



Full wwPDB EM Validation Report ⓘ

Mar 11, 2022 – 02:35 pm GMT

PDB ID : 7Z4W
EMDB ID : EMD-14509
Title : gp6/gp15/gp16 connector complex of bacteriophage SPP1
Deposited on : 2022-03-05
Resolution : 2.70 Å (reported)
Based on initial models : ?, 2JES

This wwPDB validation report is for manuscript review

This is a Full wwPDB EM Validation Report.

This report is produced by the wwPDB biocuration pipeline after annotation of the structure.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

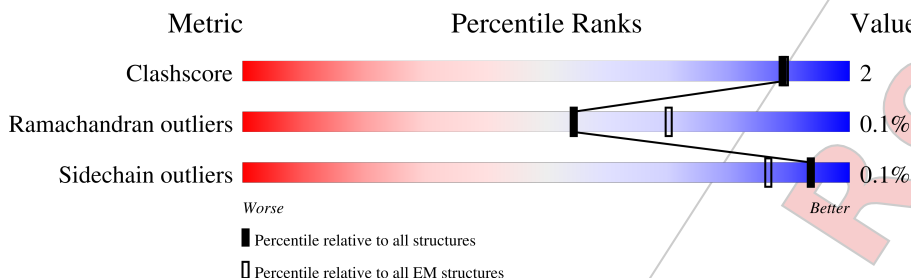
EMDB validation analysis : 0.0.0.dev97
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.27

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 2.70 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	503	
1	B	503	
1	C	503	
1	D	503	
1	E	503	
1	F	503	
1	G	503	
1	H	503	

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Mol	Chain	Length	Quality of chain
1	I	503	85% 11%
1	J	503	83% 5% 11%
1	K	503	84% 5% 11%
1	L	503	83% 6% 11%
2	a	102	99%
2	b	102	100%
2	c	102	99%
2	d	102	100%
2	e	102	99%
2	f	102	100%
2	g	102	99%
2	h	102	100%
2	i	102	99%
2	j	102	100%
2	k	102	99%
2	l	102	100%
3	1	109	98%
3	2	109	98%
3	3	109	98%
3	4	109	98%
3	5	109	98%
3	6	109	96%

2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 58942 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Portal protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	B	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	C	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	D	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	E	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	F	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	G	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	H	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	I	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	J	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	K	447	Total 3622	C 2287	N 596	O 724	S 15	0	0
1	L	447	Total 3622	C 2287	N 596	O 724	S 15	0	0

- Molecule 2 is a protein called Head completion protein gp15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	a	102	Total 813	C 517	N 137	O 153	S 6	0	0
2	b	102	Total 813	C 517	N 137	O 153	S 6	0	0
2	c	102	Total 813	C 517	N 137	O 153	S 6	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
2	d	102	Total	C	N	O	S	0	0
			813	517	137	153	6		
2	e	102	Total	C	N	O	S	0	0
			813	517	137	153	6		
2	f	102	Total	C	N	O	S	0	0
			813	517	137	153	6		
2	g	102	Total	C	N	O	S	0	0
			813	517	137	153	6		
2	h	102	Total	C	N	O	S	0	0
			813	517	137	153	6		
2	i	102	Total	C	N	O	S	0	0
			813	517	137	153	6		
2	j	102	Total	C	N	O	S	0	0
			813	517	137	153	6		
2	k	102	Total	C	N	O	S	0	0
			813	517	137	153	6		
2	l	102	Total	C	N	O	S	0	0
			813	517	137	153	6		

- Molecule 3 is a protein called Head completion protein gp16.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	1	109	Total	C	N	O	S	0	0
			886	568	142	174	2		
3	2	109	Total	C	N	O	S	0	0
			886	568	142	174	2		
3	3	109	Total	C	N	O	S	0	0
			886	568	142	174	2		
3	4	109	Total	C	N	O	S	0	0
			886	568	142	174	2		
3	5	109	Total	C	N	O	S	0	0
			886	568	142	174	2		
3	6	109	Total	C	N	O	S	0	0
			886	568	142	174	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		AltConf
4	A	18	Total	O	0
			18	18	
4	B	21	Total	O	0
			21	21	

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Mol	Chain	Residues	Atoms	AltConf
4	a	15	Total O 15 15	0
4	b	12	Total O 12 12	0
4	1	3	Total O 3 3	0
4	C	17	Total O 17 17	0
4	D	21	Total O 21 21	0
4	c	14	Total O 14 14	0
4	d	12	Total O 12 12	0
4	2	3	Total O 3 3	0
4	E	17	Total O 17 17	0
4	F	21	Total O 21 21	0
4	e	14	Total O 14 14	0
4	f	12	Total O 12 12	0
4	3	3	Total O 3 3	0
4	G	18	Total O 18 18	0
4	H	22	Total O 22 22	0
4	g	15	Total O 15 15	0
4	h	12	Total O 12 12	0
4	4	3	Total O 3 3	0
4	I	17	Total O 17 17	0
4	J	21	Total O 21 21	0
4	i	14	Total O 14 14	0

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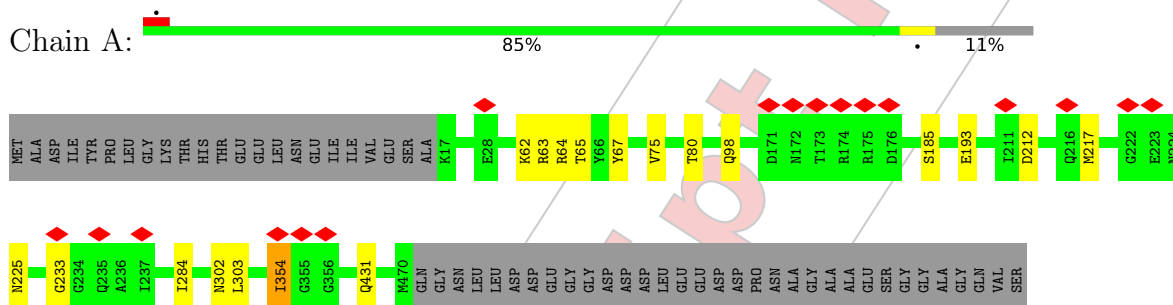
Mol	Chain	Residues	Atoms	AltConf
4	j	12	Total O 12 12	0
4	5	3	Total O 3 3	0
4	K	17	Total O 17 17	0
4	L	21	Total O 21 21	0
4	k	14	Total O 14 14	0
4	l	12	Total O 12 12	0
4	6	2	Total O 2 2	0

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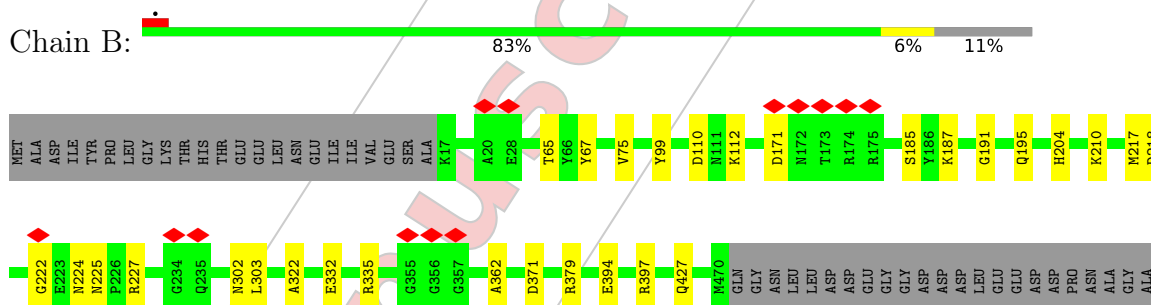
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

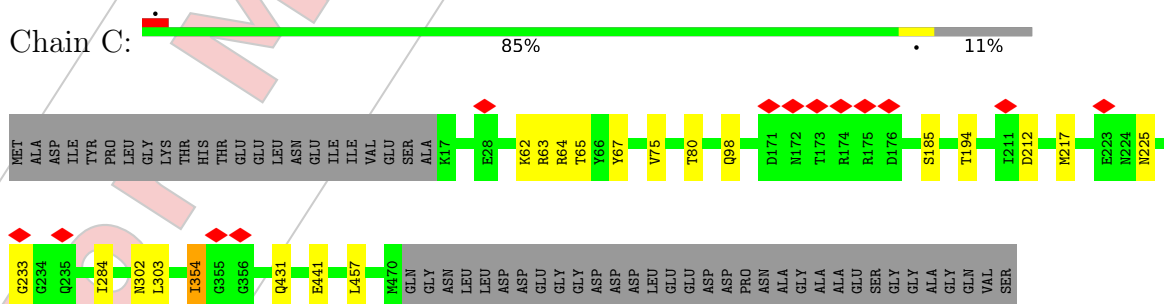
- Molecule 1: Portal protein



- Molecule 1: Portal protein

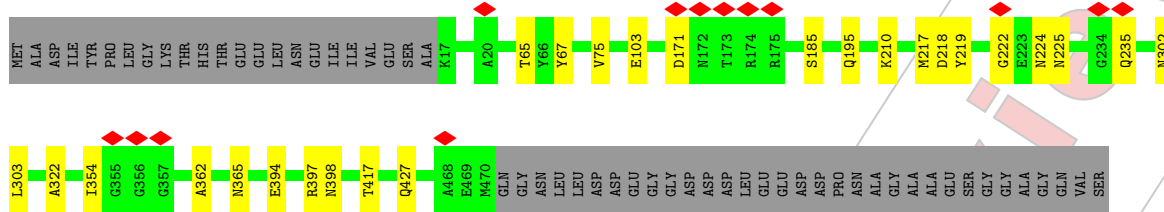


- Molecule 1: Portal protein



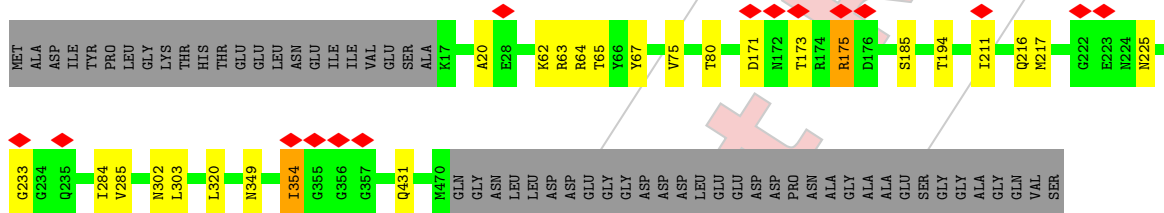
- Molecule 1: Portal protein

Chain D: 84% 5% 11%



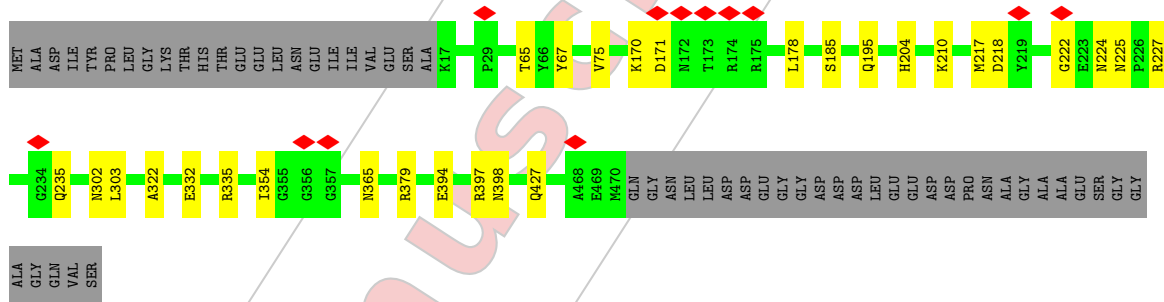
• Molecule 1: Portal protein

Chain E: 84% 5% 11%



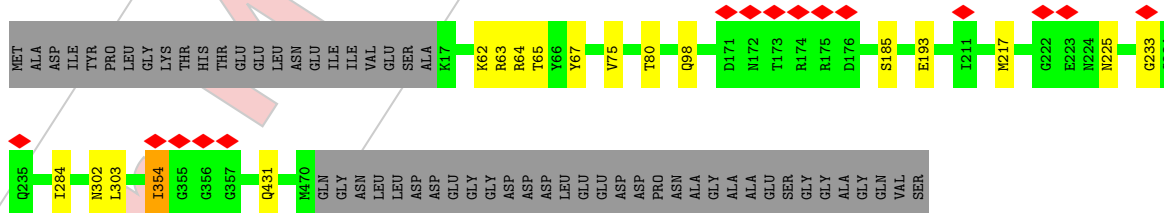
• Molecule 1: Portal protein

Chain F: 83% 6% 11%



• Molecule 1: Portal protein

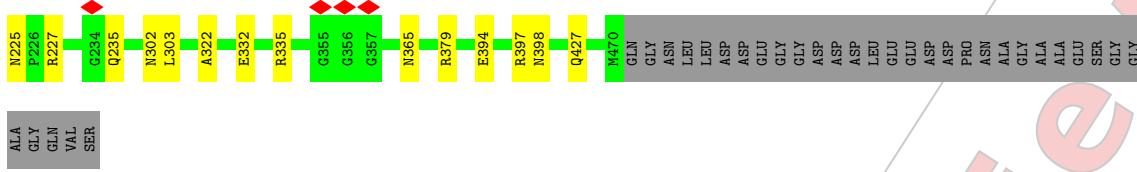
Chain G: 85% 11%



• Molecule 1: Portal protein

Chain H: 83% 6% 11%





• Molecule 2: Head completion protein gp15



• Molecule 2: Head completion protein gp15

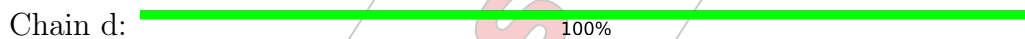


There are no outlier residues recorded for this chain.

• Molecule 2: Head completion protein gp15



• Molecule 2: Head completion protein gp15



There are no outlier residues recorded for this chain.

• Molecule 2: Head completion protein gp15

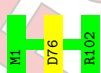


• Molecule 2: Head completion protein gp15



There are no outlier residues recorded for this chain.

• Molecule 2: Head completion protein gp15



• Molecule 2: Head completion protein gp15

Chain h:  100%

There are no outlier residues recorded for this chain.

• Molecule 2: Head completion protein gp15

Chain i:  99%



• Molecule 2: Head completion protein gp15

Chain j:  100%

There are no outlier residues recorded for this chain.

• Molecule 2: Head completion protein gp15

Chain k:  99%



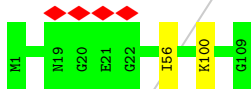
• Molecule 2: Head completion protein gp15

Chain l:  100%

There are no outlier residues recorded for this chain.

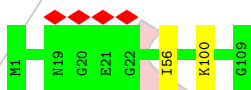
• Molecule 3: Head completion protein gp16

Chain 1:  98%



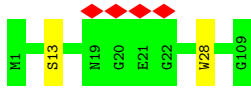
• Molecule 3: Head completion protein gp16

Chain 2:  98%

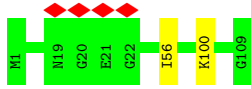


• Molecule 3: Head completion protein gp16

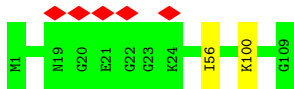
Chain 3:  98%



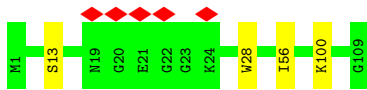
- Molecule 3: Head completion protein gp16



- Molecule 3: Head completion protein gp16



- Molecule 3: Head completion protein gp16



4 Experimental information i

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C6	Depositor
Number of particles used	401807	Depositor
Resolution determination method	FSC 0.5 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	120000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	1.815	Depositor
Minimum map value	-1.096	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.058	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	317.4, 317.4, 317.4	wwPDB
Map dimensions	460, 460, 460	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.69, 0.69, 0.69	Depositor

5 Model quality i

5.1 Standard geometry i

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.32	0/3699	0.53	1/5006 (0.0%)
1	B	0.32	0/3699	0.54	2/5006 (0.0%)
1	C	0.32	0/3699	0.54	1/5006 (0.0%)
1	D	0.32	0/3699	0.54	2/5006 (0.0%)
1	E	0.32	0/3699	0.53	1/5006 (0.0%)
1	F	0.32	0/3699	0.54	2/5006 (0.0%)
1	G	0.32	0/3699	0.53	1/5006 (0.0%)
1	H	0.32	0/3699	0.54	2/5006 (0.0%)
1	I	0.32	0/3699	0.54	1/5006 (0.0%)
1	J	0.32	0/3699	0.54	2/5006 (0.0%)
1	K	0.32	0/3699	0.53	1/5006 (0.0%)
1	L	0.32	0/3699	0.54	2/5006 (0.0%)
2	a	0.36	0/828	0.58	0/1117
2	b	0.36	0/828	0.55	0/1117
2	c	0.37	0/828	0.59	0/1117
2	d	0.35	0/828	0.55	0/1117
2	e	0.34	0/828	0.57	0/1117
2	f	0.35	0/828	0.55	0/1117
2	g	0.34	0/828	0.57	0/1117
2	h	0.37	0/828	0.55	0/1117
2	i	0.37	0/828	0.59	0/1117
2	j	0.35	0/828	0.55	0/1117
2	k	0.34	0/828	0.58	0/1117
2	l	0.35	0/828	0.55	0/1117
3	1	0.43	0/907	0.56	0/1227
3	2	0.44	0/907	0.56	0/1227
3	3	0.43	0/907	0.56	0/1227
3	4	0.43	0/907	0.56	0/1227
3	5	0.43	0/907	0.56	0/1227
3	6	0.43	0/907	0.56	0/1227
All	All	0.34	0/59766	0.55	18/80838 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected

by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
1	C	0	1
1	D	0	2
1	E	0	1
1	F	0	1
1	G	0	1
1	H	0	1
1	I	0	1
1	J	0	2
1	K	0	1
1	L	0	1
All	All	0	14

There are no bond length outliers.

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	218	ASP	CB-CG-OD1	6.26	123.93	118.30
1	F	218	ASP	CB-CG-OD1	6.24	123.91	118.30
1	B	218	ASP	CB-CG-OD1	6.21	123.89	118.30
1	H	218	ASP	CB-CG-OD1	6.21	123.89	118.30
1	J	218	ASP	CB-CG-OD1	6.11	123.80	118.30
1	E	303	LEU	CA-CB-CG	6.08	129.29	115.30
1	D	218	ASP	CB-CG-OD1	6.08	123.77	118.30
1	G	303	LEU	CA-CB-CG	6.07	129.26	115.30
1	K	303	LEU	CA-CB-CG	6.06	129.23	115.30
1	B	303	LEU	CA-CB-CG	6.05	129.23	115.30
1	H	303	LEU	CA-CB-CG	6.05	129.22	115.30
1	A	303	LEU	CA-CB-CG	6.05	129.21	115.30
1	J	303	LEU	CA-CB-CG	6.03	129.16	115.30
1	I	303	LEU	CA-CB-CG	6.01	129.13	115.30
1	D	303	LEU	CA-CB-CG	6.00	129.09	115.30
1	C	303	LEU	CA-CB-CG	5.99	129.07	115.30
1	L	303	LEU	CA-CB-CG	5.99	129.07	115.30
1	F	303	LEU	CA-CB-CG	5.98	129.05	115.30

There are no chirality outliers.

All (14) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	233	GLY	Peptide
1	B	171	ASP	Peptide
1	C	233	GLY	Peptide
1	D	171	ASP	Peptide
1	D	219	TYR	Peptide
1	E	233	GLY	Peptide
1	F	171	ASP	Peptide
1	G	233	GLY	Peptide
1	H	171	ASP	Peptide
1	I	233	GLY	Peptide
1	J	171	ASP	Peptide
1	J	219	TYR	Peptide
1	K	233	GLY	Peptide
1	L	171	ASP	Peptide

5.2 Too-close contacts [\(i\)](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3622	0	3450	12	0
1	B	3622	0	3450	18	0
1	C	3622	0	3450	14	0
1	D	3622	0	3450	16	0
1	E	3622	0	3450	16	0
1	F	3622	0	3450	17	0
1	G	3622	0	3450	11	0
1	H	3622	0	3450	20	0
1	I	3622	0	3450	15	0
1	J	3622	0	3450	18	0
1	K	3622	0	3450	17	0
1	L	3622	0	3450	17	0
2	a	813	0	823	0	0
2	b	813	0	823	0	0
2	c	813	0	823	0	0
2	d	813	0	823	0	0
2	e	813	0	823	0	0
2	f	813	0	823	0	0
2	g	813	0	823	0	0
2	h	813	0	823	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	i	813	0	823	0	0
2	j	813	0	823	0	0
2	k	813	0	823	0	0
2	l	813	0	823	0	0
3	1	886	0	855	1	0
3	2	886	0	855	1	0
3	3	886	0	855	1	0
3	4	886	0	855	1	0
3	5	886	0	855	1	0
3	6	886	0	855	2	0
4	1	3	0	0	0	0
4	2	3	0	0	0	0
4	3	3	0	0	0	0
4	4	3	0	0	0	0
4	5	3	0	0	0	0
4	6	2	0	0	0	0
4	A	18	0	0	0	0
4	B	21	0	0	0	0
4	C	17	0	0	0	0
4	D	21	0	0	0	0
4	E	17	0	0	0	0
4	F	21	0	0	0	0
4	G	18	0	0	0	0
4	H	22	0	0	0	0
4	I	17	0	0	0	0
4	J	21	0	0	0	0
4	K	17	0	0	0	0
4	L	21	0	0	0	0
4	a	15	0	0	0	0
4	b	12	0	0	0	0
4	c	14	0	0	0	0
4	d	12	0	0	0	0
4	e	14	0	0	0	0
4	f	12	0	0	0	0
4	g	15	0	0	0	0
4	h	12	0	0	0	0
4	i	14	0	0	0	0
4	j	12	0	0	0	0
4	k	14	0	0	0	0
4	l	12	0	0	0	0
All	All	58942	0	56406	160	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including

hydrogen atoms). The all-atom clashscore for this structure is 2.

All (160) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:195:GLN:OE1	1:B:210:LYS:HE2	1.92	0.69
1:H:195:GLN:OE1	1:H:210:LYS:HE2	1.92	0.69
1:L:195:GLN:OE1	1:L:210:LYS:HE2	1.94	0.67
1:F:195:GLN:OE1	1:F:210:LYS:HE2	1.94	0.67
1:B:217:MET:SD	1:B:225:ASN:ND2	2.69	0.66
1:H:217:MET:SD	1:H:225:ASN:ND2	2.69	0.66
1:L:217:MET:SD	1:L:225:ASN:ND2	2.69	0.65
1:J:217:MET:SD	1:J:225:ASN:ND2	2.69	0.65
1:K:217:MET:SD	1:K:225:ASN:ND2	2.70	0.65
1:F:217:MET:SD	1:F:225:ASN:ND2	2.70	0.65
1:D:217:MET:SD	1:D:225:ASN:ND2	2.70	0.64
1:G:217:MET:SD	1:G:225:ASN:ND2	2.70	0.64
1:E:217:MET:SD	1:E:225:ASN:ND2	2.70	0.64
1:F:185:SER:OG	1:F:195:GLN:HG2	1.98	0.64
1:H:67:TYR:H	1:J:302:ASN:HD21	1.44	0.64
1:I:217:MET:SD	1:I:225:ASN:ND2	2.71	0.64
1:B:67:TYR:H	1:D:302:ASN:HD21	1.44	0.64
1:A:217:MET:SD	1:A:225:ASN:ND2	2.70	0.64
1:C:217:MET:SD	1:C:225:ASN:ND2	2.71	0.63
1:J:67:TYR:H	1:L:302:ASN:HD21	1.44	0.63
1:D:67:TYR:H	1:F:302:ASN:HD21	1.44	0.63
1:F:67:TYR:H	1:H:302:ASN:HD21	1.44	0.63
1:B:185:SER:OG	1:B:195:GLN:HG2	1.99	0.62
1:L:185:SER:OG	1:L:195:GLN:HG2	1.98	0.62
1:B:302:ASN:HD21	1:L:67:TYR:H	1.45	0.62
1:H:185:SER:OG	1:H:195:GLN:HG2	1.99	0.62
1:A:65:THR:HG22	1:A:75:VAL:HG22	1.84	0.58
1:G:65:THR:HG22	1:G:75:VAL:HG22	1.84	0.58
1:J:103:GLU:OE1	1:J:417:THR:OG1	2.22	0.57
1:J:185:SER:OG	1:J:195:GLN:HG2	2.04	0.57
1:D:195:GLN:OE1	1:D:210:LYS:HE2	2.05	0.57
1:J:195:GLN:OE1	1:J:210:LYS:HE2	2.05	0.57
1:D:185:SER:OG	1:D:195:GLN:HG2	2.05	0.56
1:A:302:ASN:HD21	1:K:67:TYR:H	1.54	0.55
1:A:67:TYR:H	1:C:302:ASN:HD21	1.54	0.54
1:E:67:TYR:H	1:G:302:ASN:HD21	1.54	0.54
1:L:65:THR:HG22	1:L:75:VAL:HG22	1.90	0.54
1:I:67:TYR:H	1:K:302:ASN:HD21	1.55	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:394:GLU:OE2	1:D:397:ARG:NH2	2.42	0.53
1:G:67:TYR:H	1:I:302:ASN:HD21	1.54	0.53
1:J:394:GLU:OE2	1:J:397:ARG:NH2	2.42	0.53
1:C:67:TYR:H	1:E:302:ASN:HD21	1.55	0.53
1:F:394:GLU:OE2	1:F:397:ARG:NH2	2.42	0.53
1:A:62:LYS:O	1:A:63:ARG:NH1	2.41	0.53
1:B:394:GLU:OE2	1:B:397:ARG:NH2	2.42	0.53
1:H:394:GLU:OE2	1:H:397:ARG:NH2	2.42	0.53
1:D:103:GLU:OE1	1:D:417:THR:OG1	2.22	0.53
1:E:62:LYS:O	1:E:63:ARG:NH1	2.39	0.53
1:E:65:THR:HG22	1:E:75:VAL:HG22	1.91	0.52
1:L:394:GLU:OE2	1:L:397:ARG:NH2	2.41	0.52
1:K:62:LYS:O	1:K:63:ARG:NH1	2.39	0.52
1:K:65:THR:HG22	1:K:75:VAL:HG22	1.91	0.51
1:F:65:THR:HG22	1:F:75:VAL:HG22	1.92	0.51
1:C:62:LYS:O	1:C:63:ARG:NH1	2.40	0.51
1:B:110:ASP:OD1	1:B:110:ASP:N	2.39	0.51
1:J:65:THR:HG22	1:J:75:VAL:HG22	1.92	0.50
1:I:62:LYS:O	1:I:63:ARG:NH1	2.40	0.50
1:H:110:ASP:OD1	1:H:110:ASP:N	2.39	0.50
1:E:211:ILE:HG13	1:E:216:GLN:HE22	1.76	0.49
1:G:62:LYS:O	1:G:63:ARG:NH1	2.41	0.49
1:F:322:ALA:HB1	1:G:284:ILE:HD11	1.95	0.49
1:K:20:ALA:HB2	1:K:171:ASP:HB3	1.95	0.49
1:L:332:GLU:OE2	1:L:335:ARG:NH2	2.46	0.49
1:E:431:GLN:HE22	1:F:427:GLN:HG3	1.78	0.48
1:J:322:ALA:HB1	1:K:284:ILE:HD11	1.94	0.48
1:A:212:ASP:OD1	1:A:212:ASP:N	2.46	0.48
1:D:65:THR:HG22	1:D:75:VAL:HG22	1.94	0.48
1:D:322:ALA:HB1	1:E:284:ILE:HD11	1.94	0.48
1:F:332:GLU:OE2	1:F:335:ARG:NH2	2.47	0.48
1:K:431:GLN:HE22	1:L:427:GLN:HG3	1.78	0.48
1:D:222:GLY:O	1:D:224:ASN:ND2	2.46	0.48
1:A:284:ILE:HD11	1:L:322:ALA:HB1	1.95	0.47
1:J:110:ASP:OD1	1:J:110:ASP:N	2.46	0.47
1:E:20:ALA:HB2	1:E:171:ASP:HB3	1.95	0.47
1:B:322:ALA:HB1	1:C:284:ILE:HD11	1.96	0.47
1:C:431:GLN:HE22	1:D:427:GLN:HG3	1.80	0.47
1:A:431:GLN:HE22	1:B:427:GLN:HG3	1.80	0.46
1:H:65:THR:HG22	1:H:75:VAL:HG22	1.96	0.46
1:D:235:GLN:HE21	1:D:398:ASN:HB3	1.79	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:211:ILE:HG13	1:K:216:GLN:HE22	1.79	0.46
1:B:65:THR:HG22	1:B:75:VAL:HG22	1.96	0.46
1:G:64:ARG:NH1	1:G:80:THR:O	2.49	0.46
1:G:431:GLN:HE22	1:H:427:GLN:HG3	1.80	0.46
1:J:235:GLN:HE21	1:J:398:ASN:HB3	1.80	0.46
1:A:64:ARG:NH1	1:A:80:THR:O	2.49	0.46
1:I:431:GLN:HE22	1:J:427:GLN:HG3	1.80	0.46
1:C:212:ASP:N	1:C:212:ASP:OD1	2.44	0.46
1:H:322:ALA:HB1	1:I:284:ILE:HD11	1.96	0.46
1:E:354:ILE:H	1:E:354:ILE:HG13	1.64	0.46
1:B:332:GLU:OE1	1:B:335:ARG:NH2	2.48	0.46
1:C:64:ARG:NH1	1:C:80:THR:O	2.49	0.45
1:I:65:THR:HG22	1:I:75:VAL:HG22	1.98	0.45
1:I:64:ARG:NH1	1:I:80:THR:O	2.49	0.45
1:H:222:GLY:O	1:H:224:ASN:ND2	2.50	0.45
1:H:332:GLU:OE1	1:H:335:ARG:NH2	2.48	0.44
1:B:222:GLY:O	1:B:224:ASN:ND2	2.50	0.44
1:I:354:ILE:H	1:I:354:ILE:HG13	1.63	0.44
1:E:64:ARG:NH1	1:E:80:THR:O	2.51	0.44
1:G:185:SER:OG	1:G:193:GLU:OE2	2.35	0.44
1:K:64:ARG:NH1	1:K:80:THR:O	2.51	0.44
1:L:235:GLN:HE21	1:L:398:ASN:HB3	1.82	0.44
1:D:354:ILE:HD12	1:D:354:ILE:HA	1.87	0.44
1:H:235:GLN:HE21	1:H:398:ASN:HB3	1.83	0.44
1:A:185:SER:OG	1:A:193:GLU:OE2	2.36	0.44
1:B:204:HIS:HA	1:B:227:ARG:O	2.17	0.44
1:F:235:GLN:HE21	1:F:398:ASN:HB3	1.82	0.44
1:H:99:TYR:OH	1:H:371:ASP:OD1	2.29	0.44
1:H:204:HIS:HA	1:H:227:ARG:O	2.17	0.44
1:F:222:GLY:O	1:F:224:ASN:ND2	2.51	0.43
1:K:354:ILE:H	1:K:354:ILE:HG13	1.64	0.43
1:L:222:GLY:O	1:L:224:ASN:ND2	2.51	0.43
1:C:354:ILE:H	1:C:354:ILE:HG13	1.63	0.43
1:J:222:GLY:O	1:J:224:ASN:ND2	2.52	0.43
1:L:204:HIS:HA	1:L:227:ARG:O	2.19	0.43
1:D:362:ALA:HA	1:E:354:ILE:HG21	2.01	0.43
1:F:365:ASN:HB3	1:G:354:ILE:HD13	2.01	0.42
1:E:285:VAL:HG12	1:E:320:LEU:HB3	2.01	0.42
1:J:365:ASN:HD22	1:K:354:ILE:HD11	1.83	0.42
1:K:285:VAL:HG12	1:K:320:LEU:HB3	2.01	0.42
1:C:65:THR:HG22	1:C:75:VAL:HG22	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:170:LYS:HG2	1:F:178:LEU:HD13	2.01	0.42
1:F:204:HIS:HA	1:F:227:ARG:O	2.19	0.42
1:J:362:ALA:HA	1:K:354:ILE:HG21	2.01	0.42
1:L:170:LYS:HG2	1:L:178:LEU:HD13	2.01	0.42
3:5:56:ILE:HD13	3:5:100:LYS:HD2	2.02	0.42
1:B:187:LYS:HD2	1:B:191:GLY:HA2	2.02	0.42
3:6:13:SER:O	3:6:28:TRP:HA	2.20	0.42
1:H:365:ASN:HD22	1:I:354:ILE:HD11	1.85	0.41
1:C:185:SER:HA	1:C:194:THR:O	2.20	0.41
1:E:185:SER:HA	1:E:194:THR:O	2.21	0.41
1:I:212:ASP:OD1	1:I:212:ASP:N	2.44	0.41
3:2:56:ILE:HD13	3:2:100:LYS:HD2	2.02	0.41
1:K:37:LEU:HD21	1:L:189:ILE:HG23	2.03	0.41
1:A:354:ILE:HD13	1:L:365:ASN:HB3	2.01	0.41
3:1:56:ILE:HD13	3:1:100:LYS:HD2	2.03	0.41
1:D:235:GLN:NE2	1:D:398:ASN:O	2.54	0.41
1:K:351:PRO:HA	1:K:354:ILE:HD12	2.02	0.41
1:H:67:TYR:H	1:J:302:ASN:ND2	2.17	0.41
1:I:351:PRO:HA	1:I:354:ILE:HD12	2.01	0.41
1:B:362:ALA:HA	1:C:354:ILE:HG21	2.02	0.41
1:J:123:ASP:OD1	1:J:123:ASP:N	2.50	0.41
1:C:441:GLU:HG3	1:C:457:LEU:HD11	2.03	0.41
1:E:173:THR:HG22	1:E:175:ARG:H	1.86	0.41
1:F:354:ILE:HD12	1:F:354:ILE:HA	1.94	0.41
1:H:187:LYS:HD2	1:H:191:GLY:HA2	2.02	0.41
1:H:362:ALA:HA	1:I:354:ILE:HG21	2.02	0.41
1:I:185:SER:HA	1:I:194:THR:O	2.20	0.41
3:6:56:ILE:HD13	3:6:100:LYS:HD2	2.03	0.41
1:B:99:TYR:OH	1:B:371:ASP:OD1	2.29	0.41
1:B:379:ARG:HH12	1:C:98:GLN:HE22	1.69	0.40
3:3:13:SER:O	3:3:28:TRP:HA	2.21	0.40
1:K:212:ASP:OD1	1:K:212:ASP:N	2.52	0.40
1:J:235:GLN:NE2	1:J:398:ASN:O	2.54	0.40
1:A:98:GLN:HE22	1:L:379:ARG:HH12	1.69	0.40
1:B:112:LYS:HD3	1:B:112:LYS:HA	1.90	0.40
1:D:365:ASN:OD1	1:E:349:ASN:ND2	2.54	0.40
1:F:379:ARG:HH12	1:G:98:GLN:HE22	1.69	0.40
1:H:235:GLN:NE2	1:H:398:ASN:O	2.54	0.40
3:4:56:ILE:HD13	3:4:100:LYS:HD2	2.03	0.40
1:I:48:LYS:HD2	1:I:51:ARG:HH21	1.86	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	443/503 (88%)	425 (96%)	18 (4%)	0	100	100
1	B	443/503 (88%)	426 (96%)	17 (4%)	0	100	100
1	C	443/503 (88%)	426 (96%)	17 (4%)	0	100	100
1	D	443/503 (88%)	429 (97%)	14 (3%)	0	100	100
1	E	443/503 (88%)	422 (95%)	21 (5%)	0	100	100
1	F	443/503 (88%)	427 (96%)	16 (4%)	0	100	100
1	G	443/503 (88%)	425 (96%)	18 (4%)	0	100	100
1	H	443/503 (88%)	426 (96%)	17 (4%)	0	100	100
1	I	443/503 (88%)	426 (96%)	17 (4%)	0	100	100
1	J	443/503 (88%)	428 (97%)	15 (3%)	0	100	100
1	K	443/503 (88%)	423 (96%)	20 (4%)	0	100	100
1	L	443/503 (88%)	426 (96%)	17 (4%)	0	100	100
2	a	100/102 (98%)	98 (98%)	1 (1%)	1 (1%)	15	37
2	b	100/102 (98%)	96 (96%)	4 (4%)	0	100	100
2	c	100/102 (98%)	98 (98%)	1 (1%)	1 (1%)	15	37
2	d	100/102 (98%)	96 (96%)	4 (4%)	0	100	100
2	e	100/102 (98%)	98 (98%)	1 (1%)	1 (1%)	15	37
2	f	100/102 (98%)	96 (96%)	4 (4%)	0	100	100
2	g	100/102 (98%)	98 (98%)	1 (1%)	1 (1%)	15	37
2	h	100/102 (98%)	96 (96%)	4 (4%)	0	100	100
2	i	100/102 (98%)	98 (98%)	1 (1%)	1 (1%)	15	37
2	j	100/102 (98%)	96 (96%)	4 (4%)	0	100	100
2	k	100/102 (98%)	98 (98%)	1 (1%)	1 (1%)	15	37
2	l	100/102 (98%)	96 (96%)	4 (4%)	0	100	100
3	1	107/109 (98%)	102 (95%)	5 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	2	107/109 (98%)	102 (95%)	5 (5%)	0	100	100
3	3	107/109 (98%)	102 (95%)	5 (5%)	0	100	100
3	4	107/109 (98%)	102 (95%)	5 (5%)	0	100	100
3	5	107/109 (98%)	102 (95%)	5 (5%)	0	100	100
3	6	107/109 (98%)	102 (95%)	5 (5%)	0	100	100
All	All	7158/7914 (90%)	6885 (96%)	267 (4%)	6 (0%)	54	78

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	a	76	ASP
2	c	76	ASP
2	e	76	ASP
2	g	76	ASP
2	i	76	ASP
2	k	76	ASP

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	391/436 (90%)	390 (100%)	1 (0%)	92	98
1	B	391/436 (90%)	391 (100%)	0	100	100
1	C	391/436 (90%)	390 (100%)	1 (0%)	92	98
1	D	391/436 (90%)	391 (100%)	0	100	100
1	E	391/436 (90%)	389 (100%)	2 (0%)	88	96
1	F	391/436 (90%)	391 (100%)	0	100	100
1	G	391/436 (90%)	390 (100%)	1 (0%)	92	98
1	H	391/436 (90%)	391 (100%)	0	100	100
1	I	391/436 (90%)	390 (100%)	1 (0%)	92	98
1	J	391/436 (90%)	391 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	K	391/436 (90%)	389 (100%)	2 (0%)	88	96
1	L	391/436 (90%)	391 (100%)	0	100	100
2	a	91/91 (100%)	91 (100%)	0	100	100
2	b	91/91 (100%)	91 (100%)	0	100	100
2	c	91/91 (100%)	91 (100%)	0	100	100
2	d	91/91 (100%)	91 (100%)	0	100	100
2	e	91/91 (100%)	91 (100%)	0	100	100
2	f	91/91 (100%)	91 (100%)	0	100	100
2	g	91/91 (100%)	91 (100%)	0	100	100
2	h	91/91 (100%)	91 (100%)	0	100	100
2	i	91/91 (100%)	91 (100%)	0	100	100
2	j	91/91 (100%)	91 (100%)	0	100	100
2	k	91/91 (100%)	91 (100%)	0	100	100
2	l	91/91 (100%)	91 (100%)	0	100	100
3	1	94/94 (100%)	94 (100%)	0	100	100
3	2	94/94 (100%)	94 (100%)	0	100	100
3	3	94/94 (100%)	94 (100%)	0	100	100
3	4	94/94 (100%)	94 (100%)	0	100	100
3	5	94/94 (100%)	94 (100%)	0	100	100
3	6	94/94 (100%)	94 (100%)	0	100	100
All	All	6348/6888 (92%)	6340 (100%)	8 (0%)	93	98

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	354	ILE
1	C	354	ILE
1	E	175	ARG
1	E	354	ILE
1	G	354	ILE
1	I	354	ILE
1	K	175	ARG
1	K	354	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (81)

such sidechains are listed below:

Mol	Chain	Res	Type
1	A	98	GLN
1	A	283	GLN
1	A	302	ASN
1	A	349	ASN
1	B	35	GLN
1	B	131	ASN
1	B	136	ASN
1	B	224	ASN
1	B	283	GLN
1	B	302	ASN
1	B	365	ASN
1	B	427	GLN
3	1	17	GLN
1	C	98	GLN
1	C	283	GLN
1	C	302	ASN
1	C	349	ASN
1	D	35	GLN
1	D	131	ASN
1	D	136	ASN
1	D	224	ASN
1	D	283	GLN
1	D	302	ASN
1	D	365	ASN
1	D	427	GLN
3	2	17	GLN
1	E	98	GLN
1	E	216	GLN
1	E	283	GLN
1	E	302	ASN
1	E	349	ASN
1	F	35	GLN
1	F	131	ASN
1	F	136	ASN
1	F	224	ASN
1	F	283	GLN
1	F	302	ASN
1	F	365	ASN
1	F	427	GLN
2	f	17	HIS
3	3	17	GLN
1	G	98	GLN

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Mol	Chain	Res	Type
1	G	283	GLN
1	G	302	ASN
1	G	349	ASN
1	H	35	GLN
1	H	131	ASN
1	H	136	ASN
1	H	224	ASN
1	H	283	GLN
1	H	302	ASN
1	H	365	ASN
1	H	427	GLN
3	4	17	GLN
1	I	98	GLN
1	I	283	GLN
1	I	302	ASN
1	I	349	ASN
1	I	451	GLN
1	J	35	GLN
1	J	131	ASN
1	J	136	ASN
1	J	224	ASN
1	J	283	GLN
1	J	302	ASN
1	J	365	ASN
1	J	427	GLN
3	5	17	GLN
1	K	98	GLN
1	K	283	GLN
1	K	302	ASN
1	K	349	ASN
1	L	131	ASN
1	L	136	ASN
1	L	224	ASN
1	L	283	GLN
1	L	302	ASN
1	L	365	ASN
1	L	427	GLN
2	1	17	HIS
3	6	17	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	1
1	G	1
1	C	1
1	I	1
1	E	1
1	K	1
1	B	1
1	H	1
1	D	1
1	J	1
1	F	1
1	L	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	20:ALA	C	28:GLU	N	13.56
1	G	20:ALA	C	28:GLU	N	13.56
1	C	20:ALA	C	28:GLU	N	13.54
1	I	20:ALA	C	28:GLU	N	13.54
1	E	20:ALA	C	28:GLU	N	13.52
1	K	20:ALA	C	28:GLU	N	13.52
1	B	20:ALA	C	28:GLU	N	12.21
1	H	20:ALA	C	28:GLU	N	12.21
1	D	20:ALA	C	28:GLU	N	12.14
1	J	20:ALA	C	28:GLU	N	12.14
1	F	20:ALA	C	28:GLU	N	12.12
1	L	20:ALA	C	28:GLU	N	12.12

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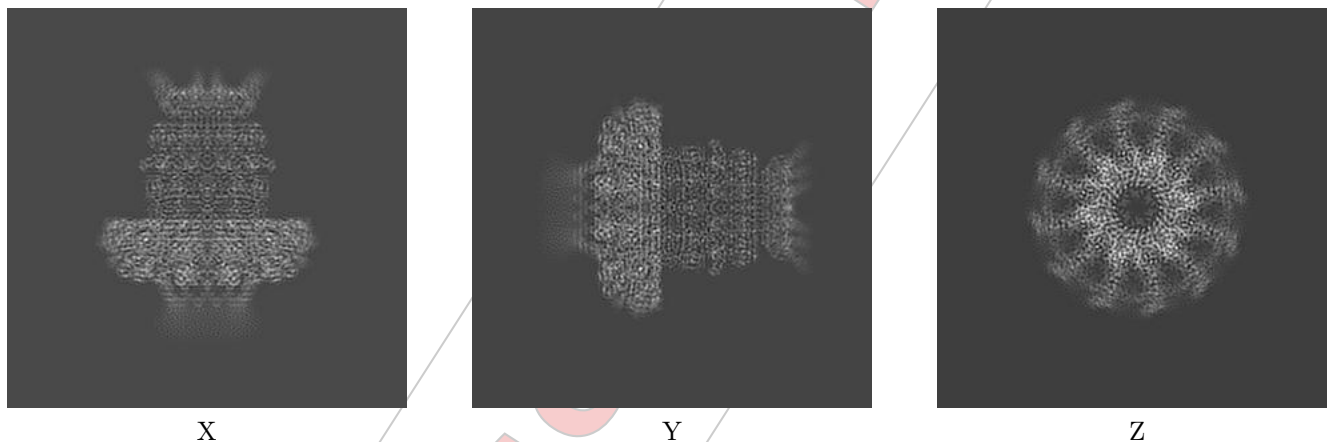
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-14509. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

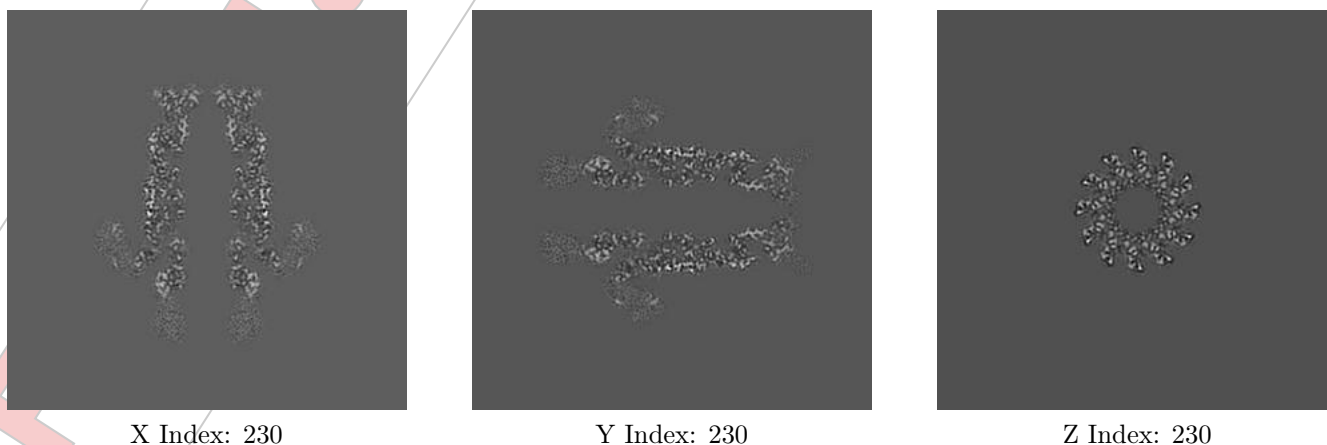
6.1.1 Primary map



The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 230

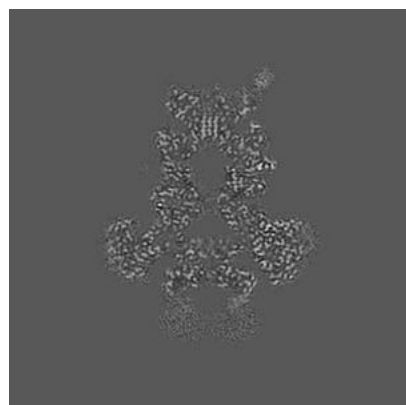
Y Index: 230

Z Index: 230

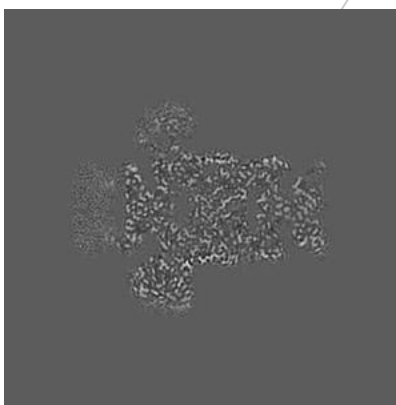
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

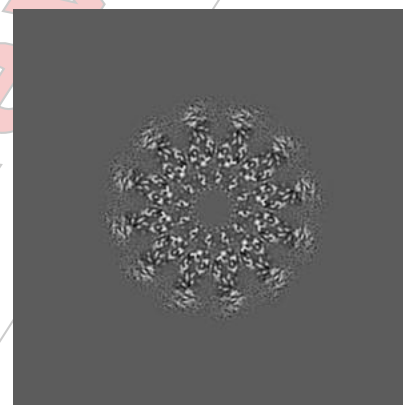
6.3.1 Primary map



X Index: 256



Y Index: 262

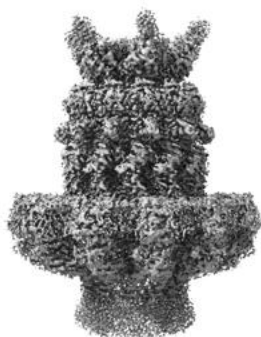


Z Index: 181

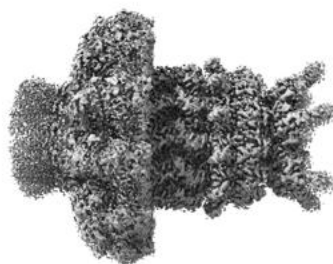
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

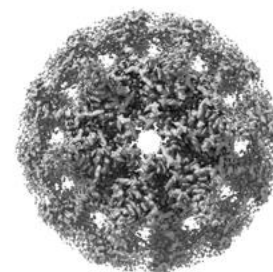
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5 Mask visualisation

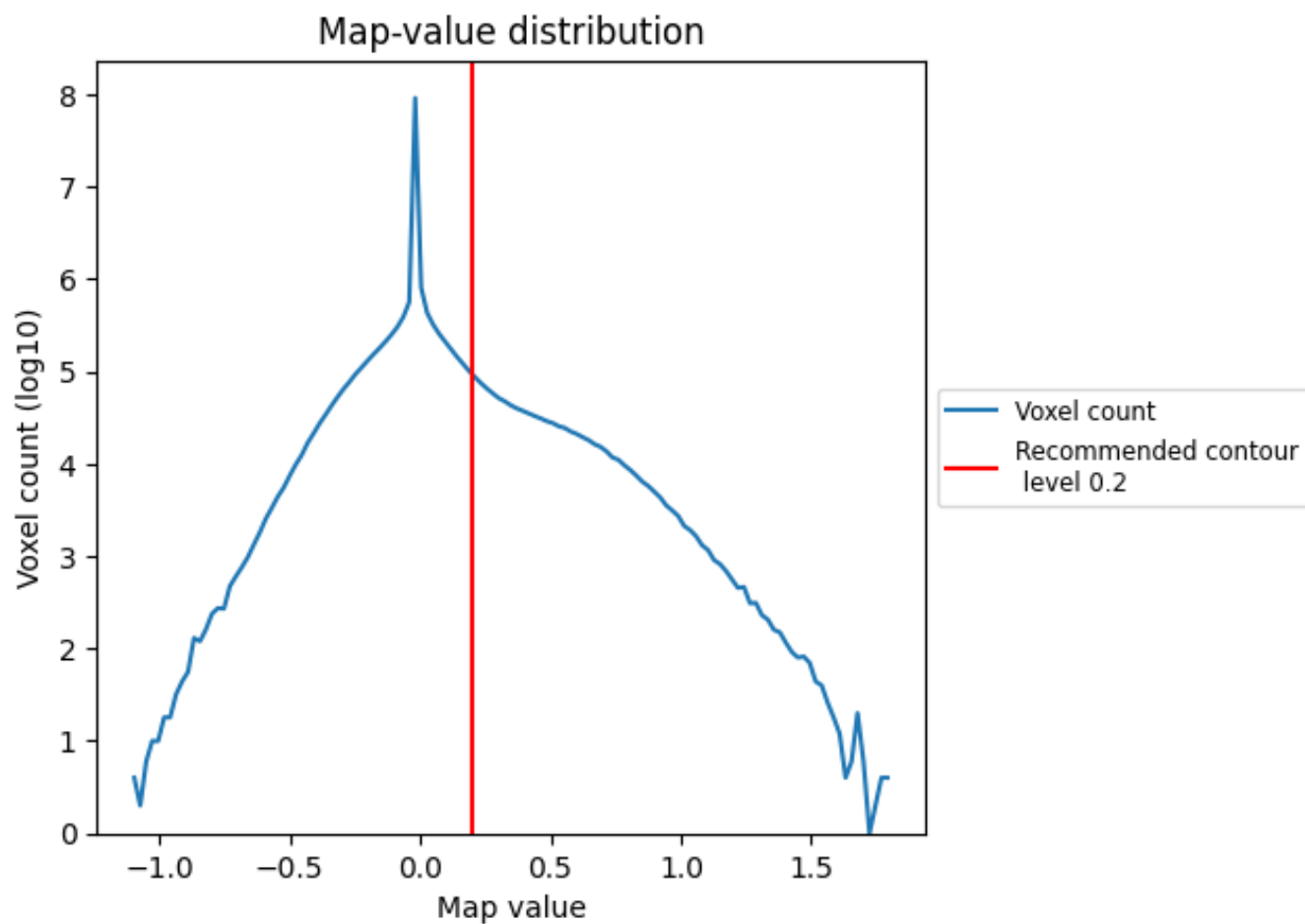
This section was not generated. No masks/segmentation were deposited.

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7 Map analysis [i](#)

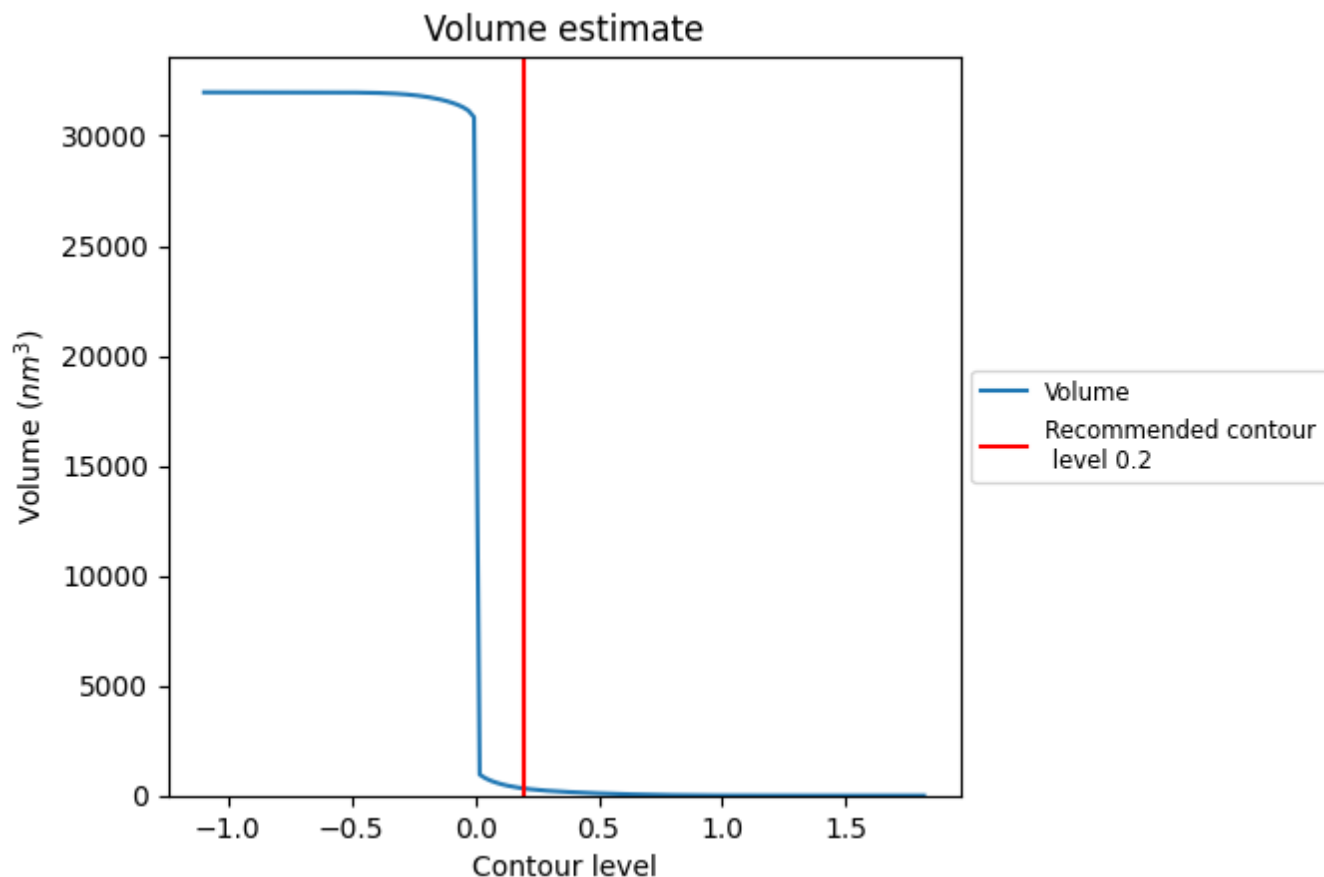
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

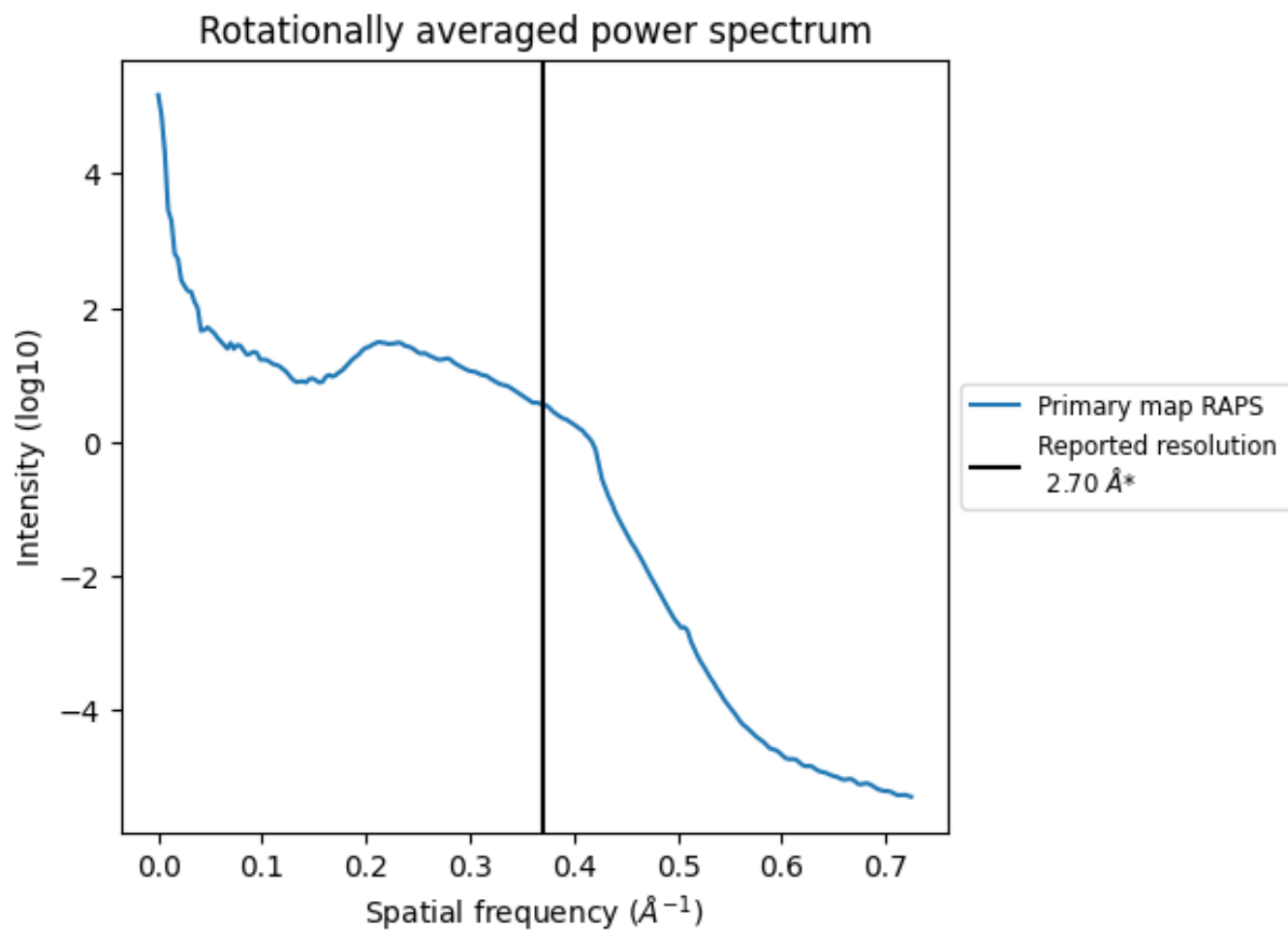
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 319 nm³; this corresponds to an approximate mass of 288 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ



*Reported resolution corresponds to spatial frequency of 0.370 Å⁻¹

8 Fourier-Shell correlation

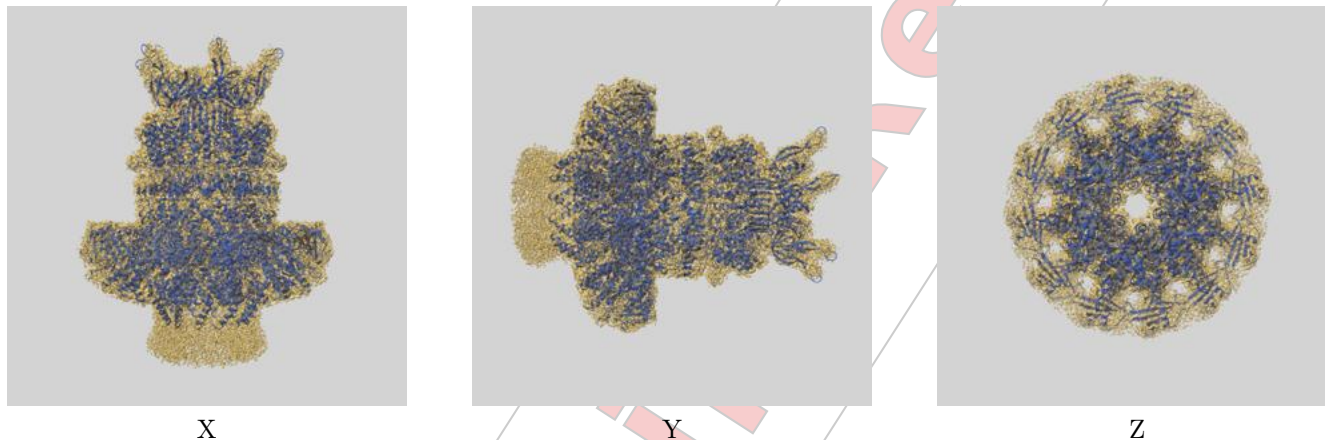
This section was not generated. No FSC curve or half-maps provided.

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9 Map-model fit [i](#)

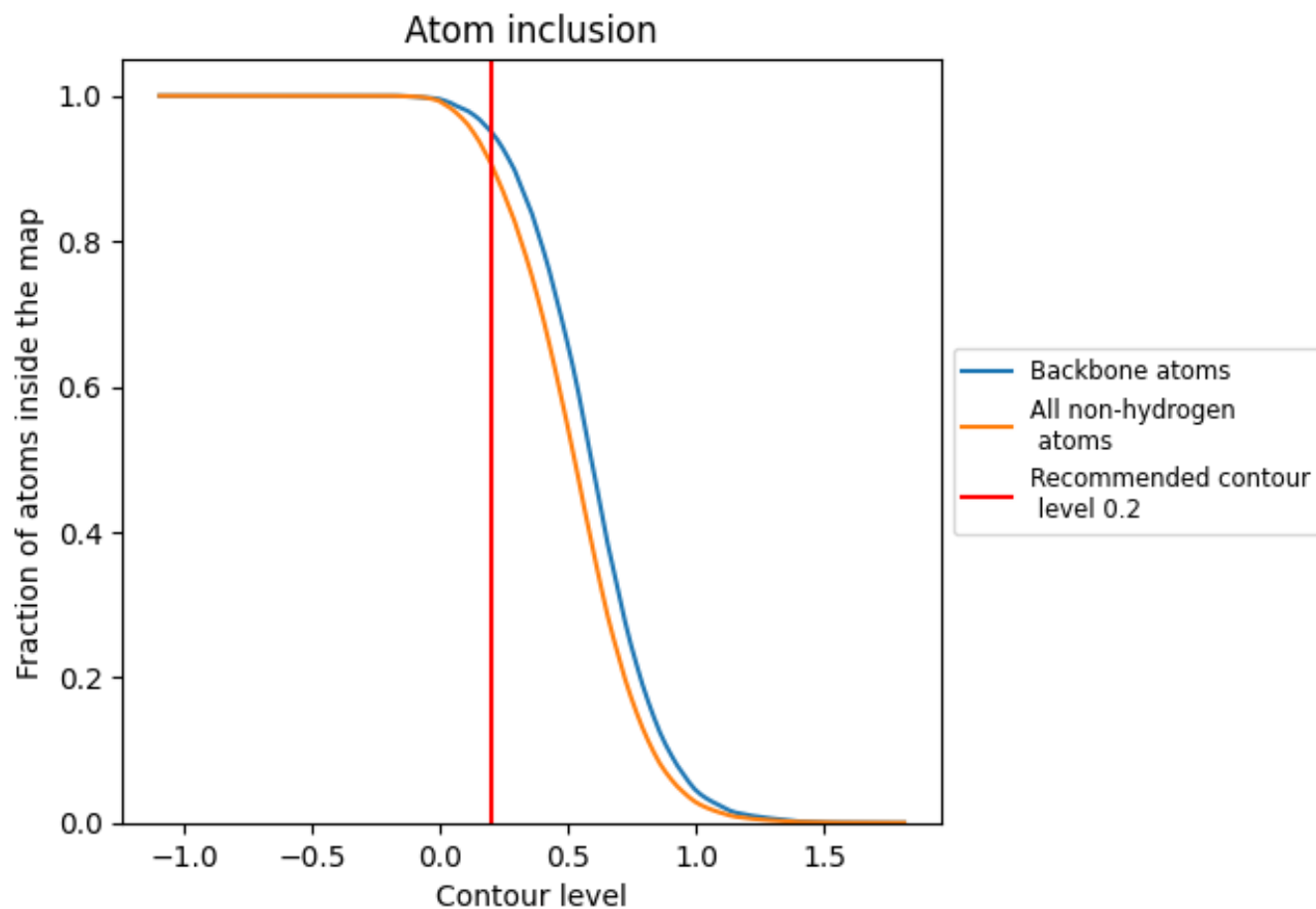
This section contains information regarding the fit between EMDB map EMD-14509 and PDB model 7Z4W. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Atom inclusion [i](#)



At the recommended contour level, 95% of all backbone atoms, 91% of all non-hydrogen atoms, are inside the map.