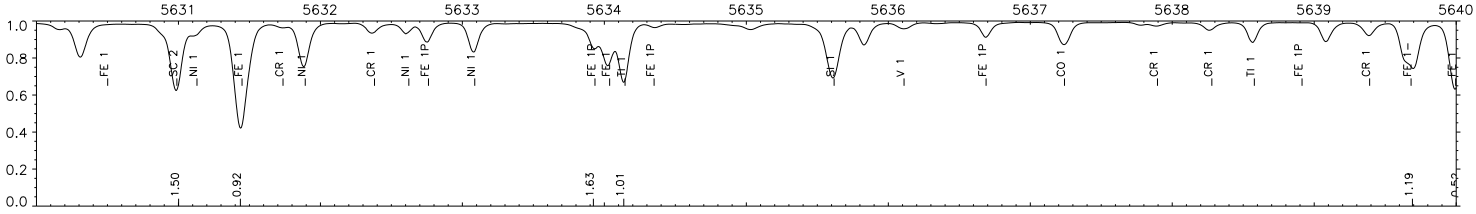
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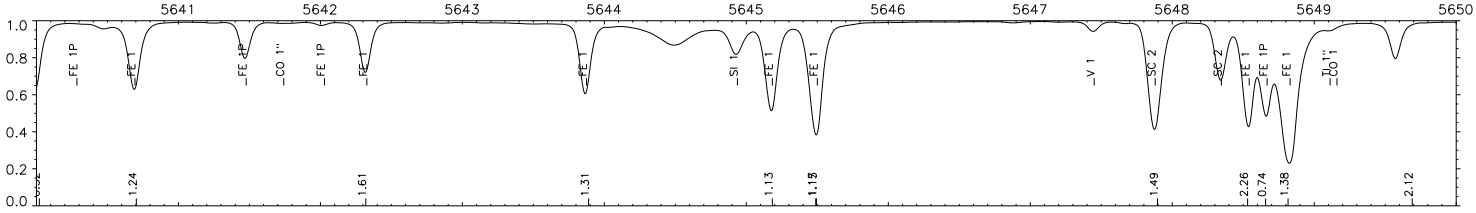
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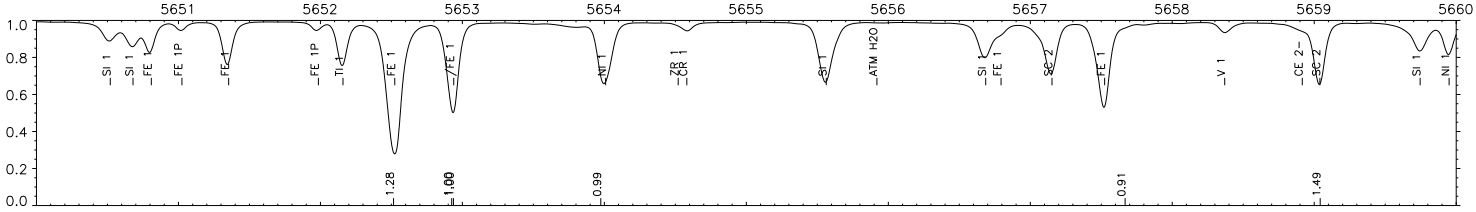
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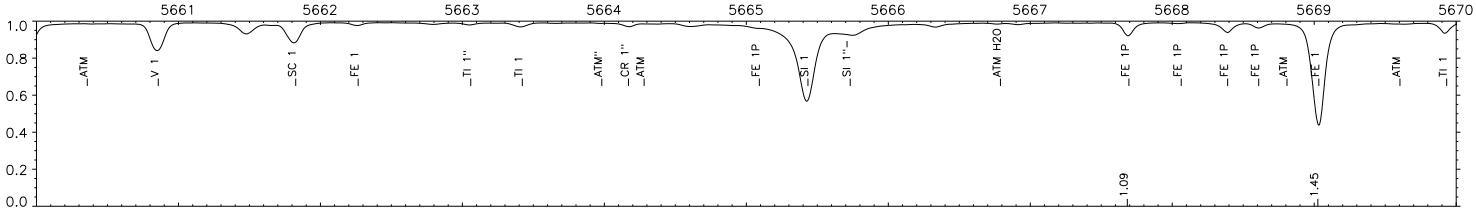
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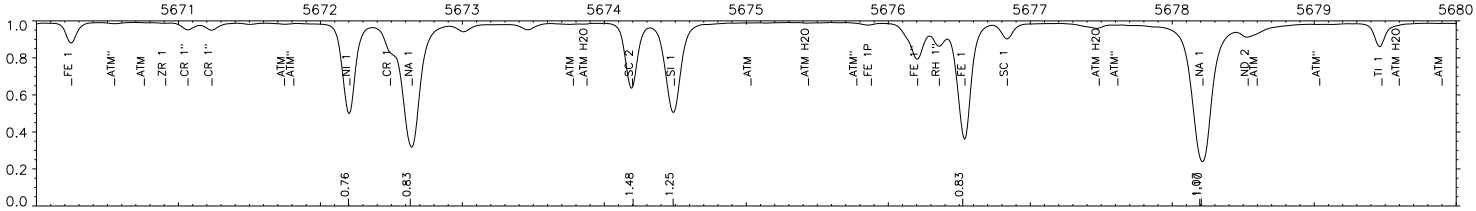
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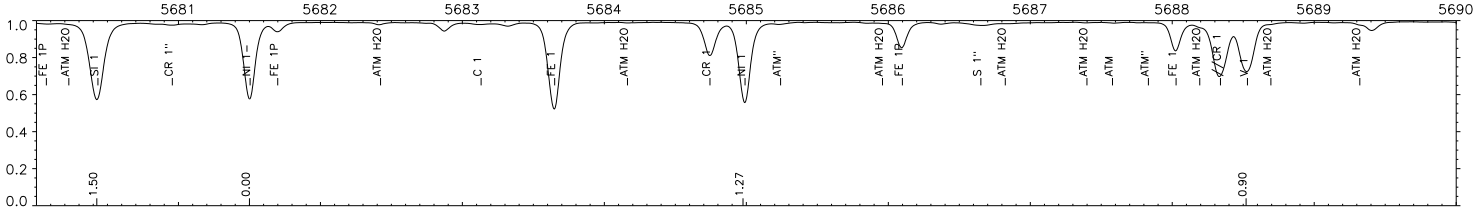
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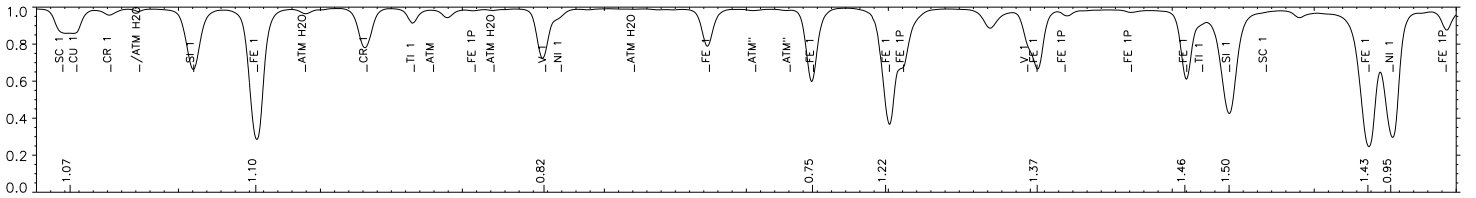
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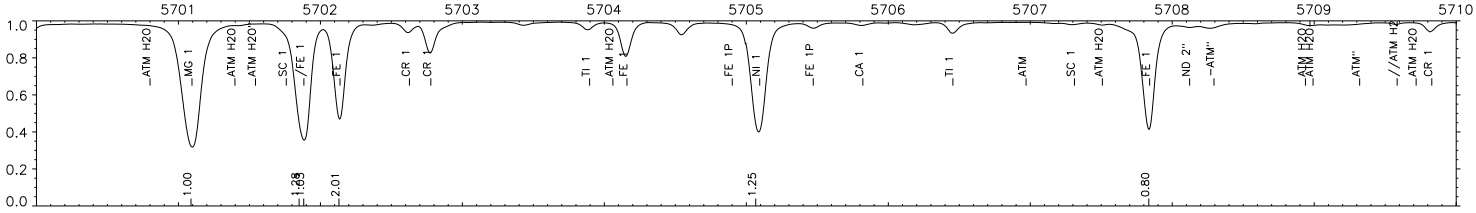
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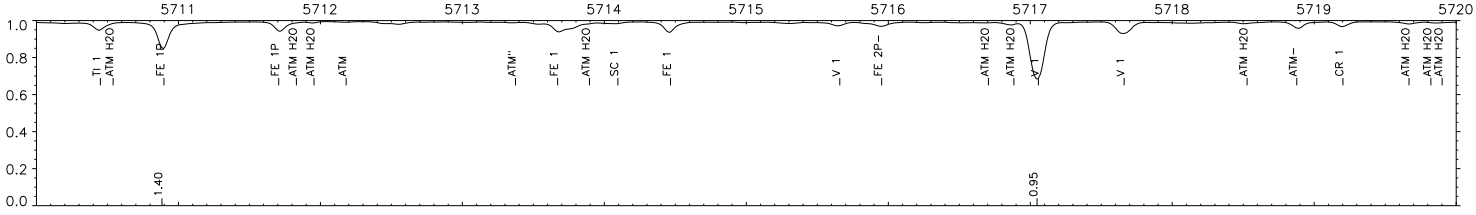
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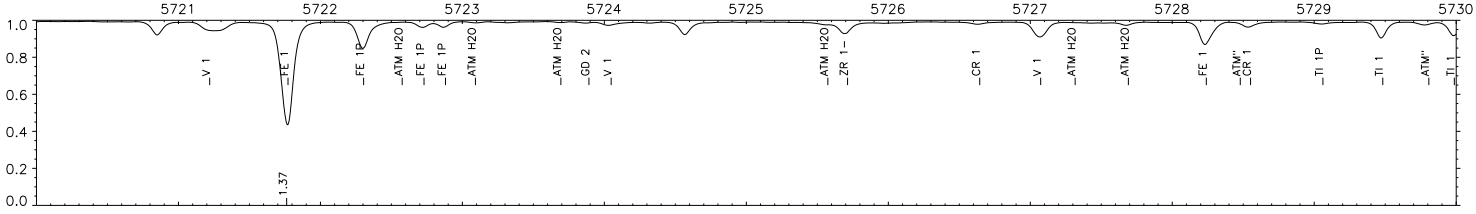
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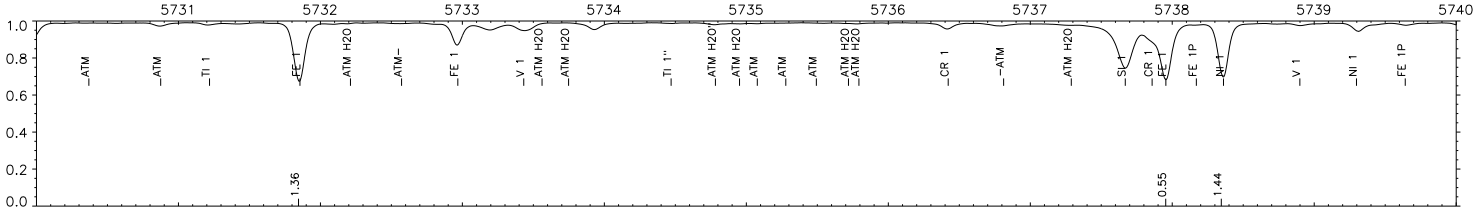
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ATM H2O
ATM H2O
ATM
ATM
ATM
ATM H2O
ATM H2O
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-ATM
ATM H2O
SI 1
CR 1
FE 1
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V 1
NI 1
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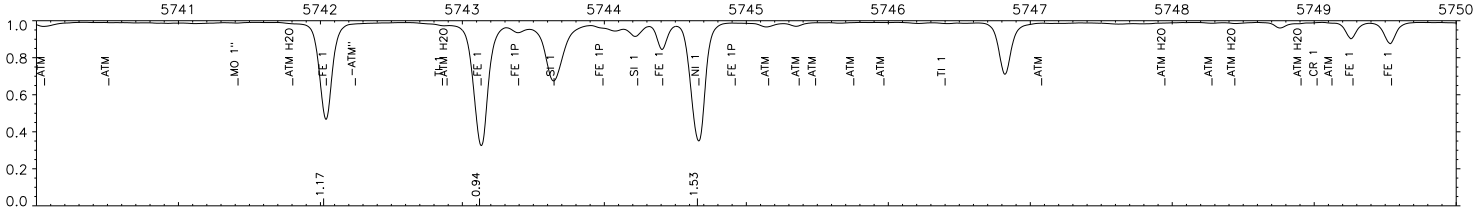
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FE 1
FE 1P
SI 1
FE 1P
SI 1
FE 1
NI 1
FE 1P
ATM
ATM
ATM
ATM
ATM
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ATM H2O
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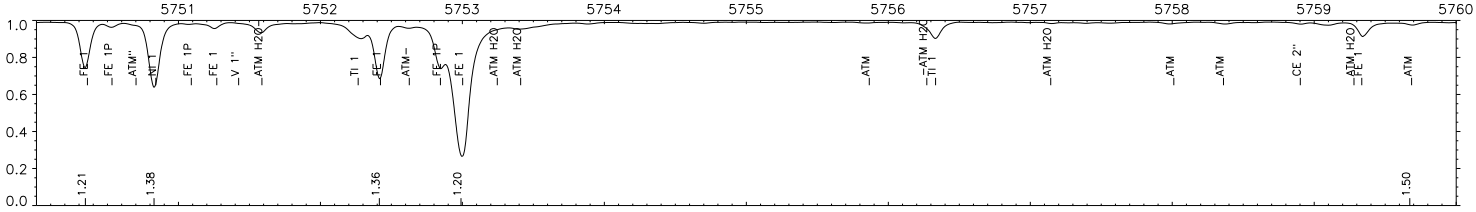
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ATM H2O
TI 1
FE
ATM-
FE 1P
FE 1
ATM H2O
ATM H2O
ATM
ATM H2O
TI 1
ATM
ATM
CE 2''
ATM H2O
FE 1
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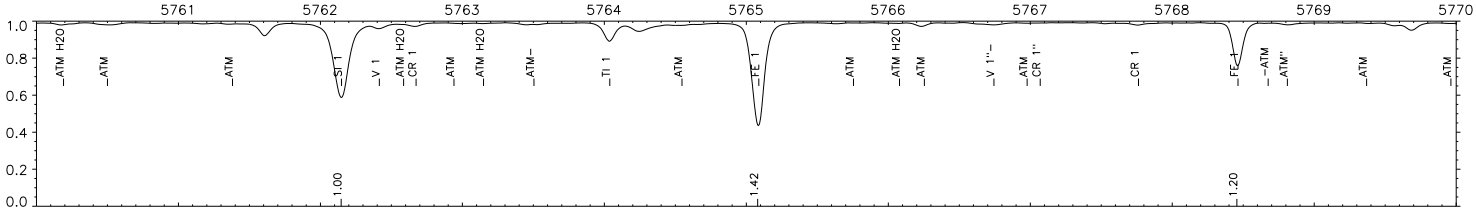
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ATM H2O
ATM-
TI 1
ATM
FE 1
ATM
ATM H2O
ATM
V 1''-
ATM
CR 1''
CR 1
FE
-ATM
ATM''
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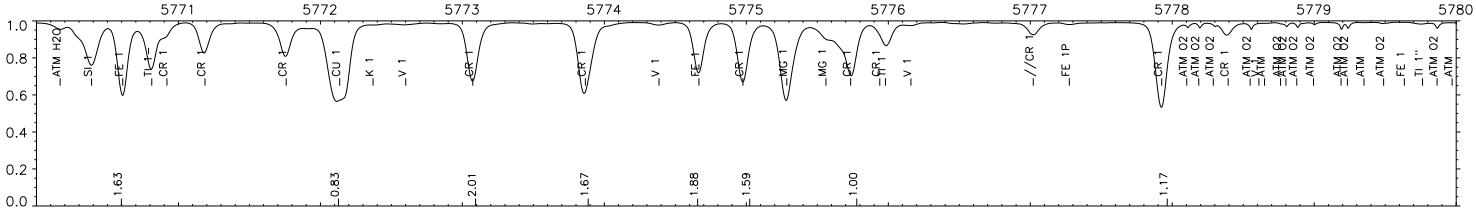
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K 1
V 1
CR 1
CR 1
V 1
FE 1
CR 1
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MG 1
CR
CR 1
V 1
//CR 1
FE 1P
CR 1
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ATM O2
ATM O2
CR 1
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ATM O2
ATM O2
ATM O2
ATM
ATM O2
FE 1
TI 1''
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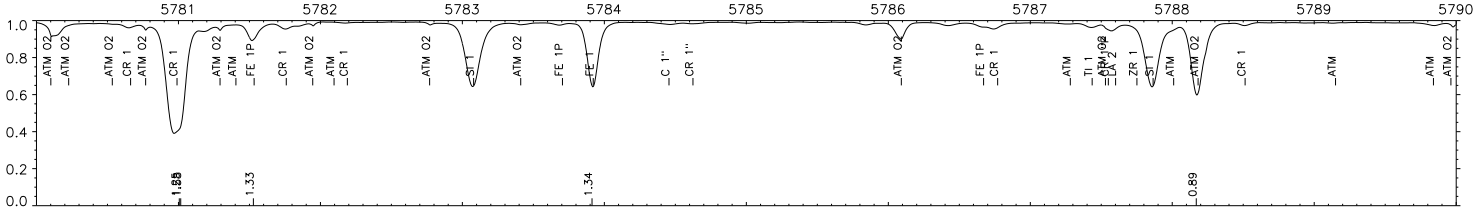
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CR 1
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CR 1
ATM O2
ATM
CR 1
ATM O2
SI 1
ATM O2
FE 1P
FE 1
C 1''
CR 1''
ATM O2
FE 1P
CR 1
ATM
TI 1
ZR 1
SI 1
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CR 1
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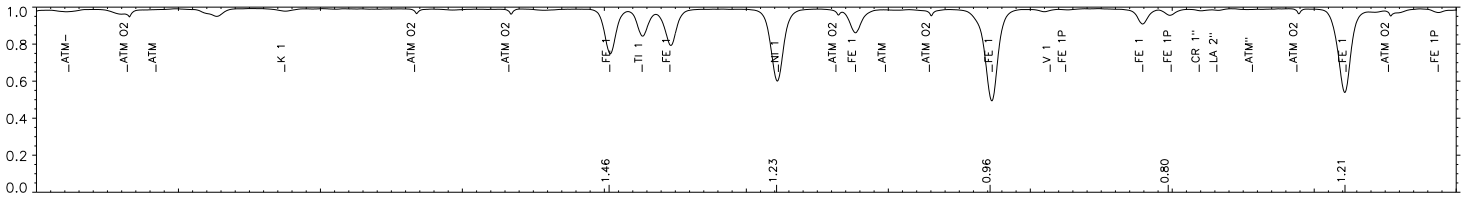
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ATM O2
FE 1
TI 1
FE 1
NI 1
ATM O2
FE 1
ATM
ATM O2
FE 1
V 1
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FE 1
FE 1P
CR 1''
LA 2''
ATM''
ATM O2
FE 1
ATM O2
FE 1P
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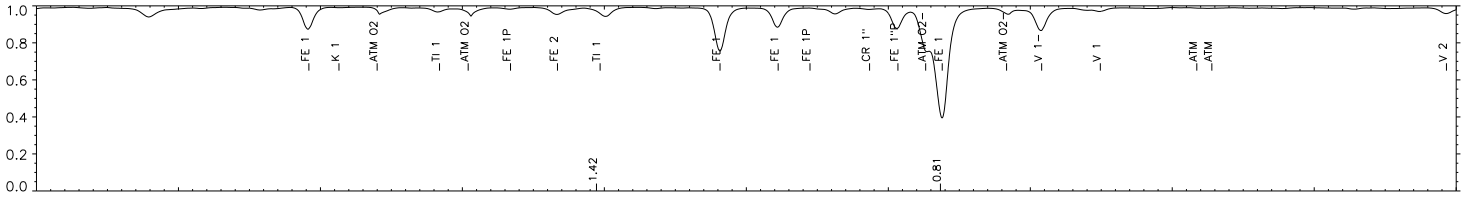
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ATM O2
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FE 2
TI 1
FE 1
FE 1
FE 1P
CR 1''
FE 1''P
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FE 1
ATM O2
V 1-
V 1
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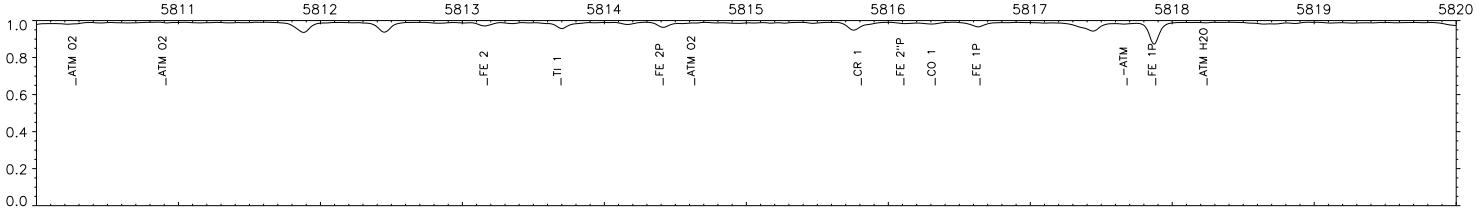
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FE 2''P
CO 1
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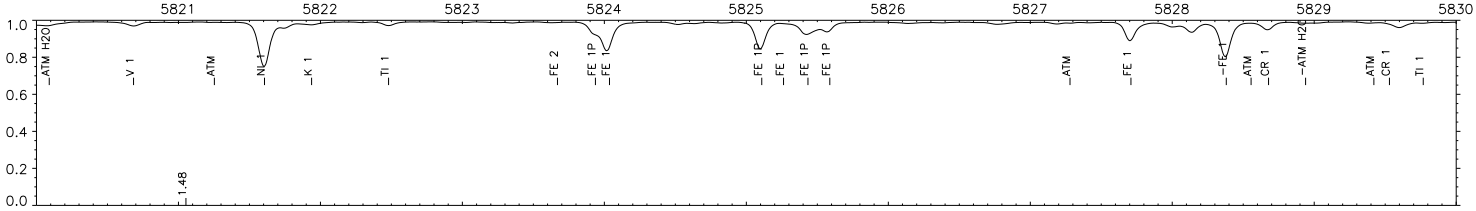
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K 1
TI 1
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FE 1P
FE 1
FE 1P
FE 1P
FE 1P
ATM
FE 1
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CR 1
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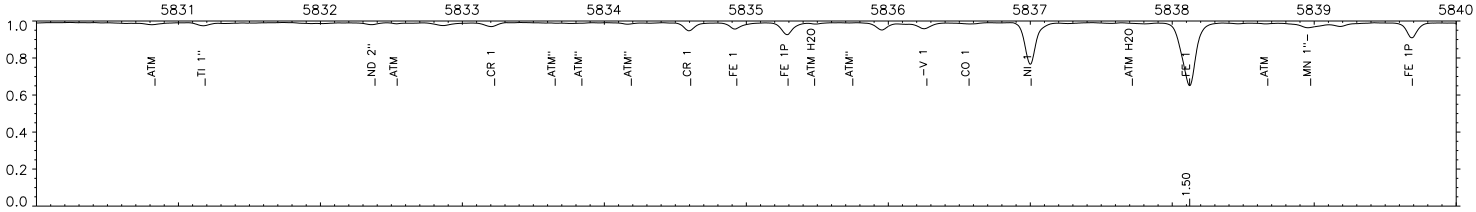
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ND 2''
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CR 1
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ATM''
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ATM''
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CO 1
NI 1
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FE 1
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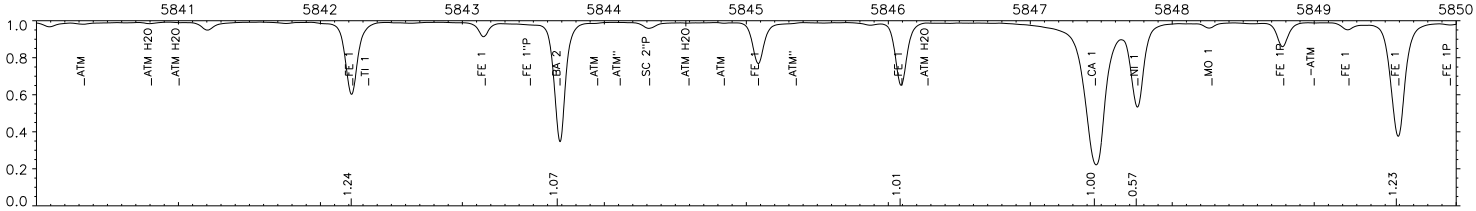
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ATM H2O
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FE 1''P
BA 2
ATM
ATM''
SC 2''P
ATM H2O
ATM
FE 1
ATM''
FE 1
ATM H2O
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NI 1
MO 1
FE 1P
--ATM
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FE 1
FE 1P
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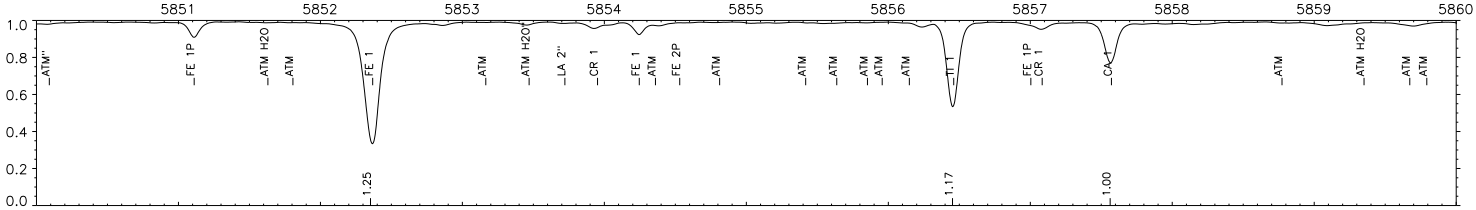
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ATM H2O
ATM
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ATM
ATM H2O
LA 2''
CR 1
FE 1
ATM
FE 2P
ATM
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CA 1
ATM
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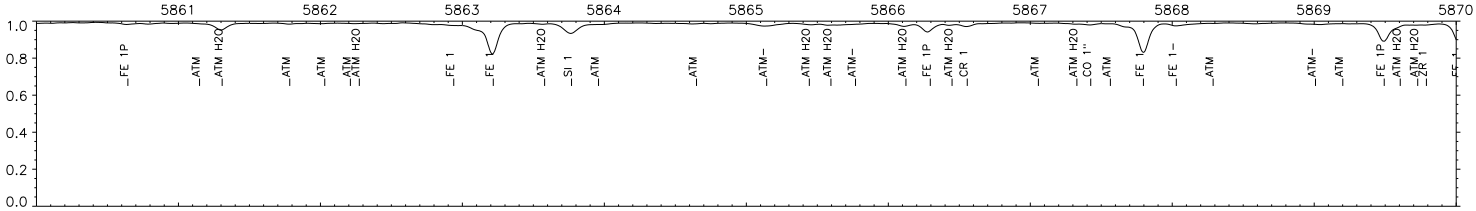
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ATM
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ATM H2O
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ATM H2O
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CR 1
ATM
ATM H2O
CO 1''
ATM
FE
FE 1-
ATM
ATM-
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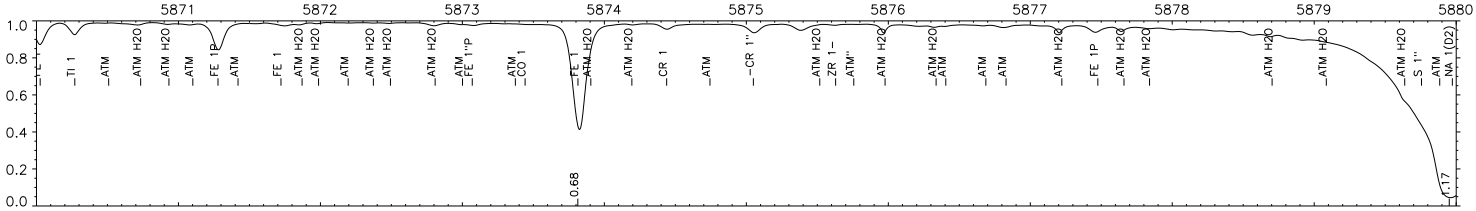
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ATM H2O
ATM H2O
ATM H2O
ATM
FE 1''P
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CO 1
FE 1
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ATM H2O
CR 1
ATM
--CR 1''
ATM H2O
ZR 1-
ATM''
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ATM H2O
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ATM
ATM H2O
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S 1''
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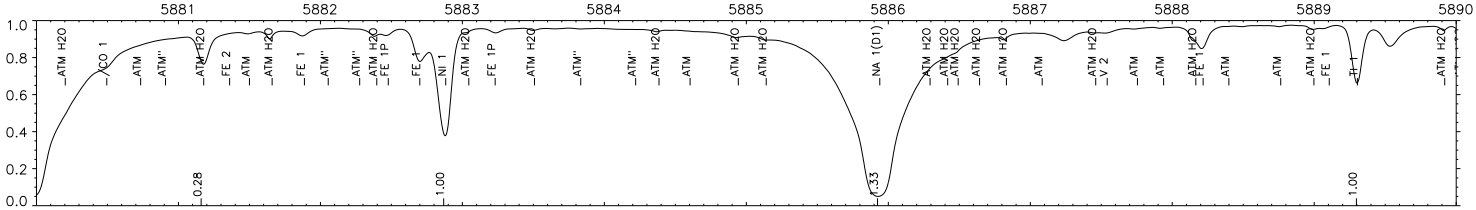
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ATM H2O
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ATM''
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FE 1
NI 1
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ATM''
ATM''
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ATM H2O
ATM H2O
ATM H2O
ATM H2O
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ATM
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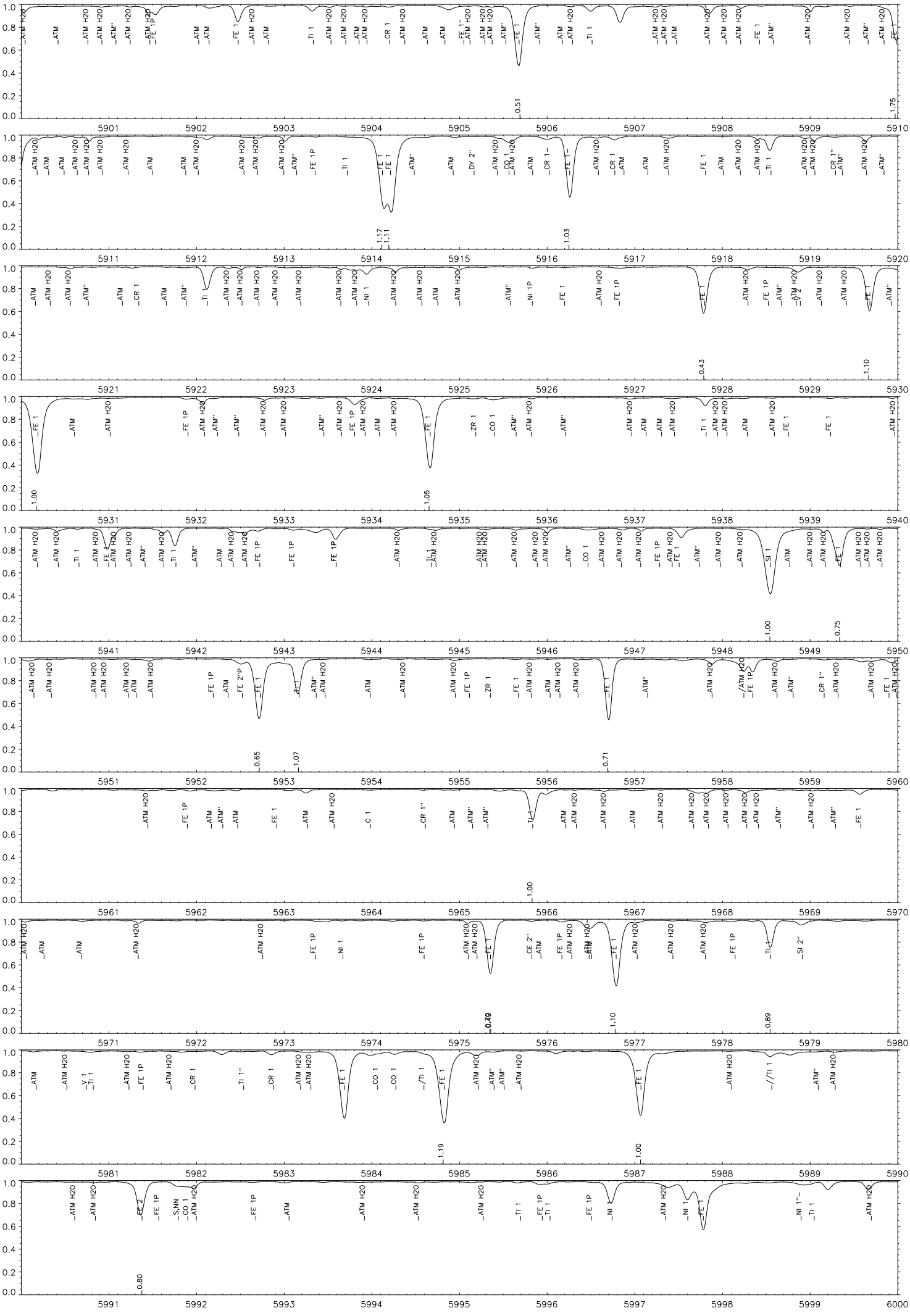
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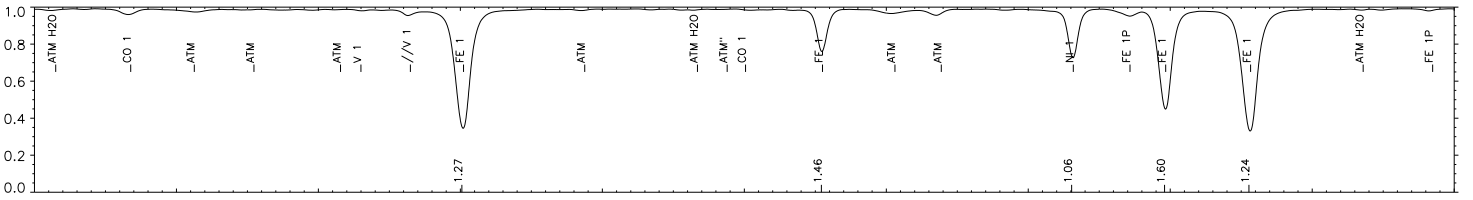
ATM H2O
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ATM
ATM
ATM
V 1
//V 1
FE 1
ATM
ATM H2O
ATM''
CO 1
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ATM
ATM
NI 1
FE 1P
FE 1
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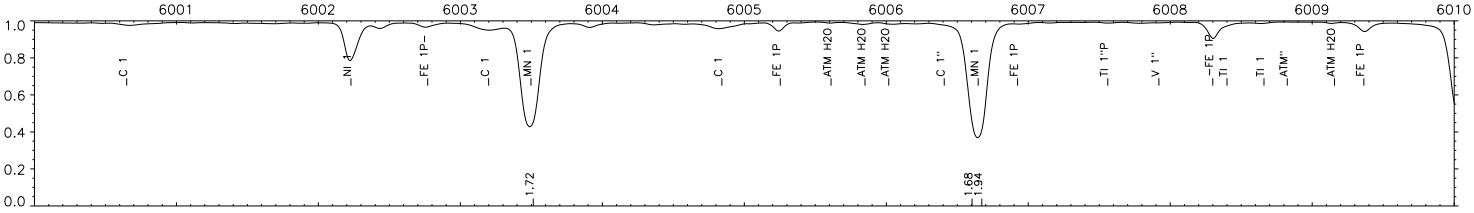
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C 1
MN 1
C 1
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ATM H2O
ATM H2O
C 1''
MN 1
FE 1P
TI 1''P
V 1''
FE 1P
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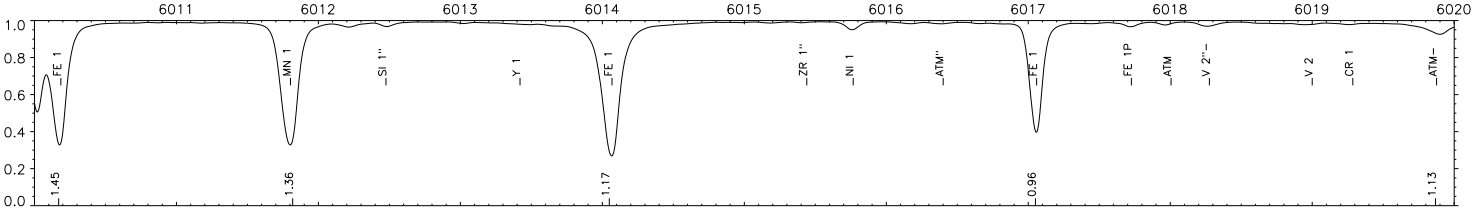
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SI 1''
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FE 1
FE 1P
ATM
V 2''-
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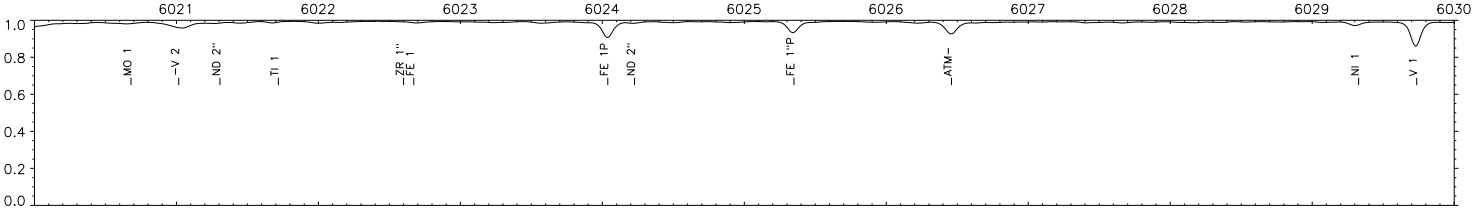
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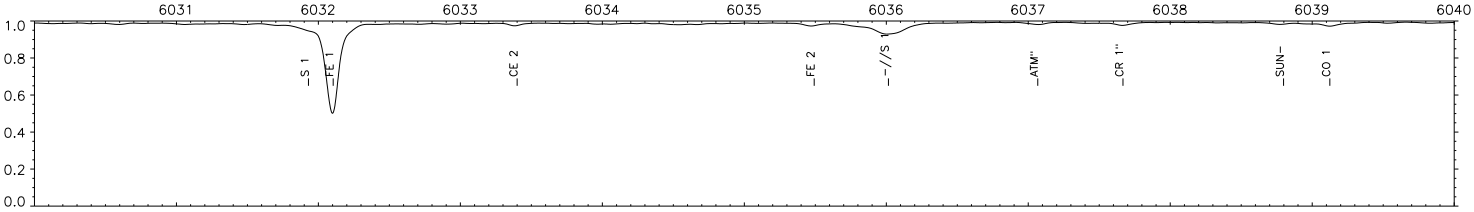
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FE 2
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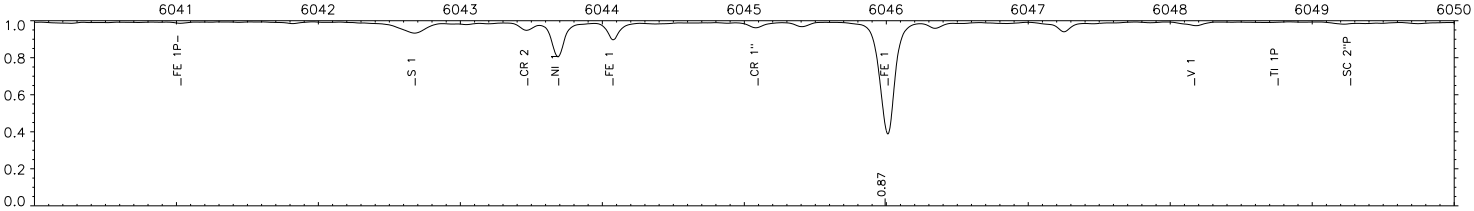
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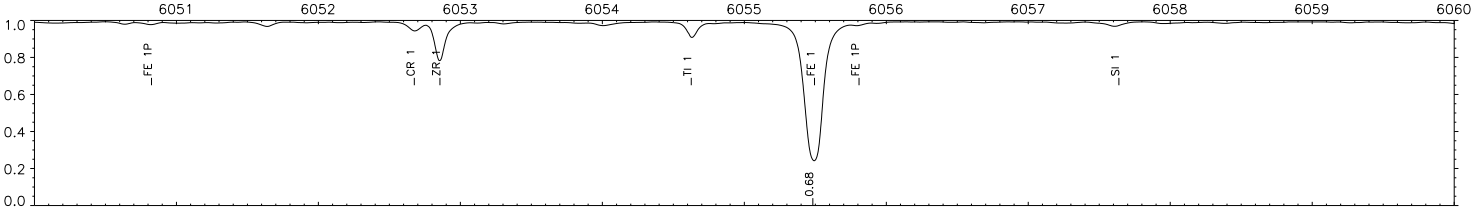
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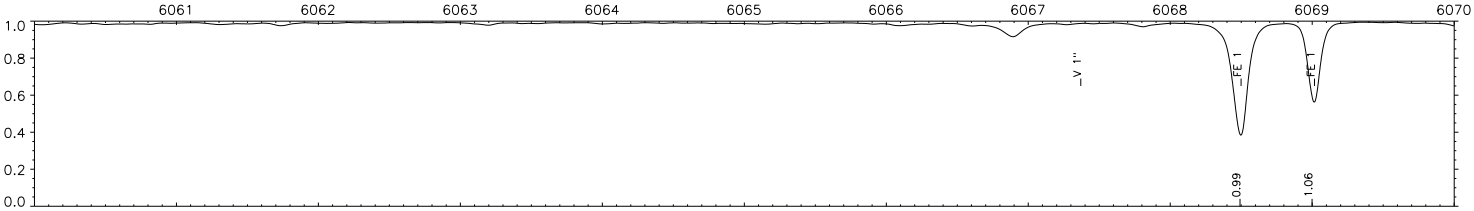
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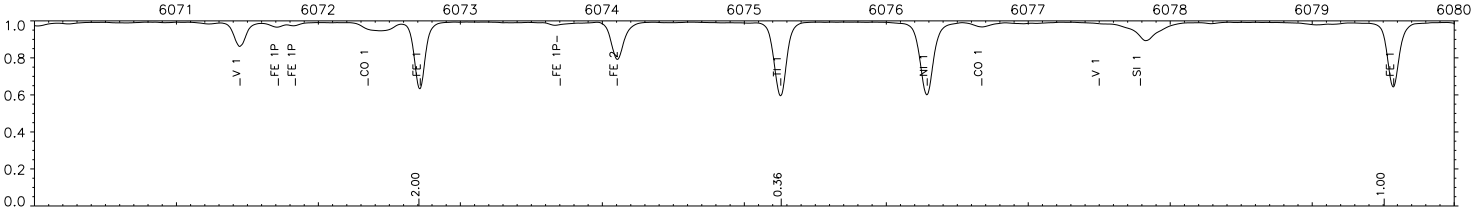
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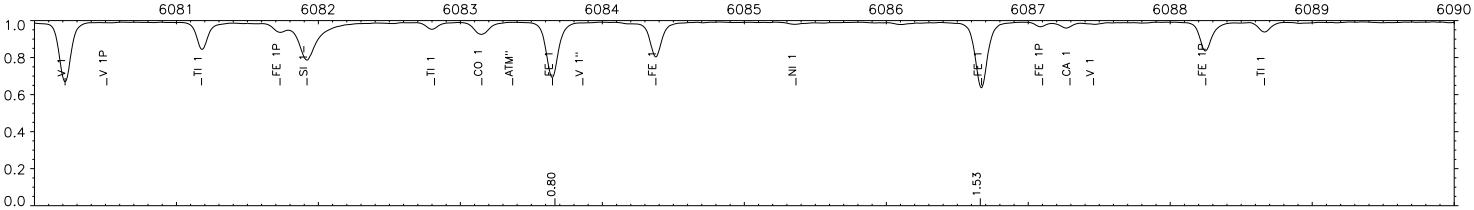
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V 1P
TI 1
FE 1P
SI 1
TI 1
CO 1
ATM''
FE 1
V 1''
FE 1
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CA 1
V 1
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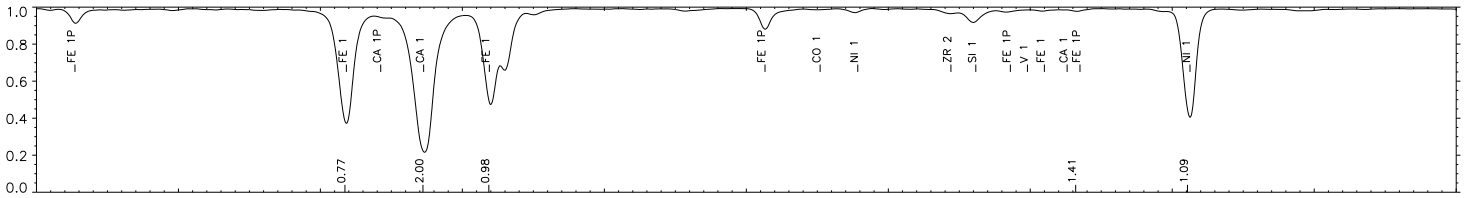
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FE 1
CA 1P
CA 1
FE 1
FE 1P
CO 1
NI 1
ZR 2
SI 1
FE 1P
V 1
FE 1
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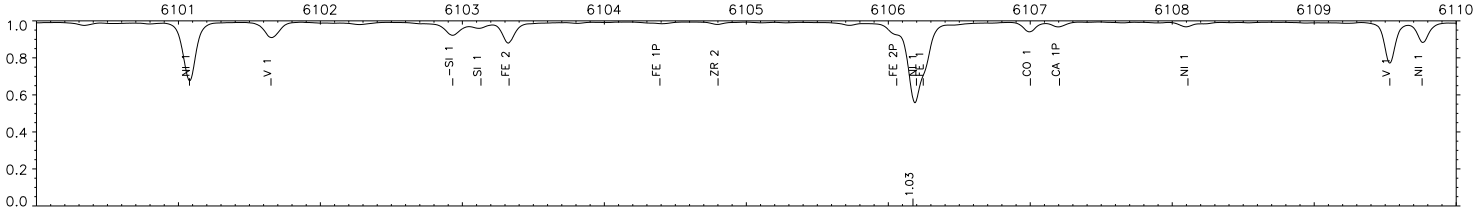
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SI 1
SI 1
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FE 1P
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CO 1
CA 1P
NI 1
V 1
NI 1
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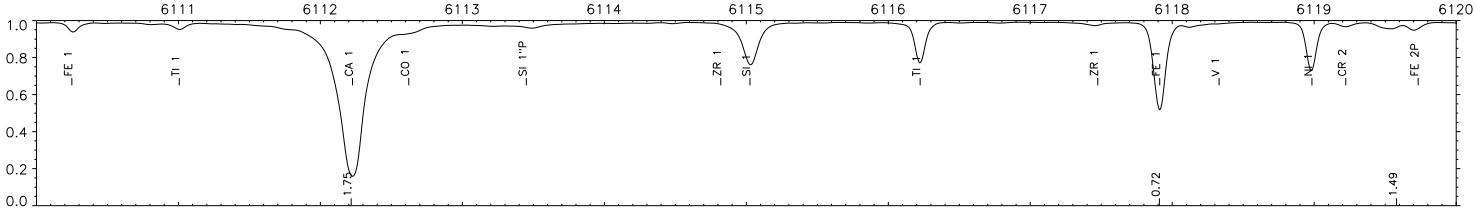
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CO 1
SI 1''P
ZR 1
SI 1
TI 1
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FE 1
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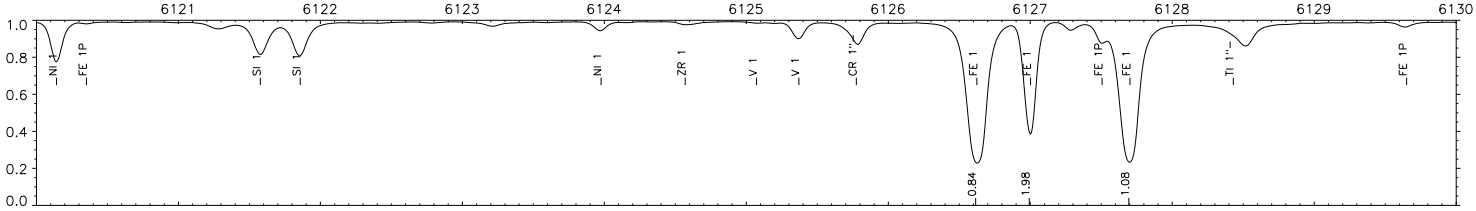
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FE 1P
SI 1
SI 1
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ZR 1
V 1
V 1
CR 1''
FE 1
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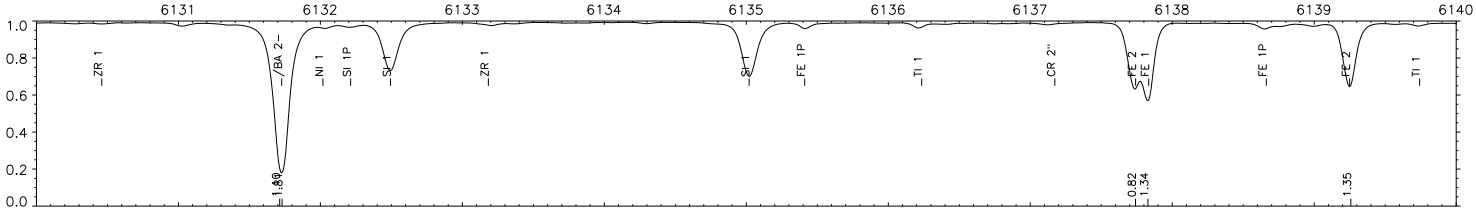
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BA 2
NI 1
SI 1P
SI 1
ZR 1
SI 1
FE 1P
TI 1
CR 2''
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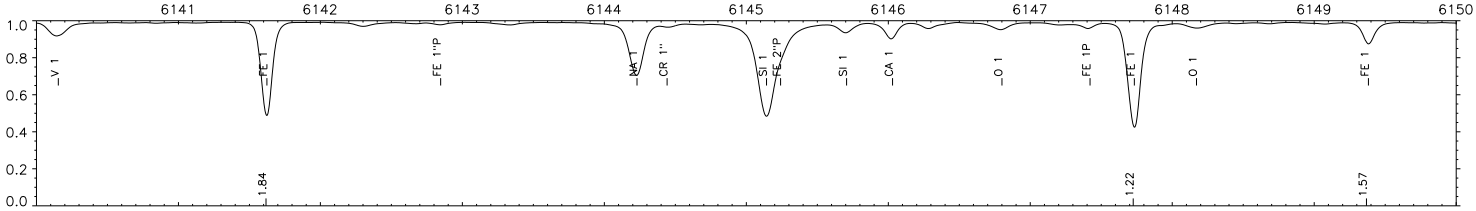
V 1
FE 1
FE 1''P
NA 1
CR 1''
SI 1
FE 2''P
SI 1
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O 1
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FE 1
O 1
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1.22
1.57
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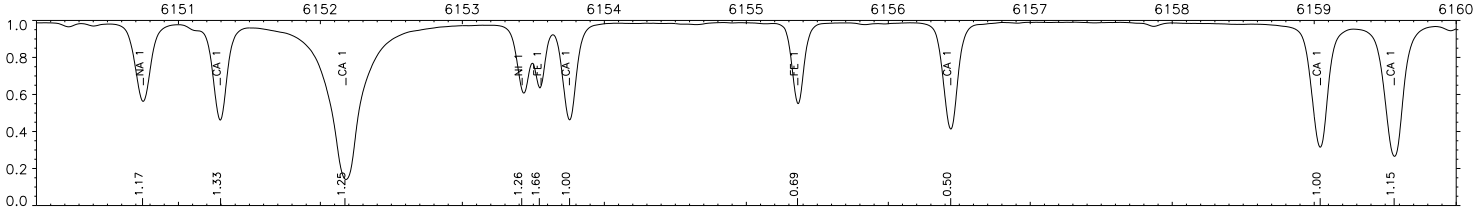
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CA 1
CA 1
NI 1
FE 1
CA 1
FE 1
CA 1
CA 1
CA 1
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1.33
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1.26
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1.00
0.69
0.50
1.00
1.15
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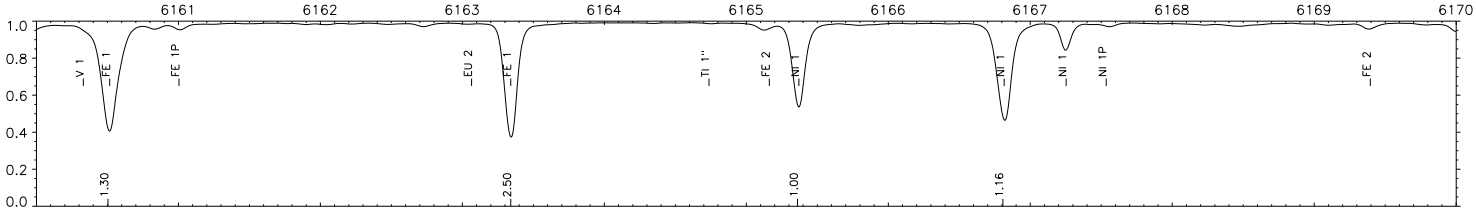
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FE 1
FE 1P
EU 2
FE 1
TI 1''
FE 2
NI 1
NI 1
NI 1
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FE 2
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1.16
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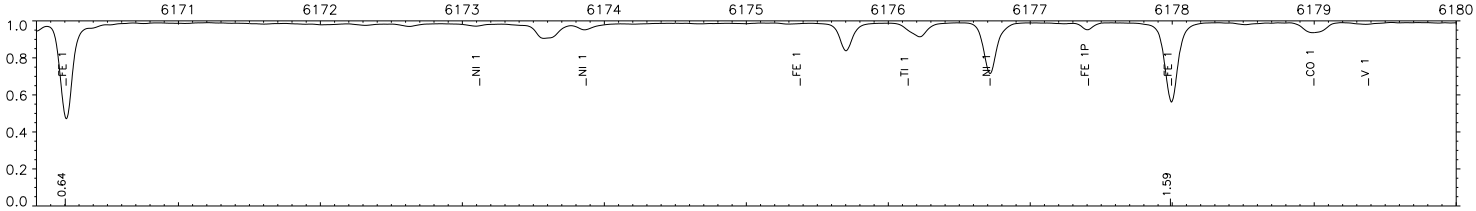
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NI 1
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V 1
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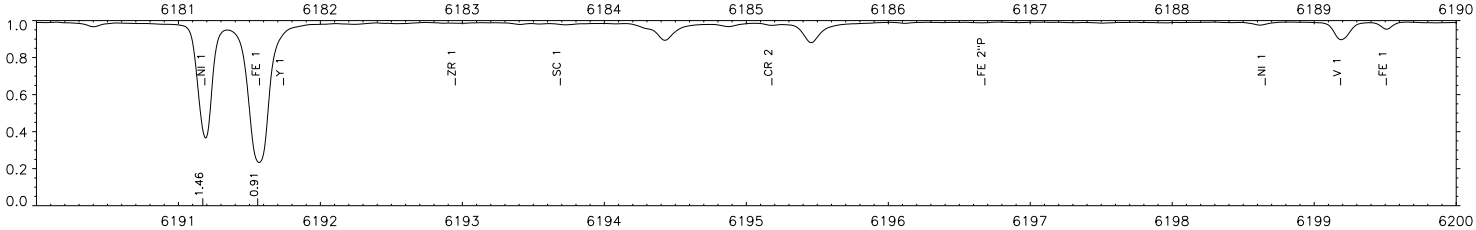
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V 1
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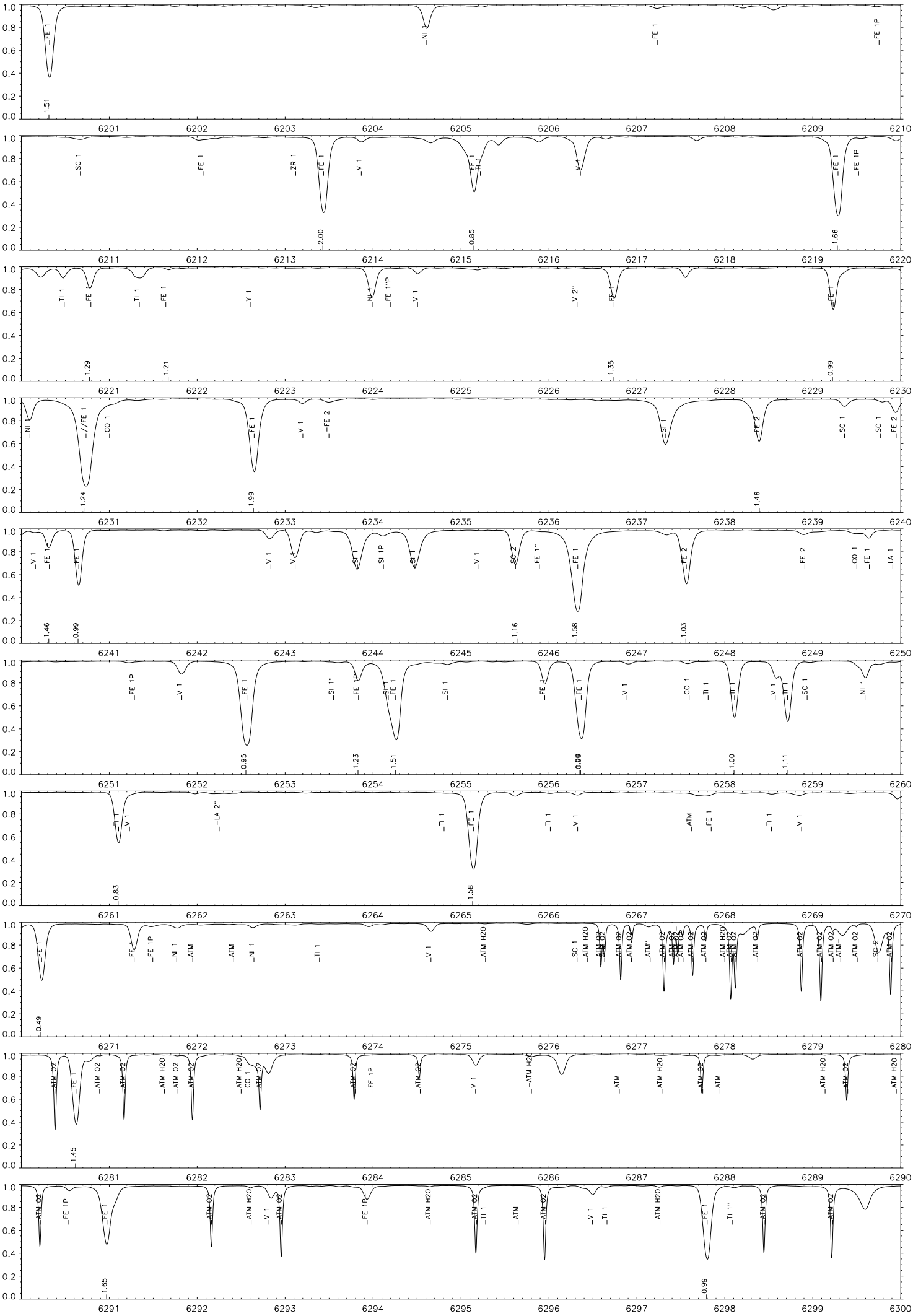
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FE 1
FE 1P
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SC 1
FE 1
ZR 1
FE 1
V 1
FE 1
TI 1
V 1
FE 1
FE 1P
2.00
0.85
1.66
6211 6212 6213 6214 6215 6216 6217 6218 6219 6220
TI 1
FE 1
TI 1
FE 1
Y 1
NI 1
FE 1"P
V 1
V 2"
FE 1
FE 1
1.29
1.21
1.35
0.99
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NI
//FE 1
CO 1
FE 1
V 1
FE 2
SI 1
FE 2
SC 1
SC 1
FE 2
1.24
1.99
1.46
6231 6232 6233 6234 6235 6236 6237 6238 6239 6240
V 1
FE 1
FE 1
V 1
V 1
SI 1
SI 1P
SI 1
V 1
SC 2
FE 1"
FE 1
FE 2
FE 2
CO 1
FE 1
LA 1
1.46
0.99
1.16
1.58
1.03
6241 6242 6243 6244 6245 6246 6247 6248 6249 6250
FE 1P
V 1
FE 1
SI 1"
FE 1P
SI 1
FE 1
SI 1
FE 1
FE 1
V 1
CO 1
TI 1
TI 1
V 1
TI 1
SC 1
NI 1
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1.51
1.00
1.11
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TI 1
V 1
LA 2"
TI 1
FE 1
TI 1
V 1
ATM
FE 1
TI 1
V 1
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1.58
6261 6262 6263 6264 6265 6266 6267 6268 6269 6270
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FE 1
FE 1P
NI 1
ATM
ATM
NI 1
TI 1
V 1
ATM H2O
SC 1
ATM H2O
ATM O2
ATM O2
ATM O2
ATM O2
ATM"
ATM O2
ATM O2
ATM O2
ATM O2
ATM H2O
ATM O2
ATM O2
ATM O2
ATM O2
ATM O2
ATM O2
SC 2
ATM O2
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FE 1
ATM O2
ATM O2
ATM H2O
ATM O2
ATM O2
ATM H2O
CO 1
ATM O2
ATM O2
FE 1P
ATM O2
V 1
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ATM
ATM H2O
ATM O2
ATM
ATM H2O
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ATM H2O
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FE 1
ATM O2
ATM H2O
V 1
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FE 1P
ATM H2O
ATM O2
TI 1
ATM
ATM O2
V 1
TI 1
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TI 1"
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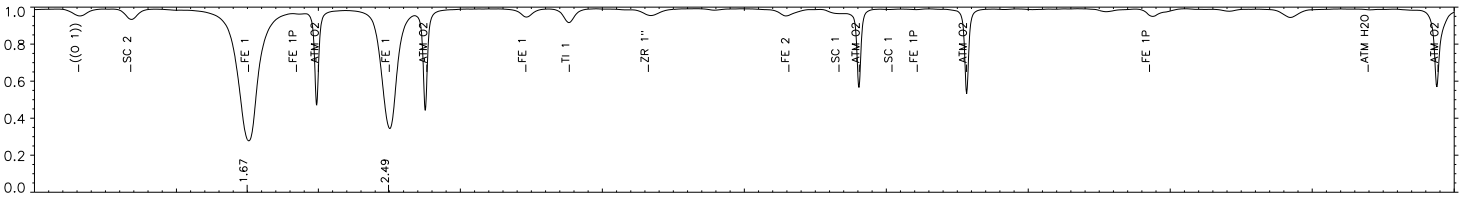
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_SC 2
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_ATM O2
_FE 1
_ATM O2
_FE 1
_TI 1
_ZR 1''
_FE 2
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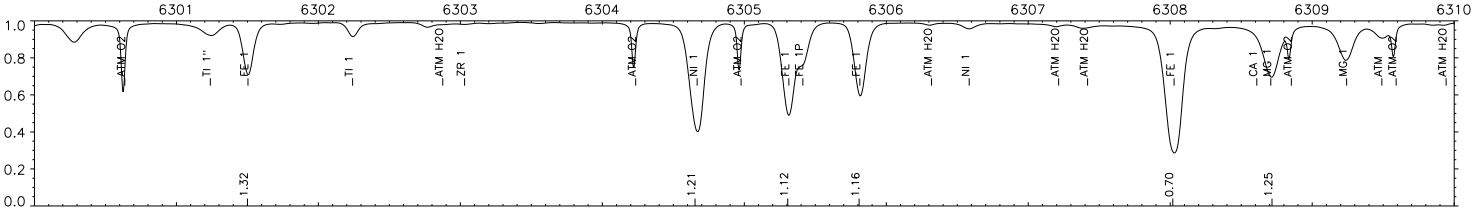
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0.0
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_TI 1''
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_ATM H2O
_ZR 1
_ATM O2
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_ATM O2
_FE 1
_FE 1P
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_ATM H2O
_NI 1
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_ATM
_ATM O2
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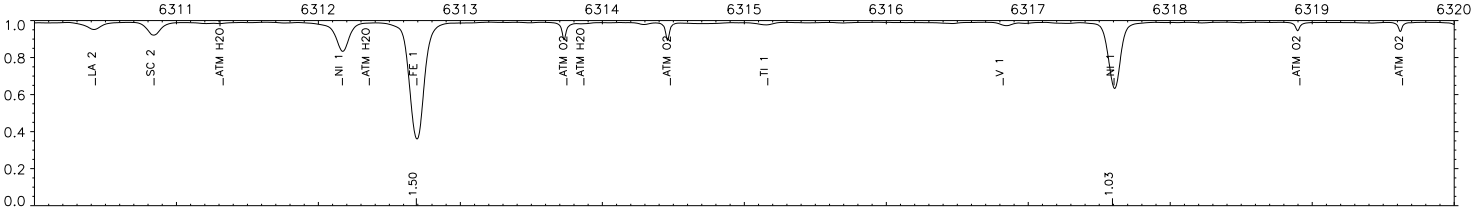
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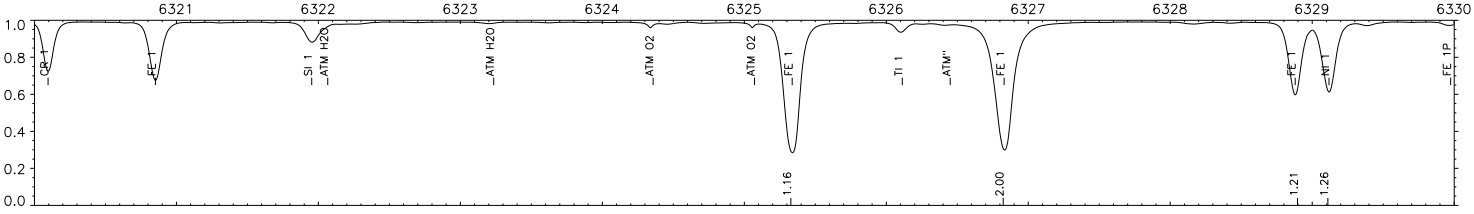
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_ATM O2
_ATM O2
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_ATM''
_FE 1
_FE 1
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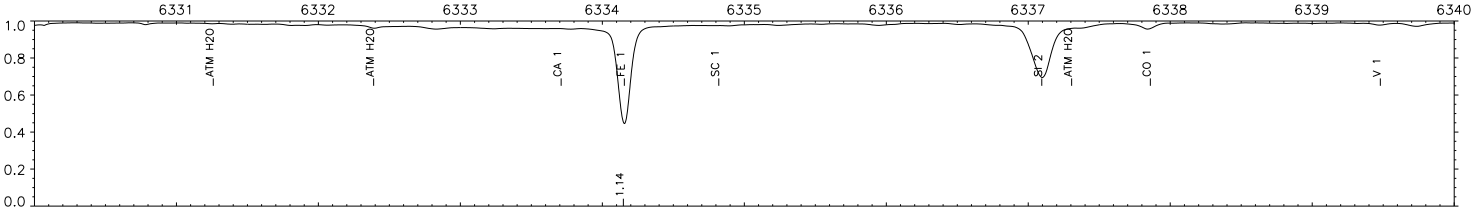
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_SI 2
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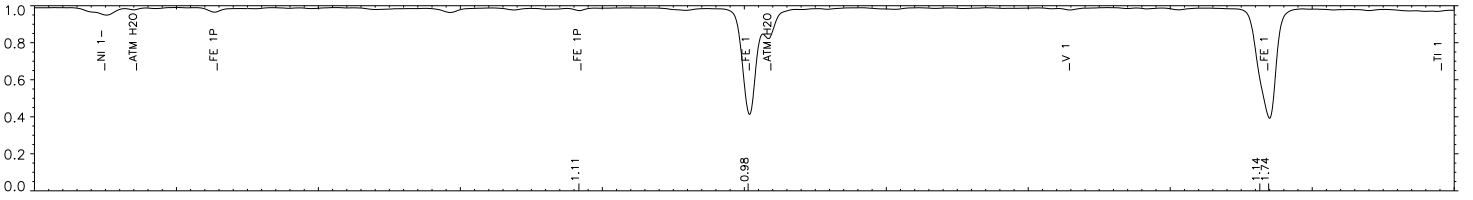
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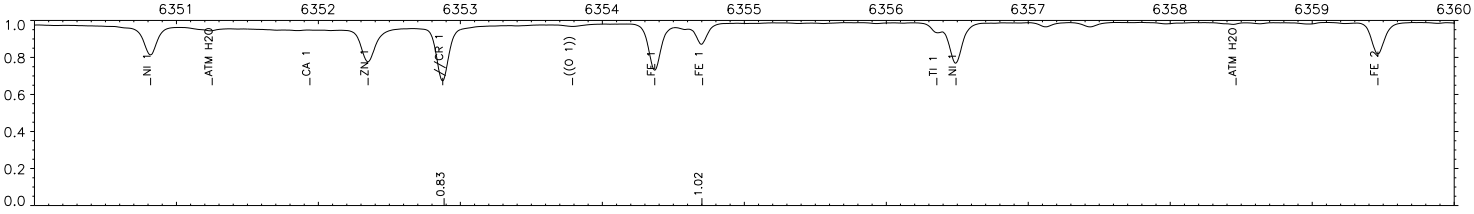
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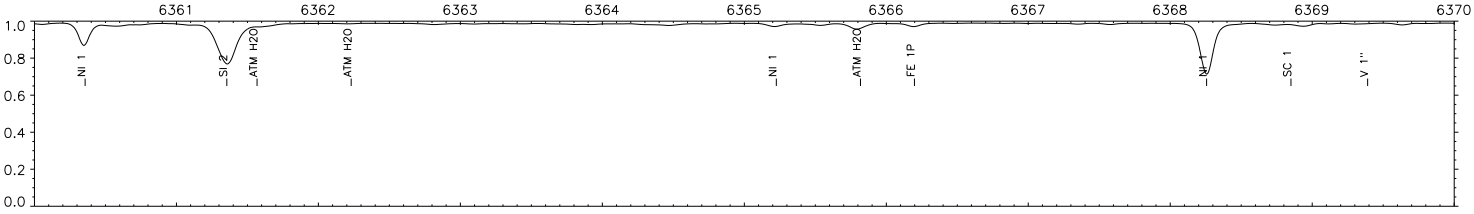
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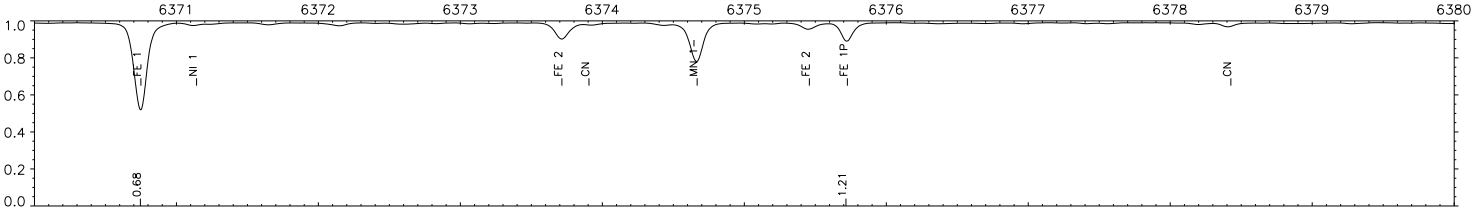
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_MN 1
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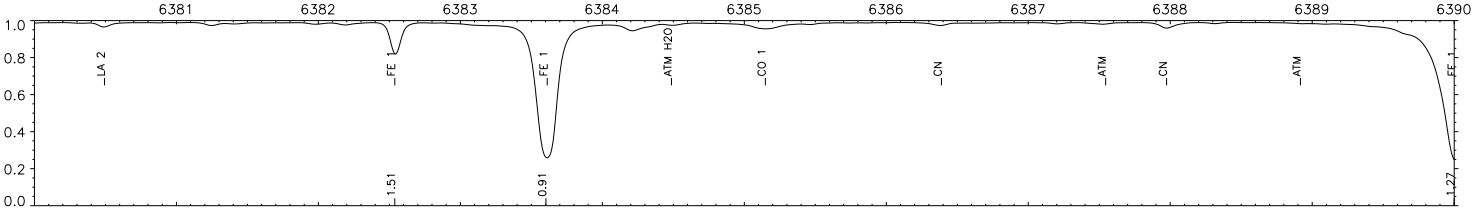
1.0
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0.6
0.4
0.2
0.0
_LA 2
_FE 1
_FE 1
_ATM H2O
_CO 1
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_ATM
_CN
_ATM
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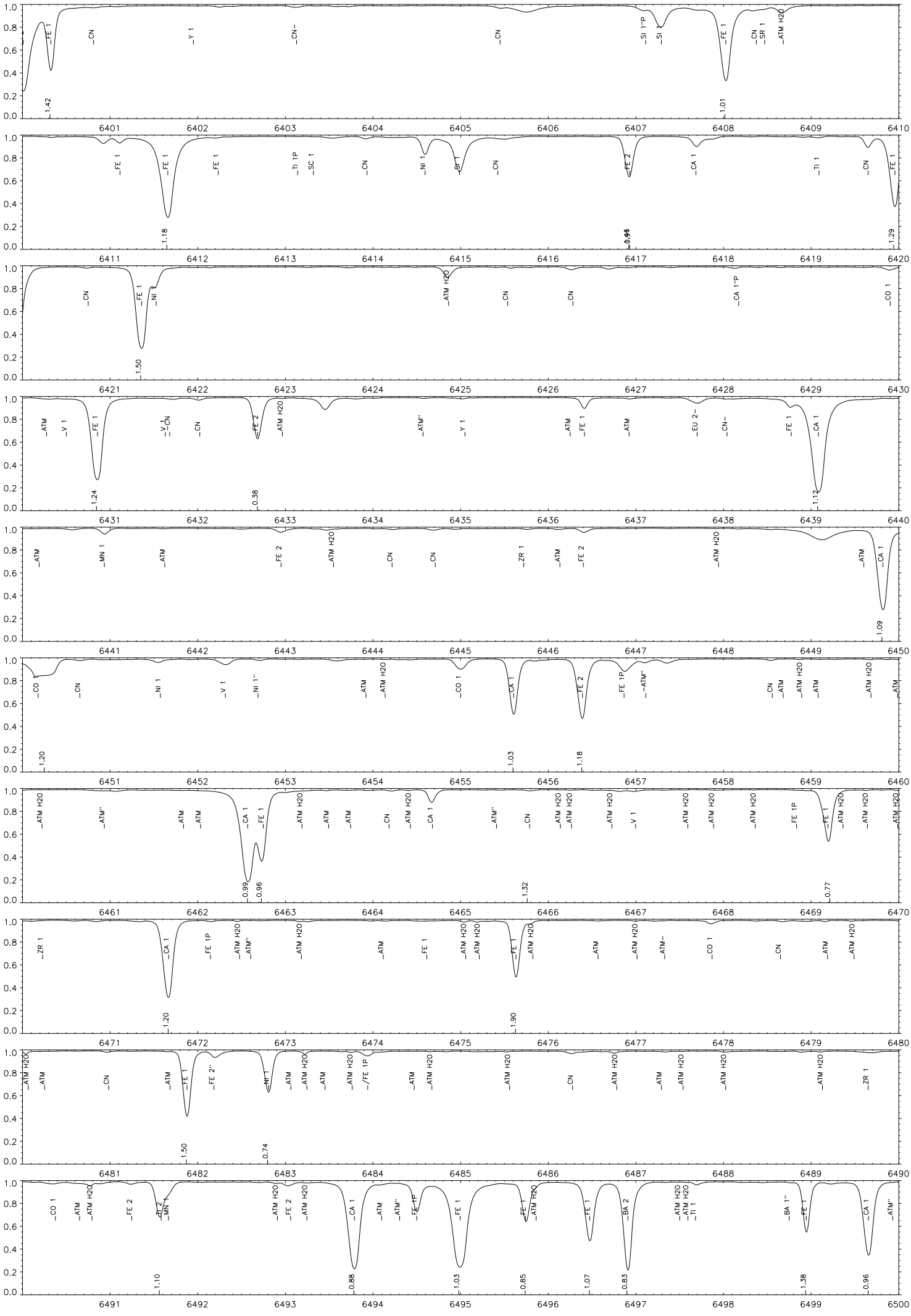
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0.4
0.2
0.0
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1.42 1.01
6411 6412 6413 6414 6415 6416 6417 6418 6419 6420
FE 1 FE 1 FE 1 TI 1P SC 1 CN NI 1 SR 1 CN FE 2 CA 1 TI 1 CN FE 1
1.18 0.96 1.29
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CN FE 1 NI 1 ATM H2O CN CN CA 1"P CO 1
1.50
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ATM V 1 FE 1 V 1 CN CN FE 2 ATM H2O ATM" Y 1 ATM FE 1 ATM EU 2- CN- FE 1 CA 1
1.24 0.38 1.12
6441 6442 6443 6444 6445 6446 6447 6448 6449 6450
ATM MN 1 ATM FE 2 ATM H2O CN CN ZR 1 ATM FE 2 ATM H2O ATM CA 1
1.09
6451 6452 6453 6454 6455 6456 6457 6458 6459 6460
CO CN NI 1 V 1 NI 1" ATM ATM H2O CO 1 CA 1 FE 2 FE 1P ATM" CN ATM ATM H2O ATM ATM H2O ATM
1.20 1.03 1.18
6461 6462 6463 6464 6465 6466 6467 6468 6469 6470
ATM H2O ATM" ATM ATM CA 1 FE 1 ATM H2O ATM ATM CN ATM H2O CA 1 ATM" CN ATM H2O ATM H2O ATM H2O V 1 ATM H2O ATM H2O ATM H2O FE 1P FE 1 ATM H2O ATM H2O ATM H2O
0.99 0.96 1.32 0.77
6471 6472 6473 6474 6475 6476 6477 6478 6479 6480
ZR 1 CA 1 FE 1P ATM H2O ATM" ATM H2O ATM FE 1 ATM H2O ATM H2O FE 1 ATM H2O ATM ATM H2O ATM- CO 1 CN ATM ATM H2O
1.20 1.90
6481 6482 6483 6484 6485 6486 6487 6488 6489 6490
ATM H2O ATM CN ATM FE 1 FE 2" NI 1 ATM ATM H2O ATM ATM H2O ATM H2O /FE 1P ATM ATM H2O ATM H2O CN ATM H2O ATM ATM H2O ATM H2O ATM H2O ZR 1
1.50 0.74
6491 6492 6493 6494 6495 6496 6497 6498 6499 6500
CO 1 ATM ATM H2O FE 2 AL 2 MN 1 ATM H2O FE 2 ATM H2O CA 1 ATM ATM" FE 1P FE 1 FE 1 ATM H2O FE 1 BA 2 ATM H2O ATM H2O TI 1 BA 1" FE 1 CA 1 ATM"
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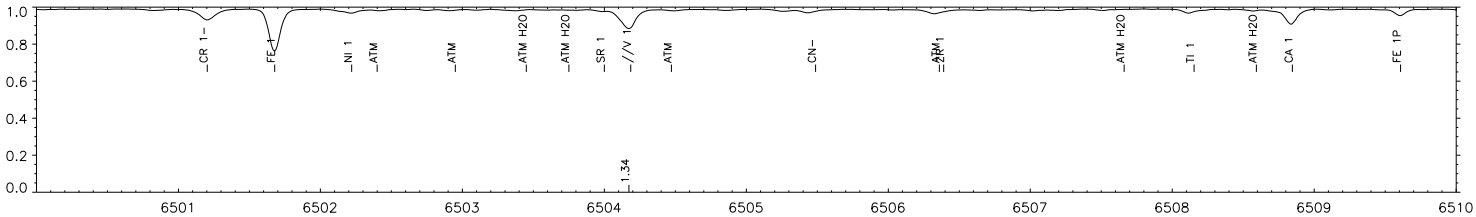
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NI 1
ATM
ATM
ATM H2O
ATM H2O
SR 1
//V 1
ATM
CN–
ATM 1
ATM H2O
Ti 1
ATM H2O
CA 1
FE 1P
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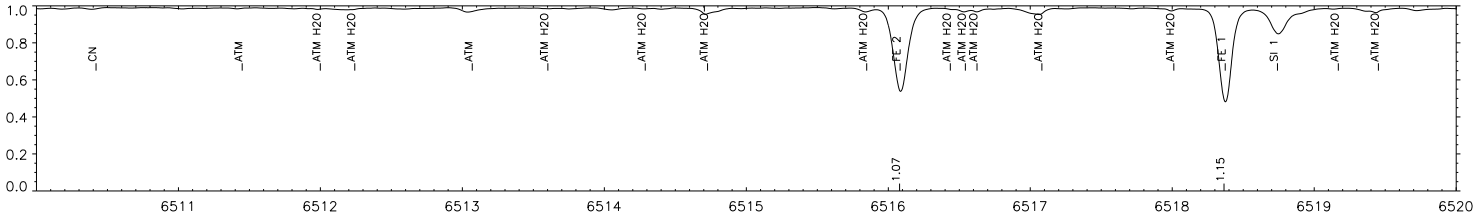
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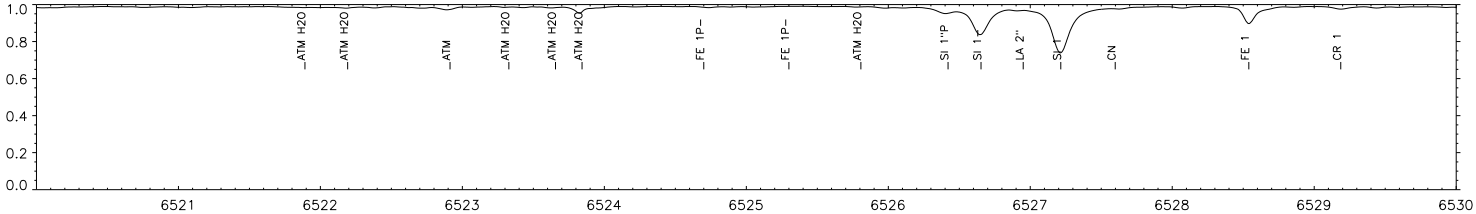
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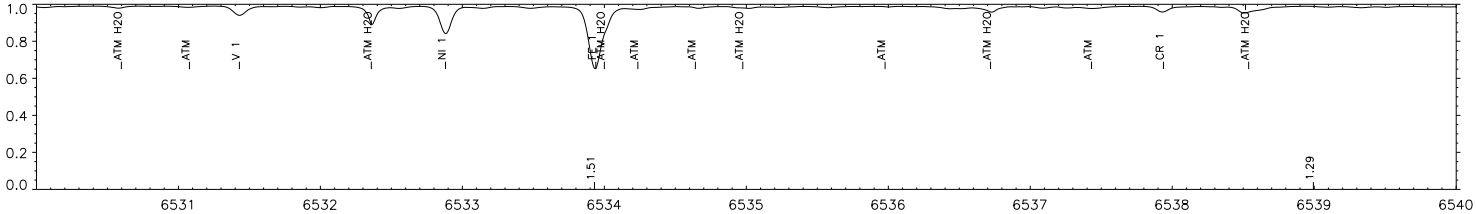
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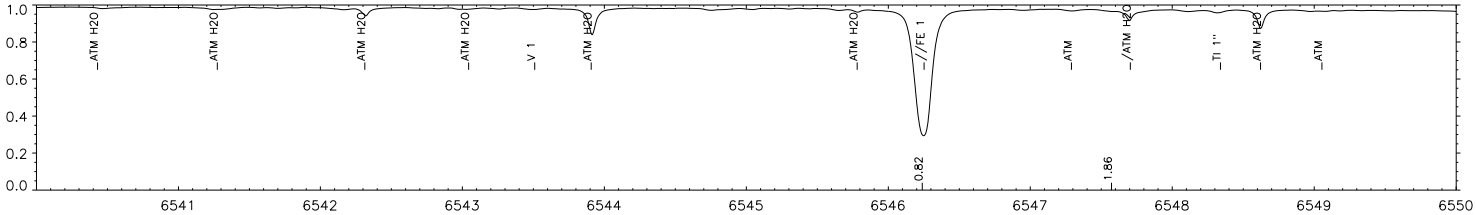
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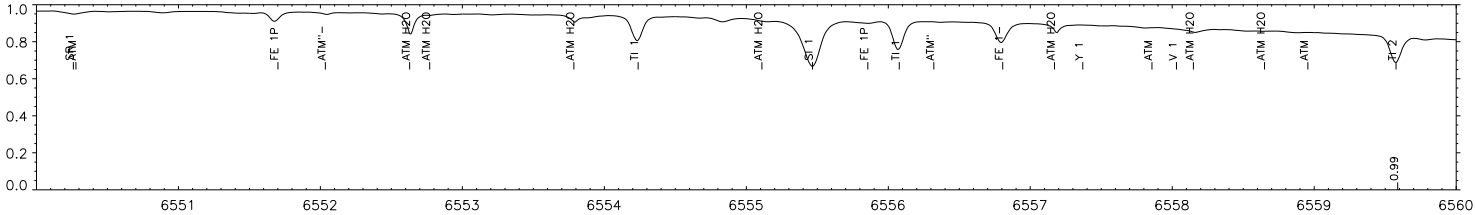
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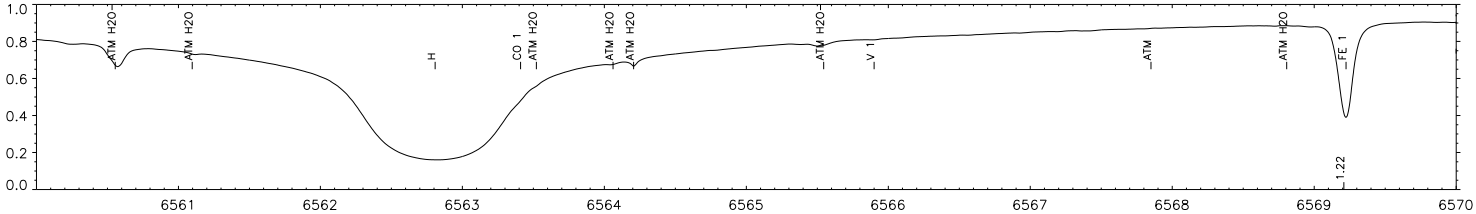
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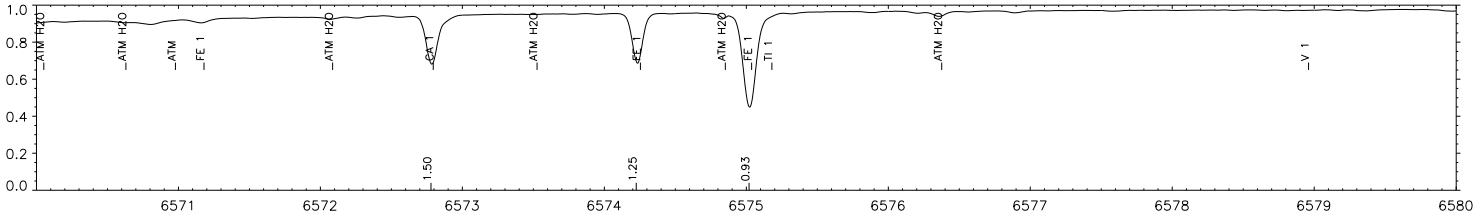
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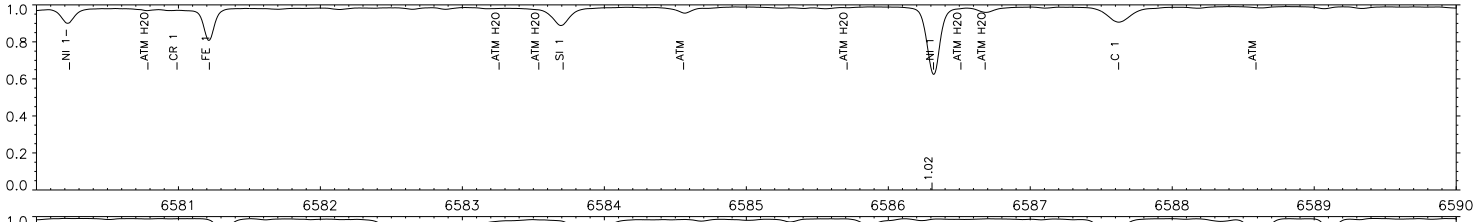
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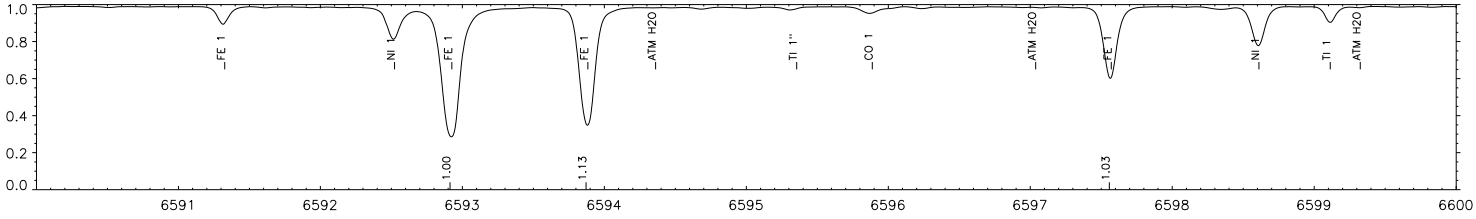
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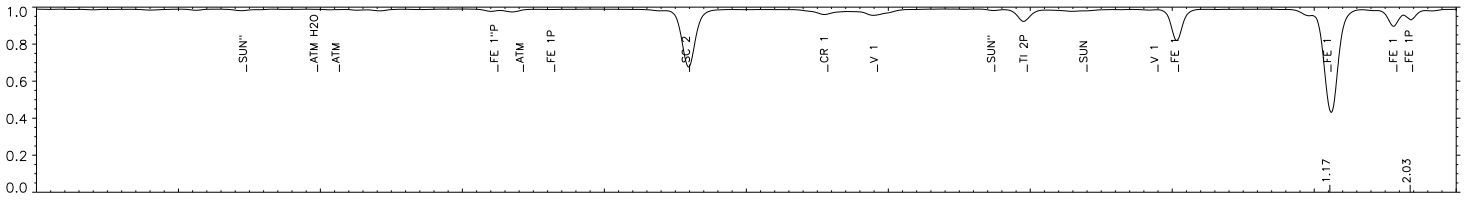
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ATM
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ATM
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CR 1
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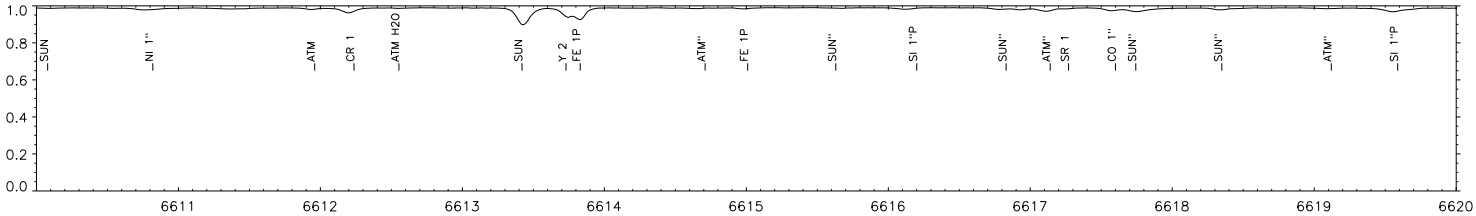
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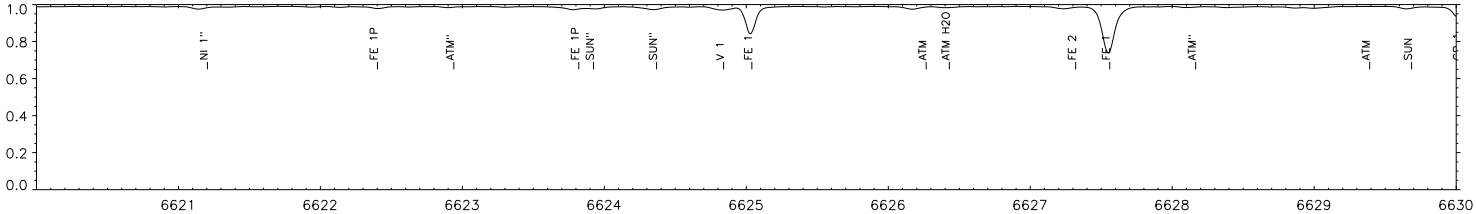
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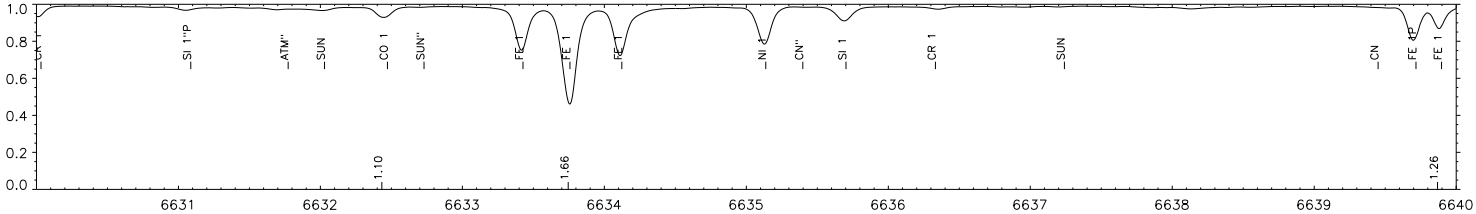
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SI 1''P
ATM''
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CO 1
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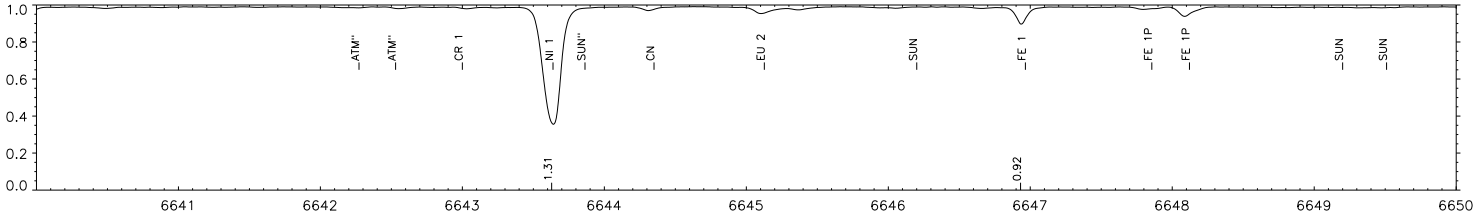
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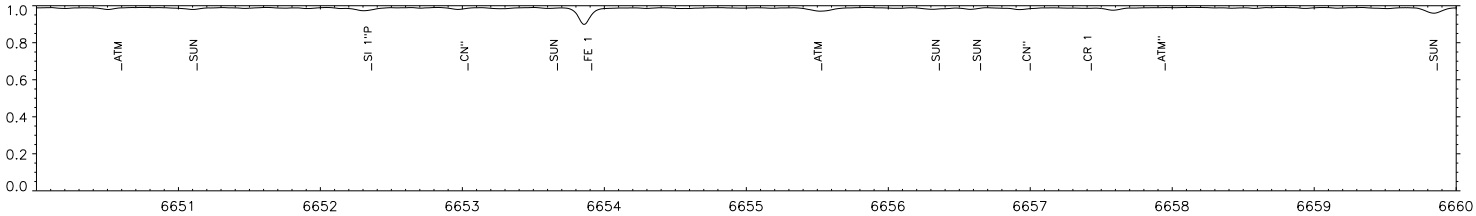
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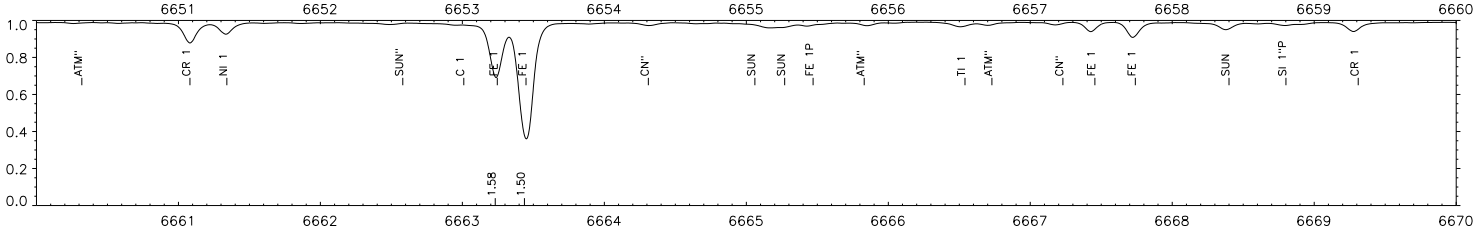
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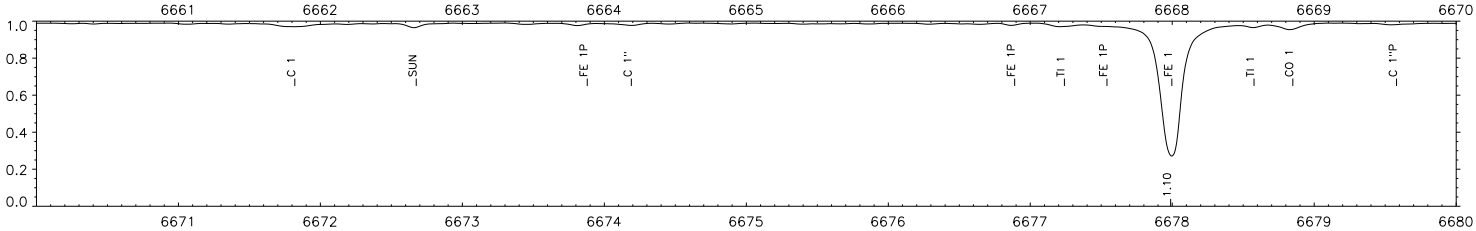
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FE 1P
C 1''
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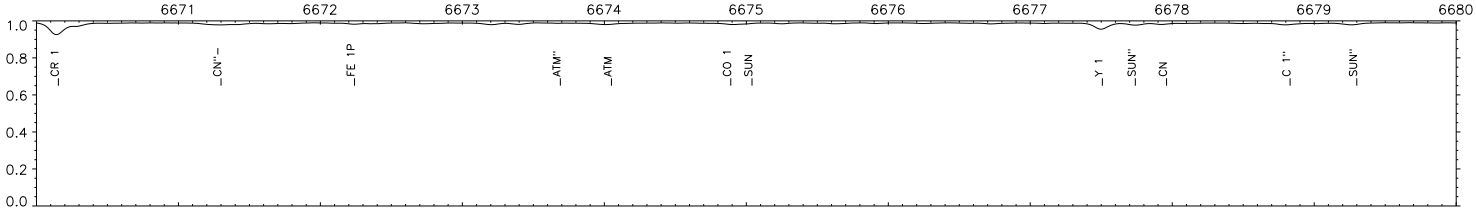
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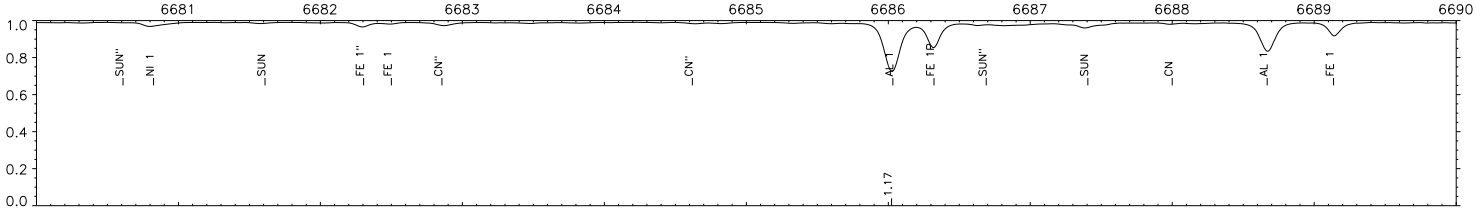
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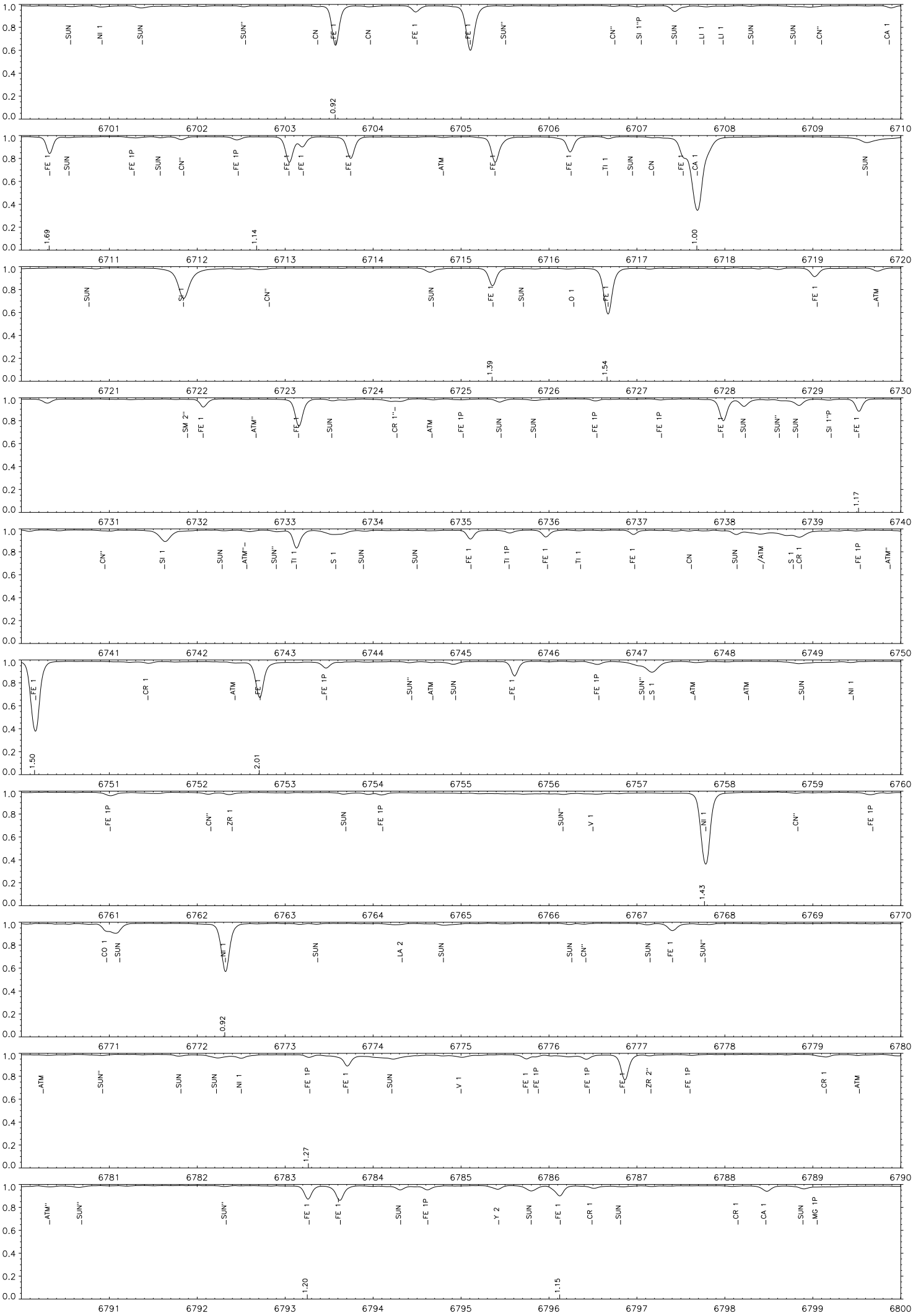
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SUN SI 1 CN'' SUN FE 1 SUN O 1 FE 1 FE 1 ATM
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SM 2'' FE 1 ATM'' FE 1 SUN CR 1''– ATM FE 1P SUN SUN FE 1P FE 1P FE 1 SUN SUN'' SUN SI 1''P FE 1
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CO 1 SUN NI 1 SUN LA 2 SUN SUN CN'' SUN FE 1 SUN''
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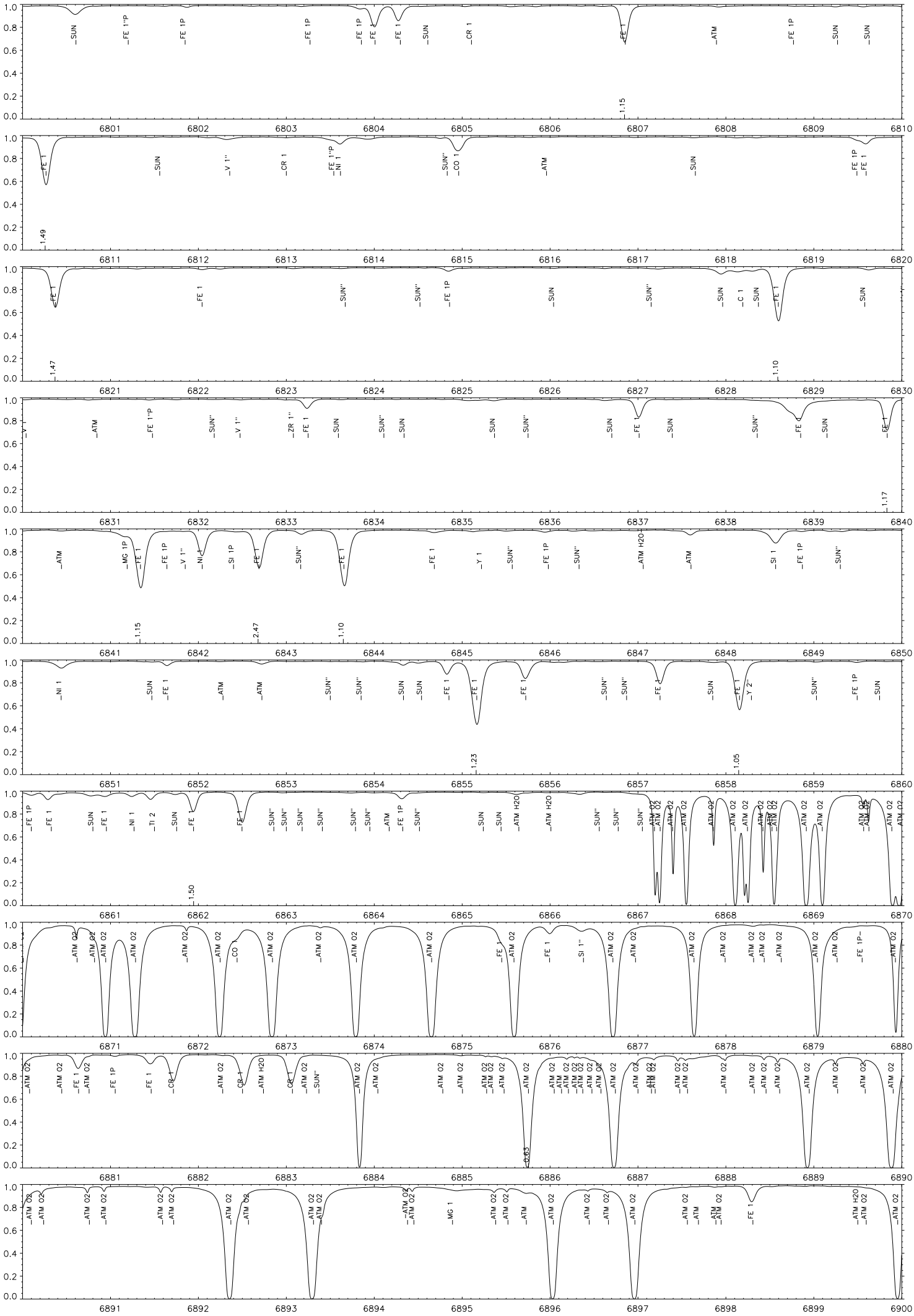
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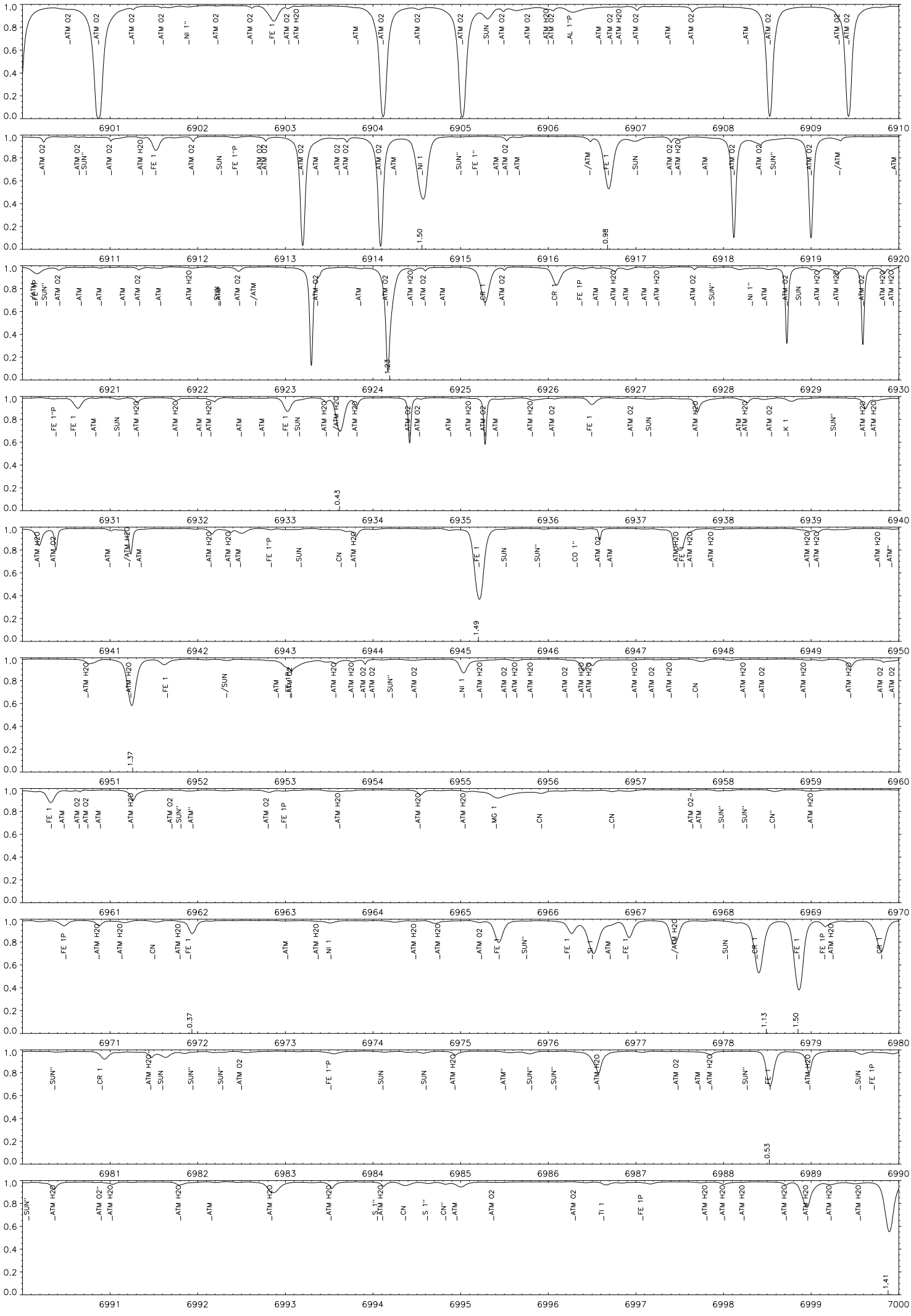
ATM O2 FE 1 ATM O2 FE 1P FE 1 CR 1 ATM O2 CR 1 ATM H2O CR 1 ATM O2 SUN" ATM O2 ATM O2 ATM O2 ATM O2 ATM O2 ATM O2 ATM O2 ATM O2 ATM O2 ATM O2 ATM O2 ATM O2 ATM O2 ATM O2 ATM O2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FE 1''P FE 1 ATM SUN ATM H2O ATM H2O ATM ATM H2O ATM ATM FE 1 SUN ATM H2O /ATM H2O ATM H2O 0.43 ATM O2 ATM O2 ATM ATM H2O ATM O2 ATM ATM H2O ATM O2 FE 1 ATM O2 SUN ATM H2O ATM ATM H2O ATM O2 K 1 SUN'' ATM H2O ATM H2O
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ATM H2O ATM O2 ATM ATM H2O ATM H2O FE 1 SUN ATM SUN ATM H2O ATM H2O ATM O2 ATM O2 SUN'' ATM O2 FE 1 1.49 SUN SUN'' CO 1'' ATM O2 ATM ATM H2O ATM H2O ATM H2O ATM H2O ATM H2O ATM H2O ATM''
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ATM H2O ATM H2O FE 1 SUN ATM ATM H2O ATM H2O ATM O2 ATM O2 SUN'' ATM O2 NI 1 ATM H2O ATM O2 ATM H2O ATM H2O ATM O2 ATM H2O ATM H2O ATM H2O ATM O2 ATM H2O ATM H2O ATM H2O CN ATM H2O ATM O2 ATM H2O ATM H2O ATM O2 ATM O2
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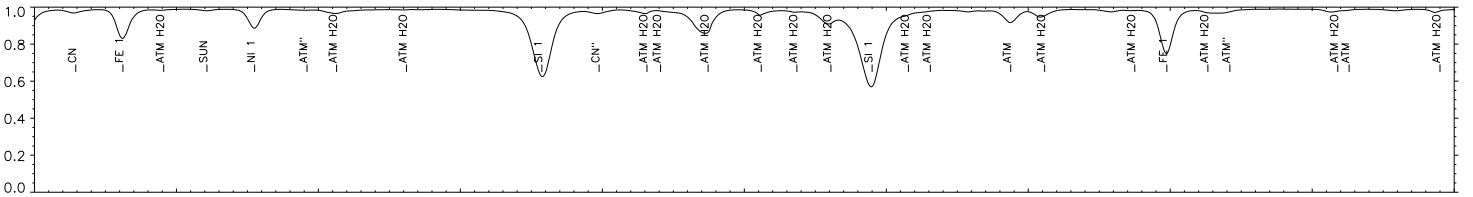
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CN''
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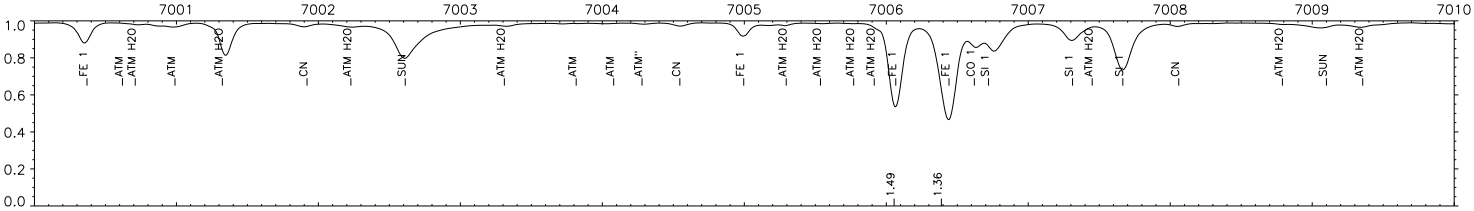
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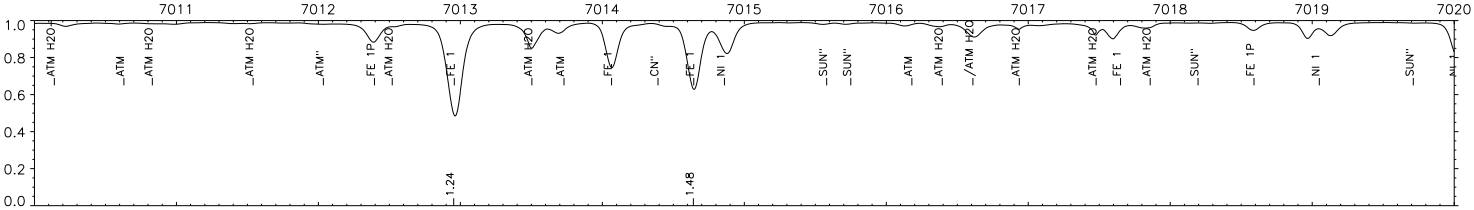
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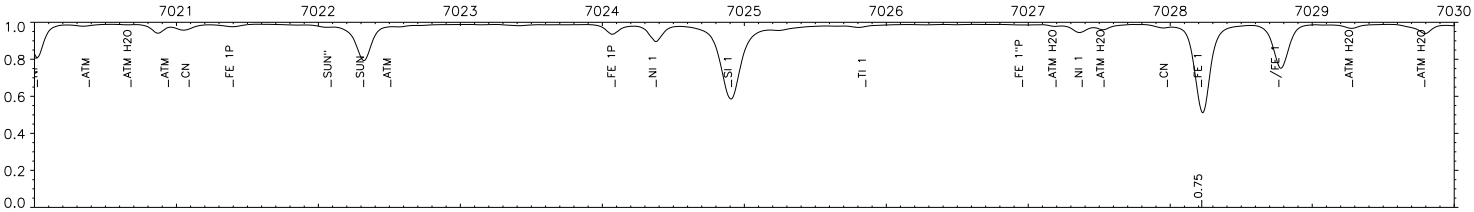
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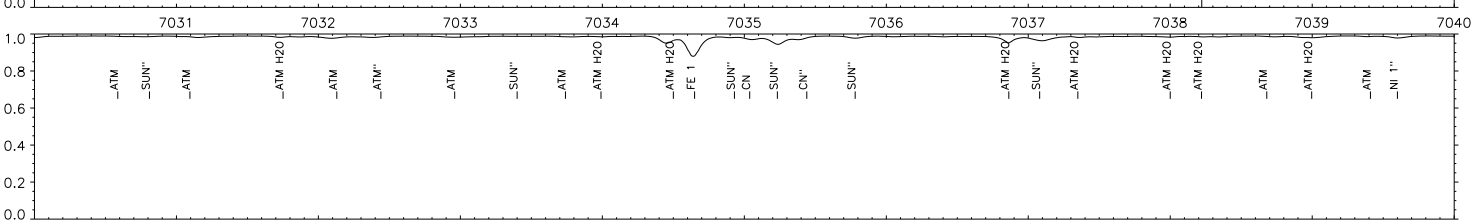
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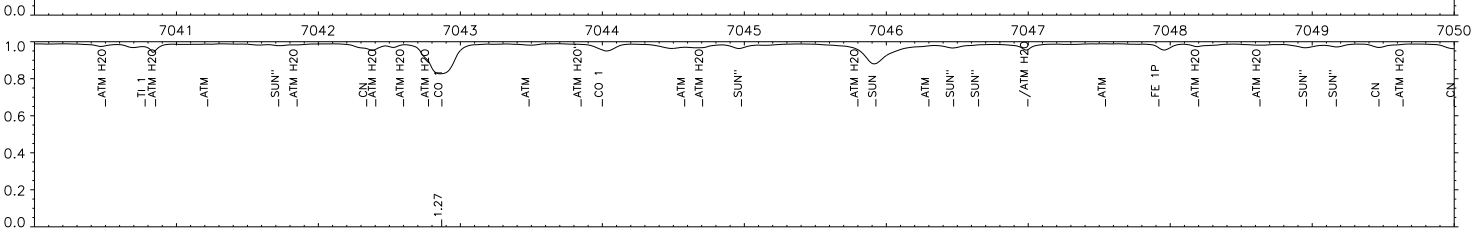
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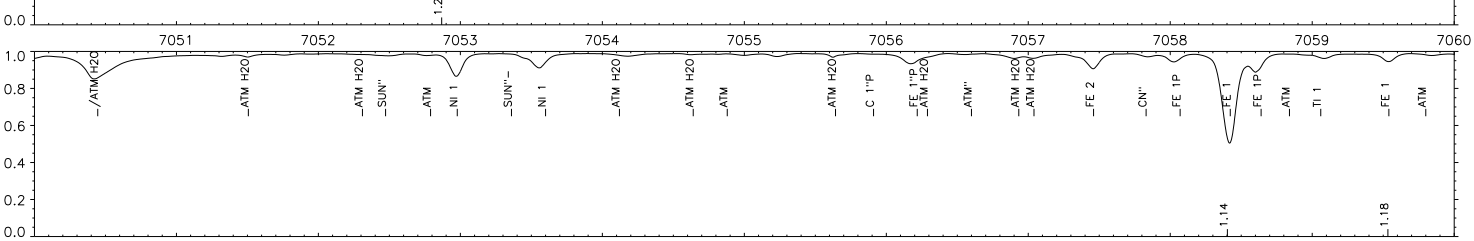
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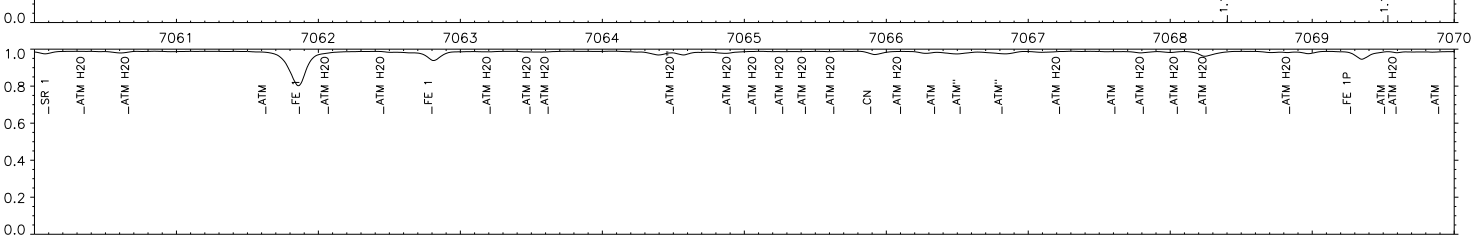
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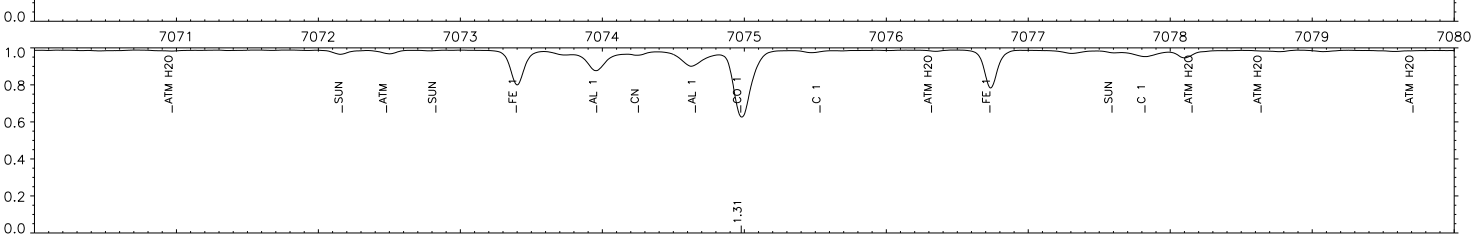
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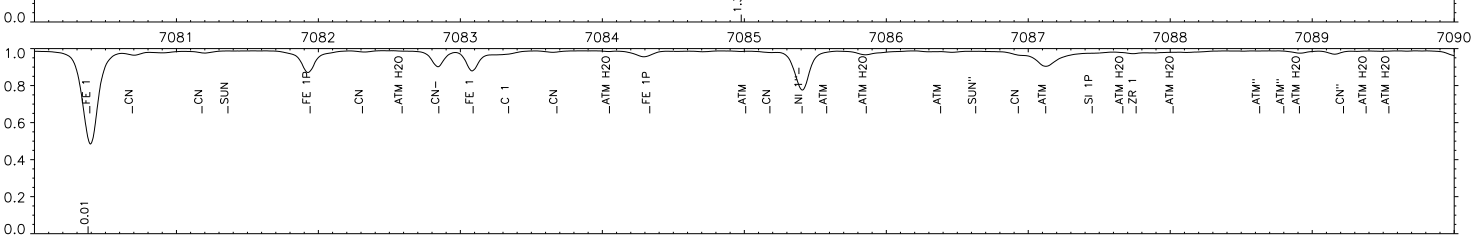
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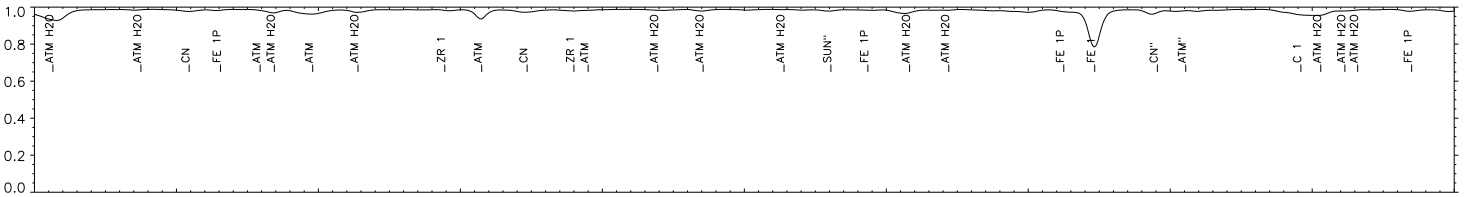
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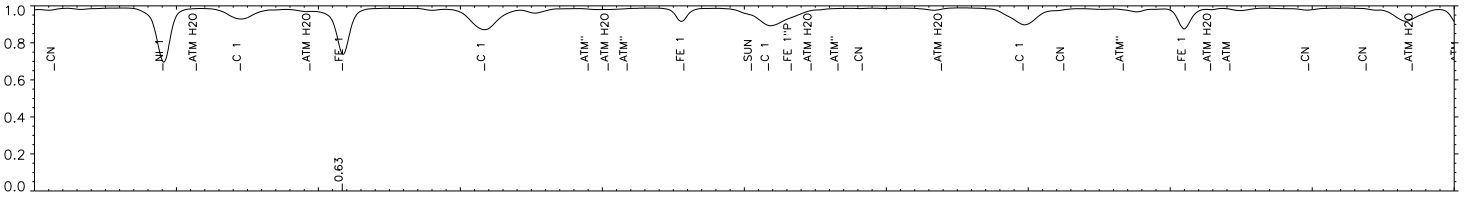
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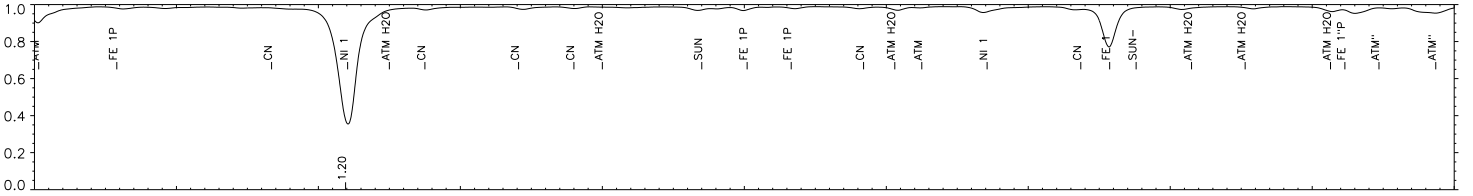
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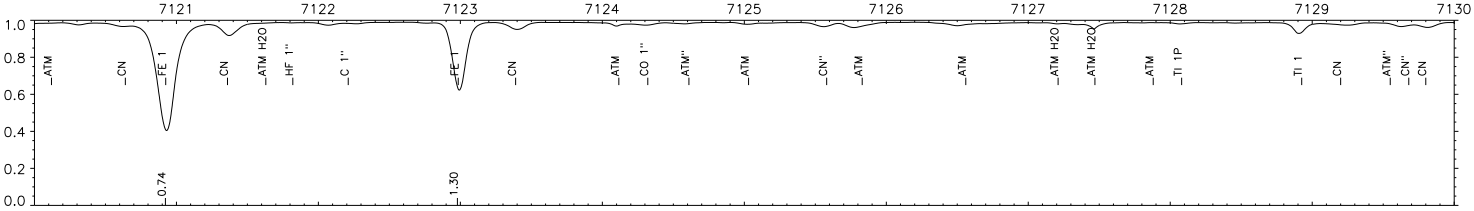
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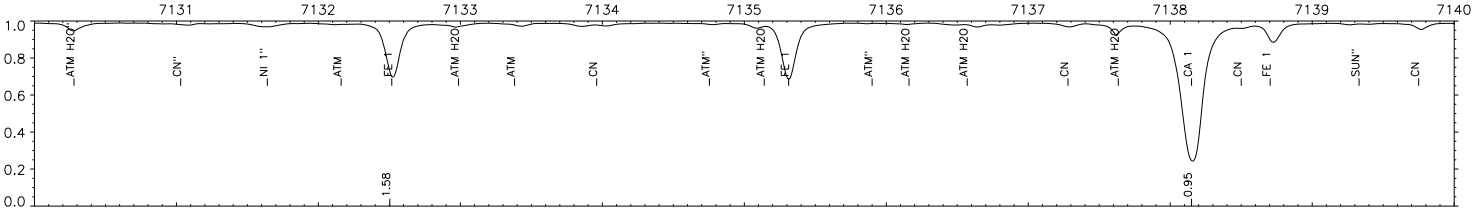
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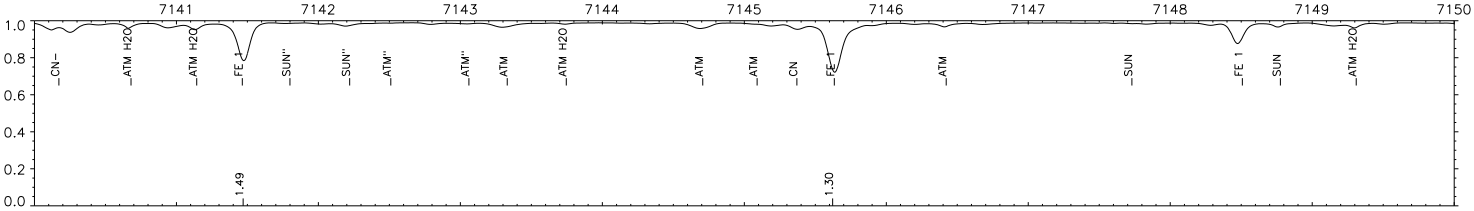
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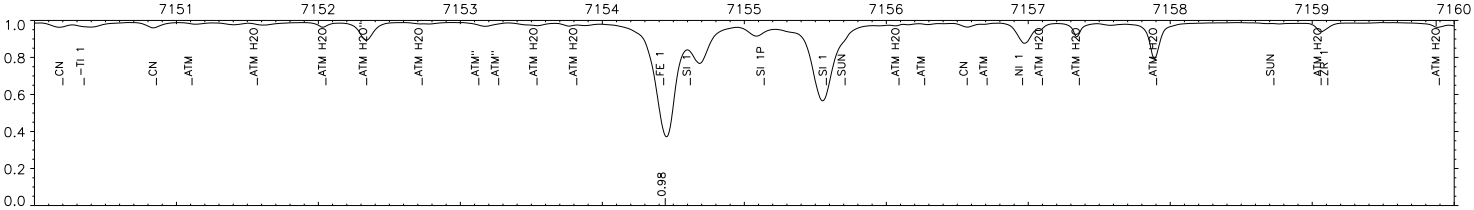
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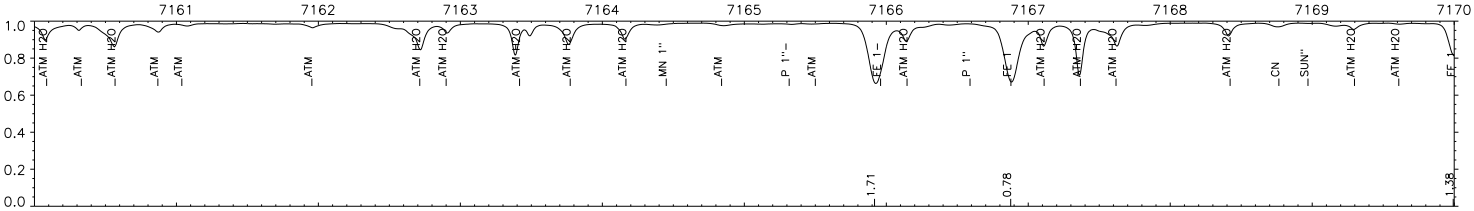
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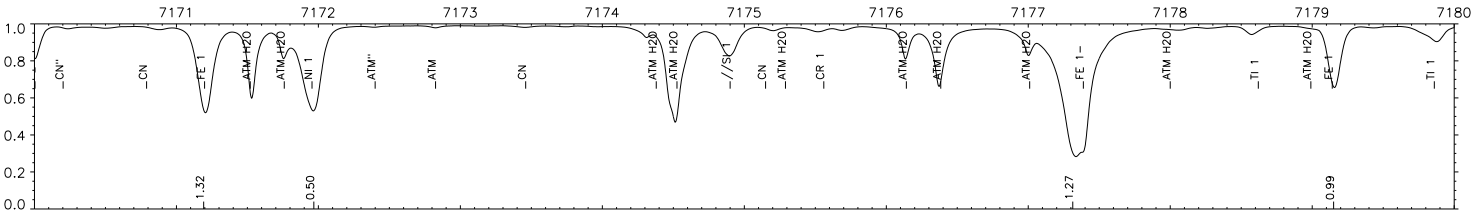
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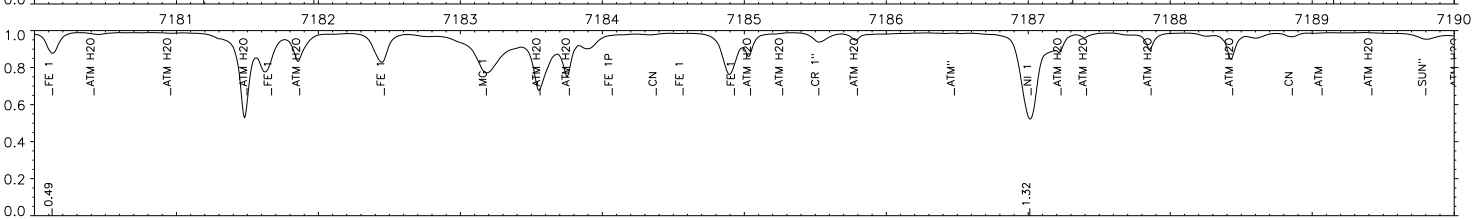
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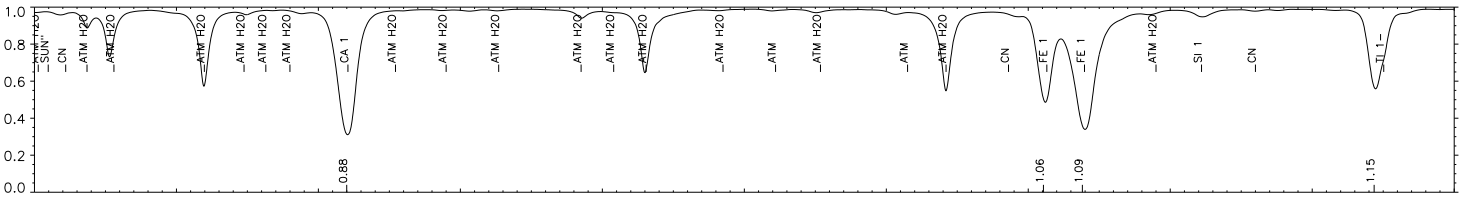
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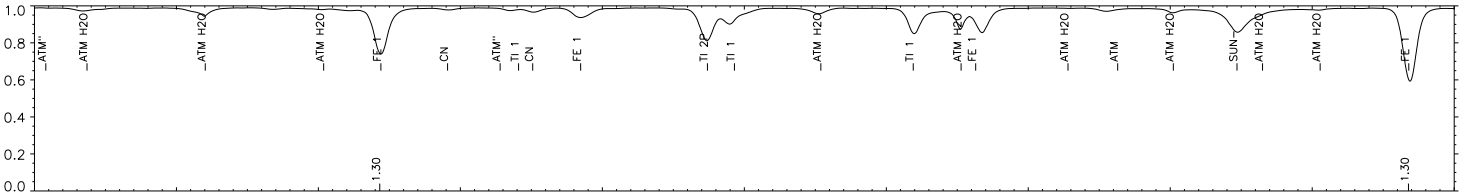
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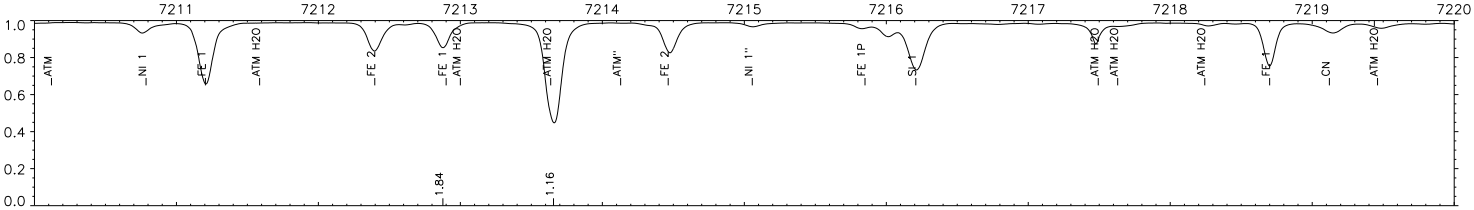
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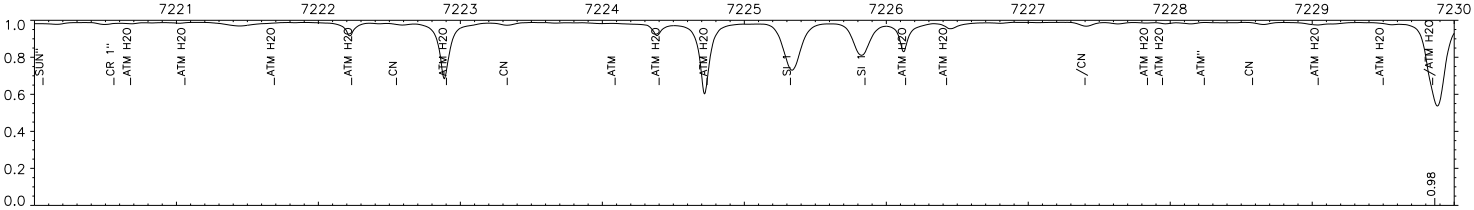
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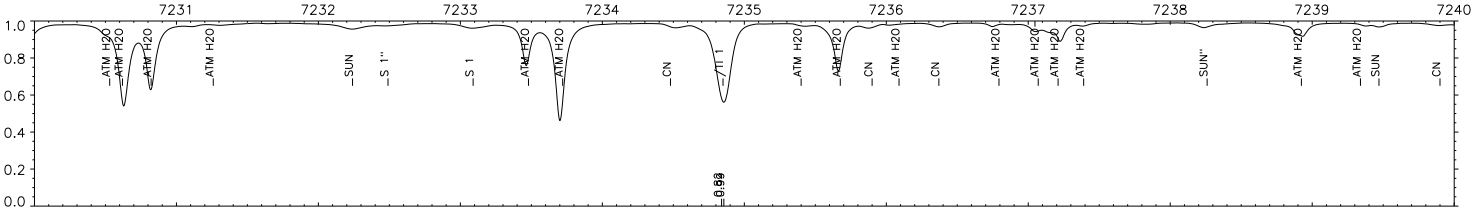
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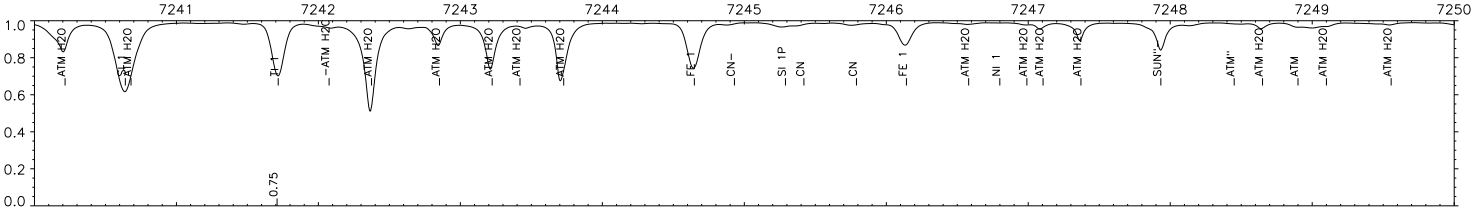
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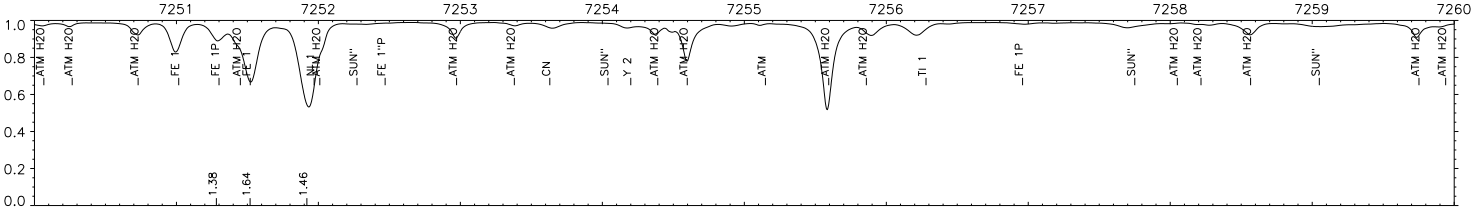
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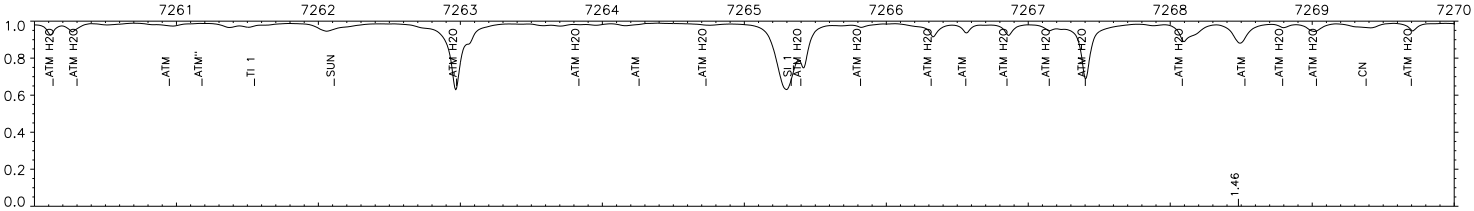
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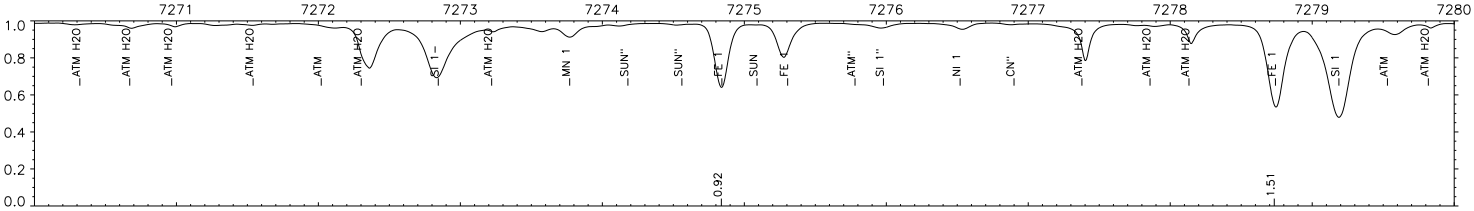
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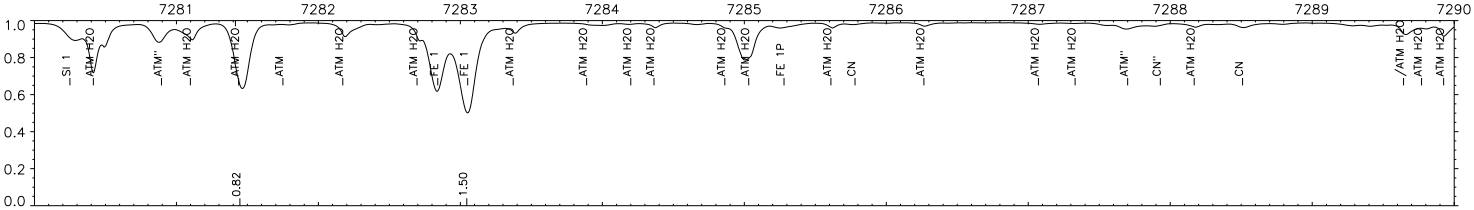
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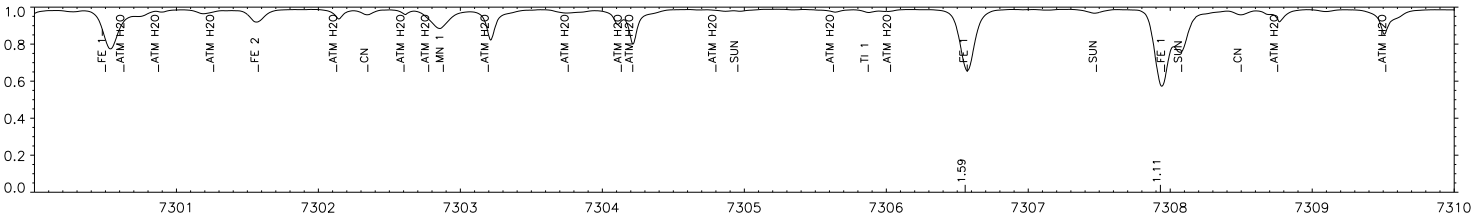
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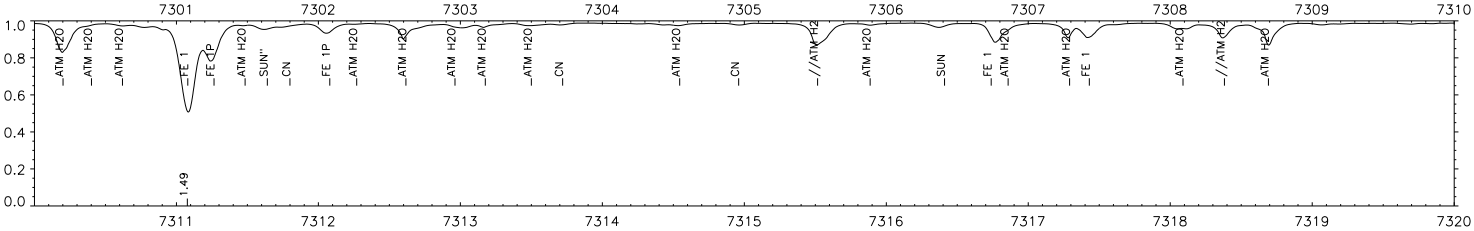
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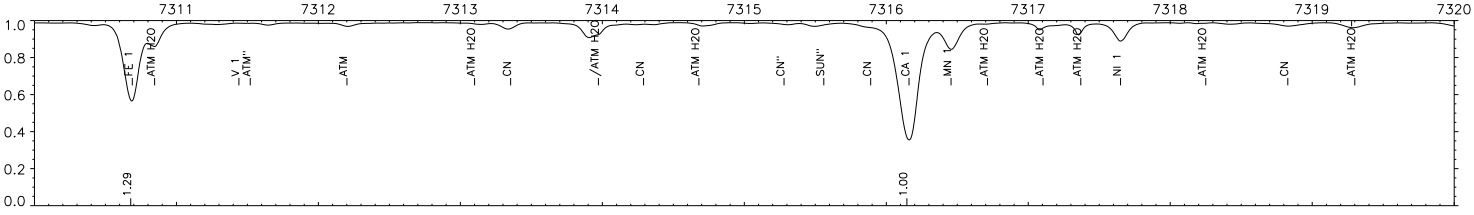
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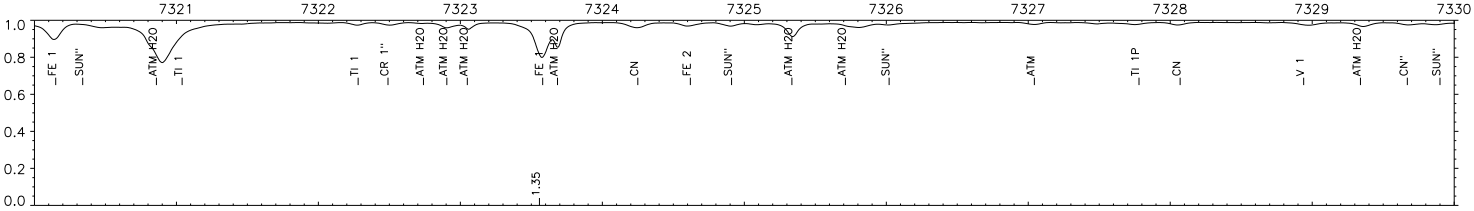
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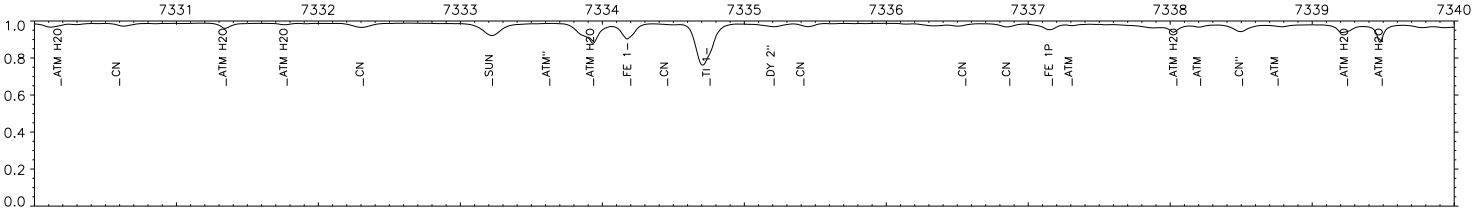
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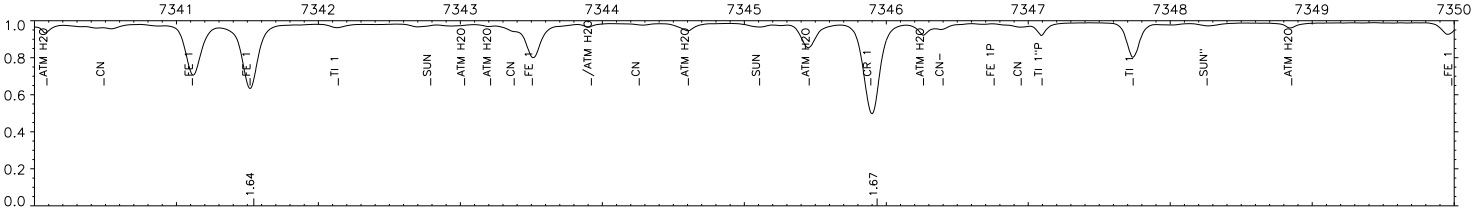
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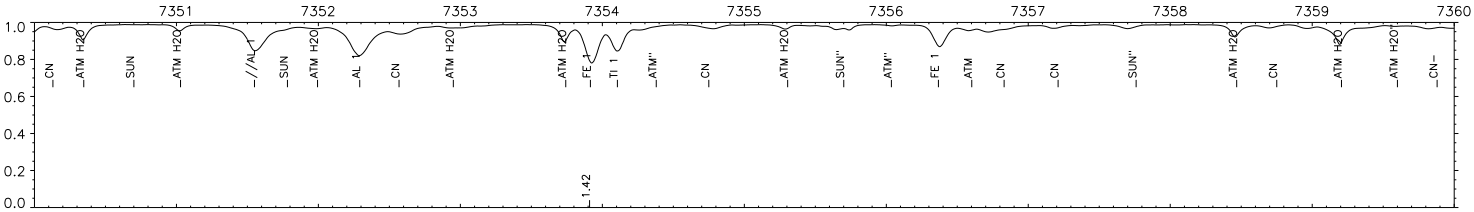
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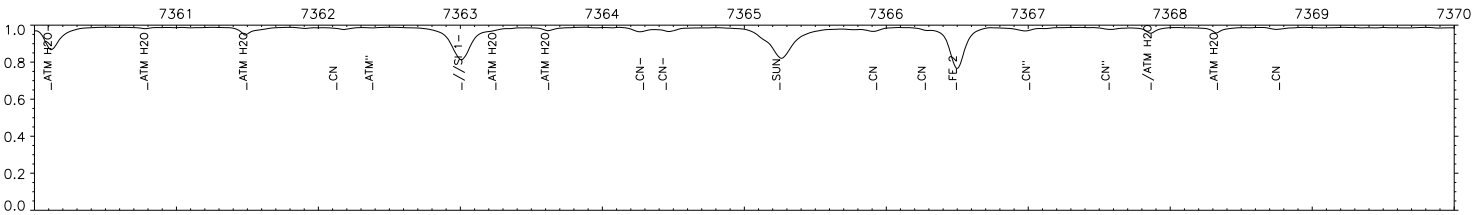
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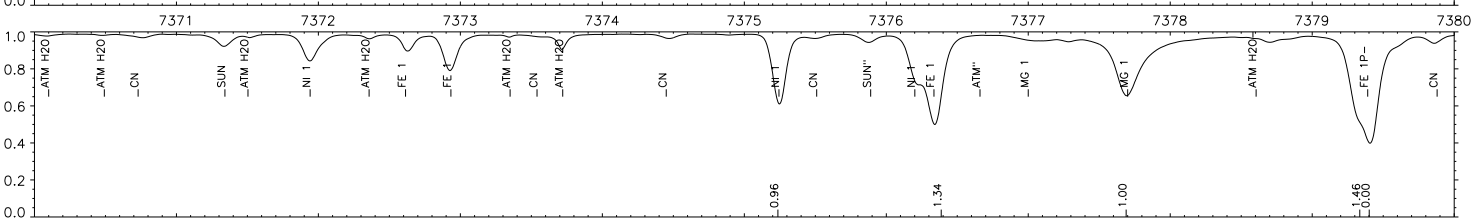
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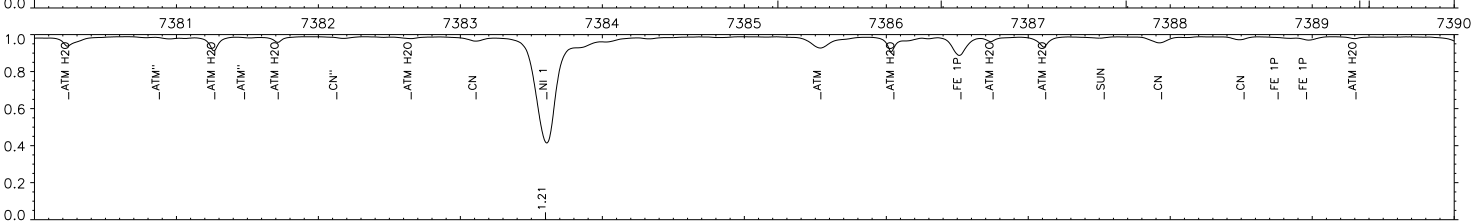
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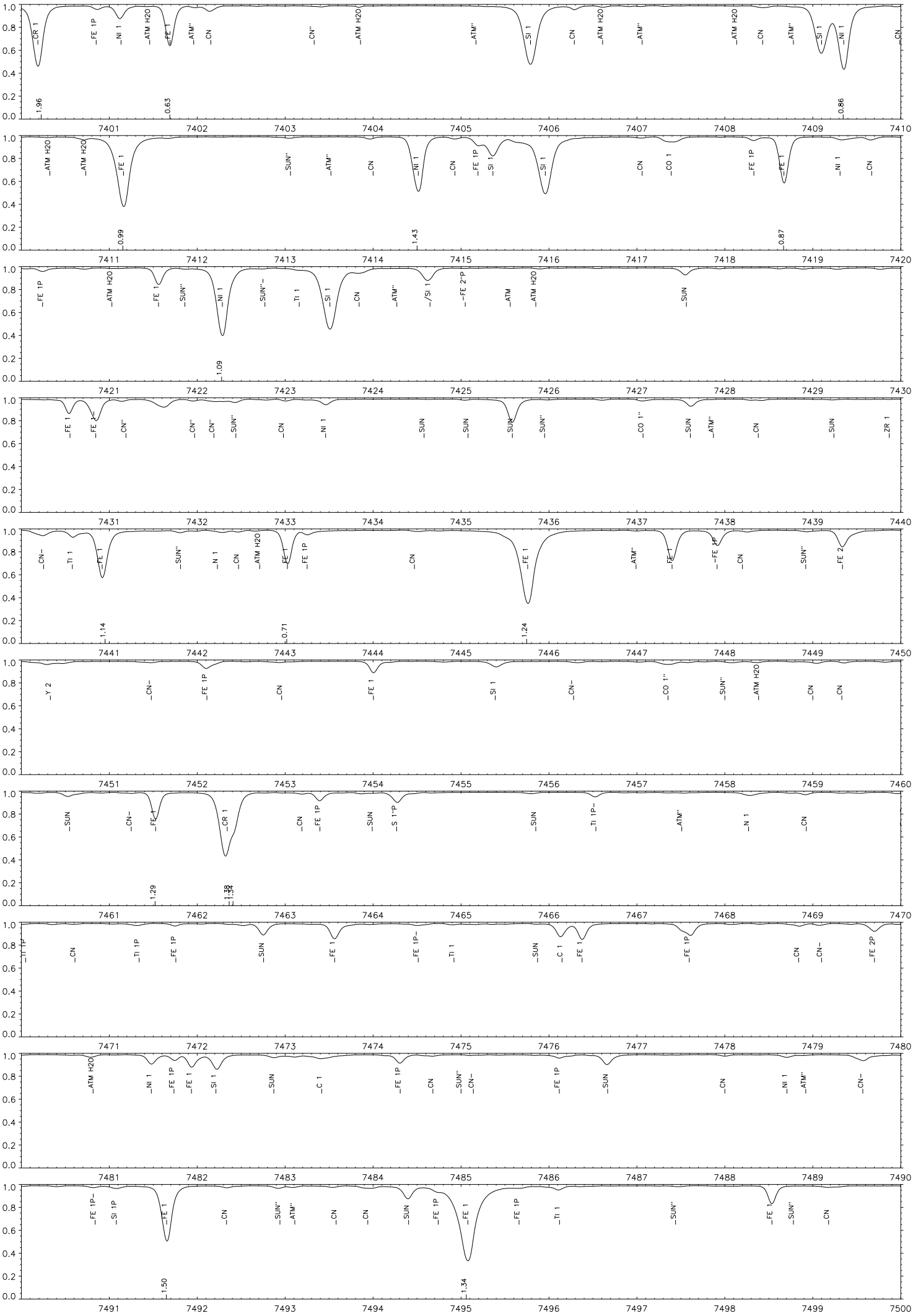
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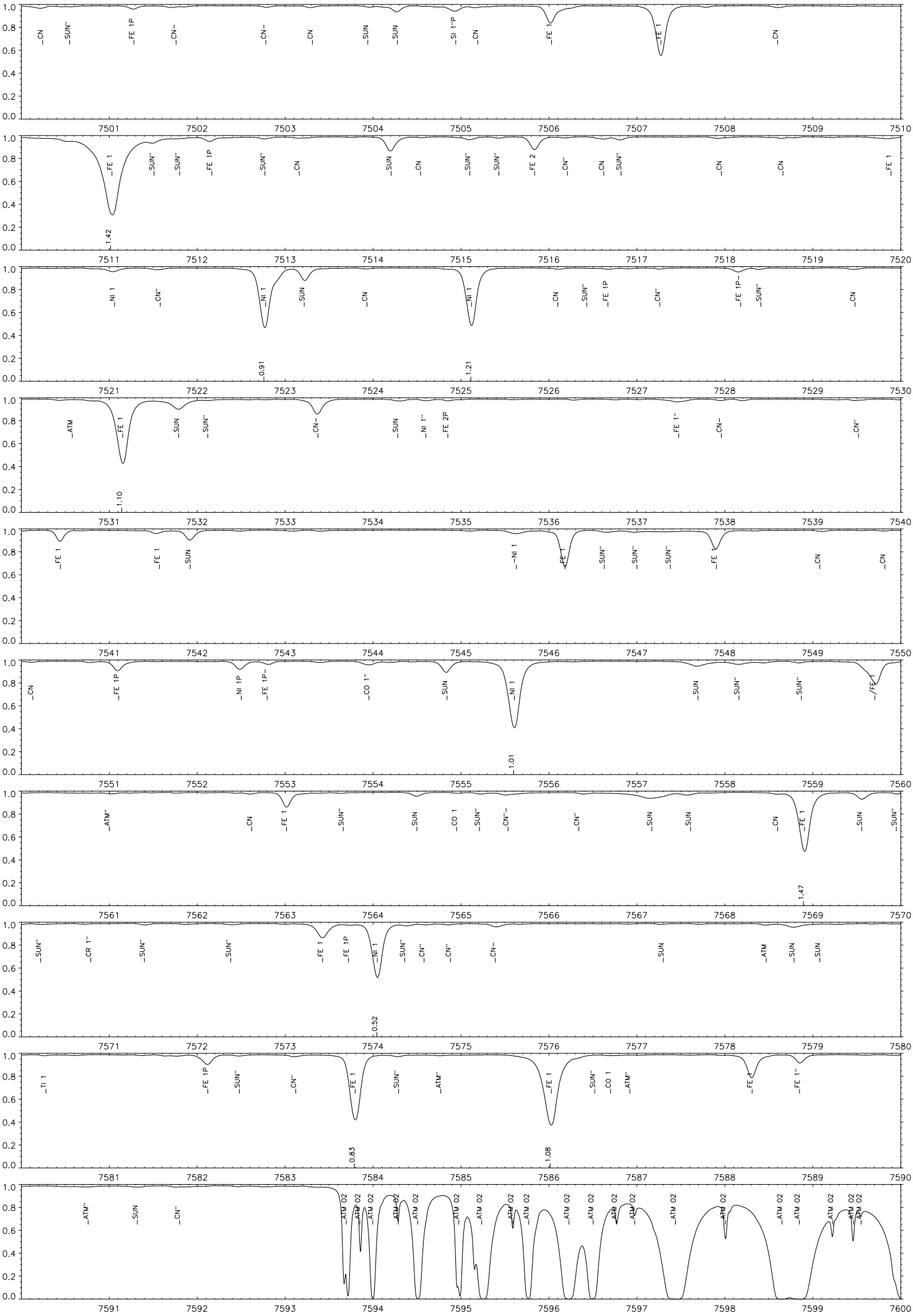
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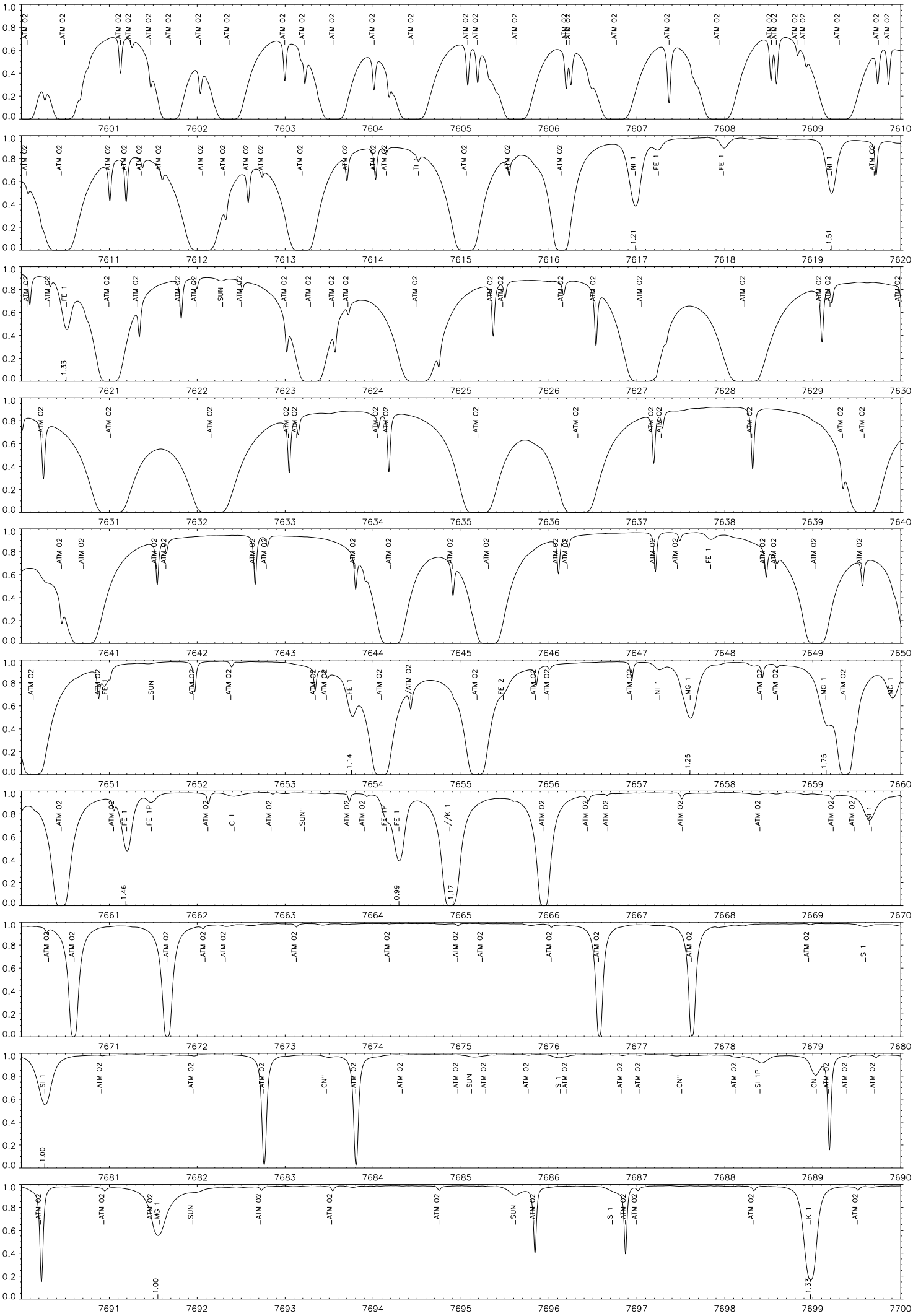
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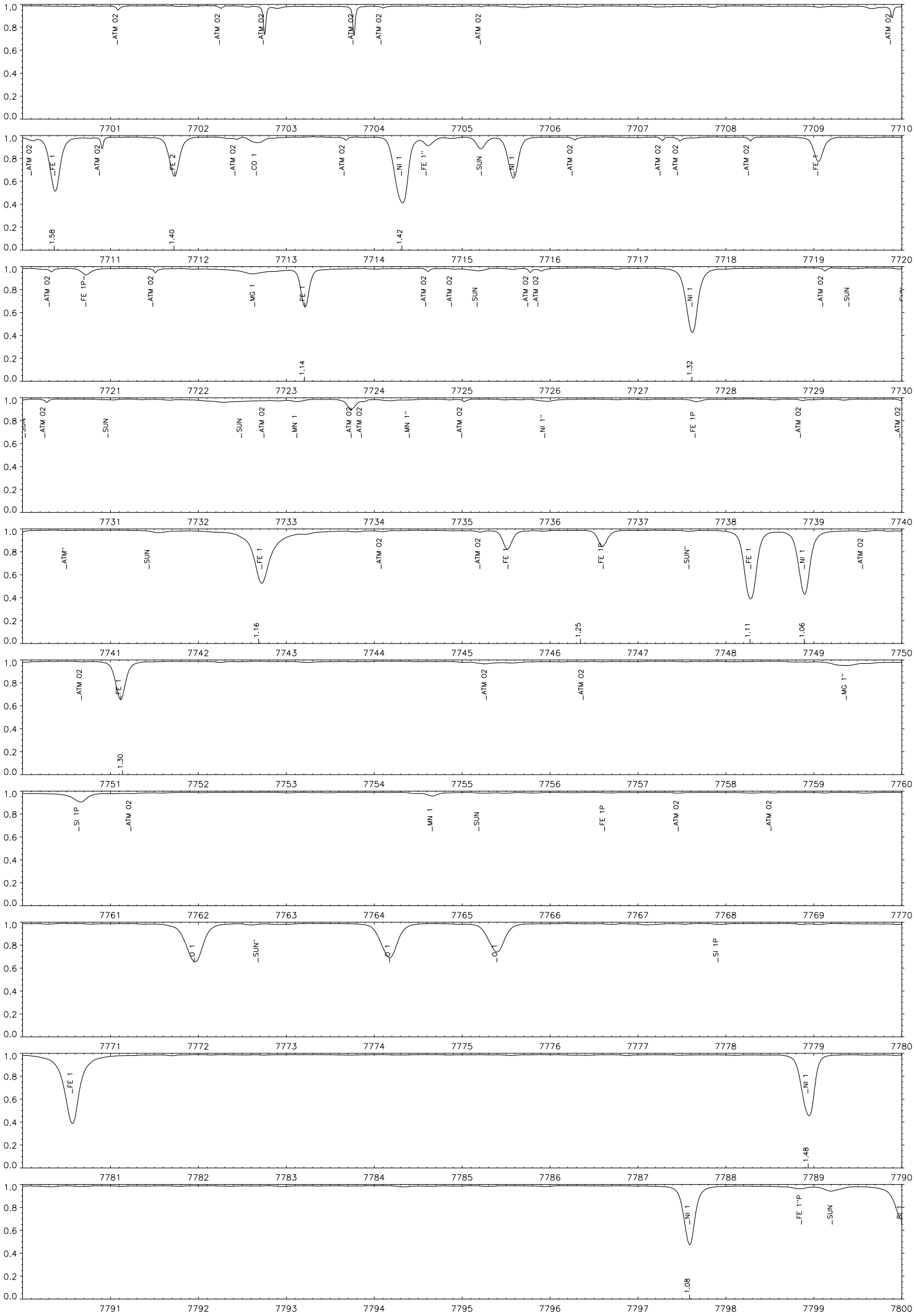
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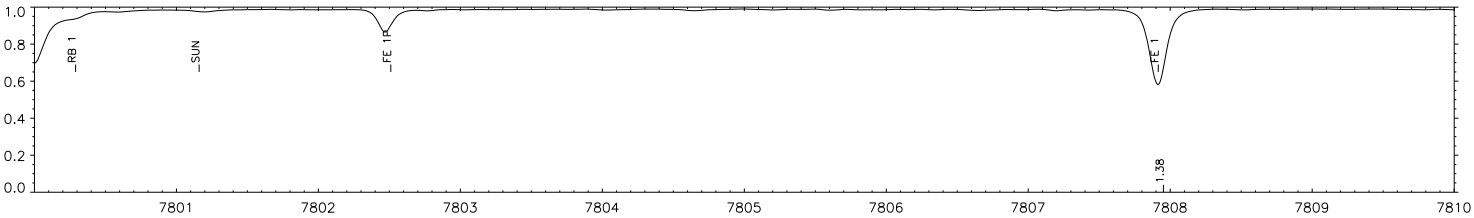
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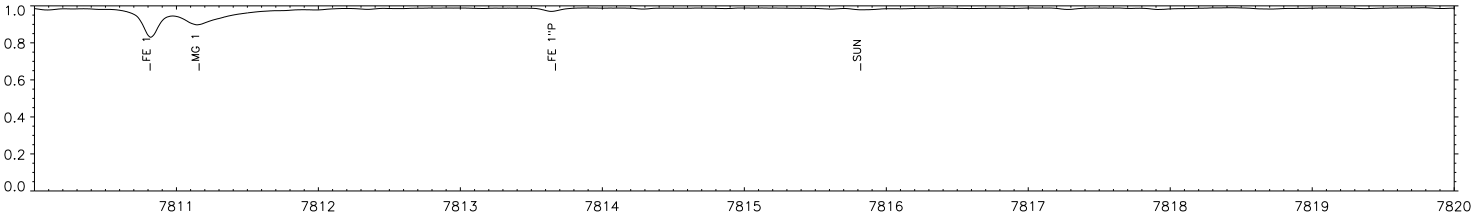
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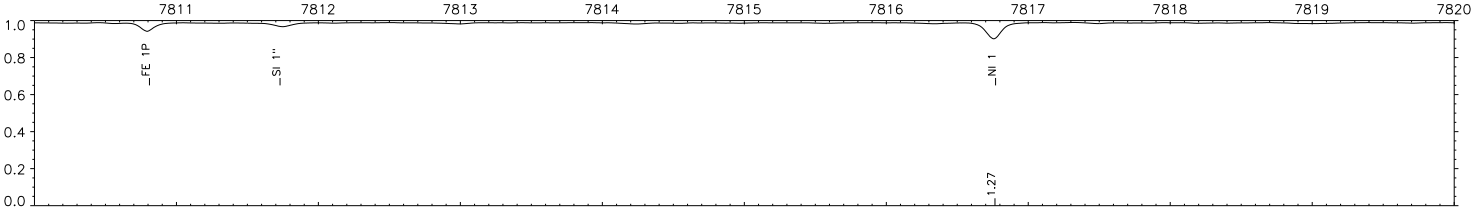
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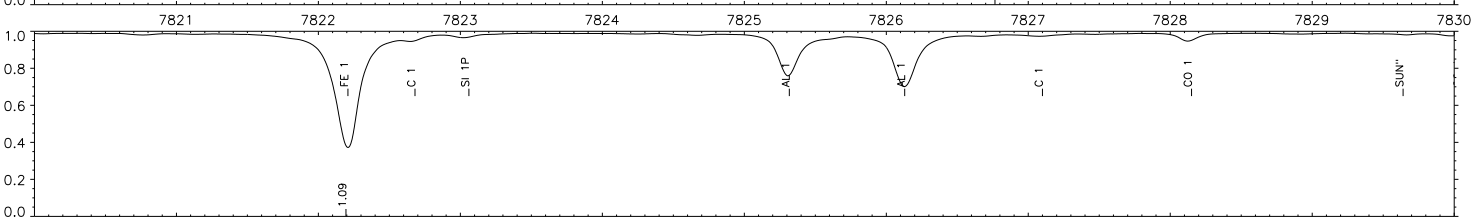
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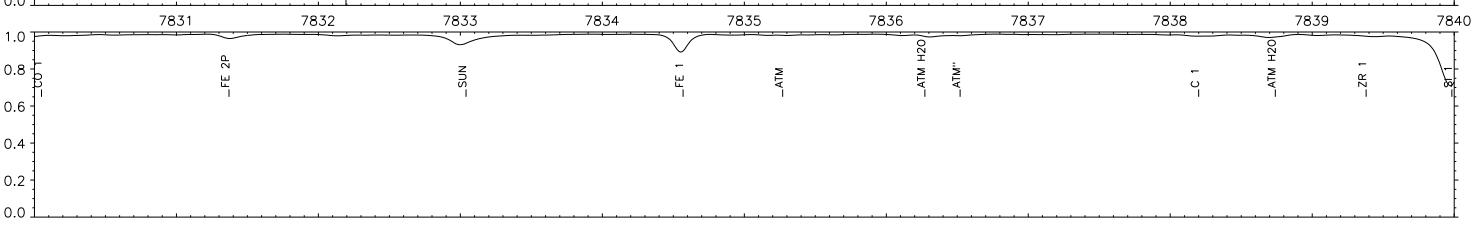
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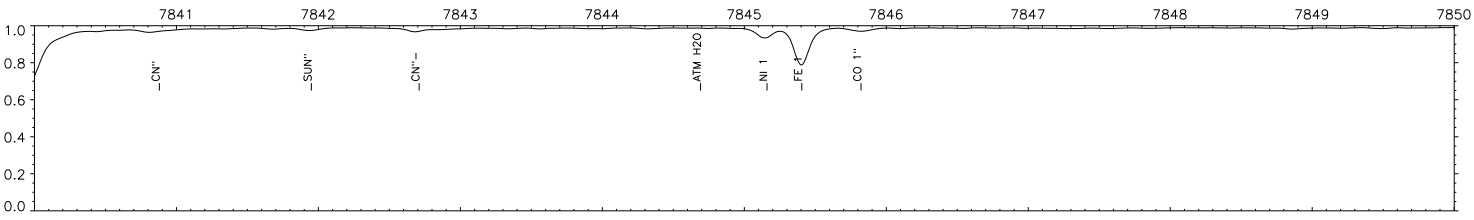
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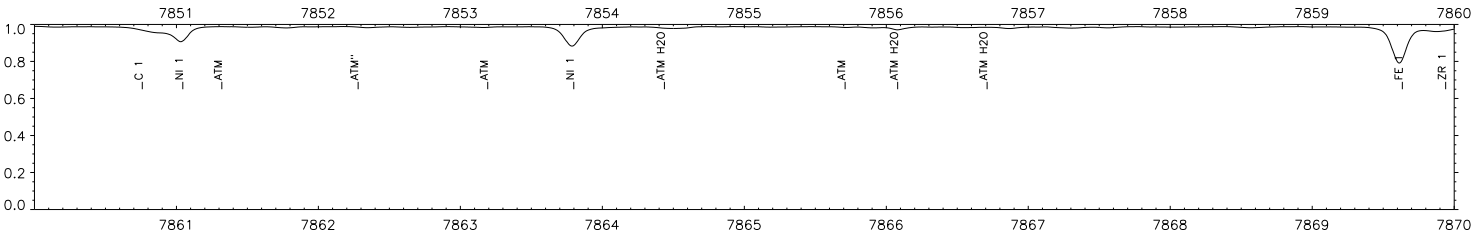
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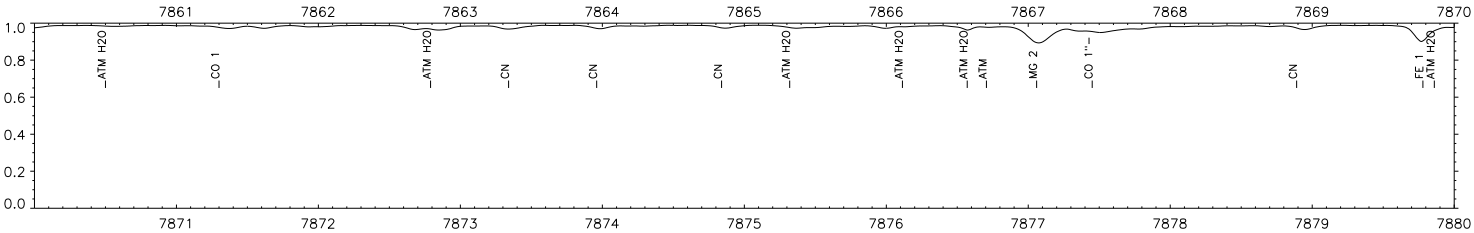
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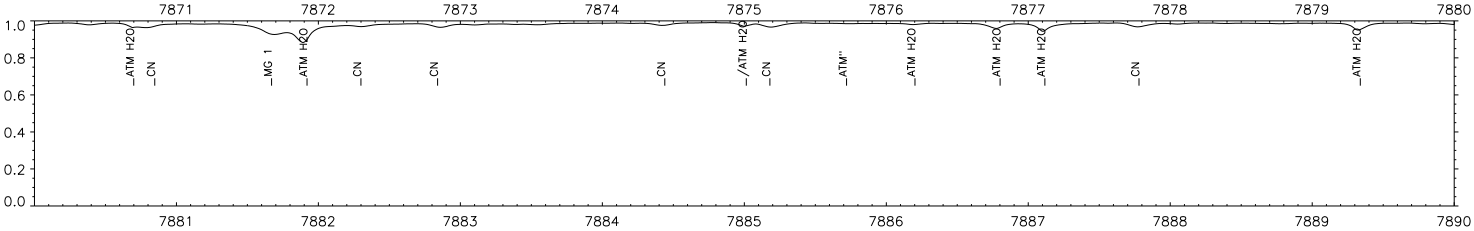
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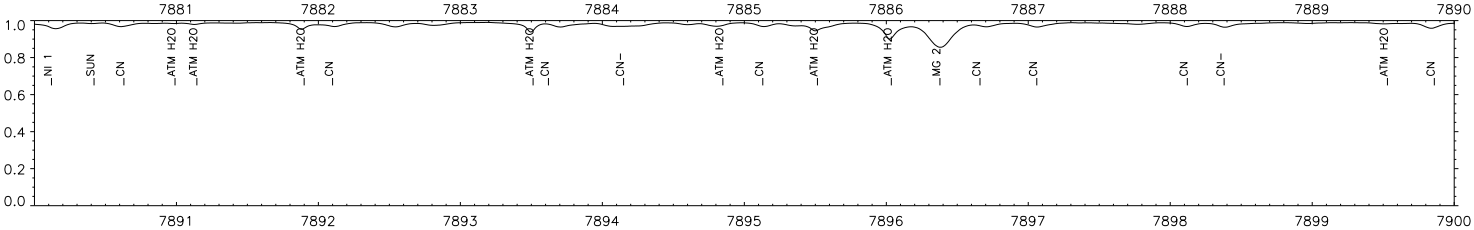
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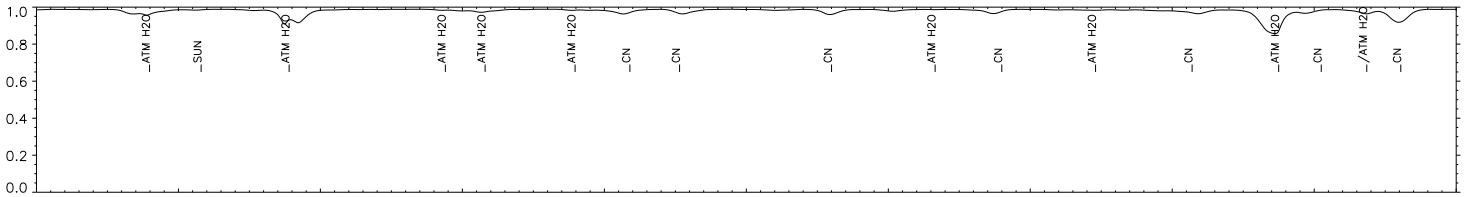
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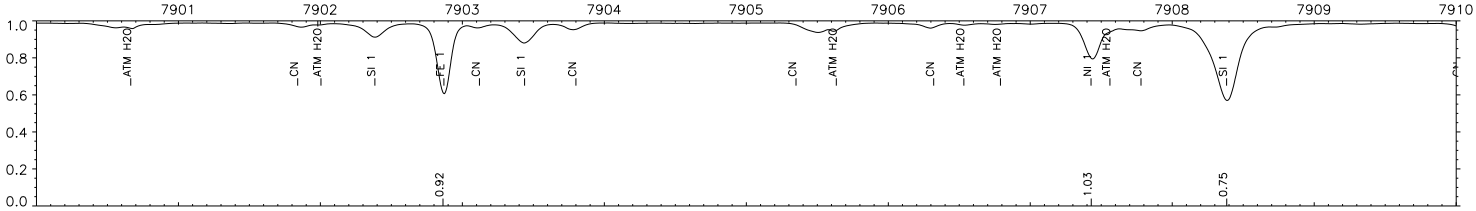
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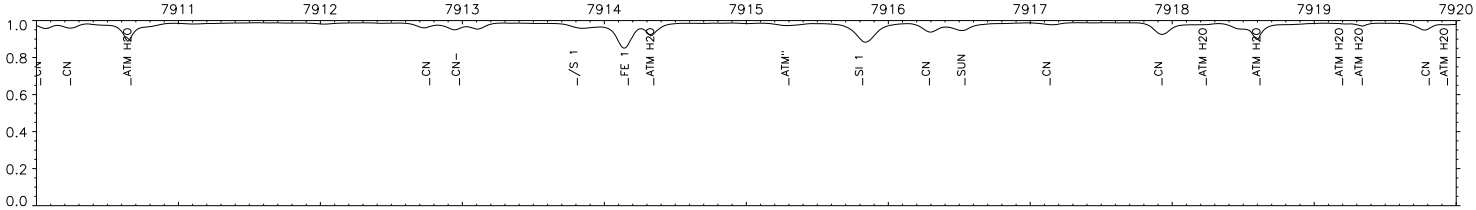
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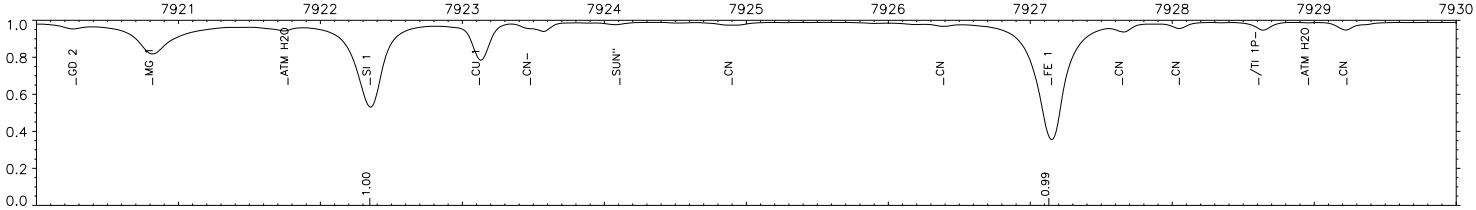
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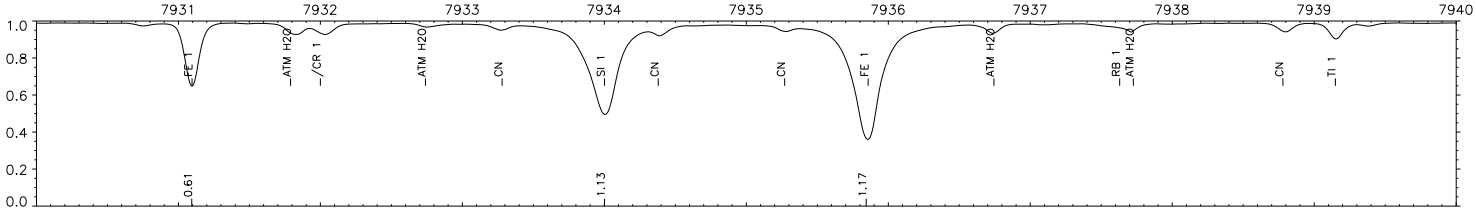
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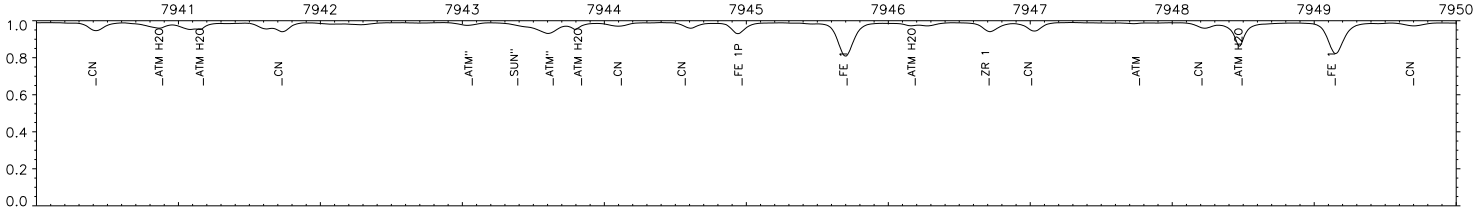
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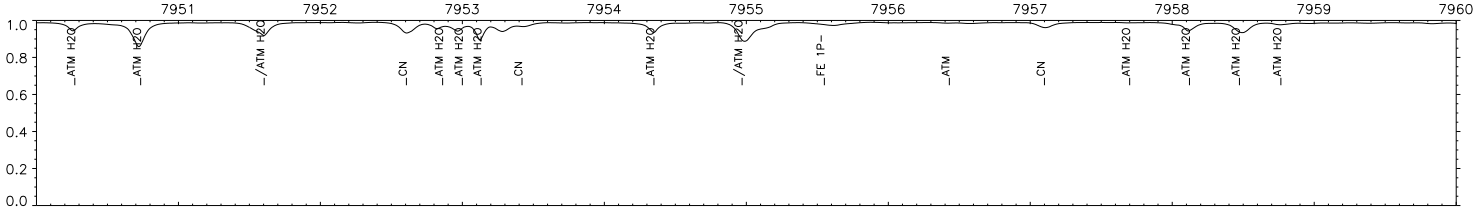
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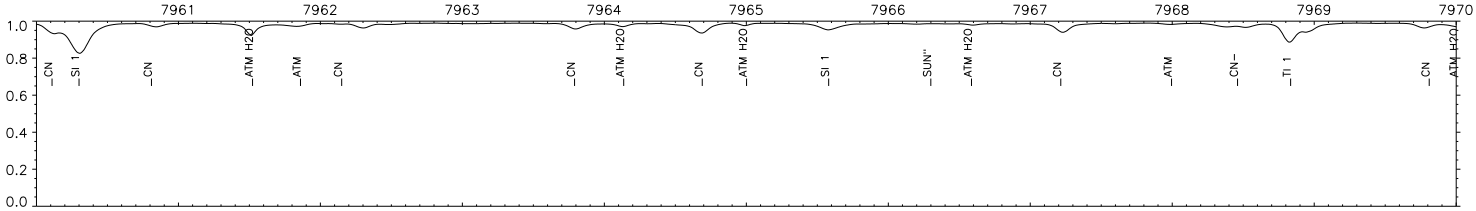
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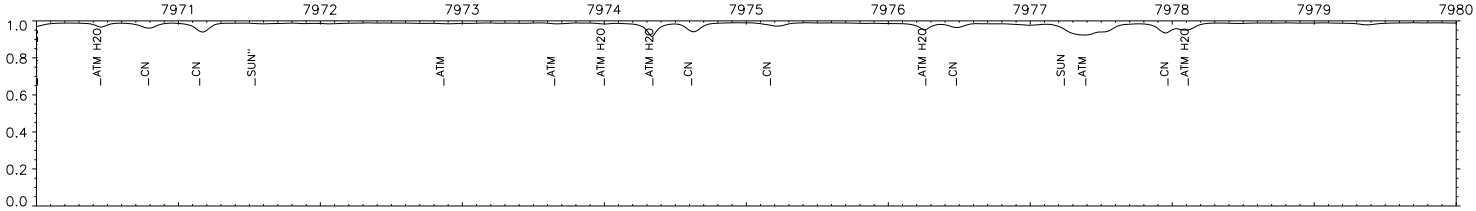
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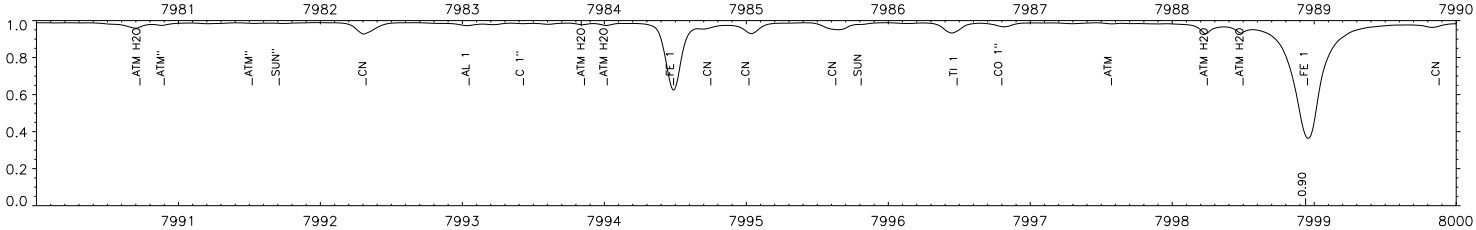
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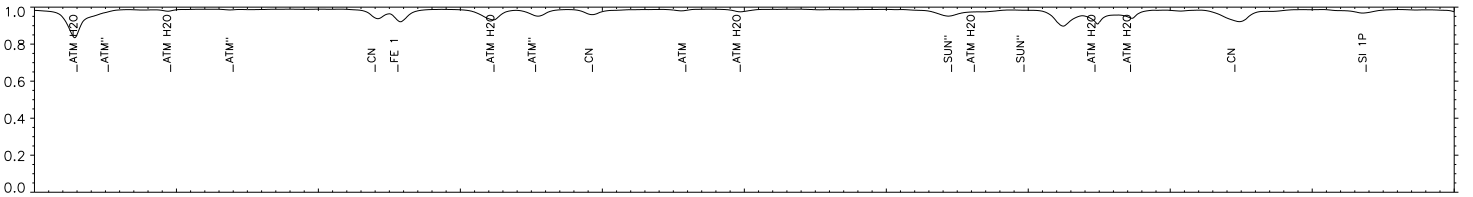
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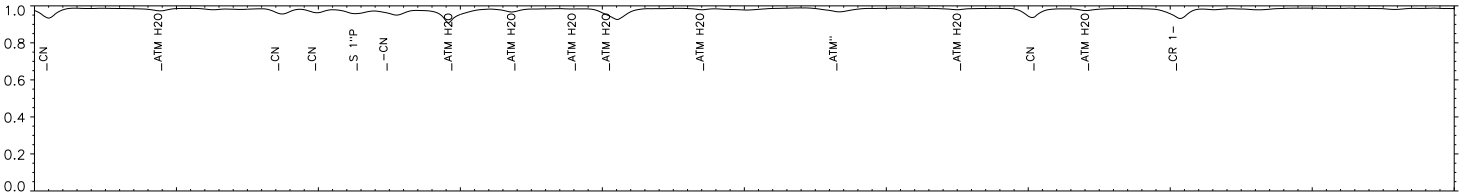
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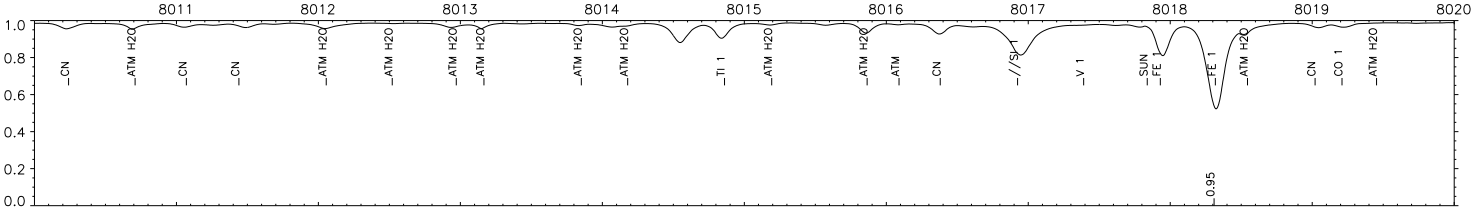
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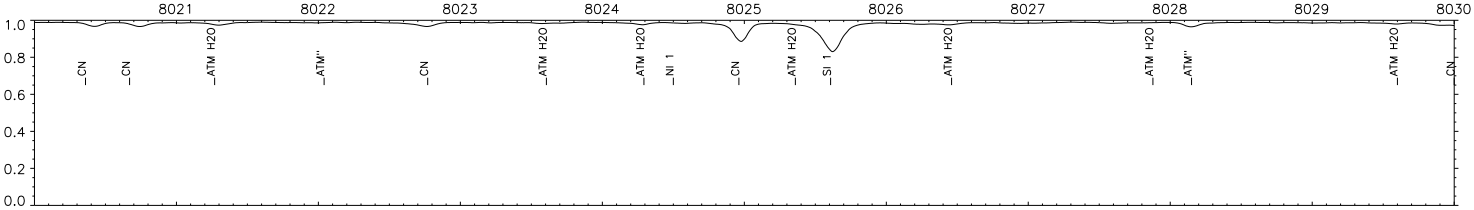
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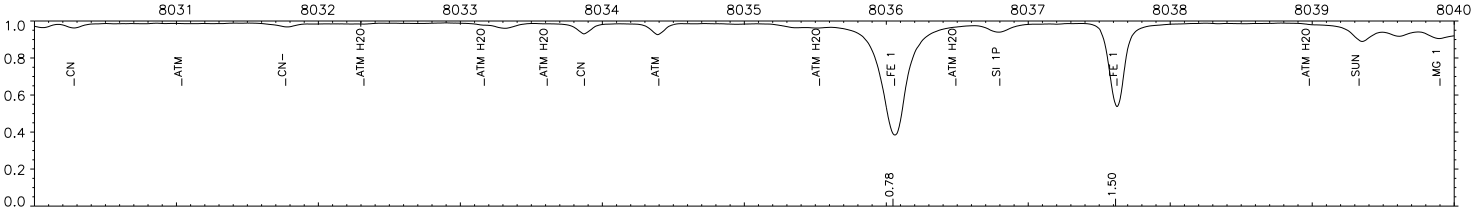
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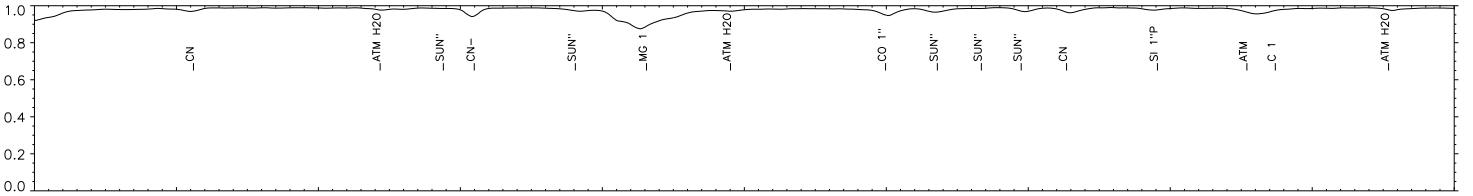
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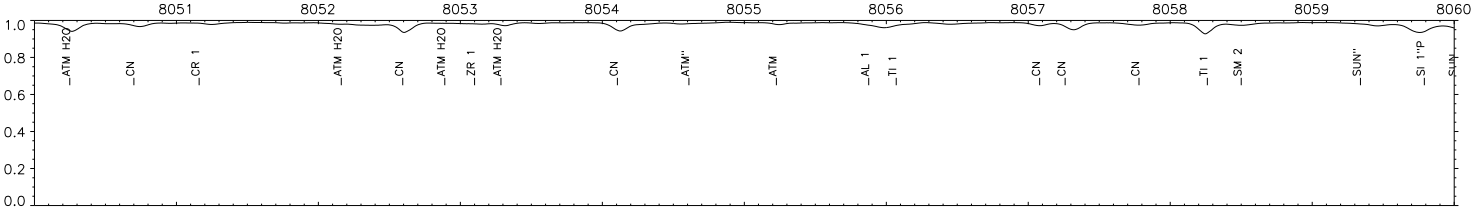
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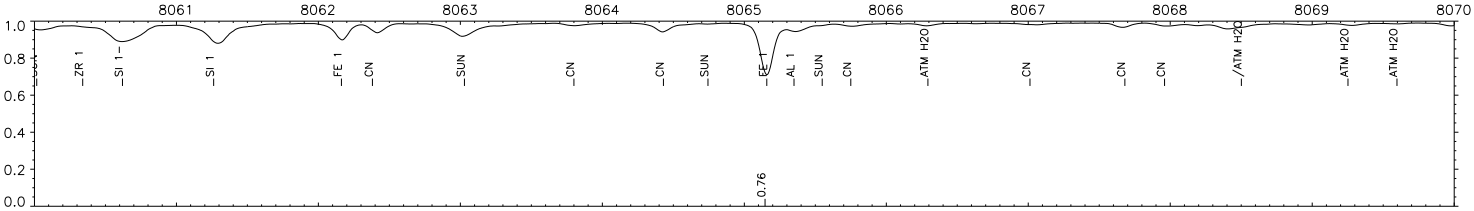
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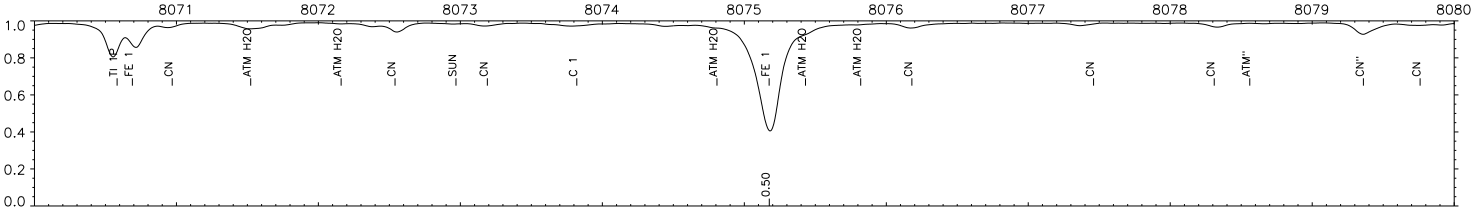
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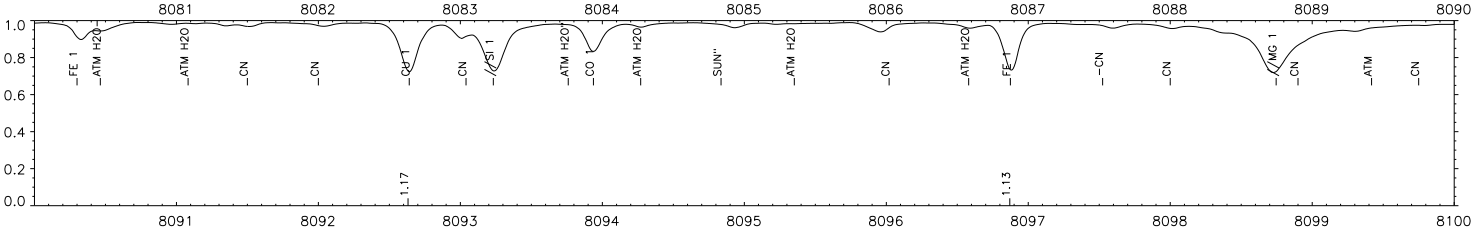
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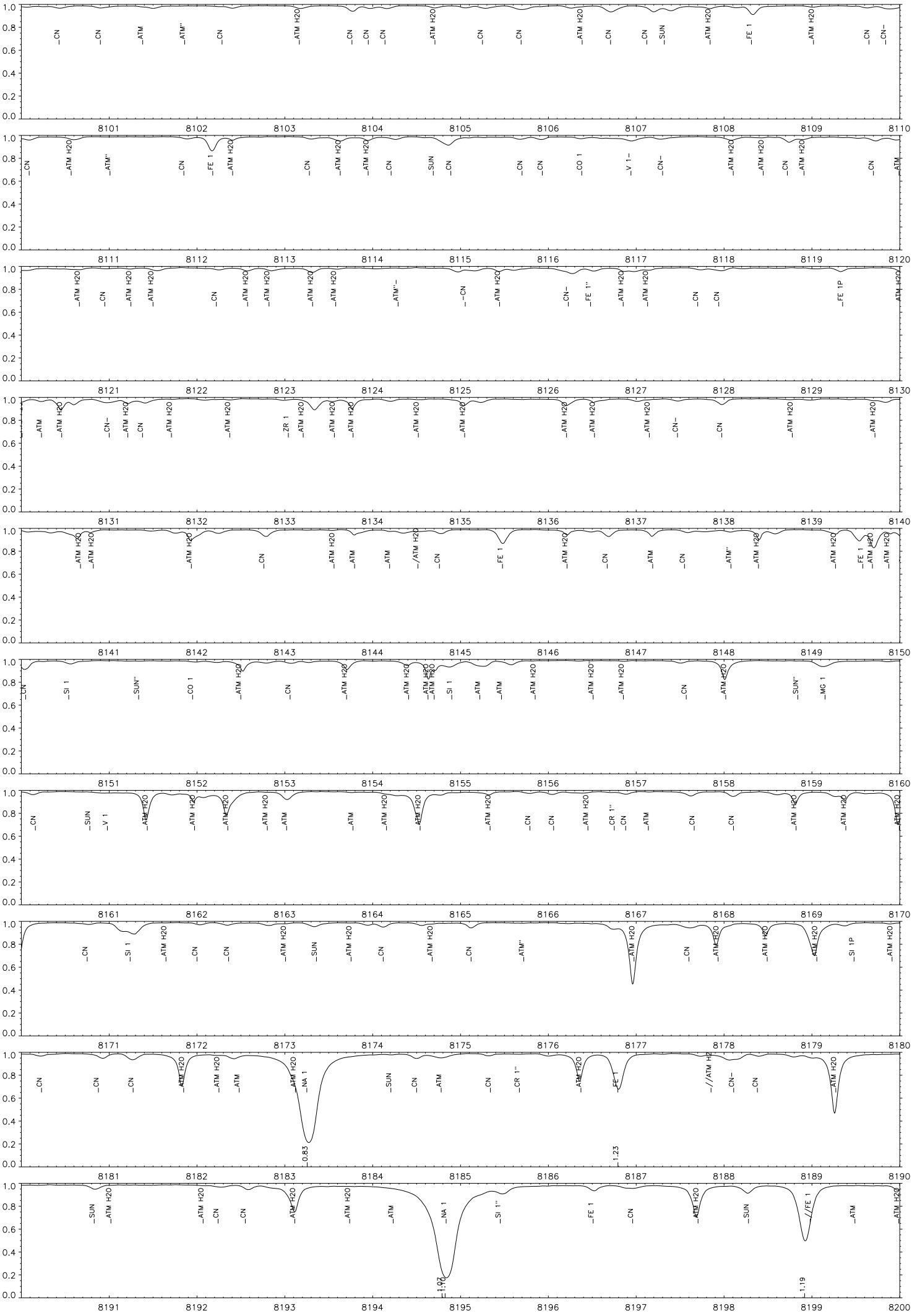
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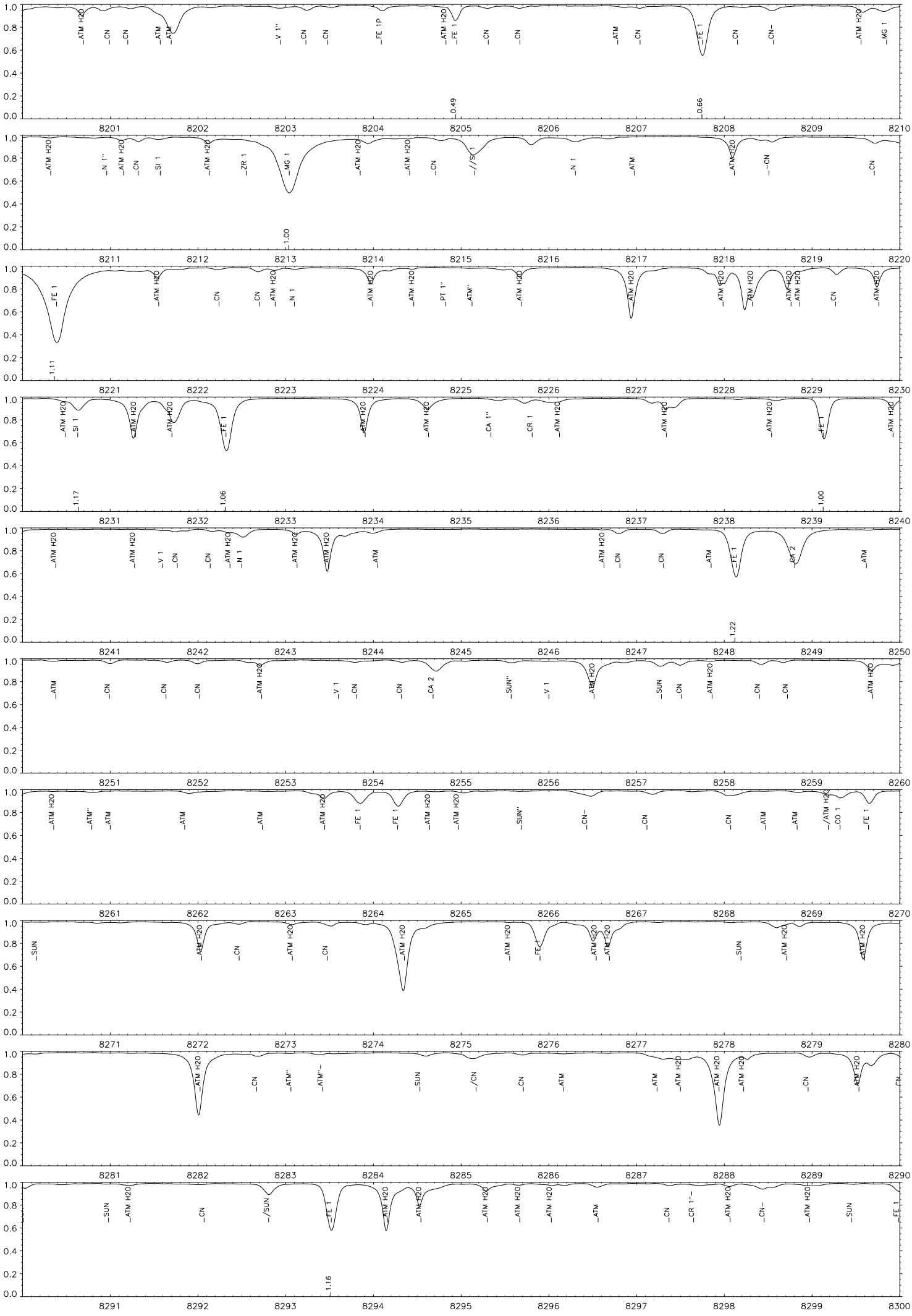
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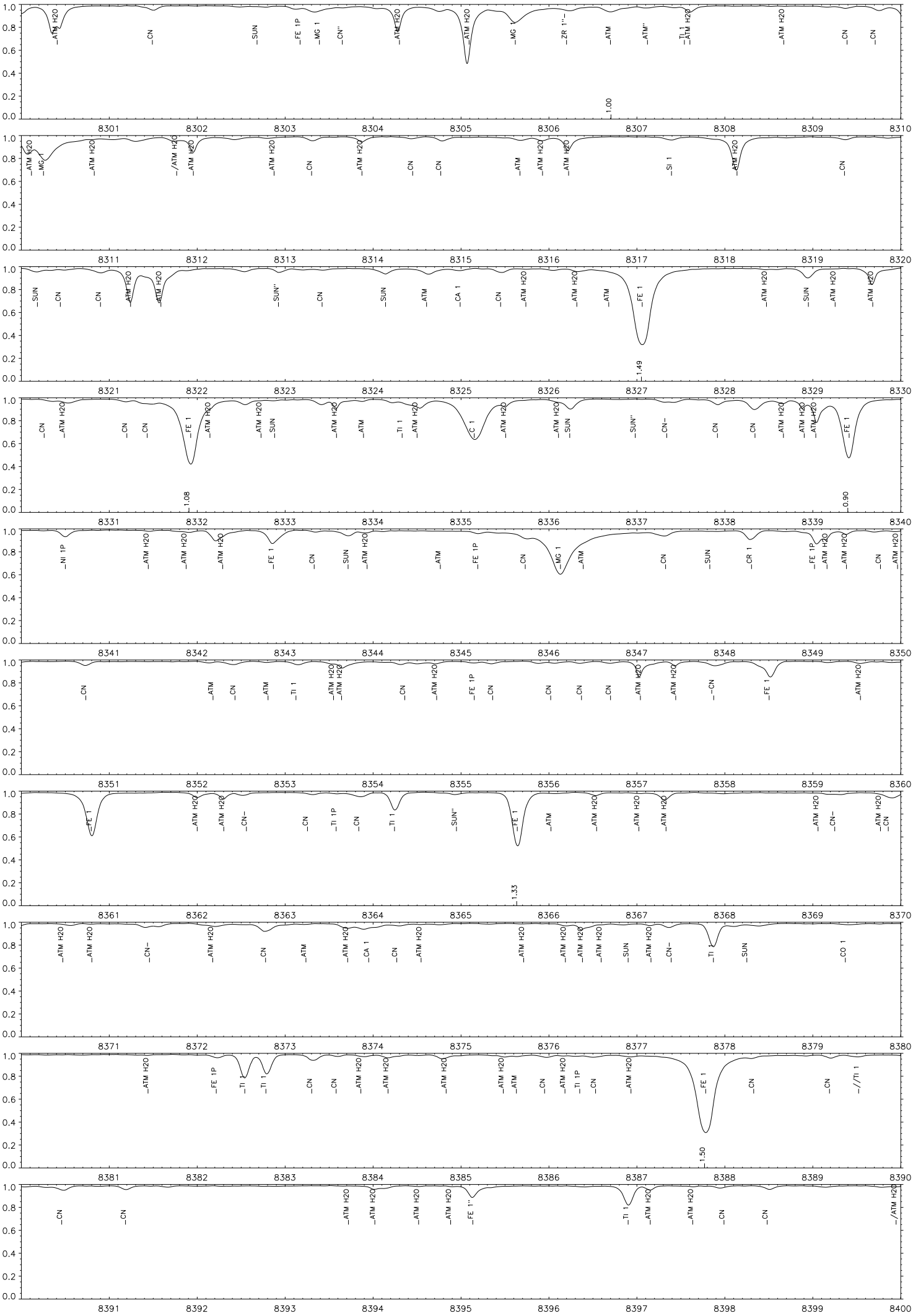
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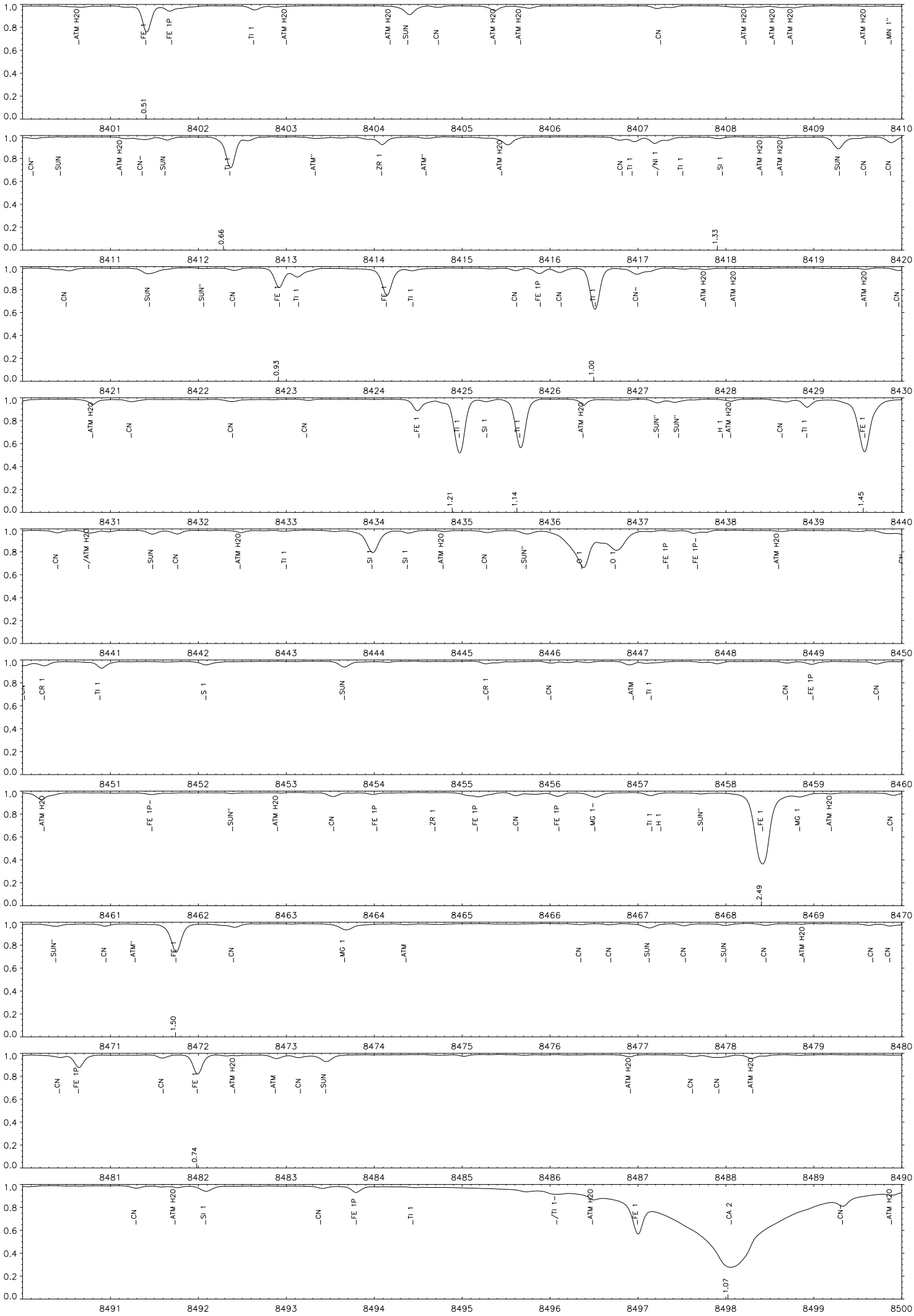
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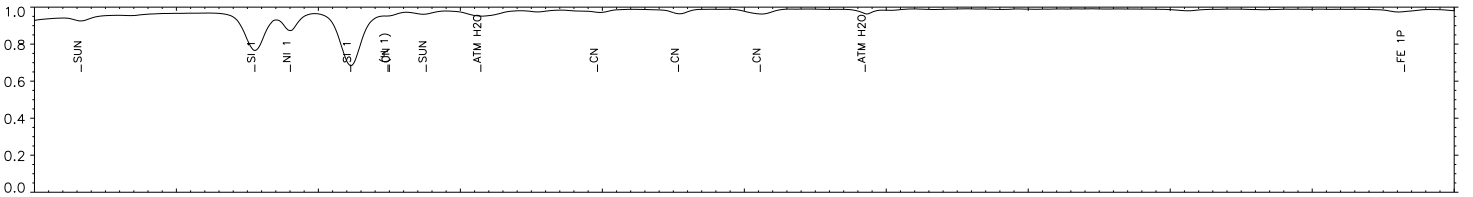
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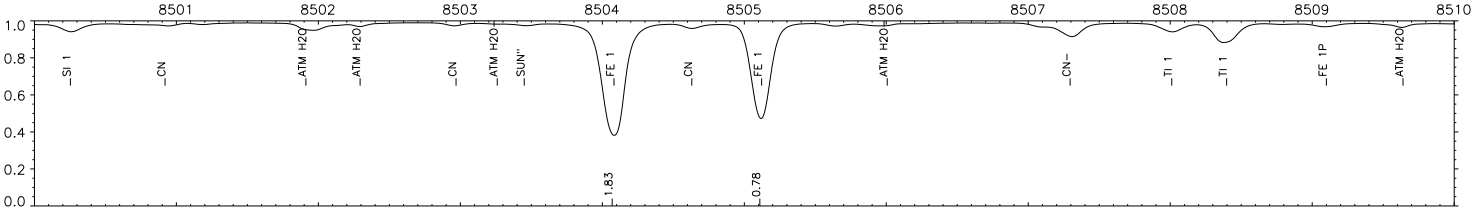
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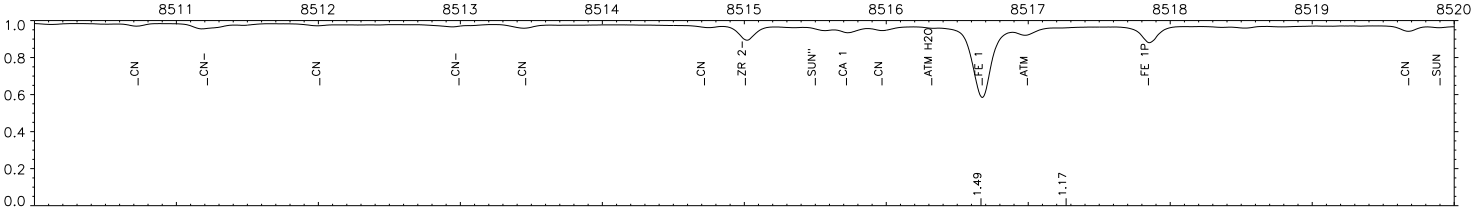
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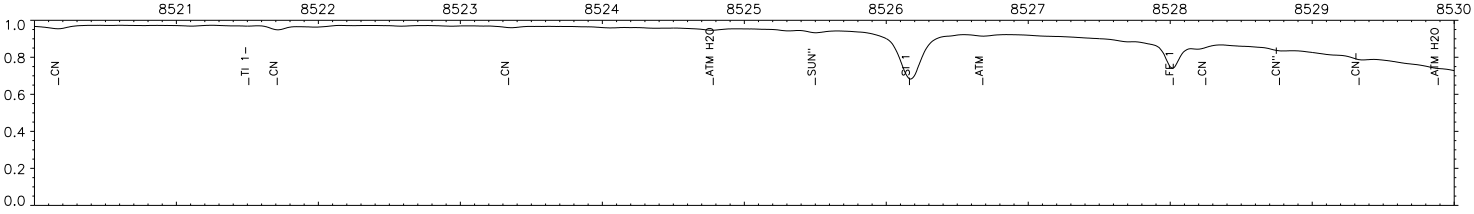
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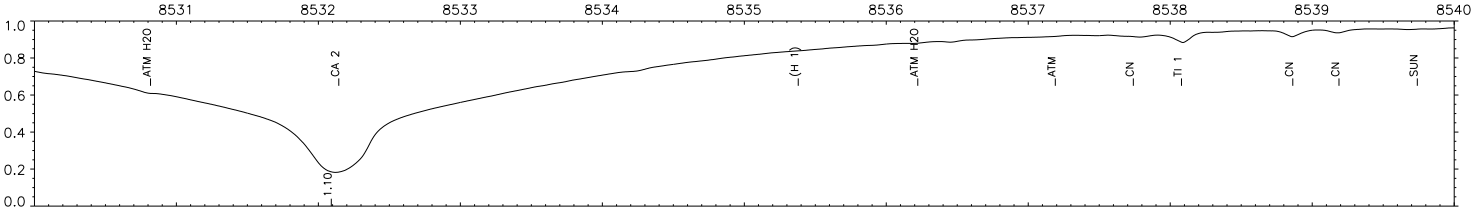
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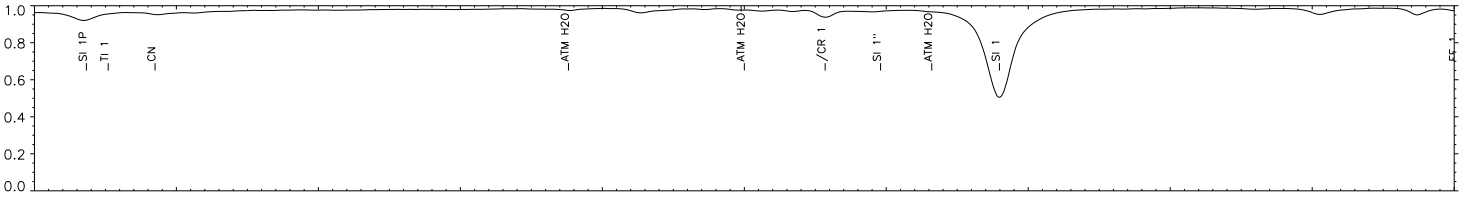
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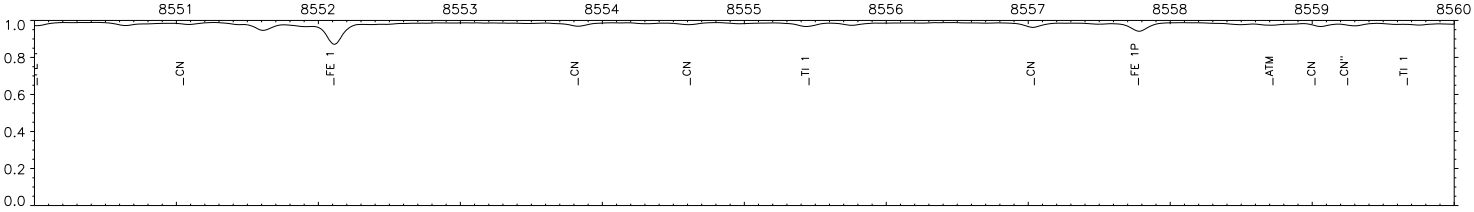
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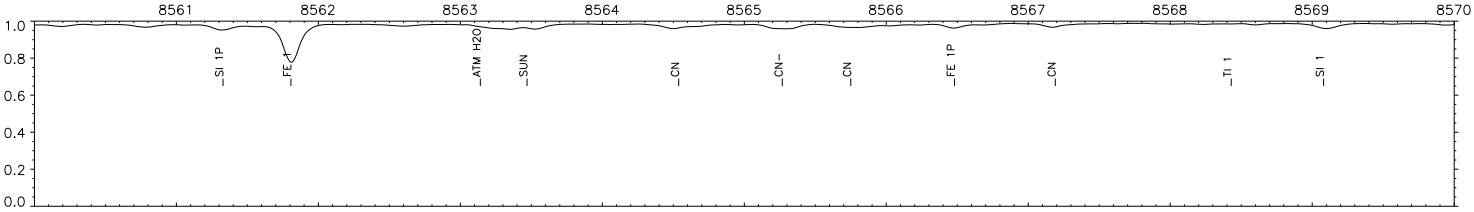
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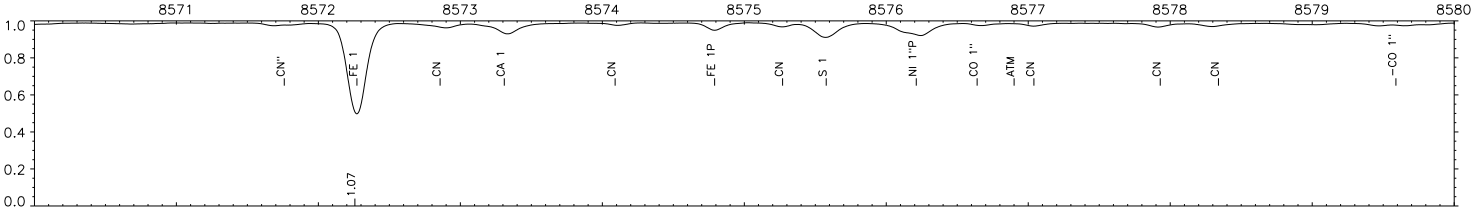
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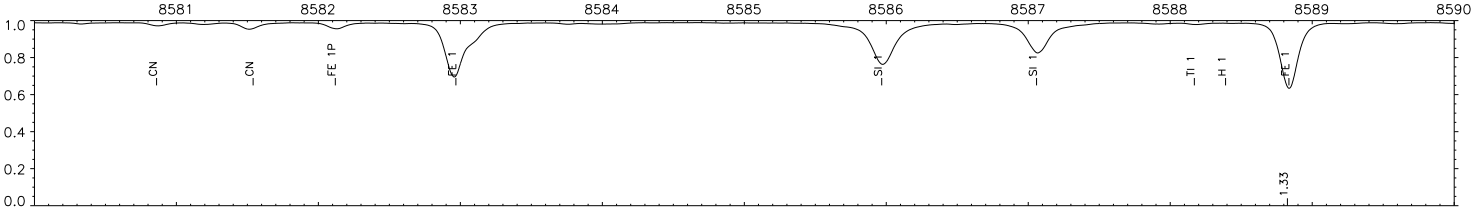
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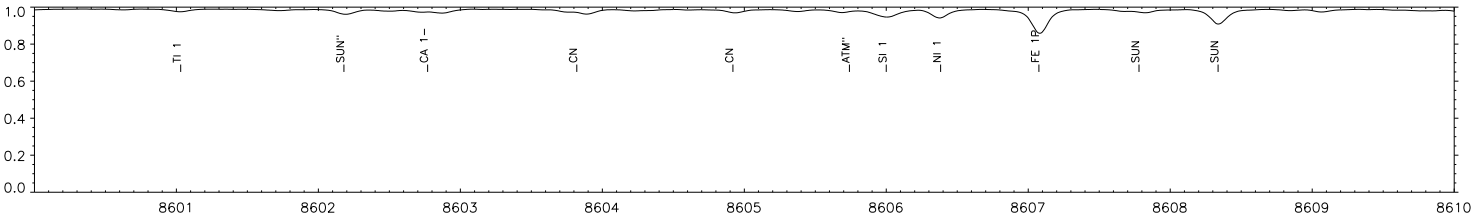
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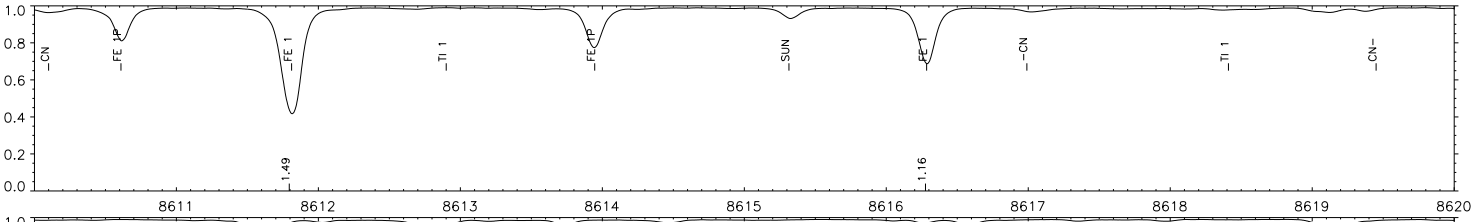
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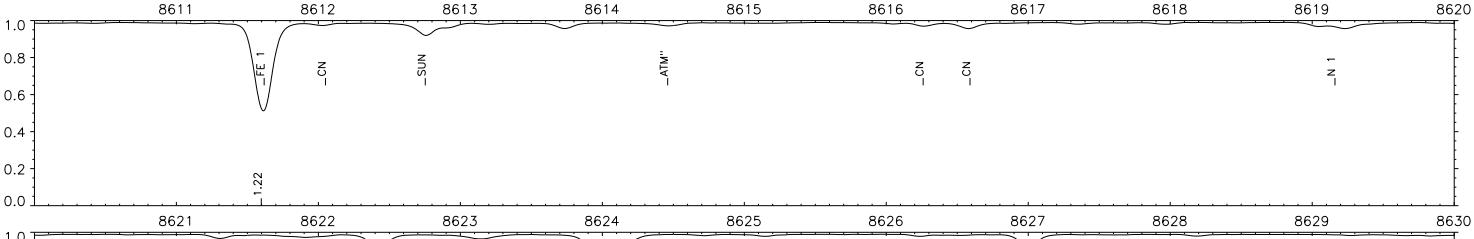
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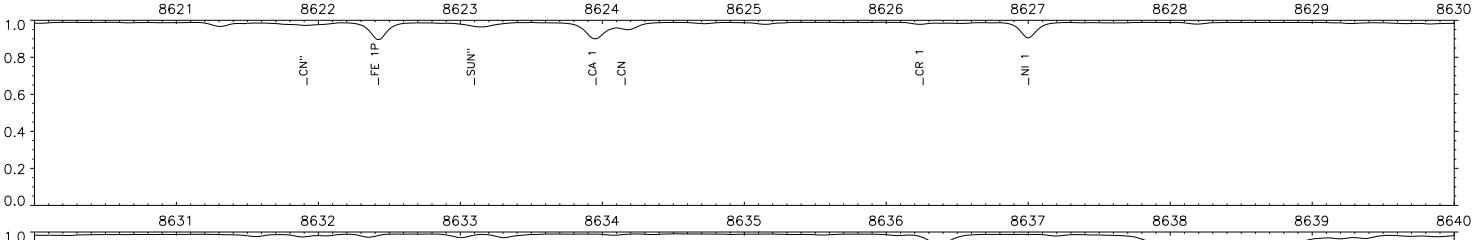
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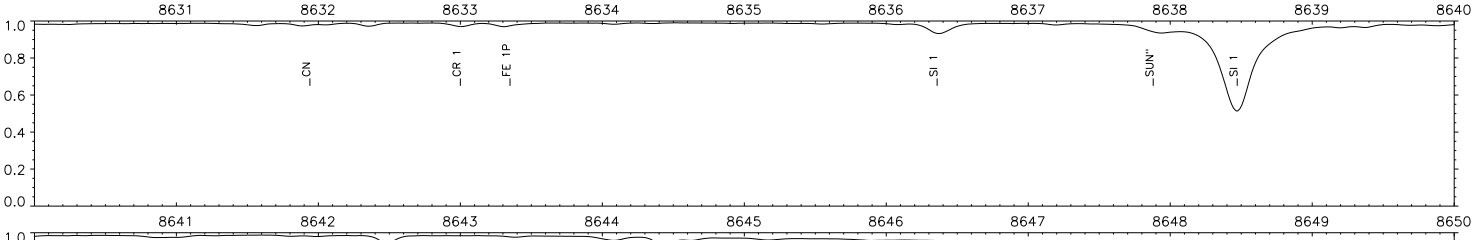
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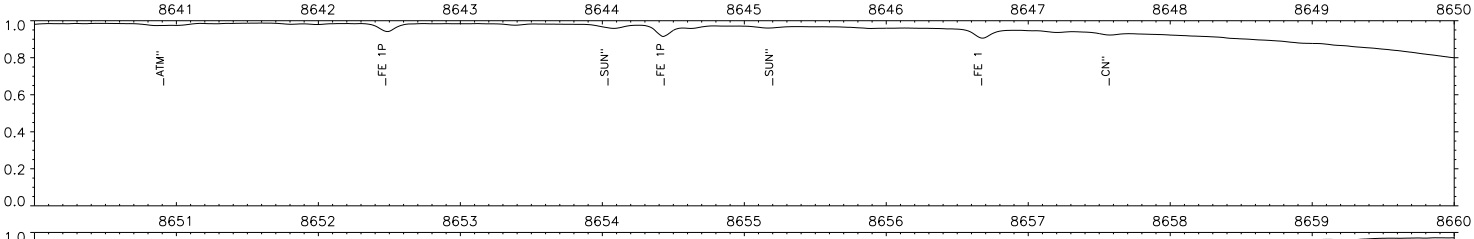
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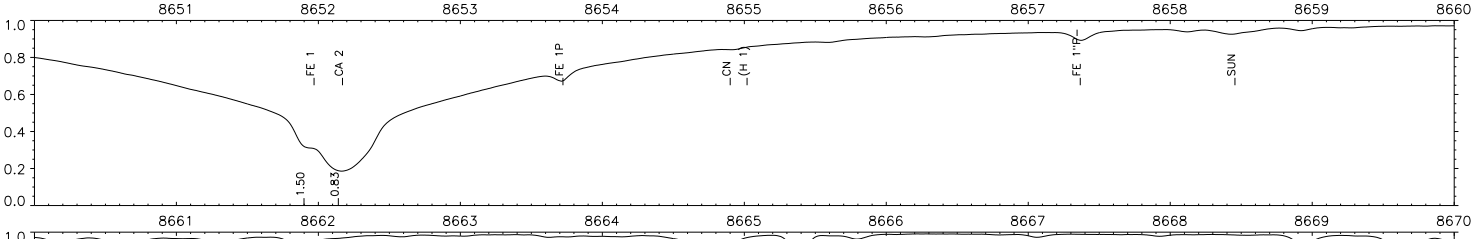
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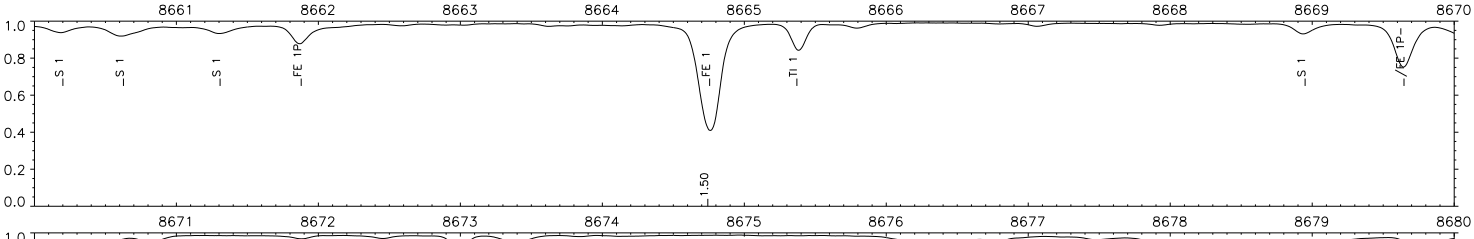
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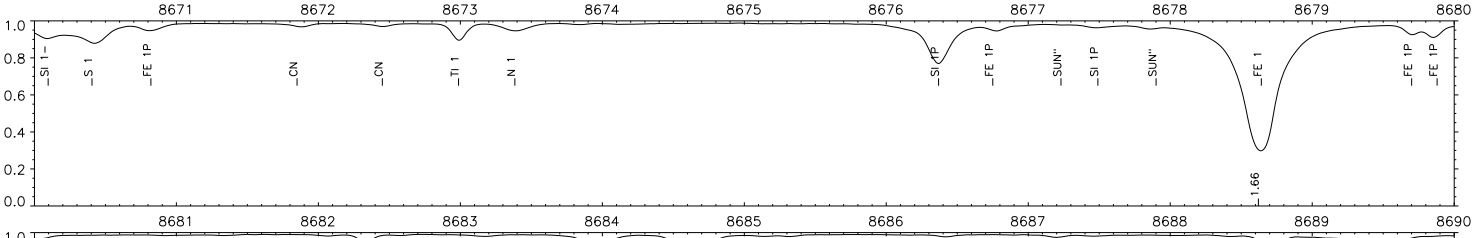
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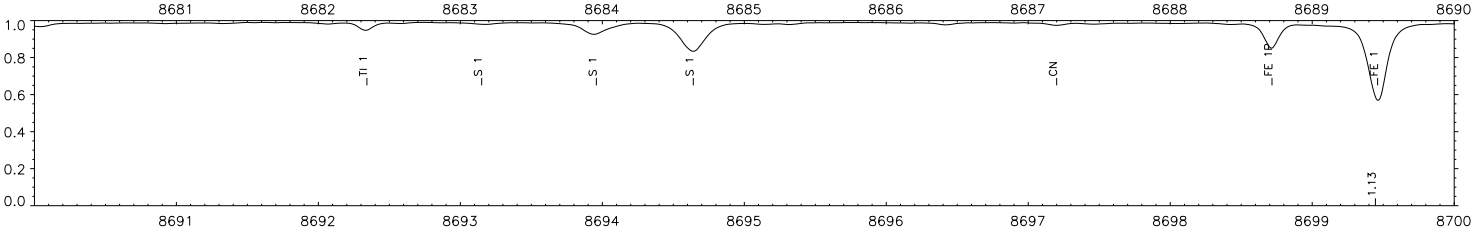
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