



HAL
open science

CDPP 3DView web-service for SMILE SXI synthetic X-ray observations

Dimitra Koutroumpa, Ronan Modolo, Qiuyu Xu, Vincent Génot, Nicolas
André, Dominica Leung, Laurent Beigbeder

► **To cite this version:**

Dimitra Koutroumpa, Ronan Modolo, Qiuyu Xu, Vincent Génot, Nicolas André, et al.. CDPP 3DView web-service for SMILE SXI synthetic X-ray observations. PNST2024, Jan 2024, Marseille, France. hal-04926871

HAL Id: hal-04926871

<https://hal.science/hal-04926871v1>

Submitted on 3 Feb 2025

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



CDPP 3DView web-service for SMILE SXI synthetic X-ray observations

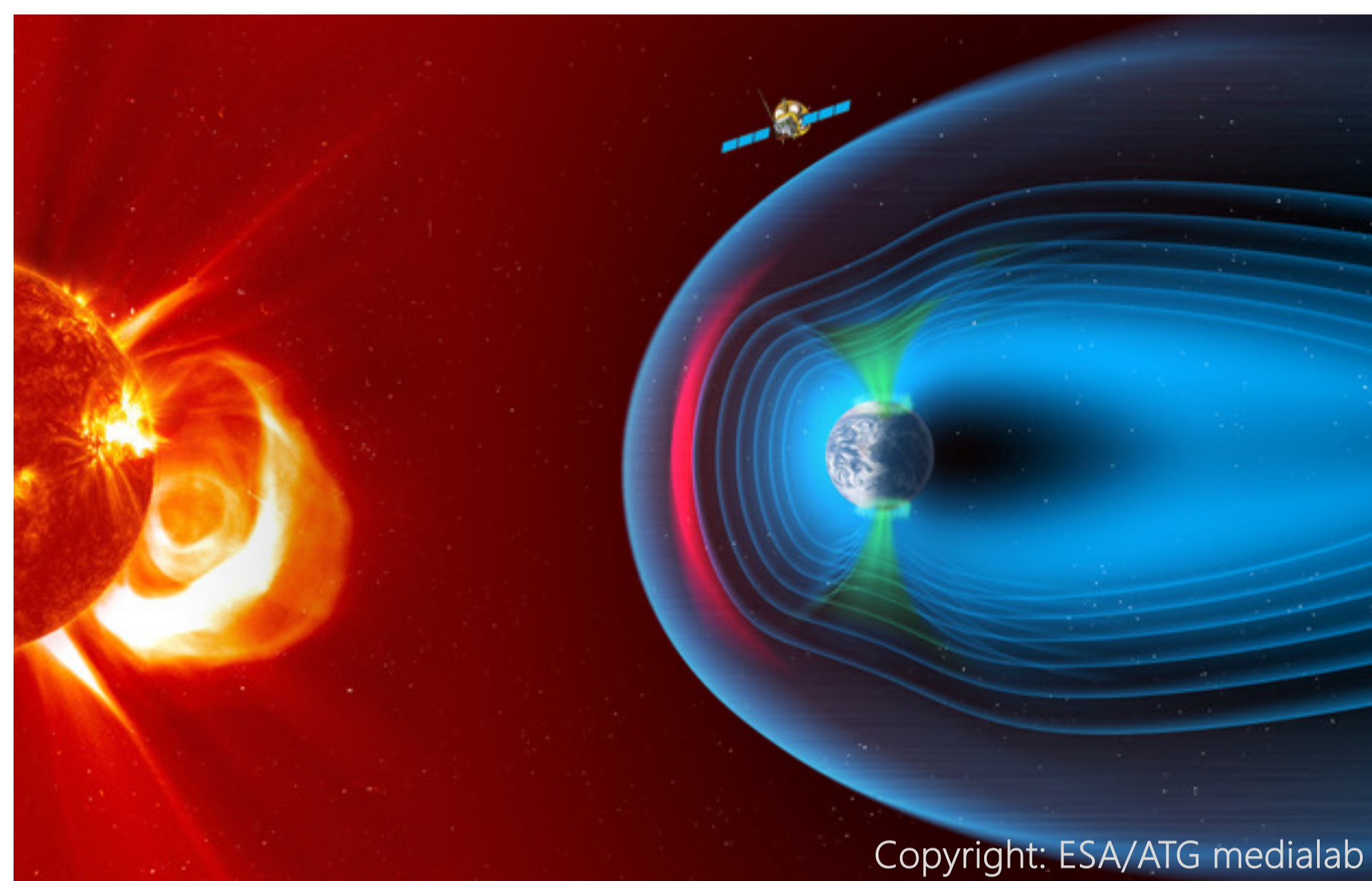
D. Koutroumpa*, R. Modolo, Q. Xu (LATMOS)
 V. Génot, N. André (IRAP)
 D. Leung (CNES), L. Beigbeder (INETUM)

*dimitra.koutroumpa@latmos.ipsl.fr

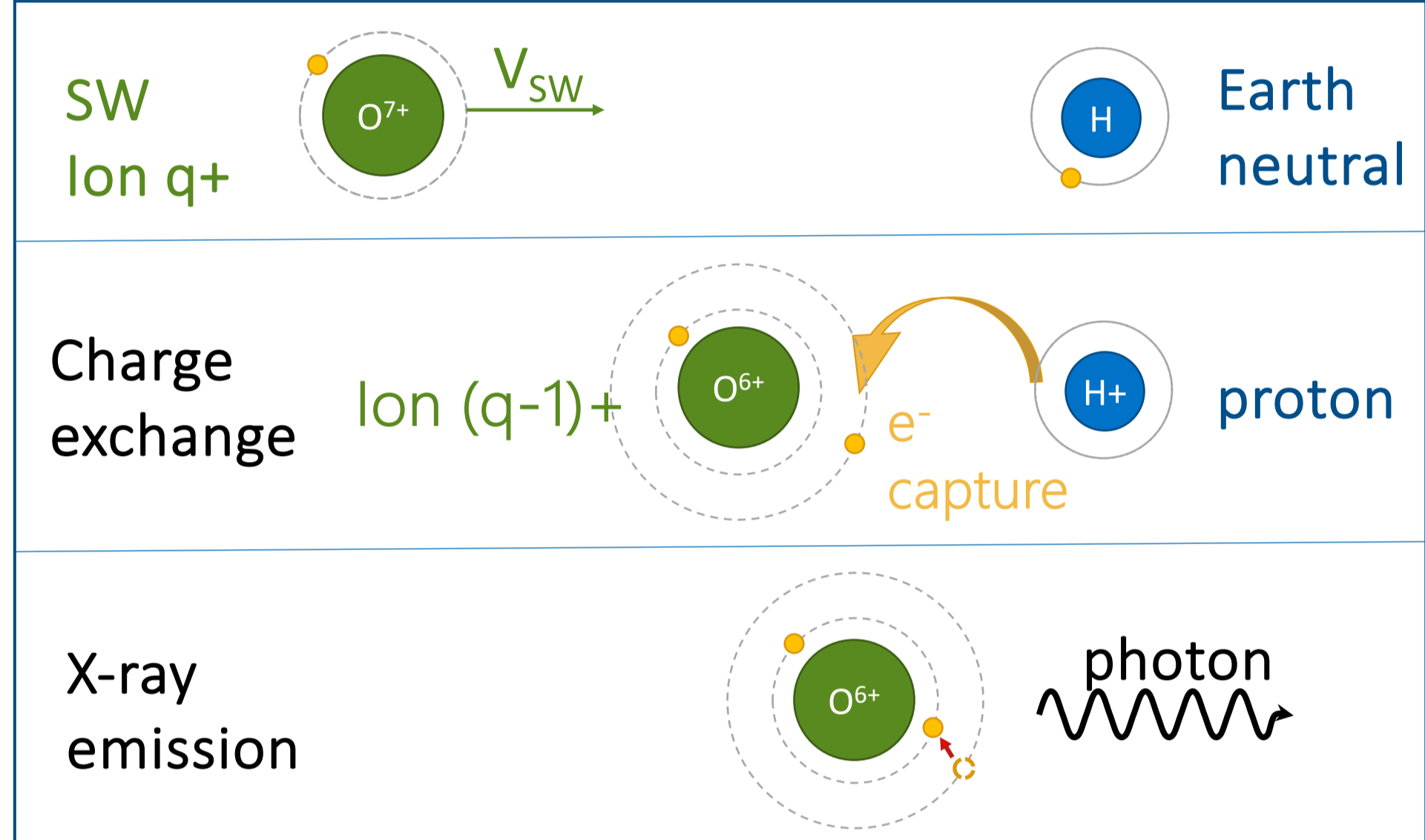
UMR 8190 - www.latmos.ipsl.fr

Solar Wind Charge eXchange (SWCX) X-ray imaging of magnetospheres

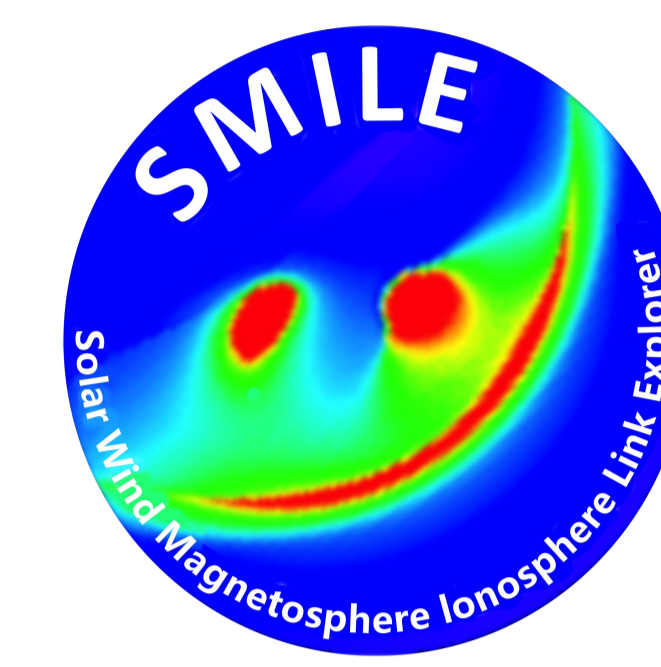
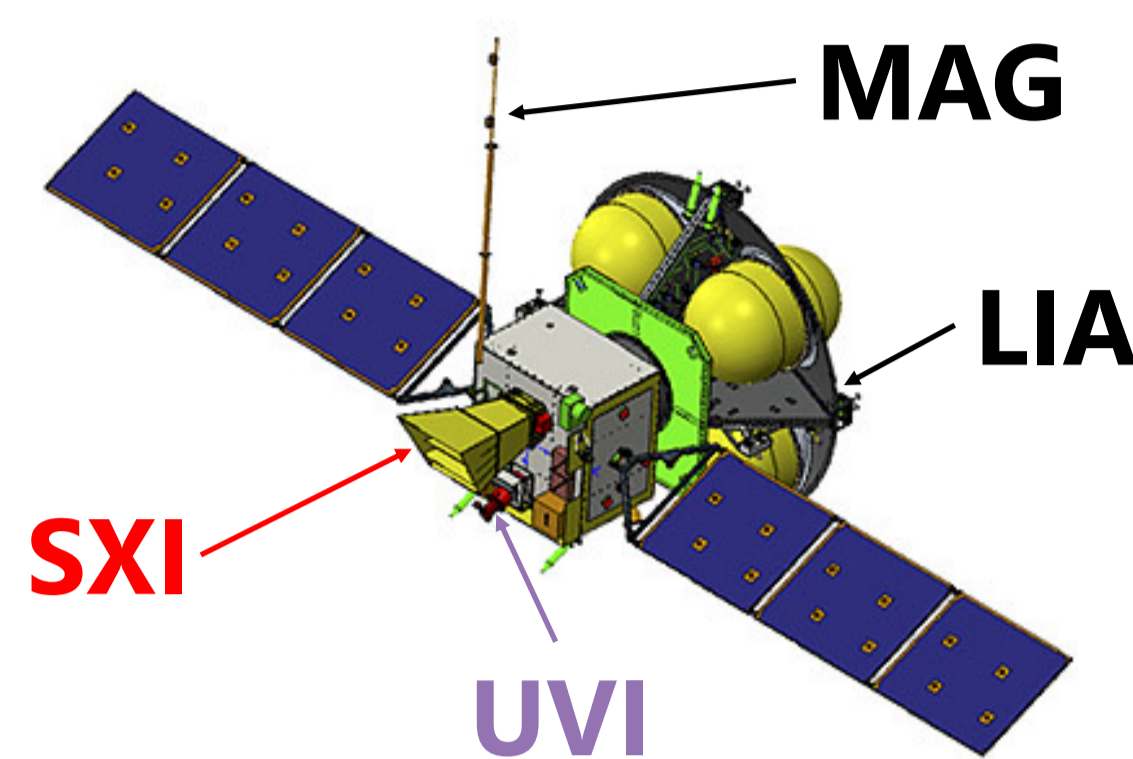
Solar Wind (SW) ions compressed in the magnetosheath, charge-exchange with planetary neutrals, illuminating the interface region and frontier surfaces (bow shock, magnetopause, cusps) in X-rays.



Copyright: ESA/ATG medialab



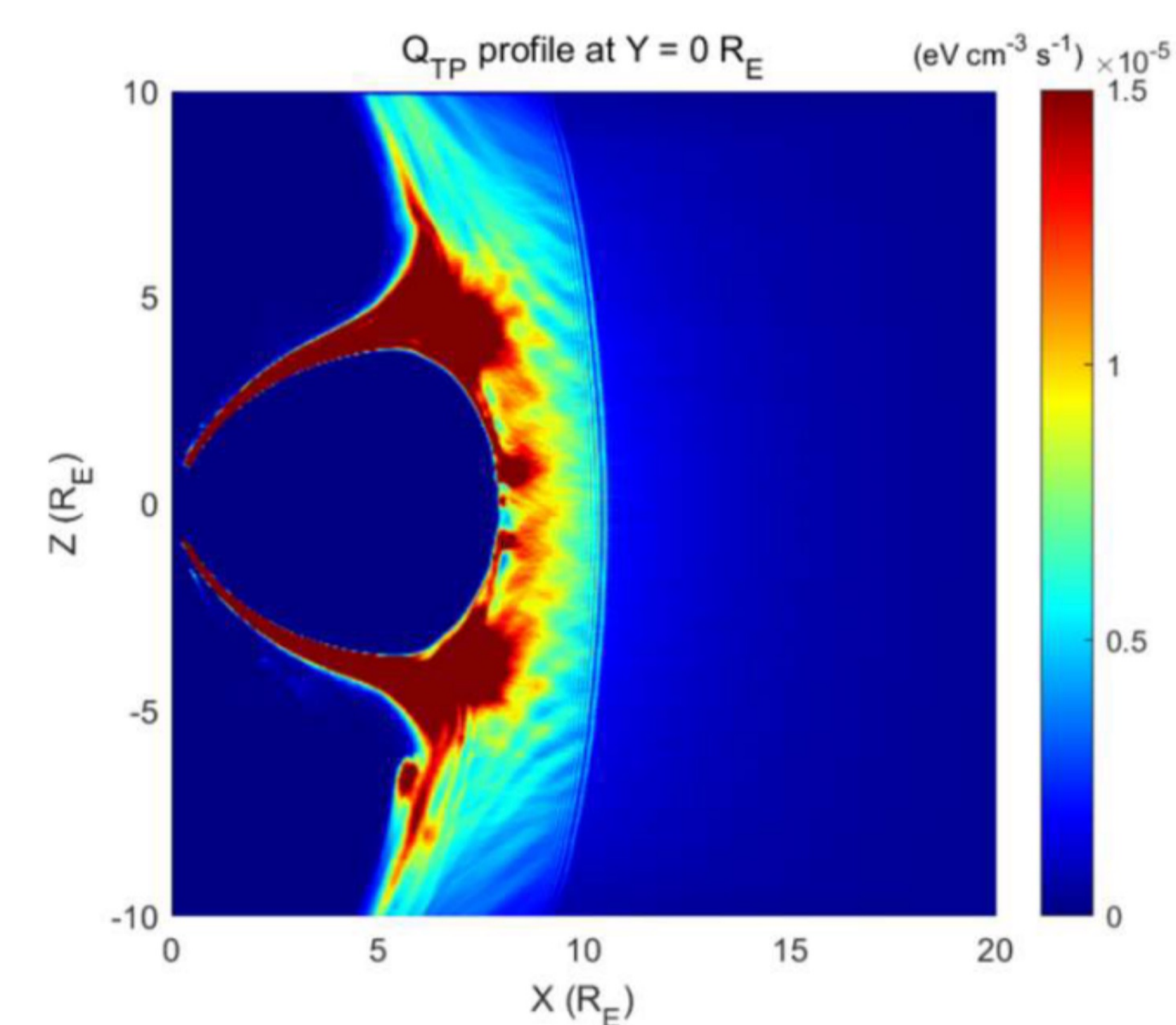
The Solar wind Magnetosphere Ionosphere Link Explorer (SMILE)



An ESA-CAS collaboration, SMILE will be the first mission to investigate the solar-terrestrial interaction globally. It will combine soft X-ray imaging (SXI) of the dayside magnetopause and polar cusps, with simultaneous UV imaging (UVI) of the auroras, and in-situ monitoring of the SW and magnetosheath plasma conditions (LIA, MAG).

Modeling efforts

The SMILE Modeling Working Group (MWG; <https://smile.alaska.edu/>) strives to collect and homogenize the parameters of various simulations and provide synthetic observations to help interpret the future SMILE data. We have developed the LATMOS Magnetospheric Test-Particle (LaMTeP) code to complement the traditional MHD approach (see talk by Xu et al.).



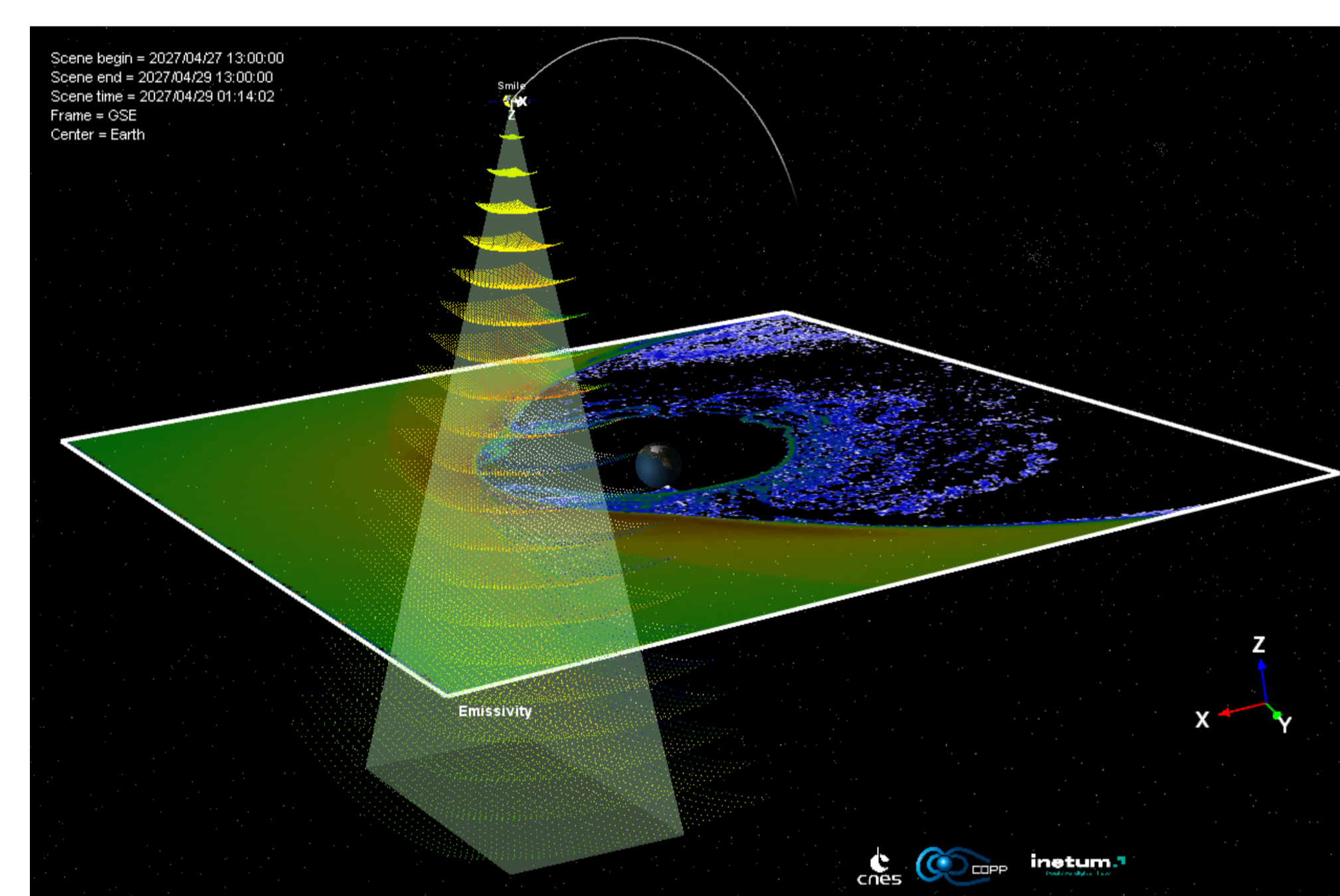
SWCX emissivity cut calculated with the LaMTeP code

3DView SXI X-ray map projection tool

Objective :

CDPP/3DView web-service to visualize an X-ray flux map for SMILE observing configurations and propose a 3D scene to facilitate the understanding of the geometry of the observation.

- Loading emissivity cubes
 - Each user has the possibility to upload a 3D cube (for the moment netcdf format)
 - loading a cube from an online catalogue (ex: LatHyS catalogue <http://impex.latmos.ipsl.fr/LatHyS.htm>)
 - Future development: Accessing SXI observation catalogue from ESA archive (L4 data archive)
- Calculation of the projected X-ray intensity - Based on the SXI simulator (Sembey & Read, U. Leicester)
 - Time interval of the scene => spice kernels provide corresponding S/C location and attitude.
 - Specification for FOV integration, integration path size, path step etc.



3. Visualisation Windows

- New window with 2D X-ray map (simulated or from SXI observations), projection of magnetopause location (e.g. Shue et al.)
- 3D auxiliary visualisation scenes: (3D magnetosphere, Emissivity cut planes etc.)

- Saving the data/models – possibility to save the 2D map figure, and/or export the numerical data (ascii, votable)

