



Full wwPDB EM Validation Report ⓘ

Jun 16, 2025 – 11:26 PM JST

PDB ID : 6IOL / pdb_00006iol
EMDB ID : EMD-9696
Title : Cryo-EM structure of multidrug efflux pump MexAB-OprM (60 degree state)
Authors : Tsutsumi, K.; Yonehara, R.; Nakagawa, A.; Yamashita, E.
Deposited on : 2018-10-30
Resolution : 3.76 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

EMDB validation analysis : 0.0.1.dev118
MolProbity : 4-5-2 with Phenix2.0rc1
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.44

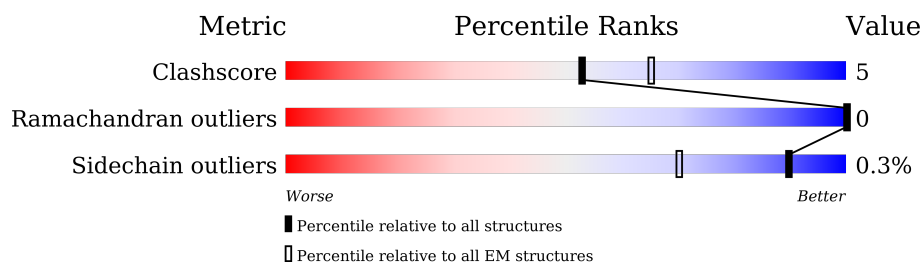
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.76 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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	I	362	81% 11% 8%
1	J	362	79% 13% 8%
1	K	362	81% 10% 8%
1	L	362	79% 14% 7%
1	M	362	80% 12% 8%
1	N	362	82% 11% 7%
2	A	474	81% 15% .
2	B	474	85% 11% .

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Mol	Chain	Length	Quality of chain
2	C	474	82% 14%
3	E	1054	84% 13%
3	F	1054	84% 13%
3	G	1054	80% 17%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 49077 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 Multidrug resistance protein MexA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	I	333	Total	C	N	O	S	0	0
			2538	1585	455	496	2		
1	J	333	Total	C	N	O	S	0	0
			2538	1585	455	496	2		
1	K	332	Total	C	N	O	S	0	0
			2529	1580	453	494	2		
1	L	336	Total	C	N	O	S	0	0
			2554	1594	458	500	2		
1	M	332	Total	C	N	O	S	0	0
			2529	1580	453	494	2		
1	N	335	Total	C	N	O	S	0	0
			2544	1589	456	497	2		

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	-1	GLY	-	expression tag	UNP P52477
I	0	ALA	-	expression tag	UNP P52477
I	1	MET	-	expression tag	UNP P52477
J	-1	GLY	-	expression tag	UNP P52477
J	0	ALA	-	expression tag	UNP P52477
J	1	MET	-	expression tag	UNP P52477
K	-1	GLY	-	expression tag	UNP P52477
K	0	ALA	-	expression tag	UNP P52477
K	1	MET	-	expression tag	UNP P52477
L	-1	GLY	-	expression tag	UNP P52477
L	0	ALA	-	expression tag	UNP P52477
L	1	MET	-	expression tag	UNP P52477
M	-1	GLY	-	expression tag	UNP P52477
M	0	ALA	-	expression tag	UNP P52477
M	1	MET	-	expression tag	UNP P52477
N	-1	GLY	-	expression tag	UNP P52477
N	0	ALA	-	expression tag	UNP P52477
N	1	MET	-	expression tag	UNP P52477

- Molecule 2 is a protein called Outer membrane protein OprM.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	A	455	Total	C	N	O	S	0	0
			3486	2182	621	680	3		
2	B	455	Total	C	N	O	S	0	0
			3486	2182	621	680	3		
2	C	455	Total	C	N	O	S	0	0
			3486	2182	621	680	3		

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	469	HIS	-	expression tag	UNP Q51487
A	470	HIS	-	expression tag	UNP Q51487
A	471	HIS	-	expression tag	UNP Q51487
A	472	HIS	-	expression tag	UNP Q51487
A	473	HIS	-	expression tag	UNP Q51487
A	474	HIS	-	expression tag	UNP Q51487
B	469	HIS	-	expression tag	UNP Q51487
B	470	HIS	-	expression tag	UNP Q51487
B	471	HIS	-	expression tag	UNP Q51487
B	472	HIS	-	expression tag	UNP Q51487
B	473	HIS	-	expression tag	UNP Q51487
B	474	HIS	-	expression tag	UNP Q51487
C	469	HIS	-	expression tag	UNP Q51487
C	470	HIS	-	expression tag	UNP Q51487
C	471	HIS	-	expression tag	UNP Q51487
C	472	HIS	-	expression tag	UNP Q51487
C	473	HIS	-	expression tag	UNP Q51487
C	474	HIS	-	expression tag	UNP Q51487

- Molecule 3 is a protein called Multidrug resistance protein MexB.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	F	1024	Total	C	N	O	S	0	0
			7764	4998	1289	1437	40		
3	G	1030	Total	C	N	O	S	0	0
			7811	5027	1298	1446	40		
3	E	1030	Total	C	N	O	S	0	0
			7812	5027	1298	1447	40		

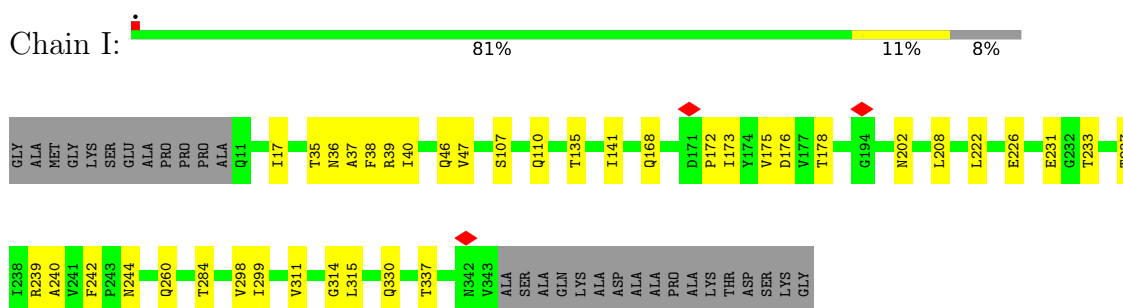
There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	1047	LEU	-	expression tag	UNP P52002
F	1048	GLU	-	expression tag	UNP P52002
F	1049	HIS	-	expression tag	UNP P52002
F	1050	HIS	-	expression tag	UNP P52002
F	1051	HIS	-	expression tag	UNP P52002
F	1052	HIS	-	expression tag	UNP P52002
F	1053	HIS	-	expression tag	UNP P52002
F	1054	HIS	-	expression tag	UNP P52002
G	1047	LEU	-	expression tag	UNP P52002
G	1048	GLU	-	expression tag	UNP P52002
G	1049	HIS	-	expression tag	UNP P52002
G	1050	HIS	-	expression tag	UNP P52002
G	1051	HIS	-	expression tag	UNP P52002
G	1052	HIS	-	expression tag	UNP P52002
G	1053	HIS	-	expression tag	UNP P52002
G	1054	HIS	-	expression tag	UNP P52002
E	1047	LEU	-	expression tag	UNP P52002
E	1048	GLU	-	expression tag	UNP P52002
E	1049	HIS	-	expression tag	UNP P52002
E	1050	HIS	-	expression tag	UNP P52002
E	1051	HIS	-	expression tag	UNP P52002
E	1052	HIS	-	expression tag	UNP P52002
E	1053	HIS	-	expression tag	UNP P52002
E	1054	HIS	-	expression tag	UNP P52002

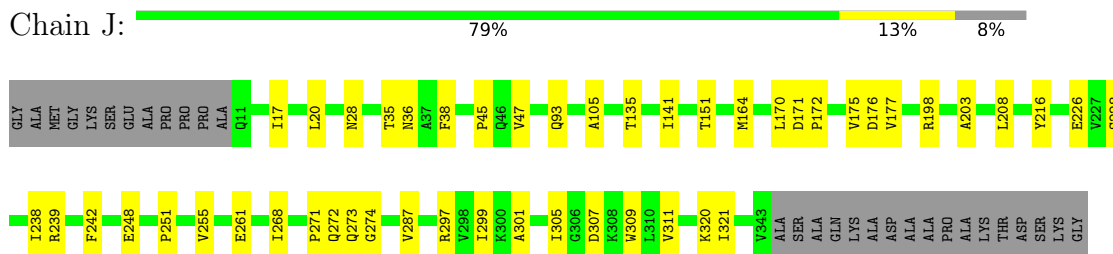
3 Residue-property plots [i](#)

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.

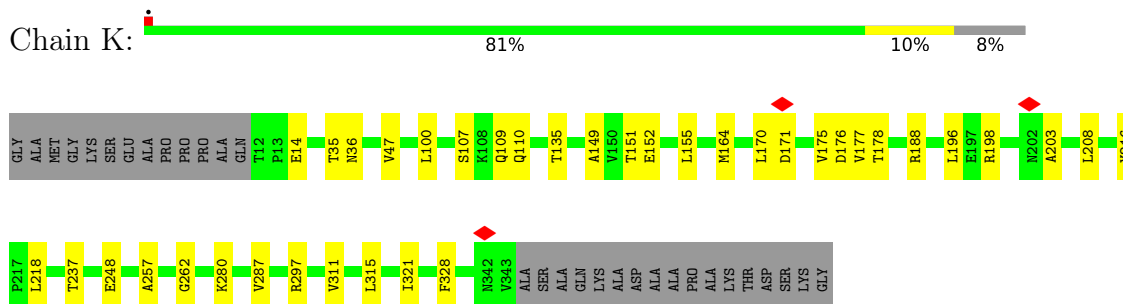
- Molecule 1: Multidrug resistance protein MexA



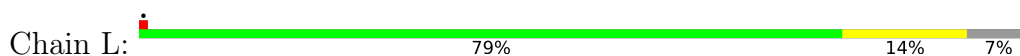
- Molecule 1: Multidrug resistance protein MexA

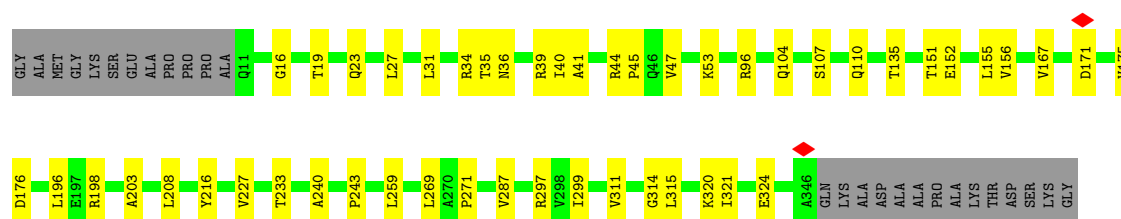


- Molecule 1: Multidrug resistance protein MexA



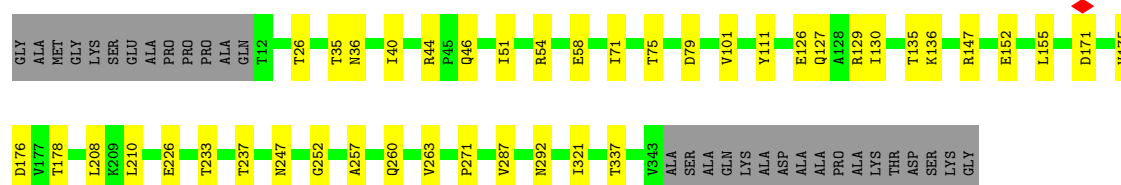
- Molecule 1: Multidrug resistance protein MexA





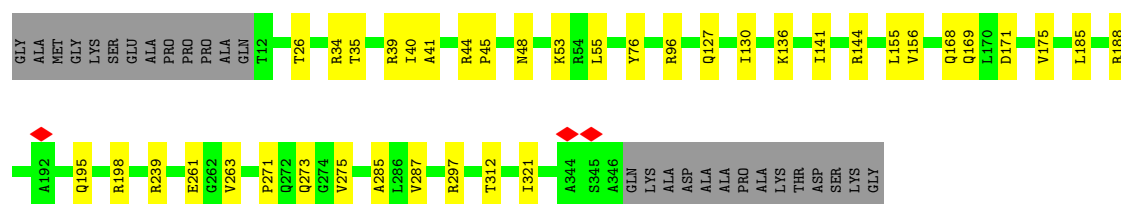
- Molecule 1: Multidrug resistance protein MexA

Chain M: 80% 12% 8%



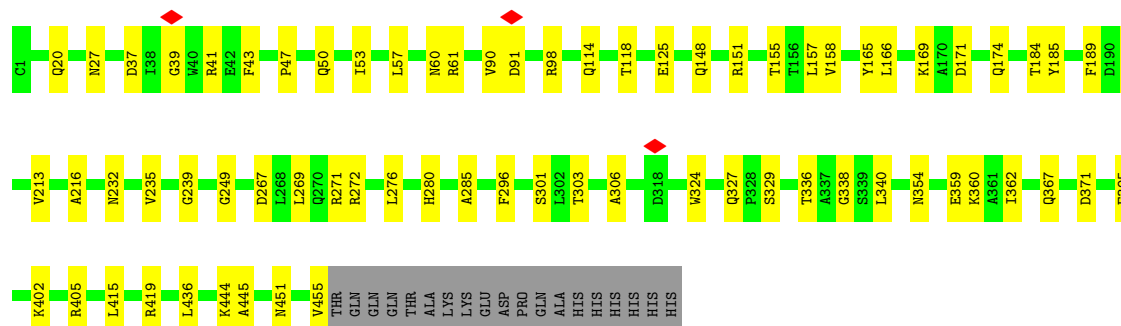
- Molecule 1: Multidrug resistance protein MexA

Chain N: 82% 11% 7%



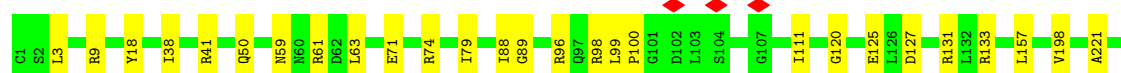
- Molecule 2: Outer membrane protein OprM

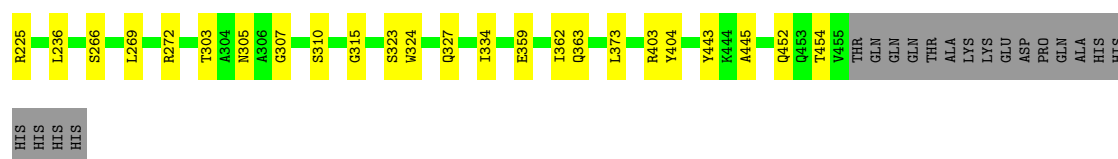
Chain A: 81% 15% 4%



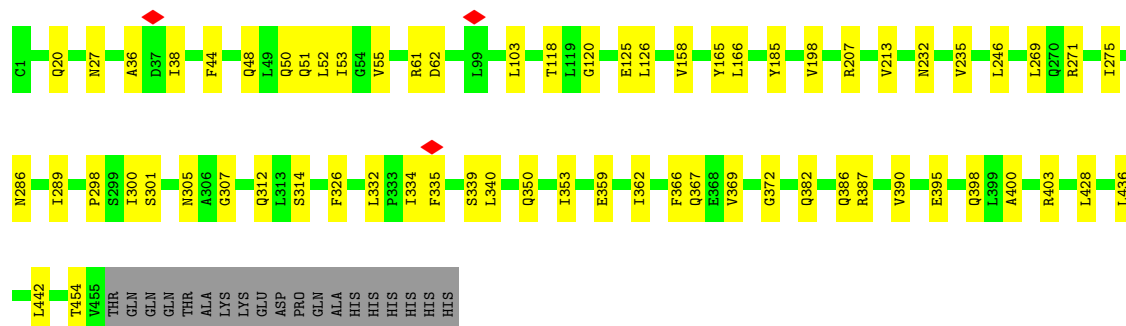
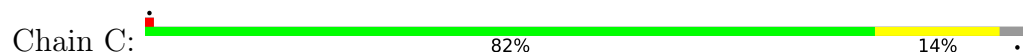
- Molecule 2: Outer membrane protein OprM

Chain B: 85% 11% 4%

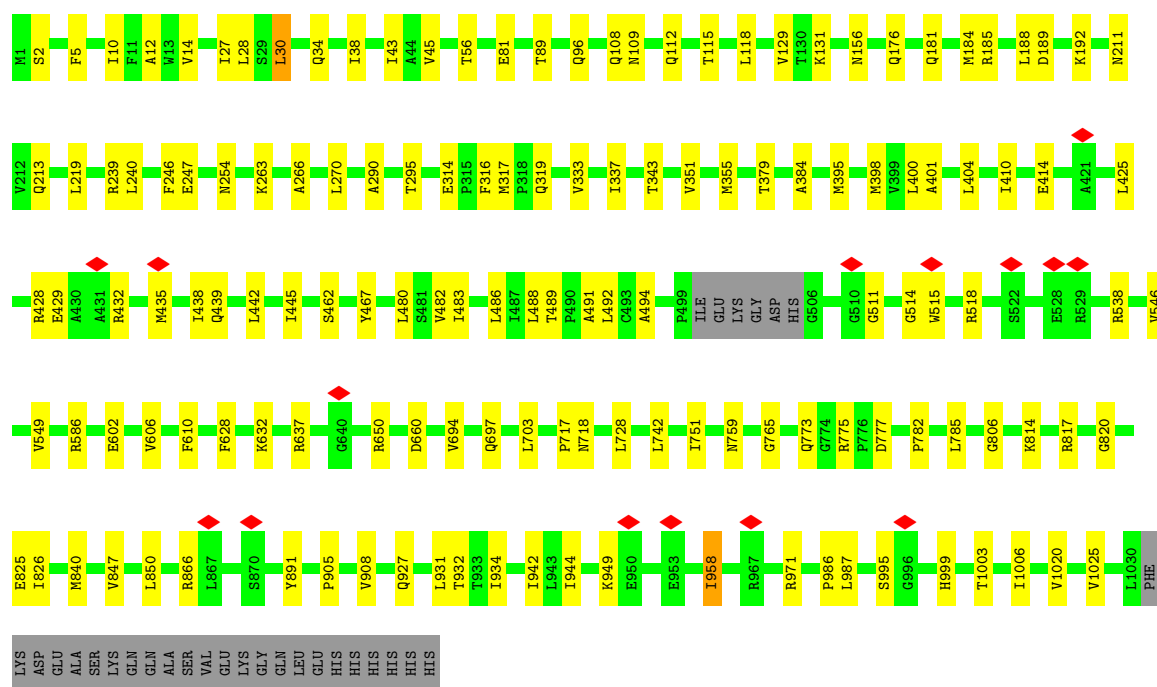
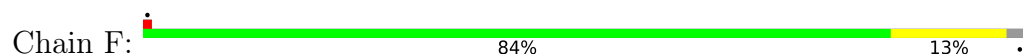




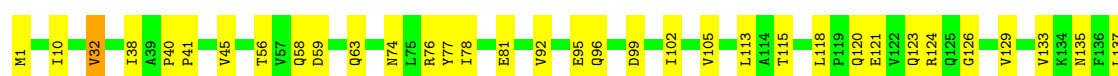
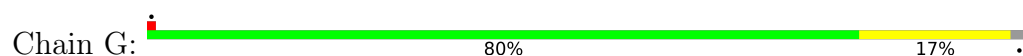
• Molecule 2: Outer membrane protein OprM

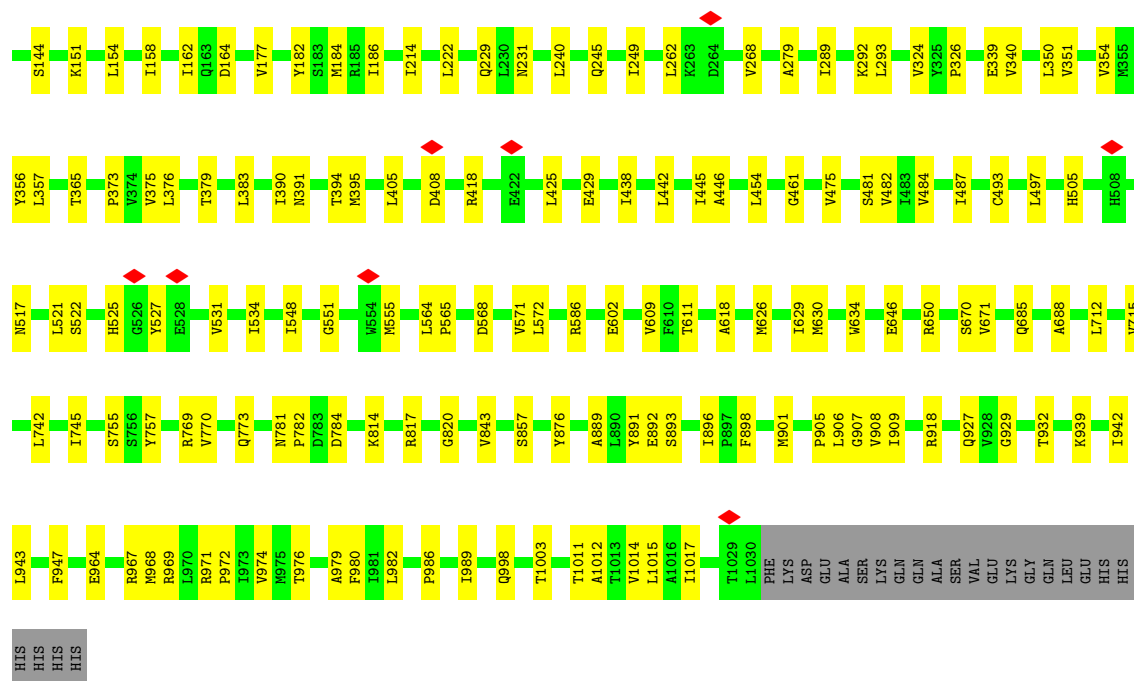


• Molecule 3: Multidrug resistance protein MexB



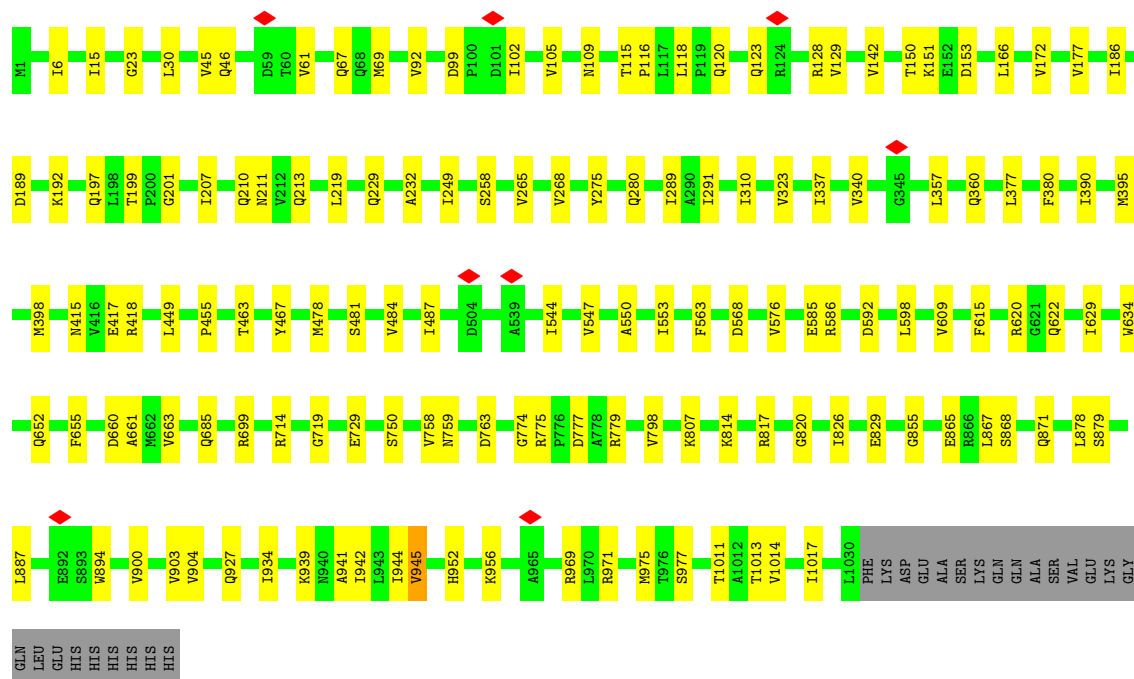
• Molecule 3: Multidrug resistance protein MexB





• Molecule 3: Multidrug resistance protein MexB

Chain E: 84% 13%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	42338	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1250	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	75000	Depositor
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	99.155	Depositor
Minimum map value	-76.440	Depositor
Average map value	0.023	Depositor
Map value standard deviation	2.561	Depositor
Recommended contour level	3.65	Depositor
Map size (Å)	350.0, 350.0, 350.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.875, 0.875, 0.875	Depositor

5 Model quality

5.1 Standard geometry

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	I	0.20	0/2569	0.50	0/3486
1	J	0.19	0/2569	0.48	0/3486
1	K	0.20	0/2560	0.47	0/3474
1	L	0.22	0/2585	0.51	0/3508
1	M	0.20	0/2560	0.48	0/3474
1	N	0.19	0/2575	0.49	0/3494
2	A	0.21	0/3542	0.49	0/4818
2	B	0.21	0/3542	0.49	0/4818
2	C	0.22	0/3542	0.50	0/4818
3	E	0.24	0/7971	0.54	0/10833
3	F	0.24	0/7921	0.54	0/10765
3	G	0.24	0/7970	0.54	0/10831
All	All	0.22	0/49906	0.52	0/67805

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	J	0	1
1	K	0	1
1	L	0	1
1	M	0	2
1	N	0	1
All	All	0	6

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	J	171	ASP	Peptide
1	K	171	ASP	Peptide
1	L	171	ASP	Peptide
1	M	136	LYS	Peptide
1	M	171	ASP	Peptide
1	N	171	ASP	Peptide

5.2 Too-close contacts

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	I	2538	0	2590	24	0
1	J	2538	0	2590	34	0
1	K	2529	0	2582	26	0
1	L	2554	0	2605	33	0
1	M	2529	0	2582	28	0
1	N	2544	0	2597	27	0
2	A	3486	0	3466	43	0
2	B	3486	0	3466	37	0
2	C	3486	0	3466	38	0
3	E	7812	0	7944	89	0
3	F	7764	0	7899	87	0
3	G	7811	0	7944	108	0
All	All	49077	0	49731	508	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 5.

All (508) 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:J:238:ILE:HG22	1:J:239:ARG:H	1.19	1.05
1:J:238:ILE:HG22	1:J:239:ARG:N	1.79	0.93
1:J:238:ILE:CG2	1:J:239:ARG:H	1.81	0.92
2:B:18:TYR:CD2	2:B:373:LEU:CD1	2.58	0.86
2:B:18:TYR:CE2	2:B:373:LEU:HD11	2.12	0.85
3:F:435:MET:O	3:F:439:GLN:HB2	1.80	0.81

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:551:GLY:O	3:G:555:MET:HB2	1.92	0.69
2:B:18:TYR:CD2	2:B:373:LEU:HD13	2.28	0.69
1:J:170:LEU:HD22	1:J:251:PRO:HD3	1.78	0.66
1:N:271:PRO:HD2	1:N:321:ILE:HD11	1.77	0.66
3:E:210:GLN:HG3	3:E:249:ILE:HG23	1.79	0.65
1:M:35:THR:HG22	1:M:175:VAL:HG22	1.79	0.64
3:G:350:LEU:HD21	3:G:982:LEU:HB3	1.80	0.64
1:K:196:LEU:HD12	1:K:262:GLY:HA3	1.78	0.64
1:K:47:VAL:HG11	1:K:135:THR:HA	1.81	0.63
1:I:35:THR:HG22	1:I:175:VAL:HG22	1.81	0.63
2:A:402:LYS:HG2	2:A:405:ARG:HH21	1.64	0.63
1:M:271:PRO:HD2	1:M:321:ILE:HD11	1.81	0.63
3:F:314:GLU:HA	3:F:317:MET:HE3	1.82	0.62
3:G:240:LEU:HD12	3:G:245:GLN:HB3	1.81	0.62
3:F:219:LEU:HD21	3:G:782:PRO:HG3	1.82	0.61
3:E:942:ILE:HA	3:E:945:VAL:HG12	1.81	0.61
3:F:213:GLN:HB2	3:F:239:ARG:HG3	1.83	0.61
3:G:81:GLU:HG3	3:G:814:LYS:HE3	1.83	0.61
1:K:35:THR:HG22	1:K:175:VAL:HG22	1.83	0.61
2:B:41:ARG:HE	2:B:452:GLN:HE21	1.49	0.60
1:L:233:THR:HA	3:E:798:VAL:HG12	1.82	0.60
2:C:125:GLU:HA	2:C:301:SER:HA	1.83	0.60
3:G:918:ARG:HD3	3:G:1003:THR:HG21	1.82	0.60
1:K:216:TYR:CE2	1:K:218:LEU:HB2	2.37	0.60
1:J:272:GLN:NE2	1:J:307:ASP:O	2.35	0.60
3:G:755:SER:HB3	3:G:773:GLN:HE21	1.66	0.60
3:G:943:LEU:HB3	3:G:969:ARG:HH12	1.65	0.59
3:F:694:VAL:HG23	3:F:697:GLN:HE21	1.67	0.59
3:F:43:ILE:HG22	3:F:131:LYS:HA	1.83	0.59
1:J:35:THR:HG22	1:J:175:VAL:HG22	1.83	0.59
3:F:176:GLN:HB3	3:F:290:ALA:HB3	1.84	0.59
1:J:93:GLN:HA	1:K:109:GLN:HE22	1.68	0.58
1:L:287:VAL:HG11	1:L:297:ARG:HH21	1.68	0.58
3:G:164:ASP:OD1	3:E:67:GLN:NE2	2.37	0.58
3:F:10:ILE:HG21	3:G:892:GLU:HA	1.86	0.58
3:F:30:LEU:HD23	3:F:384:ALA:HB2	1.86	0.58
3:F:247:GLU:HB3	3:F:263:LYS:HB3	1.86	0.58
1:K:36:ASN:ND2	1:K:176:ASP:OD2	2.37	0.58
2:C:185:TYR:HB3	2:C:213:VAL:HG12	1.85	0.58
3:F:467:TYR:OH	3:F:927:GLN:OE1	2.20	0.58
3:G:158:ILE:HA	3:G:162:ILE:HG12	1.86	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:N:273:GLN:NE2	3:E:229:GLN:OE1	2.36	0.58
3:F:188:LEU:HD23	3:F:266:ALA:HB2	1.85	0.58
1:K:216:TYR:HE1	1:K:248:GLU:OE1	1.87	0.58
3:F:14:VAL:HG11	3:G:889:ALA:HB2	1.86	0.57
1:N:198:ARG:HH21	1:N:261:GLU:HG2	1.68	0.57
3:F:115:THR:HA	3:F:118:LEU:HD13	1.84	0.57
1:I:36:ASN:ND2	1:I:176:ASP:OD2	2.37	0.57
1:J:170:LEU:HD21	1:J:251:PRO:HG3	1.86	0.57
2:C:20:GLN:NE2	2:C:27:ASN:OD1	2.37	0.57
3:F:428:ARG:HH21	3:F:494:ALA:HB1	1.69	0.57
3:F:891:TYR:O	3:F:949:LYS:NZ	2.38	0.57
1:K:170:LEU:HD11	1:L:227:VAL:HG11	1.86	0.57
1:M:155:LEU:O	1:N:44:ARG:NH2	2.37	0.57
3:F:847:VAL:HA	3:F:850:LEU:HD23	1.86	0.56
1:N:96:ARG:HG3	2:C:198:VAL:HG12	1.87	0.56
1:I:202:ASN:O	1:I:260:GLN:NE2	2.38	0.56
1:J:248:GLU:OE1	1:K:188:ARG:NH2	2.38	0.56
3:F:351:VAL:HG12	3:F:355:MET:HE2	1.86	0.56
1:K:100:LEU:HD21	2:B:403:ARG:HG2	1.87	0.56
3:G:521:LEU:O	3:G:525:HIS:ND1	2.39	0.56
2:A:185:TYR:HD2	2:A:216:ALA:HB2	1.71	0.56
3:F:185:ARG:NH2	3:F:773:GLN:OE1	2.38	0.56
3:F:239:ARG:NH2	3:G:59:ASP:O	2.38	0.56
3:F:445:ILE:HD12	3:F:942:ILE:HD13	1.86	0.56
2:A:269:LEU:HD21	2:A:362:ILE:HD12	1.88	0.56
3:F:12:ALA:HB1	3:F:488:LEU:HA	1.88	0.56
2:A:367:GLN:NE2	2:A:371:ASP:OD2	2.39	0.56
3:F:337:ILE:HG23	3:F:395:MET:HE1	1.88	0.56
3:G:742:LEU:HD23	3:G:745:ILE:HD12	1.86	0.56
3:G:976:THR:O	3:G:980:PHE:HB2	2.05	0.56
3:G:685:GLN:NE2	3:G:857:SER:OG	2.39	0.56
3:E:661:ALA:HB1	3:E:663:VAL:HG23	1.87	0.56
1:I:233:THR:OG1	3:F:254:ASN:ND2	2.40	0.55
1:L:287:VAL:HG12	1:L:321:ILE:HG22	1.86	0.55
3:F:56:THR:HG23	3:E:213:GLN:HG3	1.88	0.55
3:G:568:ASP:OD2	3:G:634:TRP:NE1	2.39	0.55
1:K:208:LEU:HA	1:K:257:ALA:HA	1.87	0.55
3:G:340:VAL:HG21	3:G:395:MET:HB3	1.88	0.55
2:A:125:GLU:HA	2:A:301:SER:HA	1.88	0.55
3:G:893:SER:HB3	3:G:896:ILE:HG22	1.89	0.55
3:G:505:HIS:O	3:G:517:ASN:ND2	2.40	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:632:LYS:O	3:F:637:ARG:NH1	2.40	0.55
3:E:177:VAL:HG12	3:E:289:ILE:HG22	1.87	0.55
1:N:35:THR:HG22	1:N:175:VAL:HG22	1.89	0.55
2:B:18:TYR:CE2	2:B:373:LEU:CD1	2.82	0.55
3:G:572:LEU:HD23	3:G:629:ILE:HD11	1.88	0.55
1:M:26:THR:HA	1:M:263:VAL:HG12	1.88	0.55
1:L:35:THR:HG22	1:L:175:VAL:HG22	1.88	0.55
1:M:79:ASP:OD1	1:N:127:GLN:NE2	2.37	0.54
3:G:571:VAL:HG12	3:G:630:MET:HG2	1.88	0.54
1:L:36:ASN:ND2	1:L:176:ASP:OD2	2.37	0.54
1:I:176:ASP:OD1	1:I:239:ARG:NE	2.39	0.54
2:C:312:GLN:HG3	2:C:314:SER:H	1.73	0.54
3:F:343:THR:HG21	3:F:987:LEU:HB3	1.89	0.54
3:F:379:THR:HG23	3:F:398:MET:HE2	1.89	0.54
3:G:115:THR:HA	3:G:118:LEU:HD13	1.90	0.54
3:E:15:ILE:HD11	3:E:487:ILE:HG12	1.89	0.54
1:M:152:GLU:OE2	1:N:39:ARG:NE	2.40	0.54
3:F:817:ARG:NH2	3:F:820:GLY:O	2.41	0.54
3:G:184:MET:HB3	3:G:770:VAL:HG22	1.90	0.54
1:M:247:ASN:O	1:N:188:ARG:NH2	2.41	0.54
2:A:53:ILE:HD11	2:A:158:VAL:HG13	1.90	0.54
3:E:115:THR:O	3:E:123:GLN:NE2	2.41	0.54
2:A:301:SER:OG	2:A:329:SER:O	2.26	0.54
2:C:38:ILE:HA	2:C:454:THR:HG22	1.90	0.54
3:F:45:VAL:HG22	3:F:129:VAL:HG22	1.90	0.54
1:L:175:VAL:HB	1:L:240:ALA:HB3	1.89	0.54
3:F:602:GLU:OE2	3:F:650:ARG:NH2	2.35	0.54
3:G:564:LEU:HD13	3:G:670:SER:HB2	1.89	0.54
1:J:287:VAL:HG21	1:J:297:ARG:HE	1.73	0.53
2:B:71:GLU:HG3	2:B:74:ARG:HD3	1.90	0.53
3:G:186:ILE:HG12	3:G:268:VAL:HG12	1.88	0.53
3:E:463:THR:HG21	3:E:868:SER:HB2	1.89	0.53
3:E:729:GLU:OE2	3:E:807:LYS:NZ	2.41	0.53
3:G:527:TYR:OH	3:G:1017:ILE:O	2.27	0.53
3:E:652:GLN:HA	3:E:655:PHE:HB2	1.89	0.53
3:G:964:GLU:OE1	3:G:967:ARG:NH1	2.41	0.53
2:A:60:ASN:HB3	2:A:157:LEU:HD11	1.91	0.53
3:F:81:GLU:OE1	3:F:814:LYS:NZ	2.40	0.53
3:E:867:LEU:O	3:E:871:GLN:HB2	2.08	0.53
2:A:166:LEU:HD13	2:A:436:LEU:HB3	1.90	0.53
3:E:23:GLY:HA3	3:E:377:LEU:HB3	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:903:VAL:HG11	3:E:941:ALA:HB2	1.89	0.53
3:G:38:ILE:HD11	3:G:671:VAL:HG11	1.90	0.53
3:G:229:GLN:NE2	3:E:585:GLU:OE2	2.41	0.53
3:G:339:GLU:OE1	3:G:998:GLN:NE2	2.41	0.53
3:E:455:PRO:HG2	3:E:879:SER:HA	1.91	0.53
3:F:38:ILE:O	3:F:96:GLN:NE2	2.42	0.53
3:G:531:VAL:HA	3:G:534:ILE:HG12	1.91	0.53
3:E:449:LEU:HD21	3:E:939:LYS:HB2	1.91	0.53
3:E:714:ARG:NH2	3:E:829:GLU:OE1	2.42	0.53
2:C:118:THR:HA	2:C:307:GLY:HA3	1.91	0.52
1:L:155:LEU:HD13	1:M:44:ARG:HB2	1.92	0.52
3:F:400:LEU:HD23	3:F:932:THR:HG21	1.91	0.52
3:G:133:VAL:O	3:G:292:LYS:NZ	2.42	0.52
3:F:782:PRO:HA	3:F:785:LEU:HD23	1.92	0.52
2:B:266:SER:HA	2:B:269:LEU:HD13	1.91	0.52
1:K:178:THR:HG22	1:K:237:THR:HG22	1.92	0.52
2:A:185:TYR:HE1	2:A:419:ARG:HD3	1.74	0.52
2:A:306:ALA:HA	2:A:324:TRP:HA	1.90	0.52
3:F:742:LEU:HG	3:E:210:GLN:HE22	1.75	0.52
1:I:39:ARG:HD3	1:I:141:ILE:HG12	1.91	0.52
1:J:105:ALA:HB2	2:A:191:LEU:HD22	1.91	0.52
2:B:59:ASN:O	2:B:61:ARG:NH1	2.43	0.52
1:I:284:THR:HG22	1:I:298:VAL:HA	1.92	0.52
1:L:271:PRO:HD2	1:L:321:ILE:HD11	1.91	0.52
3:G:151:LYS:HD3	3:G:279:ALA:H	1.75	0.52
3:G:324:VAL:HG13	3:G:326:PRO:HD3	1.92	0.52
3:G:757:TYR:OH	3:E:120:GLN:NE2	2.42	0.52
3:G:905:PRO:HA	3:G:908:VAL:HG12	1.92	0.52
2:B:310:SER:OG	2:B:315:GLY:O	2.28	0.51
1:K:151:THR:HG21	1:L:40:ILE:H	1.75	0.51
1:L:96:ARG:HG3	2:B:198:VAL:HG22	1.92	0.51
1:M:54:ARG:NH2	1:M:58:GLU:OE2	2.43	0.51
3:F:34:GLN:HE21	3:F:333:VAL:HG12	1.75	0.51
3:E:944:ILE:HG22	3:E:969:ARG:HB3	1.93	0.51
3:F:109:ASN:HA	3:F:112:GLN:HG2	1.93	0.51
1:J:20:LEU:HD21	1:J:268:ILE:HG23	1.93	0.51
1:J:36:ASN:ND2	1:J:176:ASP:OD2	2.43	0.51
3:G:969:ARG:HE	3:G:972:PRO:HG2	1.74	0.51
1:I:178:THR:HG22	1:I:237:THR:HG22	1.93	0.51
1:L:208:LEU:HB3	1:L:216:TYR:HB3	1.93	0.51
2:B:88:ILE:HD11	2:C:335:PHE:HB3	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:240:LEU:HD23	3:F:246:PHE:HA	1.93	0.51
1:L:47:VAL:HG21	1:L:135:THR:HG22	1.91	0.51
2:A:98:ARG:HB3	2:B:324:TRP:HB3	1.93	0.51
2:C:51:GLN:HE21	2:C:246:LEU:HD23	1.76	0.51
2:B:127:ASP:O	2:B:133:ARG:NH1	2.43	0.51
3:F:432:ARG:HA	3:F:435:MET:HG2	1.93	0.51
2:C:386:GLN:O	2:C:390:VAL:HG23	2.11	0.51
3:G:144:SER:HB3	3:G:154:LEU:HD11	1.93	0.51
3:G:249:ILE:HD11	3:G:262:LEU:HD22	1.93	0.51
3:G:817:ARG:NH2	3:G:820:GLY:O	2.44	0.51
1:L:299:ILE:HG22	1:L:314:GLY:HA3	1.92	0.50
2:B:303:THR:HG23	2:B:327:GLN:HG3	1.92	0.50
3:G:58:GLN:HE21	3:G:817:ARG:HD2	1.76	0.50
1:M:26:THR:OG1	1:M:260:GLN:NE2	2.44	0.50
2:A:57:LEU:HD23	2:A:157:LEU:HD22	1.93	0.50
3:G:1:MET:HE2	3:G:487:ILE:HD11	1.93	0.50
3:E:568:ASP:OD2	3:E:634:TRP:NE1	2.43	0.50
2:A:41:ARG:HE	2:A:50:GLN:HE21	1.60	0.50
1:J:226:GLU:HG3	1:J:228:SER:H	1.75	0.50
3:F:316:PHE:HB3	3:G:688:ALA:HB2	1.93	0.50
3:E:219:LEU:HD12	3:E:232:ALA:HB3	1.94	0.50
3:E:357:LEU:O	3:E:360:GLN:NE2	2.44	0.50
1:J:287:VAL:HG12	1:J:321:ILE:HG22	1.94	0.50
2:A:20:GLN:NE2	2:A:27:ASN:OD1	2.44	0.50
2:B:125:GLU:OE2	2:B:131:ARG:NH2	2.45	0.50
3:G:74:ASN:HB3	3:G:95:GLU:HB3	1.94	0.50
3:E:977:SER:OG	3:E:1013:THR:OG1	2.23	0.50
1:L:41:ALA:HB3	1:L:167:VAL:HG23	1.92	0.50
2:B:79:ILE:HG13	2:C:339:SER:HB2	1.94	0.50
2:C:359:GLU:HA	2:C:362:ILE:HG22	1.92	0.50
1:L:107:SER:HB2	1:L:110:GLN:HG2	1.93	0.50
2:A:272:ARG:NH2	2:A:445:ALA:O	2.45	0.50
2:A:296:PHE:HE1	2:A:340:LEU:HB3	1.77	0.50
3:G:164:ASP:HA	3:E:67:GLN:HE22	1.77	0.50
3:F:156:ASN:HA	3:F:181:GLN:HA	1.94	0.50
3:G:493:CYS:HA	3:G:497:LEU:HD13	1.93	0.50
2:B:272:ARG:NH1	2:B:445:ALA:O	2.45	0.49
2:C:53:ILE:HD12	2:C:158:VAL:HG23	1.94	0.49
3:F:414:GLU:OE2	3:F:971:ARG:NH2	2.45	0.49
1:I:107:SER:HB2	1:I:110:GLN:HG2	1.94	0.49
1:M:147:ARG:HB2	1:N:239:ARG:HH21	1.77	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:155:LEU:HD11	1:M:46:GLN:HG3	1.95	0.49
3:F:189:ASP:HB3	3:F:775:ARG:HD3	1.94	0.49
3:G:351:VAL:HA	3:G:354:VAL:HG12	1.94	0.49
3:E:166:LEU:HD11	3:E:310:ILE:HD11	1.94	0.49
2:C:48:GLN:NE2	2:C:165:TYR:OH	2.45	0.49
3:F:480:LEU:HA	3:F:483:ILE:HG22	1.93	0.49
1:L:104:GLN:OE1	2:B:404:TYR:OH	2.30	0.49
1:M:233:THR:HG21	3:E:258:SER:HB2	1.94	0.49
3:G:373:PRO:HA	3:G:376:LEU:HB2	1.93	0.49
3:G:418:ARG:NH1	3:G:968:MET:SD	2.85	0.49
3:E:99:ASP:HB3	3:E:102:ILE:HG12	1.94	0.49
3:F:586:ARG:NH2	3:F:660:ASP:OD1	2.44	0.49
1:L:27:LEU:HD22	1:L:196:LEU:HD21	1.94	0.49
1:L:198:ARG:HH11	1:L:203:ALA:HB1	1.77	0.49
2:B:120:GLY:HA3	2:B:305:ASN:HA	1.95	0.49
3:F:905:PRO:HA	3:F:908:VAL:HG12	1.95	0.49
3:E:563:PHE:HB2	3:E:865:GLU:HB3	1.94	0.49
1:K:315:LEU:HD21	1:K:321:ILE:HD11	1.93	0.49
1:L:34:ARG:HH21	3:E:197:GLN:HE22	1.58	0.49
3:G:781:ASN:HB2	3:G:784:ASP:HB2	1.95	0.49
1:K:14:GLU:H	1:K:328:PHE:HE2	1.59	0.49
1:K:155:LEU:HD13	1:L:44:ARG:HB2	1.94	0.49
3:G:971:ARG:HA	3:G:974:VAL:HG12	1.95	0.49
1:I:231:GLU:HA	1:N:34:ARG:HH22	1.78	0.48
1:J:208:LEU:HD13	1:J:242:PHE:HE2	1.78	0.48
1:L:107:SER:H	1:L:110:GLN:HE21	1.60	0.48
2:A:359:GLU:HA	2:A:362:ILE:HG22	1.93	0.48
1:M:226:GLU:OE1	1:M:237:THR:OG1	2.32	0.48
3:E:105:VAL:O	3:E:109:ASN:HB2	2.13	0.48
3:E:817:ARG:NH2	3:E:820:GLY:O	2.46	0.48
1:K:107:SER:HB2	1:K:110:GLN:HG2	1.94	0.48
1:L:23:GLN:HE21	1:L:269:LEU:HD12	1.77	0.48
2:B:225:ARG:NH1	2:C:382:GLN:OE1	2.42	0.48
1:I:330:GLN:OE1	3:F:319:GLN:NE2	2.46	0.48
3:F:38:ILE:HG23	3:F:462:SER:HB2	1.95	0.48
3:E:971:ARG:O	3:E:975:MET:HB2	2.14	0.48
1:I:299:ILE:HG22	1:I:314:GLY:HA3	1.95	0.48
1:J:272:GLN:HG3	1:J:309:TRP:HE1	1.79	0.48
2:B:99:LEU:HD22	2:B:100:PRO:HD2	1.95	0.48
3:G:425:LEU:HD23	3:G:429:GLU:HG3	1.96	0.48
3:G:712:LEU:HD23	3:G:715:VAL:HG21	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:287:VAL:HG22	1:M:321:ILE:HG22	1.93	0.48
2:C:269:LEU:HD23	2:C:275:ILE:HD12	1.96	0.48
3:E:774:GLY:O	3:E:779:ARG:NH1	2.46	0.48
1:M:71:ILE:O	1:M:135:THR:OG1	2.32	0.48
3:G:618:ALA:O	3:G:814:LYS:NZ	2.39	0.48
3:G:769:ARG:NH2	3:E:116:PRO:O	2.47	0.48
3:G:391:ASN:H	3:G:394:THR:HG22	1.79	0.48
3:E:699:ARG:HG3	3:E:826:ILE:HD11	1.96	0.48
1:J:17:ILE:HD13	1:J:320:LYS:HD2	1.94	0.48
3:F:944:ILE:HG13	3:F:1020:VAL:HG11	1.95	0.48
1:J:198:ARG:NH1	1:J:203:ALA:O	2.47	0.47
3:E:45:VAL:HG21	3:E:69:MET:HE1	1.95	0.47
3:E:189:ASP:HB3	3:E:192:LYS:HB2	1.96	0.47
1:I:311:VAL:HG21	1:I:315:LEU:HD12	1.95	0.47
2:B:96:ARG:HB3	2:C:326:PHE:HB3	1.94	0.47
3:E:337:ILE:HA	3:E:340:VAL:HG12	1.97	0.47
3:G:222:LEU:HB3	3:E:275:TYR:HB2	1.95	0.47
3:G:646:GLU:OE1	3:G:650:ARG:NH1	2.47	0.47
3:E:455:PRO:HB3	3:E:878:LEU:HD22	1.96	0.47
1:I:168:GLN:HE22	1:J:228:SER:HB2	1.80	0.47
1:L:311:VAL:HG21	1:L:315:LEU:HB2	1.95	0.47
2:A:61:ARG:HG2	2:B:359:GLU:HG3	1.97	0.47
3:E:337:ILE:HG23	3:E:395:MET:HE1	1.97	0.47
3:E:900:VAL:HA	3:E:903:VAL:HG12	1.97	0.47
3:F:489:THR:HA	3:F:492:LEU:HB3	1.97	0.47
1:K:177:VAL:HG11	1:K:257:ALA:HB3	1.96	0.47
3:E:544:ILE:HA	3:E:547:VAL:HG12	1.97	0.47
3:E:586:ARG:NH2	3:E:660:ASP:OD1	2.48	0.47
1:M:51:ILE:HD13	1:M:71:ILE:HG12	1.97	0.47
2:C:126:LEU:N	2:C:300:ILE:O	2.44	0.47
3:E:186:ILE:HG12	3:E:268:VAL:HG12	1.96	0.47
1:L:16:GLY:HA3	1:L:324:GLU:HB3	1.97	0.46
3:F:514:GLY:O	3:F:518:ARG:HG3	2.15	0.46
3:F:538:ARG:HH11	3:F:1025:VAL:HG13	1.81	0.46
1:M:178:THR:HG22	1:M:237:THR:HG22	1.97	0.46
1:M:208:LEU:HA	1:M:257:ALA:HA	1.97	0.46
2:C:400:ALA:HA	2:C:403:ARG:HG2	1.97	0.46
3:F:995:SER:O	3:F:999:HIS:ND1	2.39	0.46
1:K:152:GLU:OE1	1:L:39:ARG:NE	2.46	0.46
3:G:445:ILE:HD12	3:G:939:LYS:HG3	1.97	0.46
3:G:876:TYR:OH	3:G:927:GLN:NE2	2.48	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:280:GLN:NE2	3:E:592:ASP:OD1	2.47	0.46
2:A:395:GLU:HG3	2:C:207:ARG:HD2	1.98	0.46
2:B:41:ARG:O	2:B:50:GLN:NE2	2.49	0.46
3:F:429:GLU:HA	3:F:432:ARG:HG2	1.97	0.46
3:F:703:LEU:HD21	3:F:717:PRO:HD3	1.97	0.46
1:I:46:GLN:HB3	1:N:155:LEU:HD11	1.96	0.46
1:J:299:ILE:HD11	1:J:311:VAL:HG11	1.97	0.46
3:F:958:ILE:HD13	3:F:1025:VAL:HG23	1.96	0.46
3:G:906:LEU:HD22	3:G:1015:LEU:HD13	1.98	0.46
1:K:198:ARG:HD3	1:K:203:ALA:HB2	1.97	0.46
3:F:401:ALA:HA	3:F:404:LEU:HD13	1.96	0.46
3:G:712:LEU:HD21	3:G:843:VAL:HG23	1.98	0.46
3:F:511:GLY:O	3:F:515:TRP:HB2	2.16	0.45
3:F:717:PRO:HA	3:F:826:ILE:HG22	1.97	0.45
3:G:137:LEU:HD22	3:G:293:LEU:HD13	1.97	0.45
2:A:155:THR:HG22	2:A:444:LYS:HG2	1.97	0.45
3:F:765:GLY:O	3:G:63:GLN:NE2	2.49	0.45
3:F:775:ARG:NH2	3:F:777:ASP:OD2	2.47	0.45
3:G:99:ASP:OD1	3:G:99:ASP:N	2.49	0.45
3:G:438:ILE:HG22	3:G:442:LEU:HG	1.97	0.45
3:G:907:GLY:HA2	3:G:1012:ALA:HB2	1.98	0.45
1:I:37:ALA:HB3	1:I:40:ILE:HG23	1.99	0.45
1:L:151:THR:OG1	1:M:40:ILE:O	2.34	0.45
2:B:38:ILE:O	2:B:443:TYR:OH	2.31	0.45
1:J:208:LEU:HB3	1:J:216:TYR:HB3	1.99	0.45
1:L:31:LEU:HD12	1:L:259:LEU:HD21	1.98	0.45
1:L:53:LYS:HA	1:L:152:GLU:HG2	1.98	0.45
1:J:238:ILE:CG2	1:J:239:ARG:N	2.46	0.45
1:N:39:ARG:HD2	1:N:169:GLN:HE21	1.80	0.45
1:N:275:VAL:HG12	1:N:285:ALA:HB2	1.98	0.45
2:B:359:GLU:HA	2:B:362:ILE:HG22	1.99	0.45
3:E:45:VAL:HG22	3:E:129:VAL:HG12	1.98	0.45
1:I:173:ILE:HD12	1:I:244:ASN:HD22	1.81	0.45
1:J:28:ASN:HA	1:J:261:GLU:HG3	1.99	0.45
2:A:267:ASP:OD1	2:A:271:ARG:NH1	2.50	0.45
3:E:467:TYR:OH	3:E:927:GLN:NE2	2.50	0.45
1:N:41:ALA:HB3	1:N:141:ILE:HG21	1.98	0.44
3:G:135:ASN:OD1	3:G:292:LYS:NZ	2.51	0.44
1:M:36:ASN:ND2	1:M:176:ASP:OD2	2.40	0.44
2:A:239:GLY:O	2:B:363:GLN:NE2	2.50	0.44
3:G:102:ILE:HA	3:G:105:VAL:HG12	1.98	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:359:GLU:HG3	2:C:61:ARG:HE	1.82	0.44
3:F:27:ILE:HG13	3:F:28:LEU:HD12	1.98	0.44
3:E:199:THR:HG22	3:E:201:GLY:H	1.82	0.44
3:G:405:LEU:HD12	3:G:481:SER:HB2	2.00	0.44
3:E:153:ASP:N	3:E:153:ASP:OD1	2.44	0.44
2:A:47:PRO:HD2	2:A:249:GLY:HA2	1.99	0.44
2:B:63:LEU:HB2	2:B:157:LEU:HD13	1.99	0.44
2:C:298:PRO:HB3	2:C:332:LEU:HB3	2.00	0.44
3:E:46:GLN:HE21	3:E:128:ARG:HE	1.66	0.44
3:E:484:VAL:HA	3:E:487:ILE:HG22	1.98	0.44
1:K:216:TYR:CE1	1:K:248:GLU:OE1	2.68	0.44
2:A:37:ASP:OD1	2:A:451:ASN:ND2	2.51	0.44
2:C:120:GLY:HA3	2:C:305:ASN:HA	1.99	0.44
2:C:372:GLY:HA3	2:C:442:LEU:HD13	1.99	0.44
3:E:478:MET:HE2	3:E:478:MET:HB3	1.84	0.44
3:E:952:HIS:ND1	3:E:956:LYS:O	2.50	0.44
3:F:425:LEU:HD21	3:F:429:GLU:HB3	2.00	0.44
3:E:615:PHE:HD1	3:E:620:ARG:HG2	1.83	0.44
2:A:148:GLN:HG2	2:A:151:ARG:HD2	2.00	0.44
3:F:108:GLN:HE22	3:G:113:LEU:HD21	1.83	0.44
3:F:546:VAL:HA	3:F:549:VAL:HG12	1.99	0.44
3:E:172:VAL:HG13	3:E:291:ILE:HG23	2.00	0.44
1:N:45:PRO:HG3	1:N:156:VAL:HB	1.99	0.43
2:B:89:GLY:HA2	2:C:334:ILE:HG12	2.00	0.43
3:G:898:PHE:HA	3:G:901:MET:HG2	2.00	0.43
1:L:216:TYR:OH	1:L:243:PRO:O	2.34	0.43
2:A:232:ASN:HA	2:A:235:VAL:HG12	1.99	0.43
3:F:343:THR:HG23	3:F:986:PRO:HB2	2.00	0.43
3:G:354:VAL:HG11	3:G:979:ALA:HB2	1.99	0.43
3:F:718:ASN:HB3	3:F:825:GLU:HG3	2.00	0.43
3:G:121:GLU:OE2	3:G:124:ARG:NH2	2.51	0.43
3:E:939:LYS:HA	3:E:942:ILE:HG22	2.00	0.43
1:I:299:ILE:HG21	1:I:315:LEU:HG	2.00	0.43
1:J:301:ALA:HB2	1:J:311:VAL:HG12	2.01	0.43
1:N:53:LYS:HE2	1:N:55:LEU:HD11	1.99	0.43
1:N:287:VAL:HG21	1:N:297:ARG:HH12	1.83	0.43
1:J:45:PRO:HD3	1:J:164:MET:HE2	2.01	0.43
3:F:728:LEU:HA	3:F:806:GLY:HA2	2.00	0.43
3:G:522:SER:HA	3:G:525:HIS:CE1	2.54	0.43
3:G:565:PRO:O	3:G:670:SER:OG	2.37	0.43
1:J:208:LEU:HD11	1:J:255:VAL:HB	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:311:VAL:HG21	1:K:315:LEU:HD23	1.99	0.43
1:N:48:ASN:OD1	1:N:76:TYR:OH	2.35	0.43
2:A:185:TYR:CE1	2:A:419:ARG:HD3	2.54	0.43
1:I:17:ILE:HG21	1:I:337:THR:HG23	2.01	0.43
1:M:35:THR:O	1:M:252:GLY:N	2.52	0.43
1:M:292:ASN:ND2	1:M:337:THR:OG1	2.50	0.43
1:N:195:GLN:HG3	1:N:312:THR:HG23	2.00	0.43
2:A:90:VAL:HG23	2:B:334:ILE:HD11	2.01	0.43
2:C:36:ALA:HB3	2:C:271:ARG:HD3	2.01	0.43
3:F:610:PHE:O	3:F:628:PHE:N	2.48	0.43
3:G:214:ILE:HG23	3:E:750:SER:HB2	2.00	0.43
2:C:166:LEU:HD13	2:C:436:LEU:HB3	2.00	0.43
3:E:207:ILE:HG22	3:E:249:ILE:HD13	2.01	0.43
3:E:719:GLY:HA2	3:E:814:LYS:HD3	2.01	0.43
1:K:287:VAL:HG21	1:K:297:ARG:HE	1.83	0.43
1:M:101:VAL:HG21	1:M:111:TYR:HB2	2.00	0.43
3:F:2:SER:OG	3:F:486:LEU:O	2.29	0.43
3:G:375:VAL:HB	3:G:484:VAL:HG21	2.01	0.43
2:C:395:GLU:HA	2:C:398:GLN:HG2	2.01	0.42
3:F:958:ILE:H	3:F:958:ILE:HG13	1.60	0.42
3:G:446:ALA:HB2	3:G:482:VAL:HG11	2.01	0.42
3:E:150:THR:OG1	3:E:151:LYS:N	2.48	0.42
1:I:222:LEU:HA	1:I:240:ALA:HA	2.01	0.42
3:F:5:PHE:HB3	3:F:491:ALA:HB2	2.01	0.42
3:F:184:MET:HA	3:F:270:LEU:HA	2.01	0.42
3:G:231:ASN:ND2	3:E:622:GLN:OE1	2.51	0.42
3:G:947:PHE:HE2	3:G:969:ARG:HH11	1.66	0.42
1:J:271:PRO:HD2	1:J:321:ILE:HD11	2.00	0.42
2:C:232:ASN:HA	2:C:235:VAL:HG12	2.01	0.42
3:F:184:MET:HB3	3:F:270:LEU:HG	2.01	0.42
3:F:189:ASP:OD2	3:F:192:LYS:NZ	2.43	0.42
3:G:986:PRO:HA	3:G:989:ILE:HG22	2.01	0.42
3:G:1011:THR:HA	3:G:1014:VAL:HG12	2.00	0.42
3:E:478:MET:HA	3:E:481:SER:HB3	2.00	0.42
3:E:609:VAL:HG13	3:E:629:ILE:HG22	2.01	0.42
1:K:280:LYS:HA	3:G:182:TYR:HE2	1.84	0.42
2:C:286:ASN:HA	2:C:289:ILE:HG22	2.02	0.42
3:F:840:MET:HE1	3:F:866:ARG:HB2	2.02	0.42
3:G:126:GLY:HA3	3:E:116:PRO:HB3	2.01	0.42
3:E:763:ASP:OD1	3:E:763:ASP:N	2.51	0.42
1:I:38:PHE:CG	1:I:172:PRO:HG2	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:149:ALA:HB3	1:K:164:MET:HA	1.99	0.42
2:A:189:PHE:HB2	2:A:213:VAL:HG21	2.01	0.42
3:F:931:LEU:HA	3:F:934:ILE:HD12	2.01	0.42
3:G:356:TYR:HB2	3:G:365:THR:HG21	2.02	0.42
3:E:481:SER:HA	3:E:484:VAL:HG12	2.01	0.42
1:J:47:VAL:HG11	1:J:135:THR:H	1.83	0.42
1:N:40:ILE:HG13	1:N:168:GLN:HG2	2.01	0.42
3:F:211:ASN:OD1	3:F:759:ASN:ND2	2.49	0.42
3:G:177:VAL:HG12	3:G:289:ILE:HG12	2.02	0.42
3:E:576:VAL:HG22	3:E:663:VAL:HG22	2.01	0.42
3:E:887:LEU:HD23	3:E:887:LEU:HA	1.76	0.42
1:I:47:VAL:HG11	1:I:135:THR:HA	2.01	0.42
2:A:303:THR:HB	2:A:327:GLN:HB2	2.02	0.42
3:E:775:ARG:NE	3:E:777:ASP:OD1	2.53	0.42
1:J:177:VAL:O	1:J:238:ILE:N	2.44	0.42
3:F:442:LEU:HG	3:F:482:VAL:HG23	2.01	0.42
3:G:40:PRO:HA	3:G:41:PRO:HD3	1.89	0.42
2:A:114:GLN:HG2	2:C:103:LEU:HD21	2.02	0.42
2:B:98:ARG:HA	2:B:111:ILE:HG22	2.02	0.42
3:F:213:GLN:HG2	3:G:56:THR:HG23	2.02	0.42
3:G:929:GLY:HA2	3:G:932:THR:HG22	2.02	0.42
1:M:126:GLU:HA	1:M:129:ARG:HG2	2.02	0.42
3:G:78:ILE:HG22	3:G:92:VAL:HA	2.01	0.42
3:G:408:ASP:OD1	3:G:939:LYS:NZ	2.42	0.42
2:B:307:GLY:O	2:B:323:SER:N	2.45	0.41
3:F:211:ASN:HB3	3:F:240:LEU:HD13	2.02	0.41
3:G:45:VAL:HG22	3:G:129:VAL:HG22	2.02	0.41
3:E:142:VAL:HG12	3:E:323:VAL:HG12	2.01	0.41
3:E:415:ASN:OD1	3:E:418:ARG:NH2	2.53	0.41
1:J:20:LEU:HD21	1:J:268:ILE:HD12	2.01	0.41
1:J:38:PHE:CG	1:J:172:PRO:HG2	2.55	0.41
1:N:26:THR:HG22	1:N:263:VAL:HG12	2.01	0.41
2:A:39:GLY:O	2:A:43:PHE:N	2.52	0.41
2:A:276:LEU:O	2:A:280:HIS:ND1	2.42	0.41
2:A:285:ALA:HB2	2:A:354:ASN:HD22	1.86	0.41
2:B:236:LEU:HB2	2:C:367:GLN:HG3	2.01	0.41
2:C:44:PHE:O	2:C:50:GLN:NE2	2.48	0.41
1:K:216:TYR:HE2	1:K:218:LEU:HB2	1.83	0.41
1:N:144:ARG:N	1:N:168:GLN:O	2.53	0.41
3:F:131:LYS:HB3	3:F:295:THR:HG22	2.01	0.41
3:G:120:GLN:HA	3:G:123:GLN:HG2	2.01	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:602:GLU:OE2	3:G:650:ARG:NH2	2.38	0.41
3:E:61:VAL:HG13	3:E:118:LEU:HD21	2.01	0.41
3:E:904:VAL:HG13	3:E:934:ILE:HG12	2.02	0.41
1:M:210:LEU:HD21	1:N:185:LEU:HD11	2.02	0.41
3:F:718:ASN:ND2	3:F:825:GLU:OE2	2.54	0.41
3:G:891:TYR:OH	3:G:942:ILE:O	2.37	0.41
3:E:207:ILE:HG13	3:E:758:VAL:HG11	2.02	0.41
3:E:1011:THR:HA	3:E:1014:VAL:HG12	2.03	0.41
2:A:360:LYS:NZ	2:C:62:ASP:OD1	2.53	0.41
2:C:387:ARG:HE	2:C:428:LEU:HD21	1.85	0.41
3:E:550:ALA:HA	3:E:553:ILE:HG22	2.02	0.41
2:C:350:GLN:HA	2:C:353:ILE:HG12	2.03	0.41
3:F:81:GLU:HG2	3:F:89:THR:HG22	2.03	0.41
3:G:609:VAL:HG22	3:G:629:ILE:HG22	2.03	0.41
3:E:211:ASN:OD1	3:E:759:ASN:ND2	2.54	0.41
1:L:19:THR:HG22	1:L:320:LYS:HB3	2.02	0.41
1:M:127:GLN:HA	1:M:130:ILE:HD12	2.03	0.41
2:A:171:ASP:OD1	2:A:174:GLN:NE2	2.53	0.41
2:A:184:THR:HB	2:A:415:LEU:HD22	2.02	0.41
2:C:52:LEU:HA	2:C:55:VAL:HG12	2.02	0.41
2:C:366:PHE:HA	2:C:369:VAL:HG12	2.01	0.41
3:G:10:ILE:HD12	3:E:894:TRP:HE1	1.86	0.41
3:G:32:VAL:HB	3:G:390:ILE:HB	2.03	0.41
3:G:379:THR:O	3:G:383:LEU:HB2	2.21	0.41
3:G:454:LEU:HD21	3:G:475:VAL:HG11	2.01	0.41
3:G:611:THR:OG1	3:G:626:MET:O	2.37	0.41
3:E:30:LEU:HB3	3:E:390:ILE:HG22	2.03	0.41
3:E:192:LYS:HB3	3:E:265:VAL:HA	2.03	0.41
1:M:75:THR:HB	1:N:130:ILE:HD11	2.03	0.41
1:N:136:LYS:HE2	1:N:136:LYS:HB3	1.97	0.41
3:F:438:ILE:HD12	3:F:438:ILE:HG23	1.91	0.41
3:F:1003:THR:HA	3:F:1006:ILE:HG22	2.03	0.41
3:G:96:GLN:HG3	3:G:461:GLY:HA2	2.03	0.41
2:B:9:ARG:HH12	2:B:269:LEU:HD23	1.85	0.40
3:E:598:LEU:HD21	3:E:629:ILE:HD13	2.04	0.40
1:J:273:GLN:HE21	3:G:586:ARG:HD2	1.86	0.40
1:N:39:ARG:HH11	1:N:169:GLN:NE2	2.19	0.40
2:A:91:ASP:N	2:A:118:THR:O	2.44	0.40
1:I:208:LEU:HD13	1:I:242:PHE:HE2	1.85	0.40
1:J:274:GLY:HA3	1:J:321:ILE:HD12	2.02	0.40
1:L:45:PRO:HG3	1:L:156:VAL:HB	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:38:ILE:HA	2:B:454:THR:HG22	2.03	0.40
3:E:685:GLN:N	3:E:855:GLY:O	2.54	0.40
1:I:226:GLU:OE1	1:I:237:THR:OG1	2.38	0.40
2:A:165:TYR:CE2	2:A:169:LYS:HD2	2.57	0.40
3:G:548:ILE:HG13	3:G:909:ILE:HD13	2.03	0.40
3:E:380:PHE:HE1	3:E:398:MET:HE1	1.86	0.40
2:A:336:THR:HG23	2:A:338:GLY:H	1.86	0.40
2:B:221:ALA:HA	2:B:224:THR:HG22	2.02	0.40
3:G:76:ARG:HG2	3:G:77:TYR:HD1	1.87	0.40
3:E:1017:ILE:H	3:E:1017:ILE:HG13	1.73	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	I	331/362 (91%)	306 (92%)	25 (8%)	0	100	100
1	J	331/362 (91%)	308 (93%)	23 (7%)	0	100	100
1	K	330/362 (91%)	308 (93%)	22 (7%)	0	100	100
1	L	334/362 (92%)	300 (90%)	34 (10%)	0	100	100
1	M	330/362 (91%)	311 (94%)	19 (6%)	0	100	100
1	N	333/362 (92%)	312 (94%)	21 (6%)	0	100	100
2	A	453/474 (96%)	434 (96%)	19 (4%)	0	100	100
2	B	453/474 (96%)	439 (97%)	14 (3%)	0	100	100
2	C	453/474 (96%)	438 (97%)	15 (3%)	0	100	100
3	E	1028/1054 (98%)	972 (95%)	56 (5%)	0	100	100
3	F	1020/1054 (97%)	966 (95%)	54 (5%)	0	100	100
3	G	1028/1054 (98%)	973 (95%)	55 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	6424/6756 (95%)	6067 (94%)	357 (6%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	I	270/287 (94%)	270 (100%)	0	100	100
1	J	270/287 (94%)	267 (99%)	3 (1%)	70	80
1	K	269/287 (94%)	269 (100%)	0	100	100
1	L	271/287 (94%)	271 (100%)	0	100	100
1	M	269/287 (94%)	269 (100%)	0	100	100
1	N	270/287 (94%)	270 (100%)	0	100	100
2	A	358/375 (96%)	357 (100%)	1 (0%)	91	94
2	B	358/375 (96%)	357 (100%)	1 (0%)	91	94
2	C	358/375 (96%)	357 (100%)	1 (0%)	91	94
3	E	841/862 (98%)	837 (100%)	4 (0%)	86	92
3	F	836/862 (97%)	831 (99%)	5 (1%)	84	90
3	G	841/862 (98%)	839 (100%)	2 (0%)	92	95
All	All	5211/5433 (96%)	5194 (100%)	17 (0%)	90	94

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	J	141	ILE
1	J	151	THR
1	J	305	ILE
2	A	455	VAL
2	B	3	LEU
2	C	340	LEU

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Mol	Chain	Res	Type
3	F	30	LEU
3	F	410	ILE
3	F	606	VAL
3	F	751	ILE
3	F	958	ILE
3	G	32	VAL
3	G	357	LEU
3	E	6	ILE
3	E	92	VAL
3	E	417	GLU
3	E	945	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (82) such sidechains are listed below:

Mol	Chain	Res	Type
1	I	179	GLN
1	I	202	ASN
1	J	70	GLN
1	J	109	GLN
1	J	158	ASN
1	J	260	GLN
1	K	109	GLN
1	K	168	GLN
1	K	169	GLN
1	L	23	GLN
1	L	109	GLN
1	L	120	GLN
1	L	169	GLN
1	M	104	GLN
1	M	109	GLN
1	M	120	GLN
1	M	160	GLN
1	M	256	HIS
1	M	258	GLN
1	M	260	GLN
1	M	289	ASN
1	M	292	ASN
1	M	316	ASN
1	N	104	GLN
1	N	120	GLN
1	N	158	ASN
1	N	169	GLN

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Mol	Chain	Res	Type
1	N	179	GLN
1	N	195	GLN
1	N	215	GLN
1	N	247	ASN
1	N	327	GLN
2	A	50	GLN
2	A	97	GLN
2	A	354	ASN
2	A	382	GLN
2	B	48	GLN
2	B	51	GLN
2	B	114	GLN
2	B	148	GLN
2	B	452	GLN
2	C	48	GLN
2	C	51	GLN
2	C	59	ASN
2	C	172	GLN
2	C	176	GLN
2	C	193	GLN
3	F	96	GLN
3	F	108	GLN
3	F	254	ASN
3	F	273	GLN
3	F	280	GLN
3	F	319	GLN
3	F	338	HIS
3	F	439	GLN
3	F	469	GLN
3	F	537	HIS
3	F	697	GLN
3	F	849	GLN
3	G	58	GLN
3	G	123	GLN
3	G	210	GLN
3	G	439	GLN
3	G	537	HIS
3	G	652	GLN
3	G	685	GLN
3	G	725	GLN
3	G	773	GLN
3	G	849	GLN

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Mol	Chain	Res	Type
3	E	46	GLN
3	E	63	GLN
3	E	67	GLN
3	E	197	GLN
3	E	210	GLN
3	E	254	ASN
3	E	280	GLN
3	E	360	GLN
3	E	505	HIS
3	E	517	ASN
3	E	575	GLN
3	E	746	ASN
3	E	927	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 oligosaccharides 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](#)

There are no chain breaks in this entry.

6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-9696. These allow visual inspection of the internal detail of the map and identification of artifacts.

Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

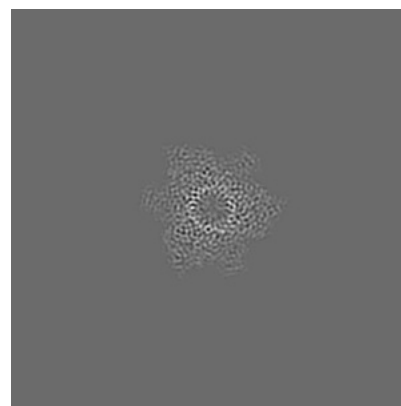
6.1.1 Primary map



X

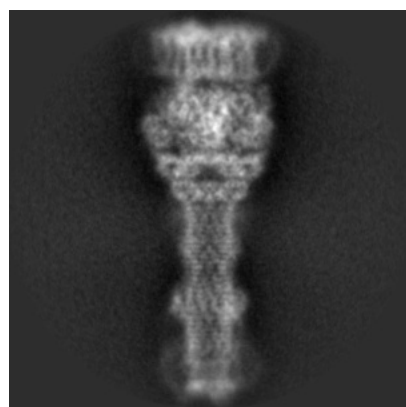


Y

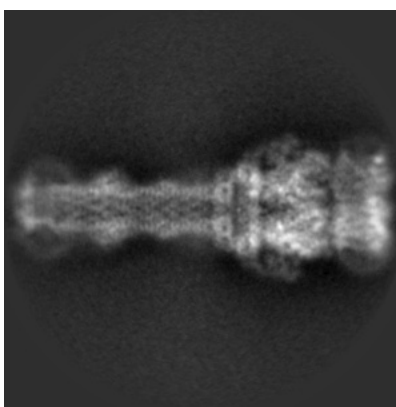


Z

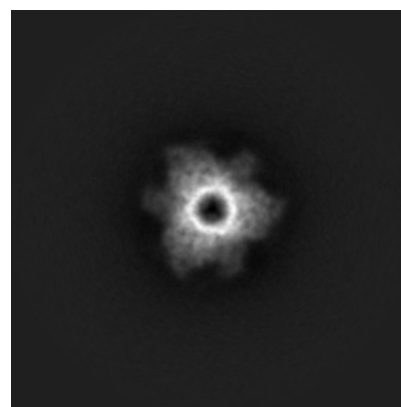
6.1.2 Raw map



X



Y



Z

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

6.2 Central slices [i](#)

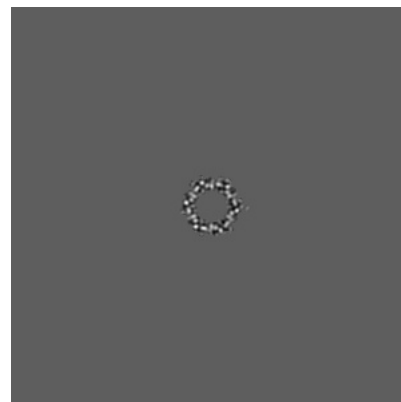
6.2.1 Primary map



X Index: 200

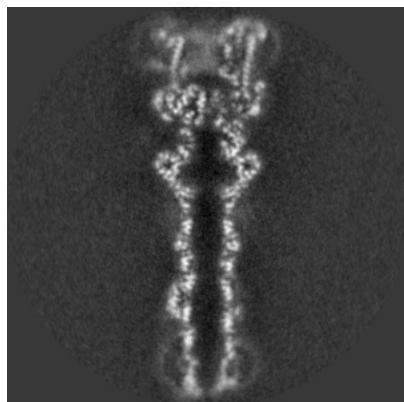


Y Index: 200

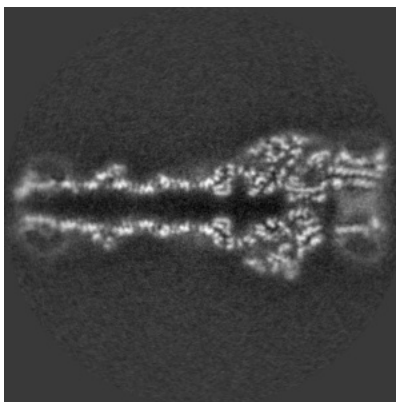


Z Index: 200

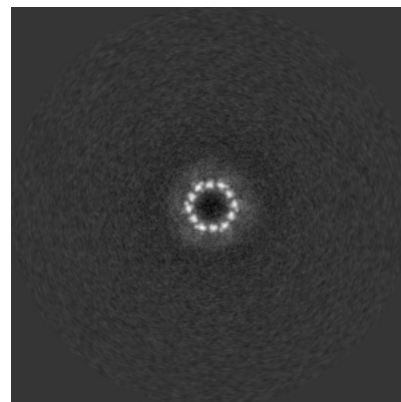
6.2.2 Raw map



X Index: 200



Y Index: 200

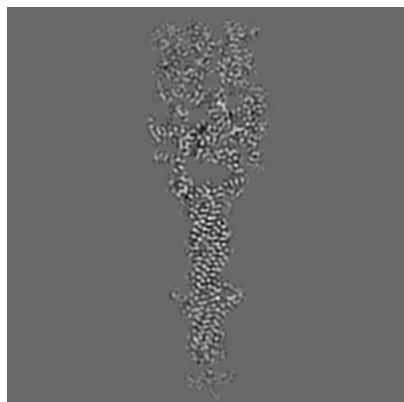


Z Index: 200

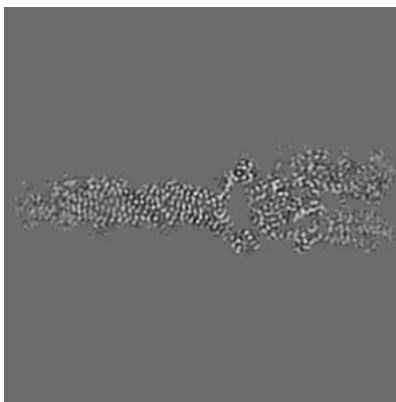
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

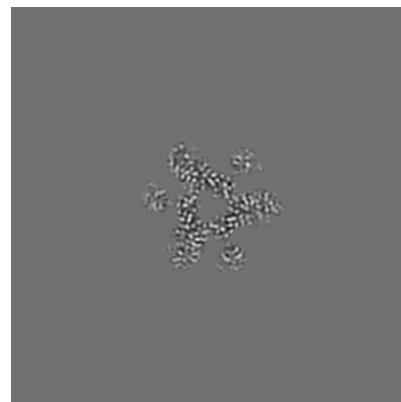
6.3.1 Primary map



X Index: 181

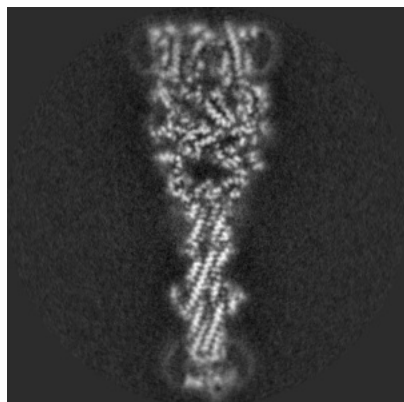


Y Index: 182

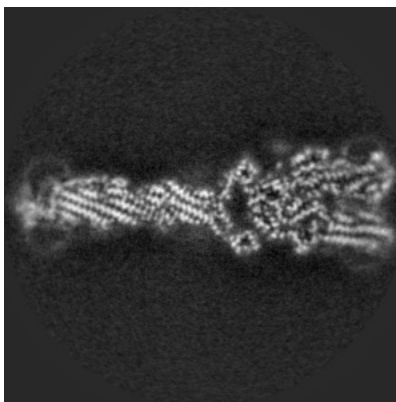


Z Index: 272

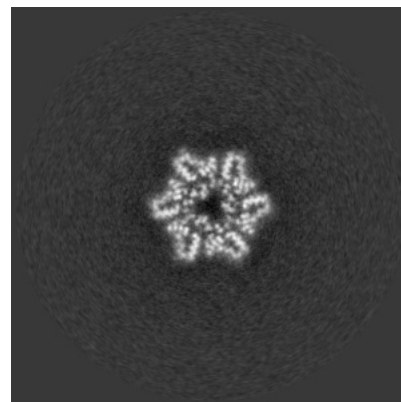
6.3.2 Raw map



X Index: 183



Y Index: 181

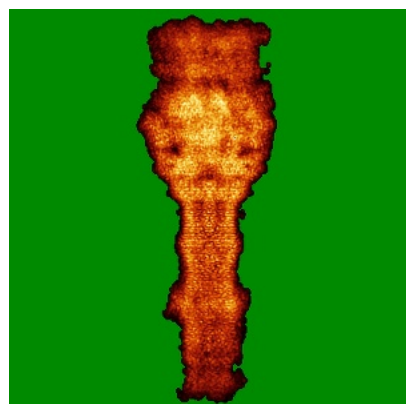


Z Index: 249

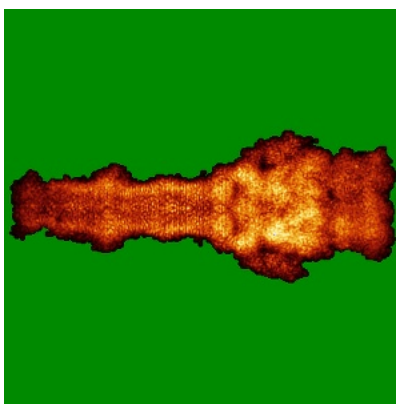
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

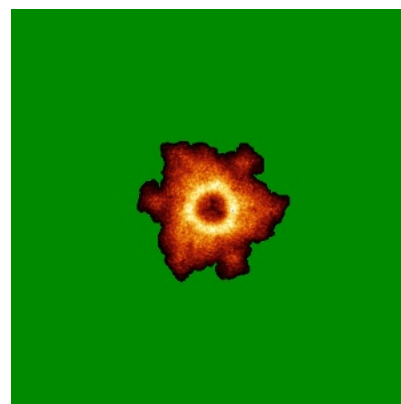
6.4.1 Primary map



X



Y

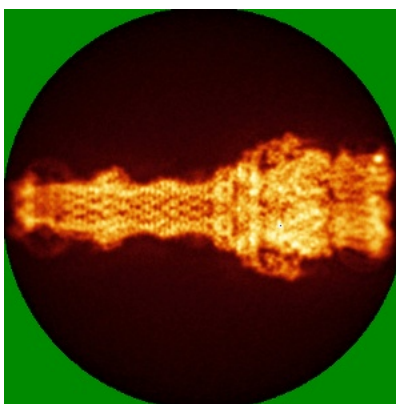


Z

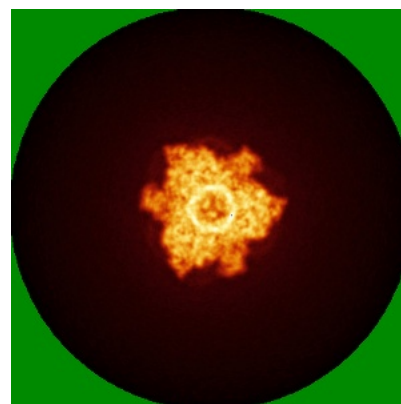
6.4.2 Raw map



X



Y

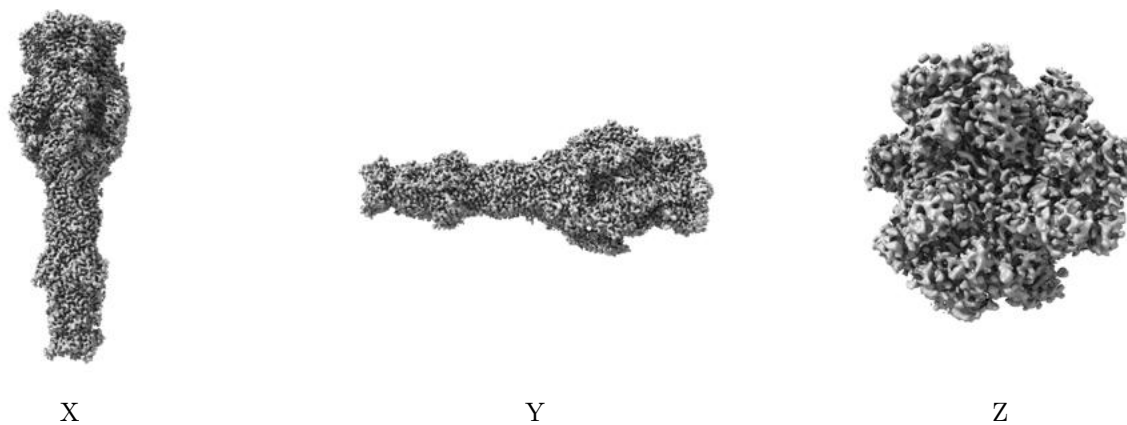


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

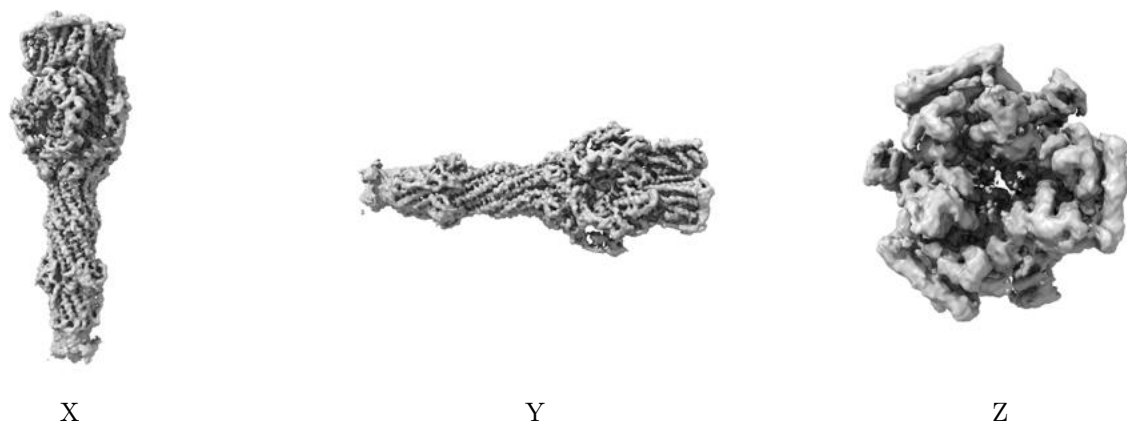
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 3.65. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

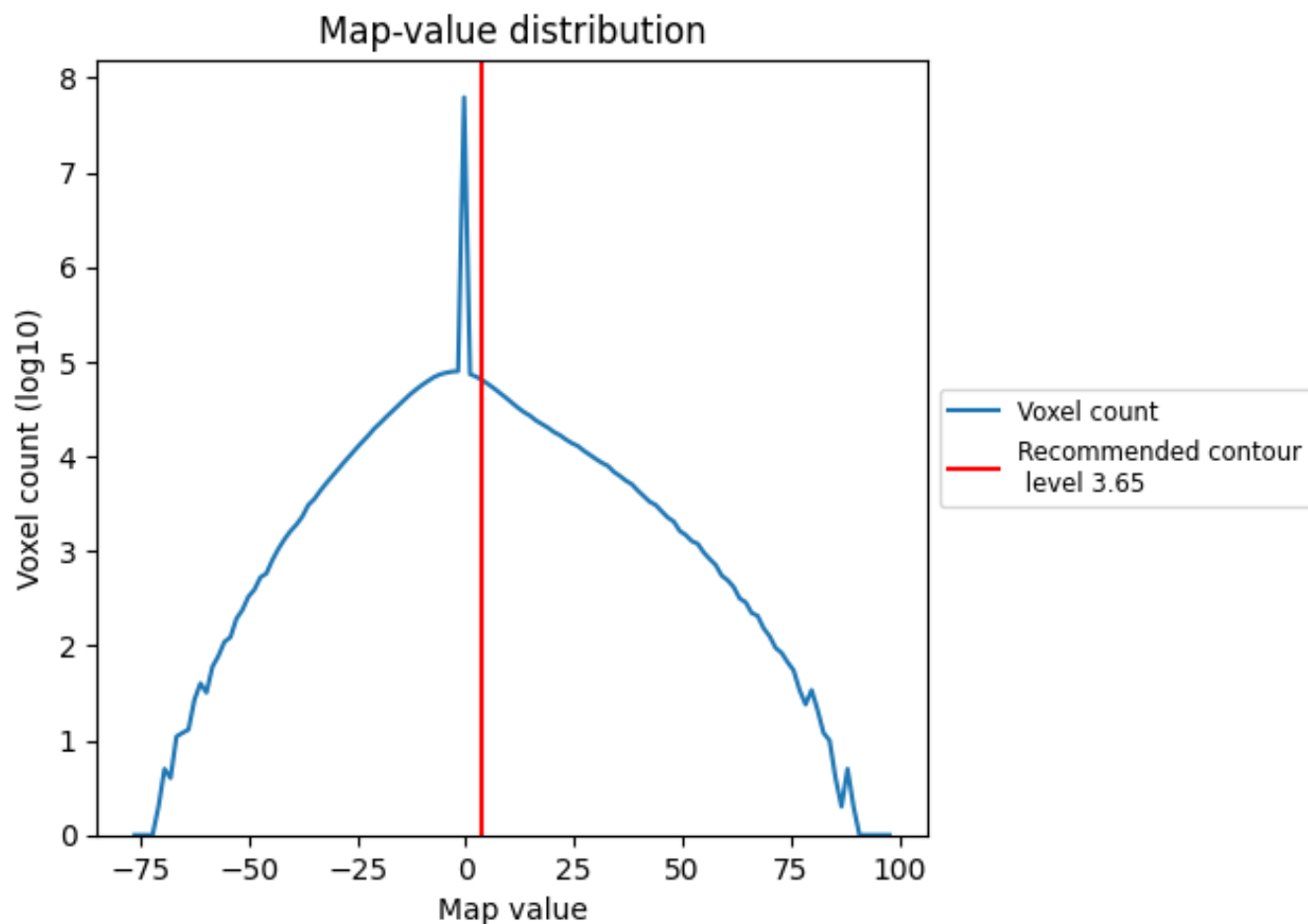
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

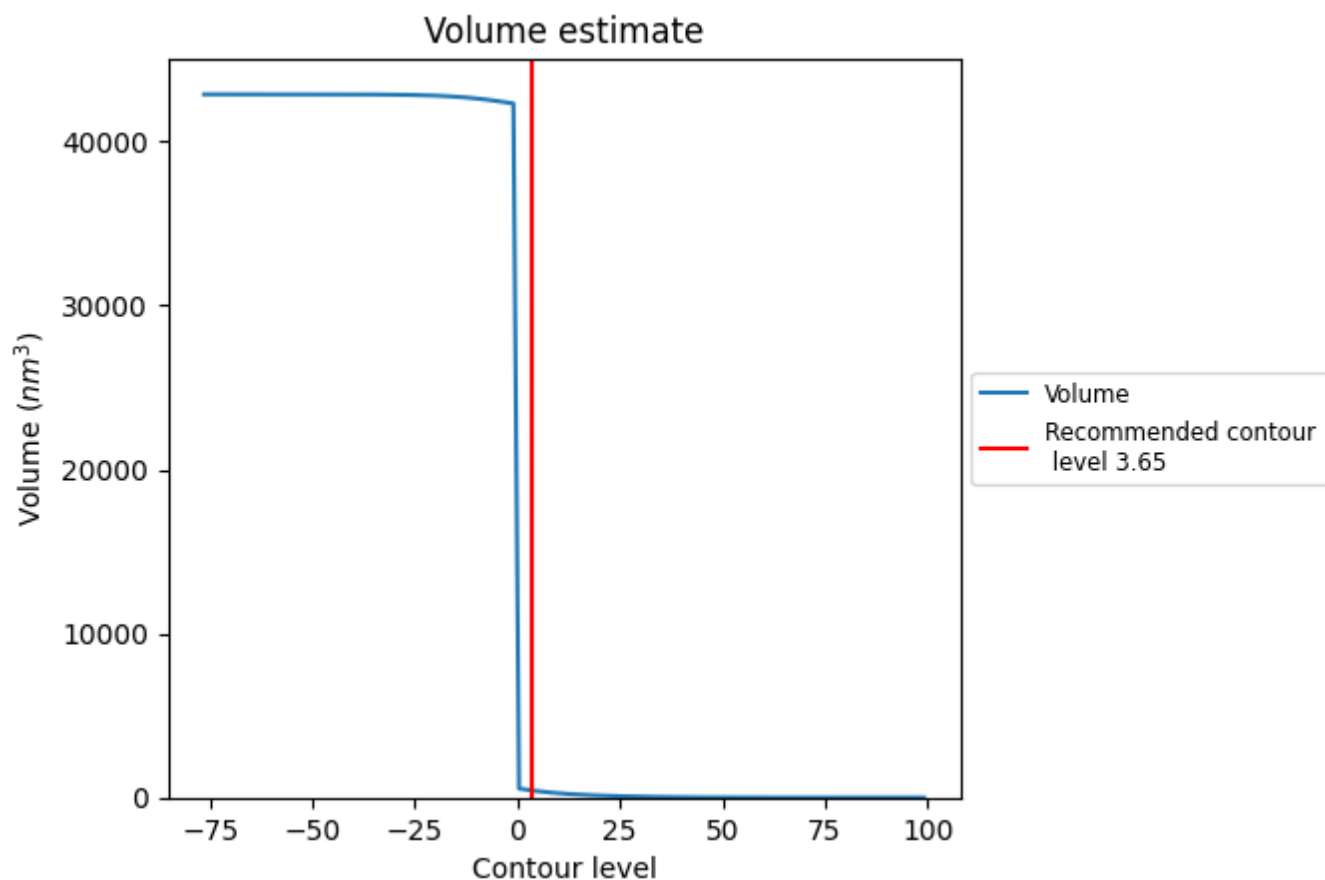
This section contains the results of statistical analysis of the map.

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.

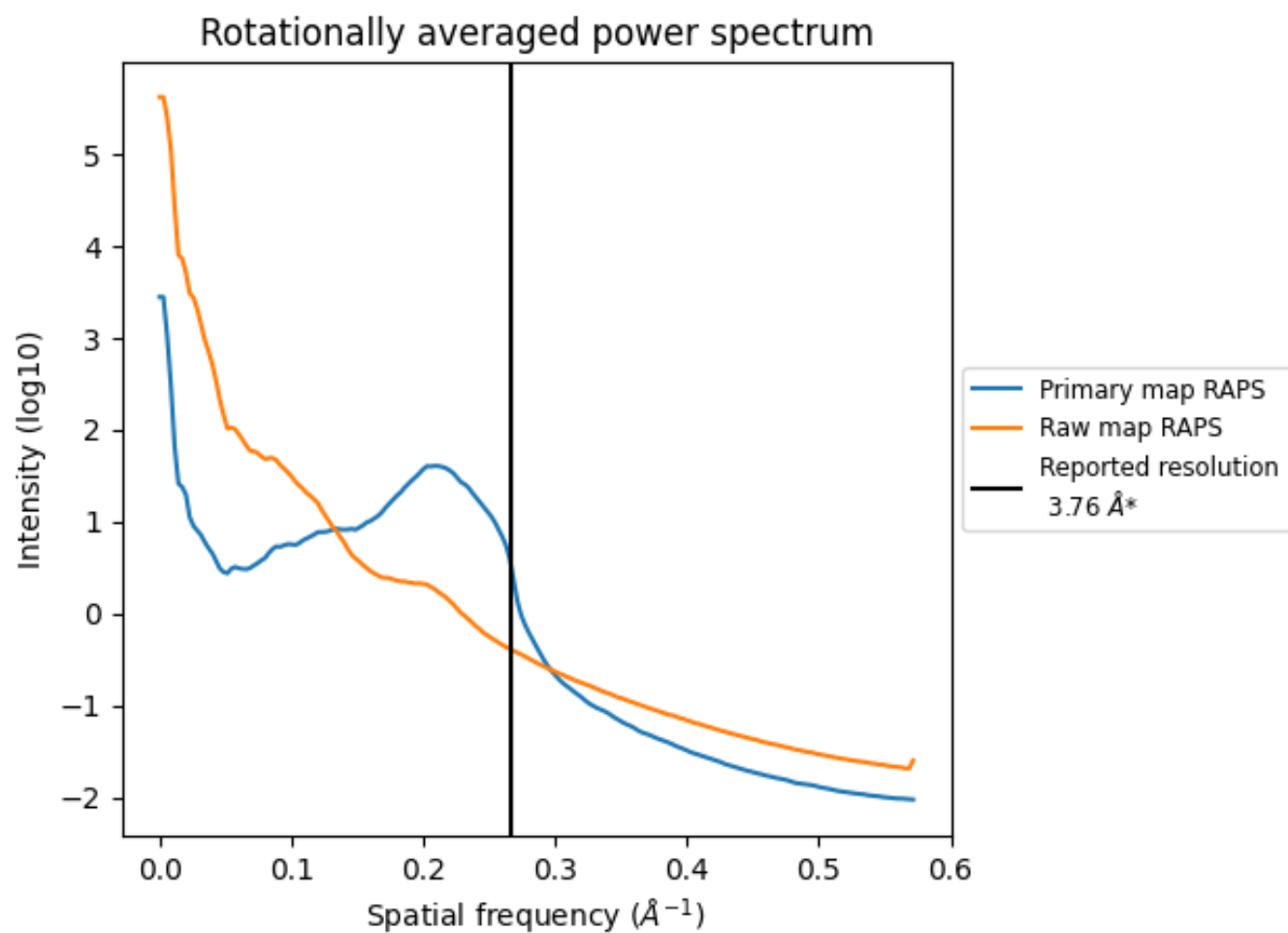
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 430 nm³; this corresponds to an approximate mass of 389 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 ⓘ

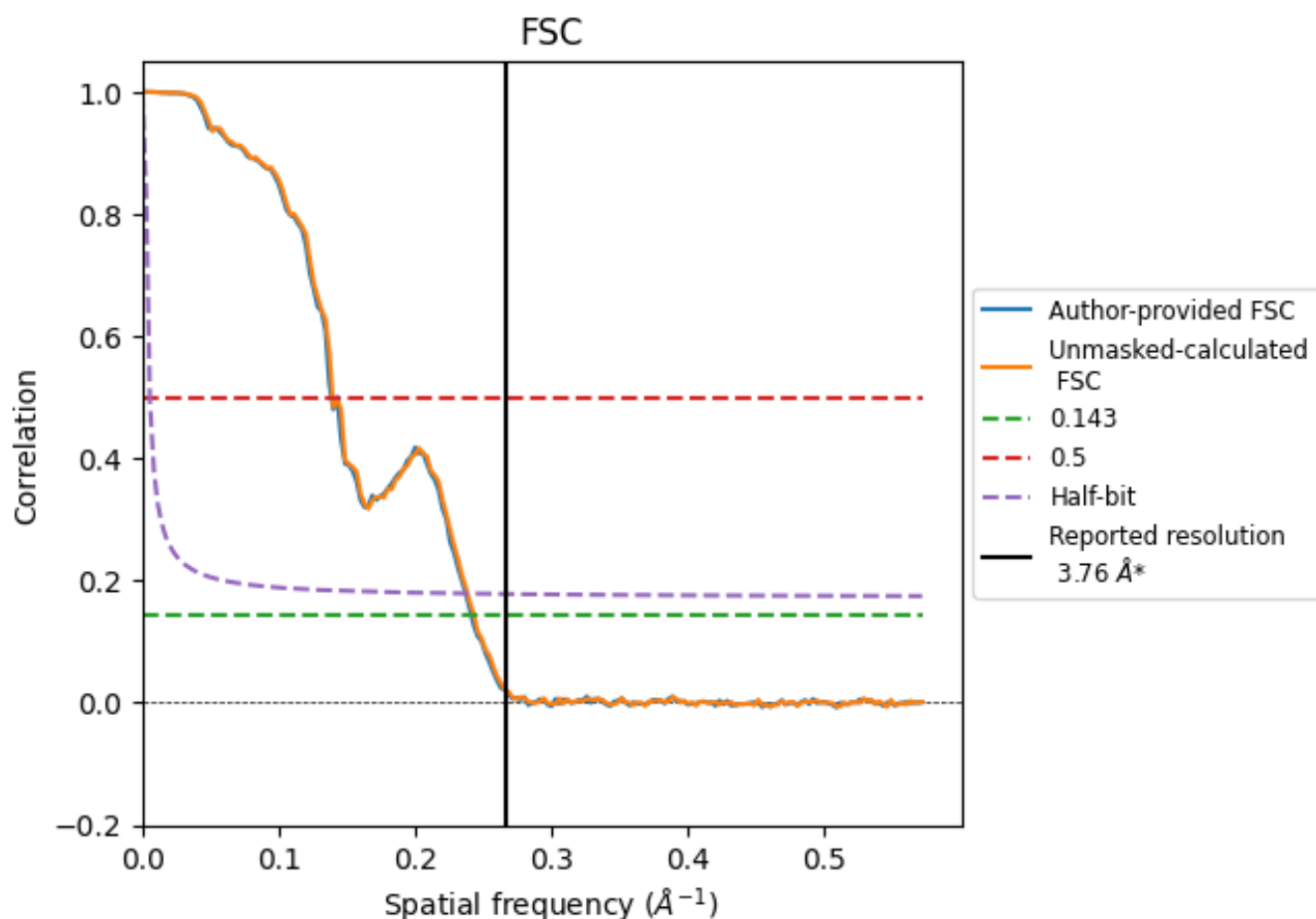


*Reported resolution corresponds to spatial frequency of 0.266 $\text{\AA}^{-1}$

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.266 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

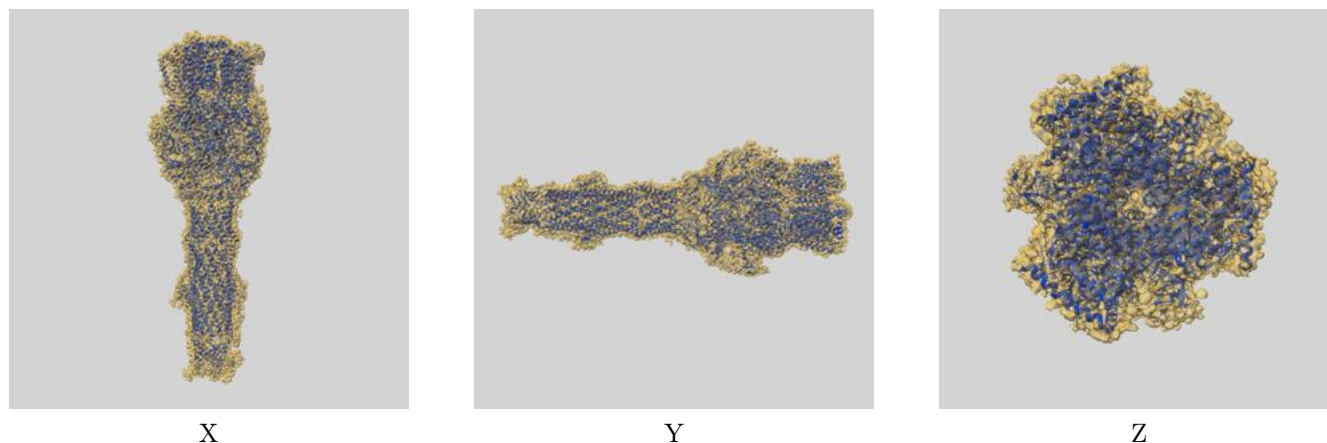
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.76	-	-
Author-provided FSC curve	4.15	7.22	4.22
Unmasked-calculated*	4.11	7.17	4.20

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 4.15 differs from the reported value 3.76 by more than 10 %

9 Map-model fit [i](#)

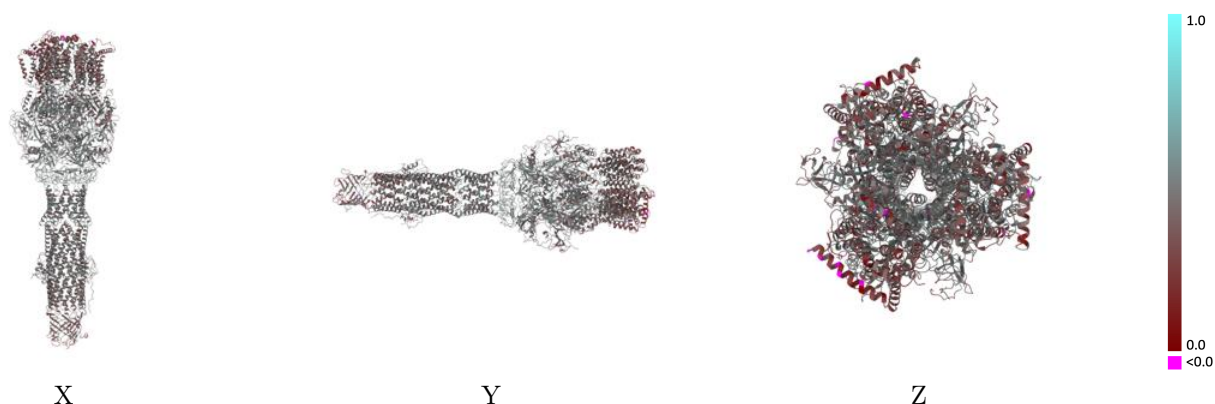
This section contains information regarding the fit between EMDB map EMD-9696 and PDB model 6IOL. Per-residue inclusion information can be found in section [3](#) on page [7](#).

9.1 Map-model overlay [i](#)



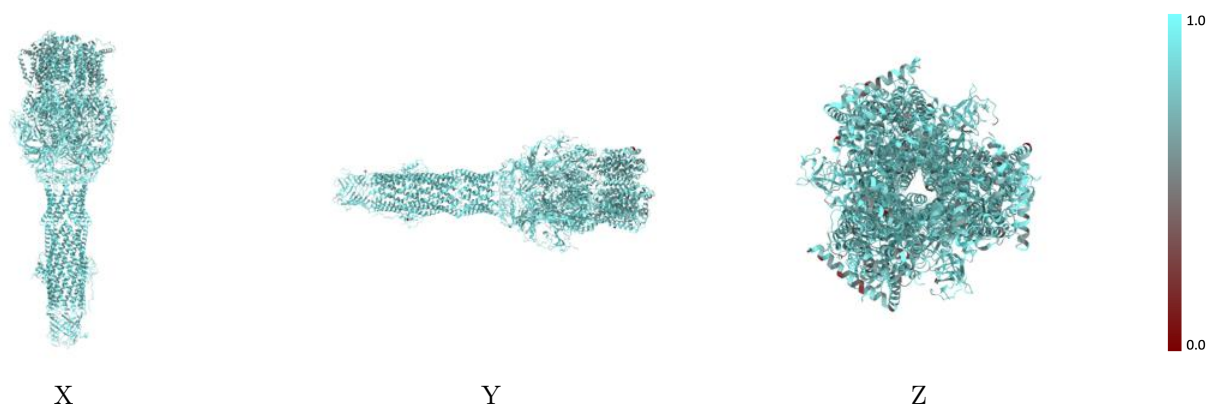
The images above show the 3D surface view of the map at the recommended contour level 3.65 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



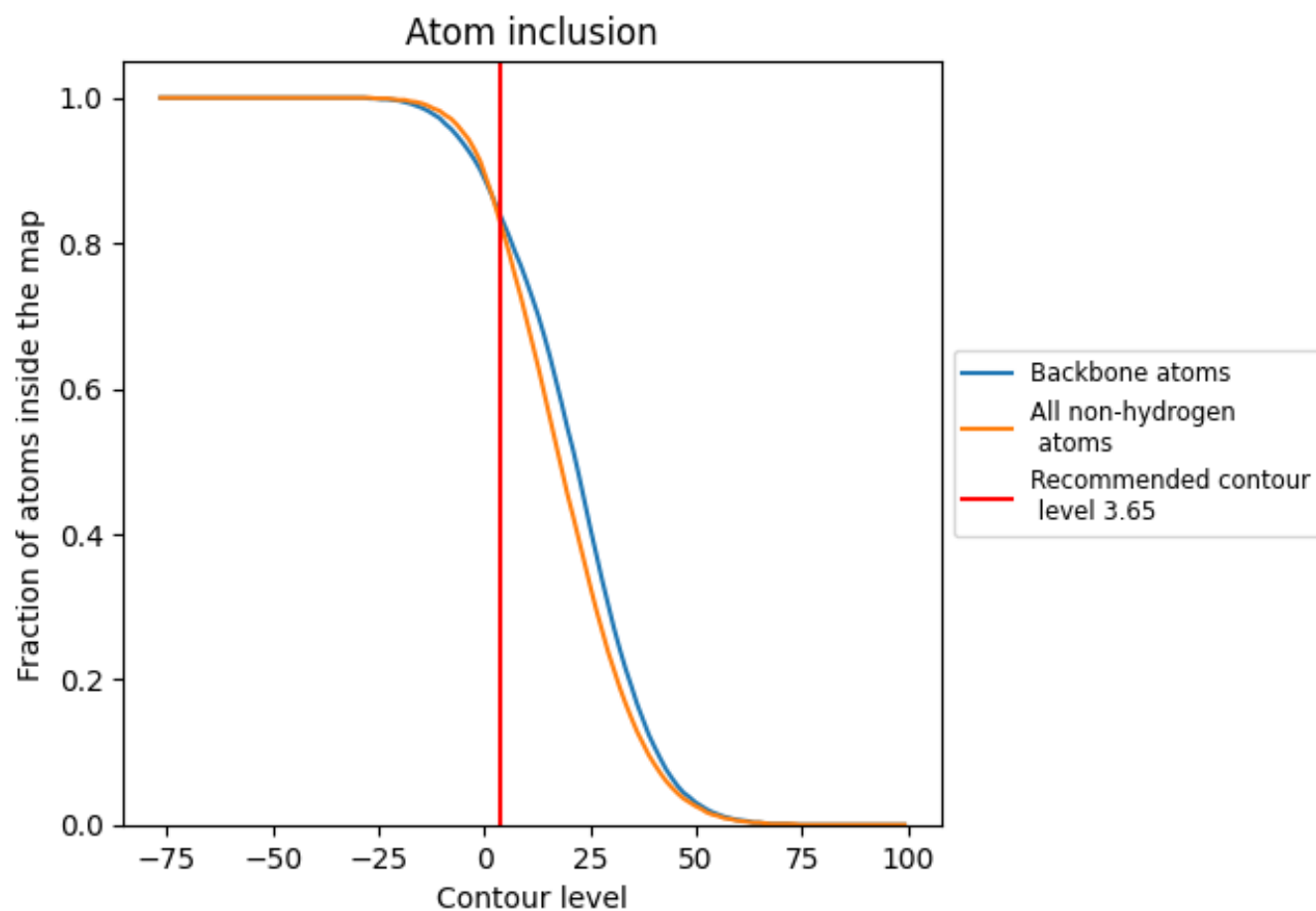
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (3.65).

9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 83% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (3.65) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8310	0.4410
A	0.8240	0.4290
B	0.8240	0.4260
C	0.8290	0.4310
E	0.8220	0.4350
F	0.8170	0.4230
G	0.8250	0.4310
I	0.8460	0.4590
J	0.8520	0.4700
K	0.8470	0.4610
L	0.8520	0.4740
M	0.8530	0.4660
N	0.8540	0.4660

