



Full wwPDB EM Validation Report ⓘ

Mar 25, 2026 – 04:06 PM UTC

PDB ID : 5L4K / pdb_00005l4k
EMDB ID : EMD-4002
Title : The human 26S proteasome lid
Authors : Schweitzer, A.; Aufderheide, A.; Rudack, T.; Beck, F.
Deposited on : 2016-05-25
Resolution : 3.90 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:

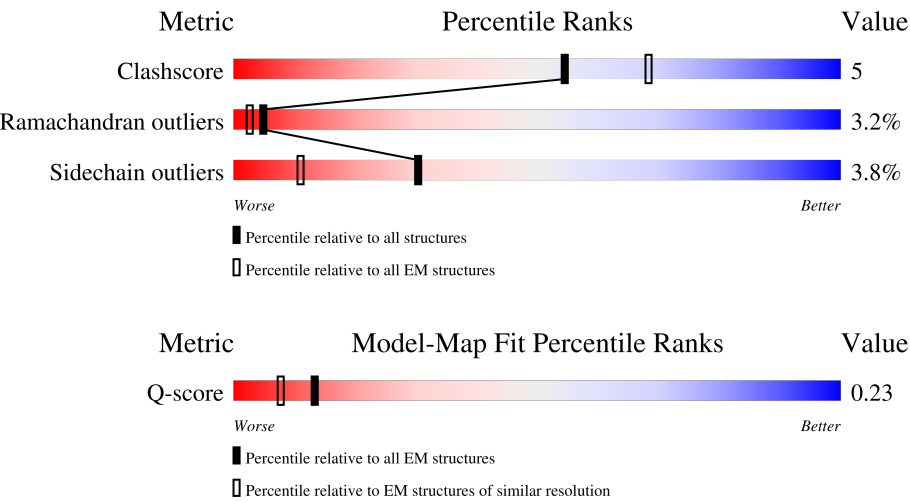
EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

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 3.90 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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	8855 (3.40 - 4.40)

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	W	377	
2	V	310	
3	T	350	
4	Y	70	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
5	Z	908	91% 82% 14% • •
6	N	953	56% 75% 16% • 8%
7	S	534	34% 79% 12% • 8%
8	P	456	11% 84% 15% •
9	Q	422	20% 86% 14%
10	R	389	8% 75% 21% •
11	U	324	13% 72% 17% • 10%
12	O	376	14% 89% 10% •

2 Entry composition [i](#)

There are 12 unique types of molecules in this entry. The entry contains 79649 atoms, of which 39990 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 26S proteasome non-ATPase regulatory subunit 4.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	W	196	Total	C	H	N	O	S	0	0
			3019	927	1531	266	286	9		

- Molecule 2 is a protein called 26S proteasome non-ATPase regulatory subunit 14.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	V	293	Total	C	H	N	O	S	0	0
			4612	1456	2311	395	431	19		

- Molecule 3 is a protein called 26S proteasome non-ATPase regulatory subunit 8.

Mol	Chain	Residues	Atoms						AltConf	Trace
3	T	272	Total	C	H	N	O	S	0	0
			4435	1424	2231	362	409	9		

- Molecule 4 is a protein called 26S proteasome complex subunit DSS1.

Mol	Chain	Residues	Atoms						AltConf	Trace
4	Y	56	Total	C	H	N	O	S	0	0
			848	288	374	72	113	1		

- Molecule 5 is a protein called 26S proteasome non-ATPase regulatory subunit 2.

Mol	Chain	Residues	Atoms						AltConf	Trace
5	Z	881	Total	C	H	N	O	S	0	0
			13583	4270	6791	1159	1318	45		

- Molecule 6 is a protein called 26S proteasome non-ATPase regulatory subunit 1.

Mol	Chain	Residues	Atoms						AltConf	Trace
6	N	876	Total	C	H	N	O	S	0	0
			13720	4332	6890	1158	1295	45		

- Molecule 7 is a protein called 26S proteasome non-ATPase regulatory subunit 3.

Mol	Chain	Residues	Atoms						AltConf	Trace
7	S	491	Total	C	H	N	O	S	0	0
			7977	2516	3998	707	742	14		

- Molecule 8 is a protein called 26S proteasome non-ATPase regulatory subunit 12.

Mol	Chain	Residues	Atoms						AltConf	Trace
8	P	456	Total	C	H	N	O	S	0	0
			7525	2339	3822	635	704	25		

- Molecule 9 is a protein called 26S proteasome non-ATPase regulatory subunit 11.

Mol	Chain	Residues	Atoms						AltConf	Trace
9	Q	422	Total	C	H	N	O	S	0	0
			6770	2116	3435	567	639	13		

- Molecule 10 is a protein called 26S proteasome non-ATPase regulatory subunit 6.

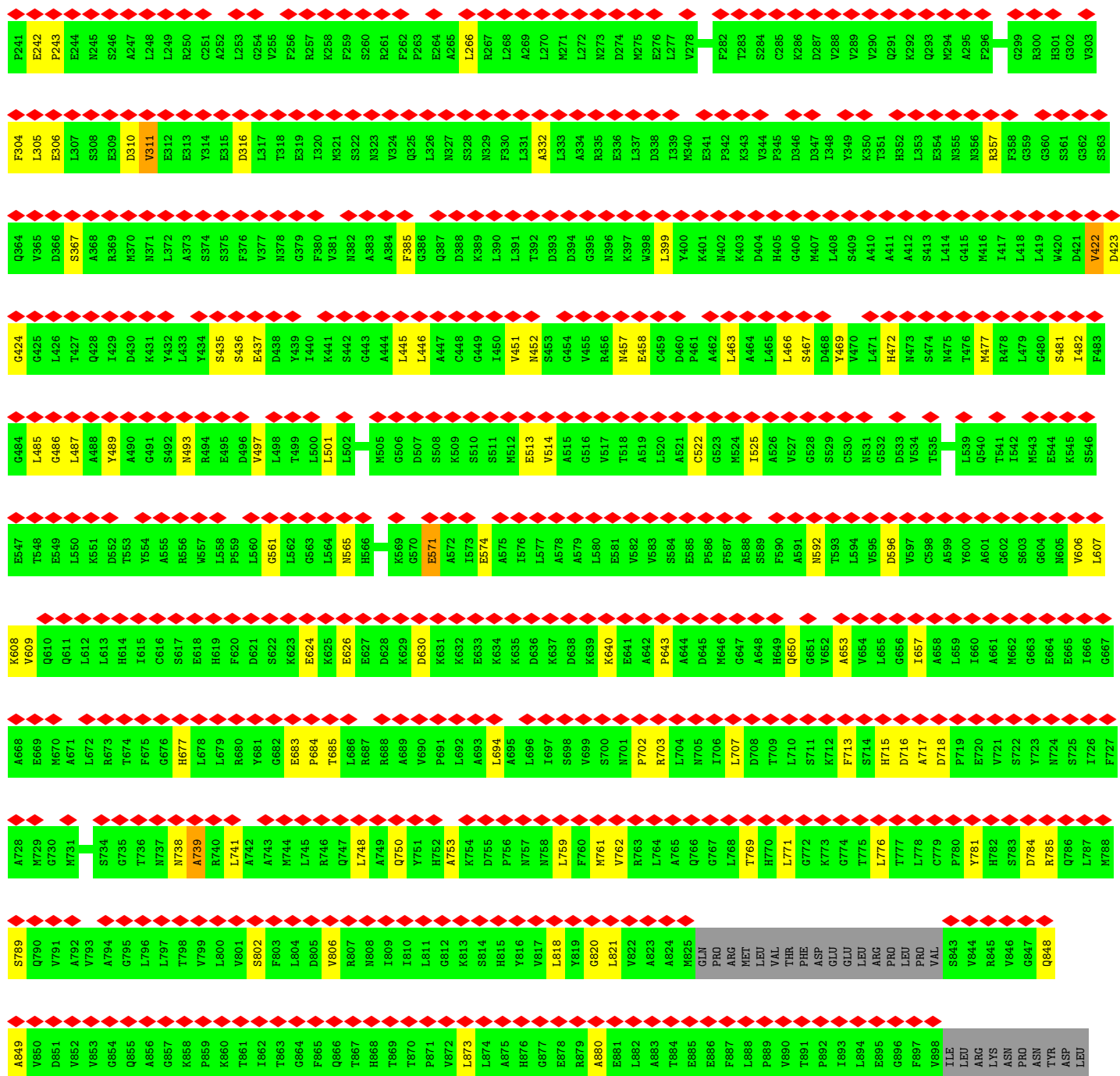
Mol	Chain	Residues	Atoms						AltConf	Trace
10	R	389	Total	C	H	N	O	S	0	0
			6406	2041	3204	545	598	18		

- Molecule 11 is a protein called 26S proteasome non-ATPase regulatory subunit 7.

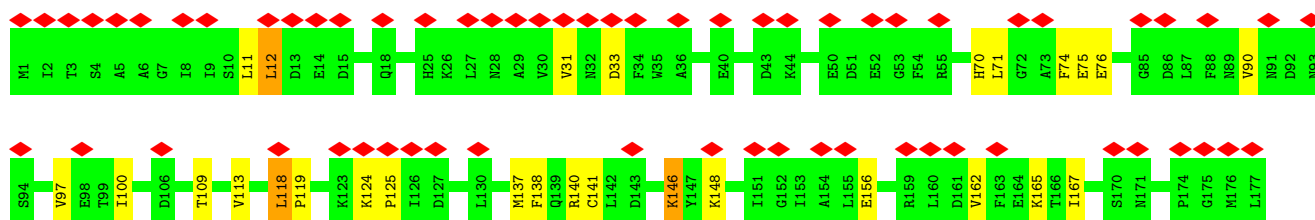
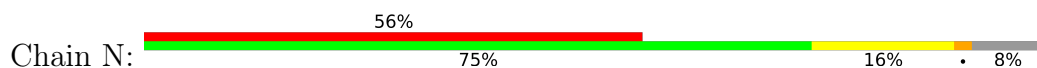
Mol	Chain	Residues	Atoms						AltConf	Trace
11	U	292	Total	C	H	N	O	S	0	0
			4693	1488	2362	399	438	6		

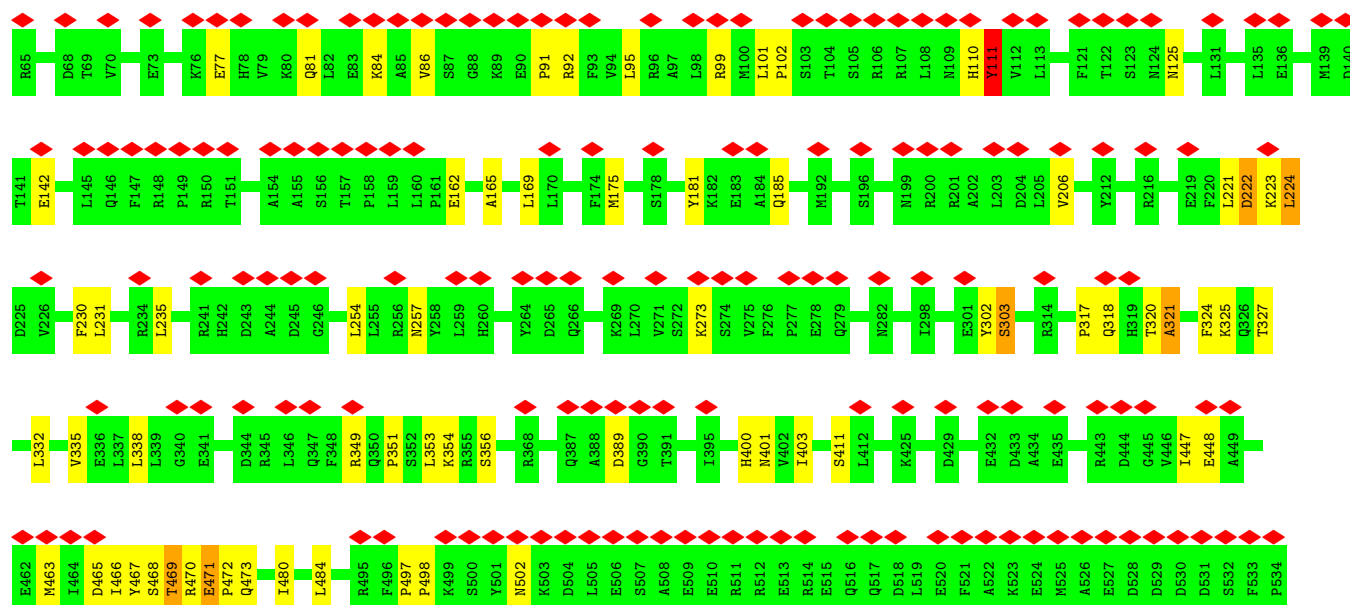
- Molecule 12 is a protein called 26S proteasome non-ATPase regulatory subunit 13.

Mol	Chain	Residues	Atoms						AltConf	Trace
12	O	376	Total	C	H	N	O	S	0	0
			6061	1926	3041	514	564	16		

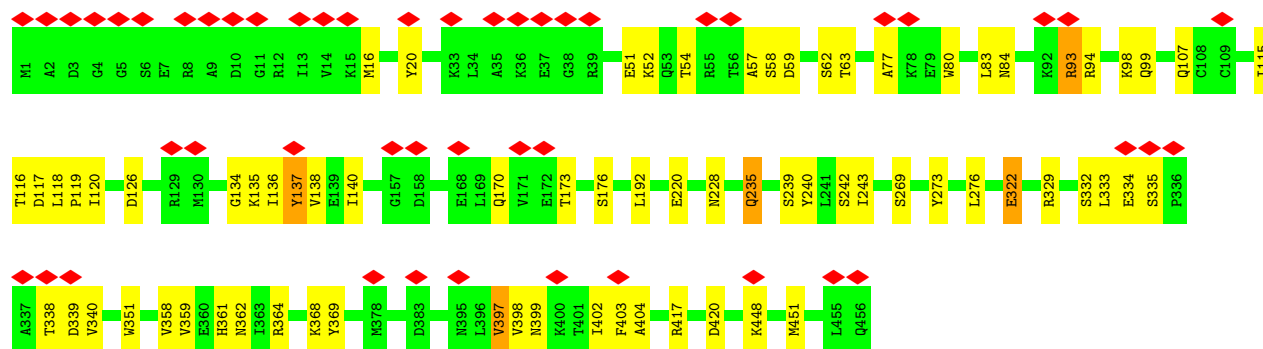
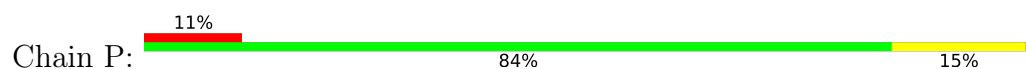


• Molecule 6: 26S proteasome non-ATPase regulatory subunit 1

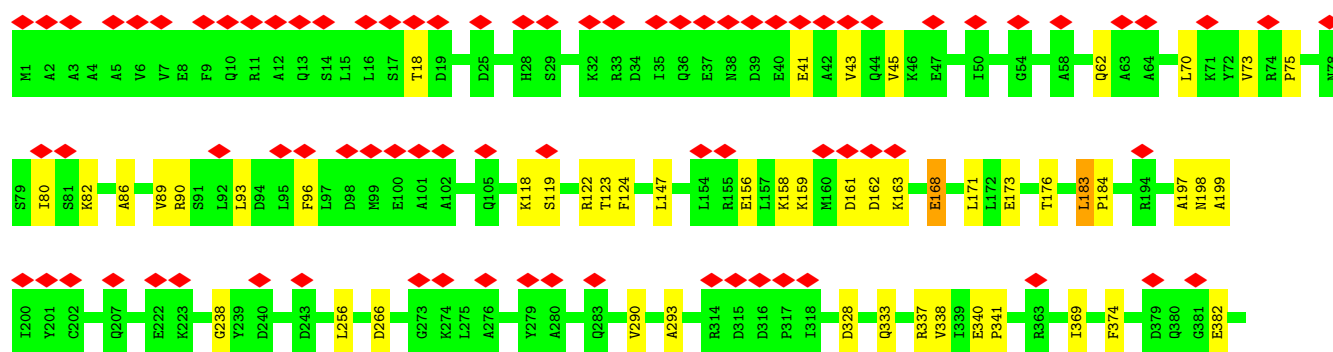
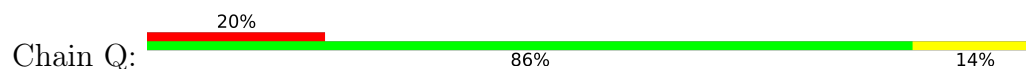




• Molecule 8: 26S proteasome non-ATPase regulatory subunit 12

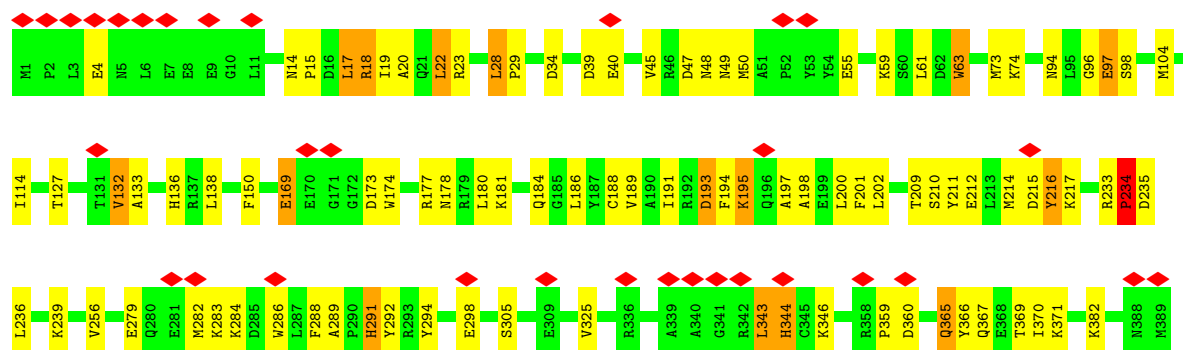
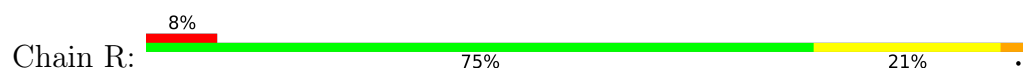


• Molecule 9: 26S proteasome non-ATPase regulatory subunit 11

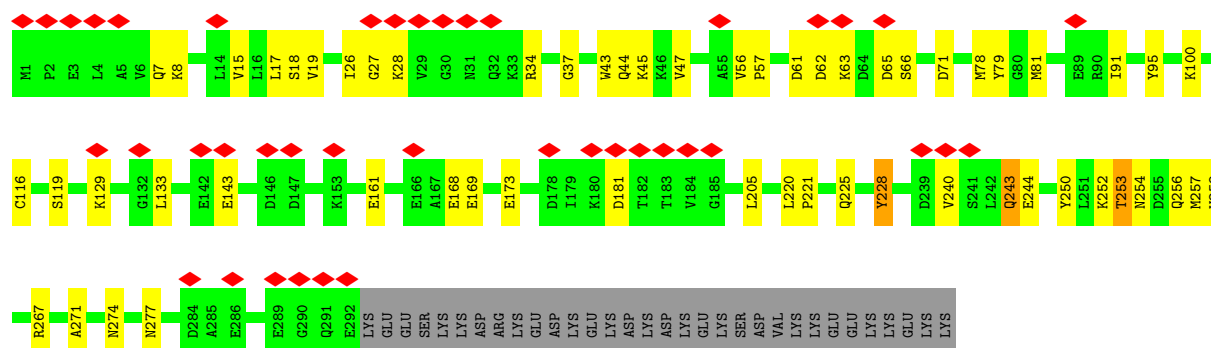




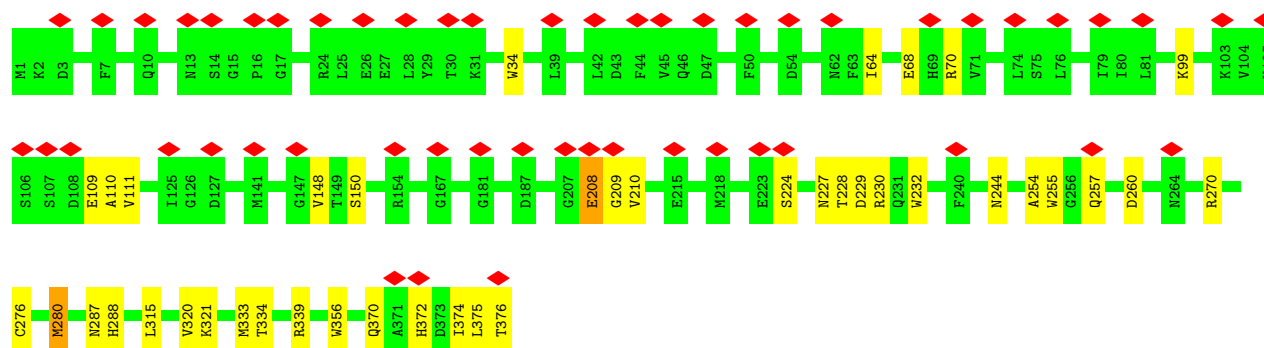
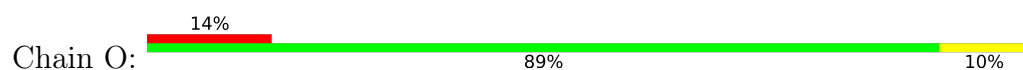
- Molecule 10: 26S proteasome non-ATPase regulatory subunit 6



- Molecule 11: 26S proteasome non-ATPase regulatory subunit 7



- Molecule 12: 26S proteasome non-ATPase regulatory subunit 13



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	461402	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 ($e^-/\text{\AA}^2$)	45	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	OTHER	Depositor
Maximum map value	0.307	Depositor
Minimum map value	-0.195	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.035	Depositor
Map size ($\text{\AA}$)	518.4, 518.4, 518.4	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.35, 1.35, 1.35	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	W	0.23	0/1508	0.44	0/2040
2	V	1.11	21/2346 (0.9%)	1.11	33/3173 (1.0%)
3	T	0.28	1/2251 (0.0%)	0.44	0/3042
4	Y	0.27	0/486	0.49	0/658
5	Z	0.22	0/6903	0.42	0/9327
6	N	0.25	0/6949	0.46	1/9395 (0.0%)
7	S	0.28	1/4053 (0.0%)	0.51	2/5465 (0.0%)
8	P	0.29	1/3751 (0.0%)	0.48	0/5042
9	Q	0.27	0/3381	0.46	0/4558
10	R	0.57	2/3261 (0.1%)	0.56	2/4393 (0.0%)
11	U	0.30	0/2375	0.51	0/3219
12	O	0.24	0/3078	0.44	0/4165
All	All	0.39	26/40342 (0.1%)	0.53	38/54477 (0.1%)

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
2	V	0	3
3	T	0	1
5	Z	0	1
8	P	0	1
10	R	0	1
12	O	0	1
All	All	0	8

All (26) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	R	28	LEU	C-N	25.40	1.93	1.33
2	V	294	SER	CA-C	-19.26	1.26	1.52

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	V	295	ASN	N-CA	-18.48	1.21	1.46
2	V	298	GLN	N-CA	-13.62	1.30	1.46
2	V	294	SER	N-CA	-12.66	1.30	1.46
2	V	293	THR	N-CA	-12.30	1.31	1.46
2	V	296	ILE	CA-C	-11.69	1.38	1.52
2	V	297	VAL	CA-C	-11.48	1.35	1.52
2	V	295	ASN	CA-C	-10.28	1.39	1.52
2	V	299	CYS	N-CA	-9.67	1.33	1.46
2	V	309	PHE	CA-C	-8.99	1.40	1.52
2	V	297	VAL	N-CA	-8.44	1.34	1.46
2	V	295	ASN	C-O	-8.31	1.12	1.24
2	V	297	VAL	C-N	-8.28	1.23	1.33
2	V	293	THR	CA-C	-7.67	1.42	1.52
2	V	294	SER	C-N	-7.50	1.22	1.33
2	V	296	ILE	N-CA	-6.90	1.38	1.46
2	V	300	LEU	N-CA	-6.76	1.38	1.46
2	V	296	ILE	C-N	-6.28	1.27	1.34
2	V	293	THR	C-N	-5.82	1.26	1.34
3	T	324	LYS	C-N	5.56	1.46	1.33
2	V	307	VAL	CA-CB	-5.36	1.49	1.55
8	P	235	GLN	CD-OE1	5.34	1.33	1.23
10	R	136	HIS	ND1-CE1	5.26	1.37	1.32
7	S	502	ASN	CG-OD1	5.21	1.33	1.23
2	V	298	GLN	CD-OE1	5.13	1.33	1.23

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	V	293	THR	CA-C-O	14.40	136.31	120.90
2	V	294	SER	CA-C-N	-12.69	100.31	122.26
2	V	294	SER	C-N-CA	-12.69	100.31	122.26
2	V	296	ILE	N-CA-C	-11.91	99.26	110.82
2	V	293	THR	O-C-N	-11.89	109.72	122.09
2	V	296	ILE	CA-C-N	-11.70	101.22	120.64
2	V	296	ILE	C-N-CA	-11.70	101.22	120.64
2	V	298	GLN	N-CA-C	-11.53	97.28	111.11
2	V	293	THR	CA-C-N	-11.11	104.29	120.28
2	V	293	THR	C-N-CA	-11.11	104.29	120.28
2	V	294	SER	CA-C-O	-11.08	107.58	120.10
2	V	307	VAL	N-CA-CB	9.98	122.39	111.41
2	V	292	MET	O-C-N	8.96	131.29	122.07
2	V	297	VAL	O-C-N	-8.87	110.44	122.05

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	V	293	THR	N-CA-C	-7.81	101.74	111.11
2	V	299	CYS	CA-C-N	7.38	130.18	120.28
2	V	299	CYS	C-N-CA	7.38	130.18	120.28
10	R	136	HIS	CB-CG-CD2	-6.90	122.23	131.20
7	S	110	HIS	CA-C-N	6.68	134.29	121.54
7	S	110	HIS	C-N-CA	6.68	134.29	121.54
2	V	305	ASP	CA-CB-CG	-6.58	106.02	112.60
2	V	298	GLN	CA-C-N	6.56	134.07	121.54
2	V	298	GLN	C-N-CA	6.56	134.07	121.54
2	V	307	VAL	CA-CB-CG2	-6.30	99.69	110.40
2	V	294	SER	O-C-N	6.22	129.50	122.22
2	V	298	GLN	O-C-N	6.01	128.34	122.09
10	R	136	HIS	CB-CG-ND1	5.84	131.46	122.70
2	V	307	VAL	O-C-N	-5.64	116.96	121.98
2	V	307	VAL	N-CA-C	-5.64	106.71	111.56
2	V	299	CYS	CA-C-O	-5.44	112.73	120.51
2	V	309	PHE	N-CA-C	-5.14	106.32	112.59
2	V	300	LEU	CA-C-N	5.14	127.48	120.54
2	V	300	LEU	C-N-CA	5.14	127.48	120.54
2	V	295	ASN	O-C-N	5.09	129.08	122.42
2	V	306	THR	CA-C-N	5.07	128.20	123.08
2	V	306	THR	C-N-CA	5.07	128.20	123.08
6	N	599	ILE	N-CA-C	-5.03	107.93	112.96
2	V	298	GLN	CA-C-O	-5.02	115.53	120.90

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
12	O	254	ALA	Peptide
8	P	398	VAL	Peptide
10	R	234	PRO	Peptide
3	T	241	TYR	Peptide
2	V	293	THR	Mainchain
2	V	294	SER	Mainchain
2	V	297	VAL	Mainchain
5	Z	102	HIS	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	W	1488	1531	1531	5	0
2	V	2301	2311	2314	73	0
3	T	2204	2231	2231	19	0
4	Y	474	374	374	4	0
5	Z	6792	6791	6790	49	0
6	N	6830	6890	6890	86	0
7	S	3979	3998	3998	36	0
8	P	3703	3822	3822	33	0
9	Q	3335	3435	3435	22	0
10	R	3202	3204	3204	49	0
11	U	2331	2362	2362	36	0
12	O	3020	3041	3041	15	0
All	All	39659	39990	39992	407	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 (407) 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)
2:V:289:ASP:O	2:V:293:THR:HG23	1.31	1.28
10:R:28:LEU:C	10:R:29:PRO:N	1.93	1.25
2:V:237:HIS:NE2	2:V:298:GLN:HG2	1.50	1.22
2:V:296:ILE:O	2:V:299:CYS:HB2	1.13	1.22
2:V:297:VAL:O	2:V:298:GLN:C	1.81	1.15
2:V:296:ILE:O	2:V:299:CYS:CB	2.01	1.07
2:V:289:ASP:O	2:V:293:THR:CG2	2.09	1.00
2:V:296:ILE:C	2:V:299:CYS:HB2	1.94	0.90
2:V:293:THR:O	2:V:294:SER:C	1.91	0.88
2:V:297:VAL:O	2:V:299:CYS:N	2.13	0.81
2:V:237:HIS:CE1	2:V:298:GLN:HG2	2.16	0.80
2:V:299:CYS:SG	11:U:256:GLN:HG2	2.22	0.79
10:R:365:GLN:O	10:R:367:GLN:N	2.17	0.78
2:V:71:ASP:OD2	2:V:72:VAL:N	2.18	0.76
2:V:299:CYS:SG	11:U:256:GLN:CG	2.74	0.76

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:V:295:ASN:HB3	11:U:256:GLN:OE1	1.86	0.75
2:V:297:VAL:O	2:V:298:GLN:O	2.04	0.75
8:P:403:PHE:O	8:P:417:ARG:NH1	2.19	0.75
2:V:52:GLU:OE2	2:V:52:GLU:N	2.20	0.74
2:V:295:ASN:O	2:V:298:GLN:HB3	1.91	0.71
2:V:295:ASN:HA	2:V:298:GLN:HB2	1.72	0.69
6:N:524:LYS:O	6:N:559:ARG:NH1	2.24	0.69
2:V:237:HIS:NE2	2:V:298:GLN:CG	2.44	0.69
10:R:193:ASP:O	10:R:195:LYS:N	2.26	0.68
2:V:293:THR:O	2:V:295:ASN:N	2.25	0.68
7:S:465:ASP:O	7:S:467:TYR:N	2.25	0.68
2:V:237:HIS:CD2	2:V:298:GLN:HG2	2.28	0.67
2:V:292:MET:O	2:V:295:ASN:N	2.28	0.66
10:R:289:ALA:O	10:R:291:HIS:N	2.29	0.65
2:V:153:GLY:N	11:U:173:GLU:OE1	2.28	0.65
2:V:115:HIS:NE2	2:V:126:ASP:OD2	2.29	0.64
9:Q:197:ALA:O	9:Q:199:ALA:N	2.29	0.64
4:Y:17:ASP:O	7:S:99:ARG:NH1	2.32	0.64
2:V:293:THR:O	2:V:294:SER:O	2.17	0.63
6:N:258:GLN:OE1	6:N:452:ASN:ND2	2.32	0.63
2:V:299:CYS:SG	11:U:256:GLN:HG3	2.40	0.62
8:P:58:SER:O	8:P:63:THR:OG1	2.17	0.62
2:V:237:HIS:CE1	2:V:298:GLN:CG	2.83	0.61
3:T:184:GLU:N	3:T:184:GLU:OE2	2.33	0.61
2:V:152:LYS:NZ	11:U:169:GLU:OE2	2.26	0.61
6:N:348:THR:HA	6:N:742:HIS:NE2	2.15	0.61
7:S:162:GLU:N	7:S:162:GLU:OE2	2.34	0.60
2:V:294:SER:O	2:V:298:GLN:HB2	2.02	0.59
10:R:194:PHE:O	10:R:198:ALA:N	2.32	0.59
10:R:96:GLY:O	10:R:98:SER:N	2.36	0.59
2:V:194:HIS:O	2:V:198:ARG:HB3	2.04	0.57
2:V:237:HIS:CE1	2:V:298:GLN:CD	2.83	0.57
10:R:233:ARG:HB3	10:R:234:PRO:HD2	1.87	0.57
2:V:295:ASN:HA	2:V:298:GLN:CB	2.34	0.56
3:T:342:TYR:CZ	7:S:480:ILE:HD11	2.41	0.56
5:Z:187:LEU:O	5:Z:190:GLU:N	2.39	0.56
5:Z:422:VAL:HG13	5:Z:423:ASP:H	1.71	0.55
2:V:296:ILE:CA	2:V:299:CYS:HB2	2.37	0.55
3:T:251:ILE:N	3:T:252:PRO:CD	2.70	0.55
6:N:250:PHE:CE2	6:N:913:ILE:HD11	2.41	0.55
5:Z:316:ASP:OD1	5:Z:493:ASN:N	2.40	0.55

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:V:88:ASP:HB3	2:V:90:VAL:HG22	1.89	0.54
5:Z:522:CYS:O	5:Z:525:ILE:HG22	2.07	0.54
5:Z:715:HIS:CB	5:Z:753:ALA:HB1	2.38	0.54
6:N:583:MET:HG3	6:N:602:LEU:HD11	1.89	0.54
6:N:545:LEU:HG	6:N:577:ILE:HG21	1.89	0.54
11:U:78:MET:O	11:U:81:MET:N	2.41	0.54
6:N:368:ALA:O	6:N:371:ILE:HG12	2.08	0.54
8:P:57:ALA:O	8:P:62:SER:N	2.41	0.53
10:R:96:GLY:O	10:R:97:GLU:C	2.52	0.53
6:N:804:SER:OG	6:N:876:GLN:N	2.40	0.53
2:V:71:ASP:OD1	2:V:104:ARG:NH1	2.42	0.53
5:Z:423:ASP:OD2	5:Z:424:GLY:N	2.41	0.53
9:Q:399:ALA:O	9:Q:402:GLU:N	2.41	0.53
6:N:118:LEU:HB2	6:N:119:PRO:HD3	1.92	0.52
6:N:575:ASP:O	6:N:579:ARG:NH1	2.43	0.52
6:N:915:LYS:O	6:N:917:THR:N	2.42	0.52
10:R:17:LEU:O	10:R:19:ILE:N	2.43	0.52
6:N:803:LYS:HE2	6:N:875:PHE:CD1	2.44	0.52
2:V:292:MET:O	2:V:293:THR:C	2.52	0.52
6:N:813:TYR:OH	6:N:883:ARG:HB3	2.10	0.52
2:V:186:LYS:H	2:V:187:PRO:HD2	1.74	0.51
7:S:338:LEU:O	7:S:401:ASN:ND2	2.43	0.51
8:P:136:ILE:O	8:P:138:VAL:N	2.44	0.51
12:O:109:GLU:HG2	12:O:110:ALA:N	2.26	0.51
11:U:257:MET:O	11:U:258:VAL:C	2.52	0.51
2:V:277:LYS:O	2:V:280:PRO:HD2	2.11	0.51
7:S:497:PRO:HB2	7:S:498:PRO:HD3	1.93	0.51
7:S:317:PRO:O	7:S:325:LYS:NZ	2.45	0.50
5:Z:486:GLY:HA2	5:Z:525:ILE:HB	1.92	0.50
2:V:296:ILE:O	2:V:299:CYS:CA	2.59	0.50
3:T:328:THR:HA	3:T:331:PRO:HD2	1.92	0.50
12:O:228:THR:O	12:O:230:ARG:N	2.45	0.50
5:Z:624:GLU:O	5:Z:626:GLU:N	2.41	0.50
7:S:470:ARG:O	7:S:473:GLN:N	2.45	0.50
10:R:343:LEU:O	10:R:344:HIS:HB2	2.12	0.49
6:N:137:MET:O	6:N:140:ARG:HB3	2.12	0.49
6:N:74:PHE:O	6:N:76:GLU:N	2.45	0.49
10:R:173:ASP:N	10:R:173:ASP:OD1	2.41	0.49
2:V:115:HIS:CE1	2:V:126:ASP:OD2	2.65	0.49
10:R:215:ASP:O	10:R:216:TYR:CB	2.60	0.49
9:Q:397:TYR:CE2	11:U:258:VAL:HG21	2.47	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:R:211:TYR:O	10:R:212:GLU:HB3	2.12	0.49
10:R:217:LYS:H	10:R:217:LYS:HD2	1.78	0.48
2:V:192:LEU:HG	2:V:196:LEU:HB2	1.95	0.48
2:V:298:GLN:NE2	2:V:298:GLN:HA	2.28	0.48
5:Z:114:ALA:H	5:Z:115:PRO:CD	2.27	0.48
5:Z:561:GLY:O	5:Z:565:ASN:ND2	2.42	0.48
7:S:92:ARG:NH1	7:S:95:LEU:HB2	2.28	0.48
8:P:404:ALA:HA	8:P:417:ARG:HH12	1.79	0.48
10:R:202:LEU:HD21	10:R:239:LYS:HB3	1.95	0.48
7:S:111:TYR:N	7:S:111:TYR:CD2	2.80	0.48
5:Z:463:LEU:O	5:Z:467:SER:OG	2.29	0.48
7:S:222:ASP:O	7:S:224:LEU:N	2.46	0.48
3:T:342:TYR:O	3:T:346:LEU:HG	2.14	0.48
6:N:252:LEU:O	6:N:256:ALA:HB3	2.13	0.48
8:P:368:LYS:C	8:P:369:TYR:CD1	2.92	0.48
11:U:15:VAL:O	11:U:18:SER:N	2.45	0.48
6:N:742:HIS:CE1	6:N:814:PRO:HG2	2.49	0.48
6:N:921:ILE:O	6:N:922:GLU:C	2.57	0.48
12:O:372:HIS:HA	12:O:376:THR:O	2.14	0.48
6:N:146:LYS:HE3	6:N:146:LYS:HA	1.94	0.48
6:N:437:TYR:HA	6:N:472:ILE:HG21	1.95	0.48
11:U:225:GLN:O	11:U:228:TYR:HB2	2.14	0.48
10:R:174:TRP:CE3	10:R:177:ARG:NH1	2.82	0.48
3:T:331:PRO:O	3:T:332:SER:C	2.56	0.47
6:N:109:THR:HG21	6:N:156:GLU:HB3	1.96	0.47
6:N:601:ARG:HA	6:N:604:HIS:NE2	2.29	0.47
8:P:116:THR:OG1	8:P:117:ASP:N	2.47	0.47
2:V:154:LYS:O	2:V:155:VAL:HB	2.14	0.47
6:N:644:TYR:O	6:N:645:ASN:CB	2.63	0.47
9:Q:122:ARG:C	9:Q:124:PHE:H	2.23	0.47
8:P:358:VAL:O	8:P:361:HIS:HB3	2.14	0.47
10:R:20:ALA:HA	10:R:23:ARG:HE	1.78	0.47
2:V:87:VAL:HG12	2:V:87:VAL:O	2.14	0.47
12:O:208:GLU:OE1	12:O:209:GLY:N	2.47	0.47
6:N:138:PHE:O	6:N:141:CYS:N	2.48	0.47
6:N:523:SER:O	6:N:559:ARG:NH1	2.47	0.47
6:N:899:ARG:NE	6:N:916:ASP:OD2	2.45	0.47
10:R:178:ASN:O	10:R:181:LYS:HB2	2.15	0.47
6:N:428:PRO:O	6:N:429:LYS:HB2	2.15	0.46
10:R:132:VAL:HG13	10:R:133:ALA:N	2.31	0.46
6:N:148:LYS:HD2	6:N:148:LYS:N	2.30	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:N:742:HIS:CD2	6:N:814:PRO:HD2	2.51	0.46
9:Q:86:ALA:O	9:Q:89:VAL:HG12	2.15	0.46
5:Z:316:ASP:OD2	5:Z:316:ASP:N	2.41	0.46
5:Z:718:ASP:OD1	5:Z:718:ASP:N	2.49	0.46
8:P:333:LEU:O	8:P:340:VAL:HG22	2.14	0.46
10:R:289:ALA:HB1	10:R:291:HIS:CE1	2.51	0.46
6:N:148:LYS:HD2	6:N:148:LYS:H	1.80	0.46
6:N:923:GLU:O	6:N:928:VAL:HG22	2.16	0.46
8:P:136:ILE:HG13	8:P:138:VAL:HG22	1.98	0.46
7:S:349:ARG:HA	7:S:349:ARG:NH1	2.29	0.46
2:V:146:ASP:O	2:V:150:SER:OG	2.33	0.46
6:N:90:VAL:HA	6:N:97:VAL:HG21	1.97	0.46
6:N:124:LYS:HB2	6:N:125:PRO:HD3	1.97	0.46
3:T:129:LEU:O	3:T:130:PRO:C	2.59	0.46
11:U:79:TYR:CE1	11:U:91:ILE:HG13	2.50	0.45
2:V:296:ILE:O	2:V:299:CYS:N	2.49	0.45
8:P:134:GLY:O	8:P:136:ILE:N	2.49	0.45
7:S:465:ASP:C	7:S:467:TYR:H	2.22	0.45
7:S:484:LEU:HD21	11:U:267:ARG:NH1	2.31	0.45
9:Q:163:LYS:HD2	9:Q:163:LYS:N	2.31	0.45
11:U:19:VAL:HG12	11:U:95:TYR:CZ	2.52	0.45
12:O:321:LYS:O	12:O:334:THR:OG1	2.34	0.45
9:Q:397:TYR:O	9:Q:398:GLU:C	2.58	0.45
7:S:165:ALA:O	7:S:169:LEU:HG	2.17	0.45
8:P:369:TYR:CE2	12:O:315:LEU:HB2	2.52	0.45
12:O:270:ARG:HE	12:O:270:ARG:HA	1.82	0.45
2:V:84:VAL:HG13	2:V:87:VAL:HB	1.99	0.45
3:T:309:VAL:O	3:T:314:ASN:ND2	2.50	0.45
7:S:470:ARG:O	7:S:471:GLU:C	2.59	0.45
11:U:19:VAL:HG12	11:U:95:TYR:CE1	2.51	0.45
5:Z:92:VAL:N	5:Z:93:PRO:CD	2.80	0.45
6:N:872:GLU:HB3	6:N:873:PRO:HA	1.99	0.45
10:R:178:ASN:O	10:R:181:LYS:N	2.48	0.45
2:V:46:ARG:O	2:V:46:ARG:HG2	2.17	0.45
6:N:571:CYS:SG	6:N:583:MET:HE2	2.57	0.45
6:N:644:TYR:O	6:N:645:ASN:HB3	2.17	0.45
6:N:788:VAL:O	6:N:880:ASN:O	2.34	0.45
11:U:8:LYS:O	11:U:47:VAL:HA	2.16	0.45
5:Z:39:LYS:O	5:Z:40:ASP:HB2	2.17	0.44
6:N:549:ALA:HB1	6:N:581:SER:HB2	1.99	0.44
8:P:16:MET:O	8:P:20:TYR:N	2.48	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:P:77:ALA:HA	8:P:80:TRP:CE2	2.52	0.44
10:R:180:LEU:O	10:R:180:LEU:HD13	2.17	0.44
1:W:22:LEU:O	1:W:23:PRO:C	2.60	0.44
5:Z:482:ILE:HD11	5:Z:514:VAL:HG21	2.00	0.44
6:N:621:SER:OG	6:N:622:LEU:N	2.51	0.44
10:R:47:ASP:O	10:R:48:ASN:C	2.61	0.44
10:R:104:MET:HB3	10:R:127:THR:HG22	1.99	0.44
4:Y:56:LEU:O	4:Y:57:ARG:C	2.61	0.44
10:R:215:ASP:O	10:R:216:TYR:HB2	2.17	0.44
11:U:168:GLU:O	11:U:169:GLU:C	2.60	0.44
2:V:285:GLU:HA	2:V:288:VAL:HG22	2.00	0.44
3:T:169:ALA:O	3:T:170:GLN:C	2.60	0.44
5:Z:761:MET:HB3	5:Z:806:VAL:HG11	1.99	0.44
12:O:227:ASN:O	12:O:228:THR:OG1	2.24	0.44
2:V:157:ILE:HG23	2:V:157:ILE:O	2.17	0.44
3:T:159:LYS:O	3:T:160:ASP:CB	2.65	0.44
6:N:645:ASN:O	6:N:646:PRO:C	2.59	0.44
9:Q:338:VAL:O	9:Q:341:PRO:HD2	2.17	0.44
5:Z:750:GLN:O	5:Z:753:ALA:HB3	2.17	0.44
6:N:899:ARG:NE	6:N:923:GLU:HB2	2.33	0.44
5:Z:114:ALA:H	5:Z:115:PRO:HD2	1.83	0.44
6:N:447:GLY:HA3	6:N:480:GLY:HA2	2.00	0.44
6:N:801:GLN:CB	6:N:877:LEU:HB3	2.48	0.44
3:T:192:LEU:O	3:T:195:ASN:HB3	2.17	0.43
3:T:211:GLU:O	3:T:214:ARG:HG2	2.18	0.43
6:N:638:SER:C	6:N:640:LEU:H	2.26	0.43
6:N:801:GLN:HA	6:N:878:LEU:O	2.18	0.43
6:N:917:THR:HA	6:N:922:GLU:HB3	1.99	0.43
6:N:926:GLU:HB3	6:N:927:PRO:HD2	2.00	0.43
7:S:324:PHE:O	7:S:327:THR:HG22	2.18	0.43
8:P:136:ILE:O	8:P:137:TYR:C	2.60	0.43
2:V:221:HIS:HB2	2:V:223:LYS:HE3	2.00	0.43
10:R:194:PHE:HA	10:R:197:ALA:HB3	1.99	0.43
2:V:241:ASN:O	2:V:242:GLU:C	2.60	0.43
5:Z:9:ALA:N	5:Z:10:PRO:HD2	2.34	0.43
6:N:755:THR:HG23	6:N:755:THR:O	2.17	0.43
7:S:92:ARG:HH21	7:S:206:VAL:HA	1.81	0.43
11:U:43:TRP:HB2	11:U:47:VAL:O	2.18	0.43
5:Z:640:LYS:HA	5:Z:771:LEU:HD22	2.00	0.43
6:N:603:LEU:HD13	6:N:603:LEU:C	2.43	0.43
7:S:484:LEU:HD13	7:S:484:LEU:O	2.19	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:R:194:PHE:O	10:R:195:LYS:C	2.62	0.43
10:R:294:TYR:O	10:R:298:GLU:HG2	2.19	0.43
2:V:139:ARG:NE	2:V:139:ARG:HA	2.33	0.43
5:Z:219:LYS:O	5:Z:220:ASP:HB2	2.19	0.43
5:Z:522:CYS:HA	5:Z:525:ILE:HG22	1.99	0.43
6:N:583:MET:CG	6:N:602:LEU:HD11	2.49	0.43
10:R:63:TRP:HA	10:R:63:TRP:CE3	2.53	0.43
2:V:300:LEU:HD22	3:T:340:ILE:HD11	2.01	0.43
6:N:71:LEU:HD13	7:S:273:LYS:HE3	2.00	0.43
6:N:368:ALA:O	6:N:371:ILE:CG1	2.66	0.43
6:N:903:PHE:CE2	6:N:915:LYS:HB3	2.54	0.43
7:S:221:LEU:HD23	7:S:221:LEU:N	2.33	0.43
8:P:334:GLU:HA	8:P:339:ASP:HA	2.00	0.43
11:U:26:ILE:O	11:U:28:LYS:N	2.52	0.43
2:V:227:GLU:C	2:V:229:LEU:H	2.27	0.43
2:V:279:ASP:N	2:V:280:PRO:CD	2.81	0.43
6:N:612:ASP:HB3	6:N:647:HIS:ND1	2.32	0.43
6:N:800:VAL:HG11	6:N:914:LEU:HD13	2.01	0.43
7:S:175:MET:HE2	7:S:185:GLN:HA	2.01	0.43
11:U:253:THR:HG22	11:U:254:ASN:N	2.33	0.43
12:O:34:TRP:CD1	12:O:70:ARG:NH2	2.87	0.43
5:Z:489:TYR:CD2	5:Z:497:VAL:HG21	2.54	0.43
6:N:167:ILE:HD11	6:N:204:ILE:HG21	2.00	0.43
6:N:600:ARG:HD2	6:N:600:ARG:C	2.44	0.43
7:S:81:GLN:HG3	7:S:91:PRO:HG2	1.99	0.43
9:Q:168:GLU:O	9:Q:171:LEU:N	2.52	0.43
10:R:45:VAL:HA	10:R:49:ASN:HB2	2.00	0.43
11:U:271:ALA:O	11:U:274:ASN:HB3	2.19	0.43
5:Z:190:GLU:HA	5:Z:193:PRO:HD2	2.01	0.43
6:N:798:PRO:HB3	6:N:900:TYR:CE1	2.54	0.43
6:N:899:ARG:O	6:N:917:THR:N	2.52	0.43
9:Q:80:ILE:O	9:Q:82:LYS:HG3	2.19	0.43
10:R:284:LYS:HD2	10:R:292:TYR:CD1	2.54	0.43
6:N:11:LEU:O	6:N:12:LEU:CB	2.67	0.42
7:S:471:GLU:HB3	7:S:472:PRO:CD	2.49	0.42
11:U:205:LEU:HD21	12:O:356:TRP:CH2	2.54	0.42
5:Z:266:LEU:HD11	5:Z:305:LEU:HD12	2.00	0.42
6:N:524:LYS:HB2	6:N:555:VAL:HB	2.01	0.42
8:P:51:GLU:O	8:P:52:LYS:C	2.62	0.42
8:P:118:LEU:HB3	8:P:119:PRO:HD3	2.01	0.42
11:U:220:LEU:O	11:U:221:PRO:C	2.62	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:V:194:HIS:O	2:V:199:HIS:N	2.52	0.42
3:T:134:THR:O	3:T:138:LYS:HG3	2.20	0.42
5:Z:469:TYR:HB3	5:Z:481:SER:OG	2.19	0.42
9:Q:408:SER:O	9:Q:409:LYS:C	2.62	0.42
11:U:56:VAL:O	11:U:57:PRO:C	2.61	0.42
11:U:61:ASP:OD2	11:U:62:ASP:N	2.52	0.42
5:Z:487:LEU:C	5:Z:487:LEU:HD23	2.45	0.42
5:Z:592:ASN:O	5:Z:596:ASP:HB2	2.19	0.42
6:N:811:PHE:O	6:N:812:ALA:HB3	2.18	0.42
7:S:101:LEU:N	7:S:102:PRO:HD2	2.33	0.42
8:P:240:TYR:O	8:P:243:ILE:N	2.52	0.42
9:Q:96:PHE:CD1	9:Q:96:PHE:C	2.97	0.42
10:R:14:ASN:HB2	10:R:15:PRO:HD3	2.00	0.42
2:V:46:ARG:HB2	2:V:147:PRO:HB3	2.02	0.42
5:Z:469:TYR:CB	5:Z:481:SER:OG	2.68	0.42
6:N:612:ASP:C	6:N:614:VAL:N	2.75	0.42
6:N:888:GLN:O	6:N:888:GLN:HG2	2.20	0.42
9:Q:290:VAL:O	9:Q:293:ALA:HB3	2.19	0.42
10:R:104:MET:HB3	10:R:127:THR:CG2	2.49	0.42
6:N:420:LEU:O	6:N:424:ALA:HB2	2.20	0.42
7:S:332:LEU:HA	7:S:335:VAL:HG22	2.00	0.42
7:S:469:THR:HG22	7:S:471:GLU:H	1.85	0.42
8:P:118:LEU:C	8:P:120:ILE:H	2.28	0.42
8:P:235:GLN:HE22	8:P:338:THR:HB	1.83	0.42
2:V:111:TRP:O	2:V:111:TRP:CG	2.72	0.42
5:Z:118:ASN:H	5:Z:122:ALA:HB2	1.84	0.42
6:N:616:ARG:HD2	6:N:770:TRP:CZ3	2.55	0.42
7:S:77:GLU:O	7:S:81:GLN:HB2	2.19	0.42
10:R:18:ARG:O	10:R:22:LEU:N	2.43	0.42
11:U:253:THR:O	11:U:254:ASN:C	2.62	0.42
1:W:89:GLY:O	1:W:92:VAL:HG22	2.19	0.42
3:T:316:TYR:CD2	3:T:316:TYR:N	2.86	0.42
8:P:134:GLY:C	8:P:136:ILE:N	2.78	0.42
11:U:116:CYS:O	11:U:119:SER:OG	2.38	0.42
6:N:661:ALA:HA	6:N:694:ILE:HA	2.01	0.42
10:R:50:MET:SD	10:R:74:LYS:HB2	2.59	0.42
2:V:237:HIS:HE1	2:V:294:SER:OG	2.02	0.42
3:T:158:ARG:O	3:T:159:LYS:HB2	2.20	0.42
3:T:208:PHE:CD2	3:T:208:PHE:C	2.98	0.42
5:Z:653:ALA:O	5:Z:657:ILE:HG12	2.19	0.42
5:Z:781:TYR:O	5:Z:784:ASP:N	2.53	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:N:100:ILE:O	6:N:100:ILE:HG22	2.19	0.42
9:Q:156:GLU:C	9:Q:158:LYS:H	2.26	0.42
10:R:150:PHE:O	10:R:150:PHE:CD1	2.73	0.42
10:R:169:GLU:OE1	10:R:169:GLU:HA	2.20	0.42
2:V:203:ILE:HD12	2:V:203:ILE:N	2.34	0.41
4:Y:60:LEU:HB3	4:Y:66:LYS:HB2	2.01	0.41
5:Z:182:GLU:HB3	5:Z:183:PRO:CD	2.50	0.41
5:Z:762:VAL:O	5:Z:762:VAL:HG13	2.20	0.41
8:P:170:GLN:NE2	8:P:173:THR:O	2.53	0.41
10:R:279:GLU:O	10:R:283:LYS:HB2	2.20	0.41
5:Z:316:ASP:OD1	5:Z:493:ASN:HB2	2.20	0.41
7:S:81:GLN:HA	7:S:84:LYS:HB2	2.01	0.41
7:S:400:HIS:O	7:S:403:ILE:HG22	2.20	0.41
8:P:273:TYR:O	8:P:276:LEU:N	2.53	0.41
10:R:289:ALA:C	10:R:291:HIS:H	2.22	0.41
12:O:64:ILE:HG22	12:O:64:ILE:O	2.20	0.41
5:Z:650:GLN:O	5:Z:653:ALA:N	2.53	0.41
5:Z:683:GLU:N	5:Z:684:PRO:HD3	2.35	0.41
6:N:918:SER:O	6:N:919:GLU:HB2	2.20	0.41
8:P:329:ARG:HH22	8:P:351:TRP:NE1	2.19	0.41
10:R:369:THR:O	10:R:370:ILE:C	2.63	0.41
11:U:133:LEU:CD1	11:U:161:GLU:HA	2.50	0.41
2:V:267:PRO:O	2:V:271:ALA:HB2	2.20	0.41
6:N:883:ARG:HD3	6:N:883:ARG:H	1.85	0.41
8:P:93:ARG:HG2	8:P:94:ARG:N	2.36	0.41
10:R:20:ALA:HA	10:R:23:ARG:NE	2.35	0.41
10:R:184:GLN:O	10:R:188:CYS:HB2	2.20	0.41
10:R:200:LEU:O	10:R:201:PHE:C	2.64	0.41
5:Z:310:ASP:O	5:Z:311:VAL:HB	2.20	0.41
6:N:138:PHE:CZ	6:N:162:VAL:HG13	2.55	0.41
7:S:230:PHE:O	7:S:231:LEU:C	2.63	0.41
8:P:329:ARG:HH22	8:P:351:TRP:HE1	1.69	0.41
8:P:397:VAL:HG11	9:Q:341:PRO:HB3	2.02	0.41
9:Q:183:LEU:H	9:Q:184:PRO:HD2	1.86	0.41
10:R:174:TRP:O	10:R:177:ARG:N	2.54	0.41
11:U:78:MET:O	11:U:79:TYR:C	2.64	0.41
11:U:253:THR:O	11:U:256:GLN:N	2.53	0.41
6:N:645:ASN:O	6:N:648:VAL:N	2.51	0.41
6:N:753:GLY:O	6:N:754:HIS:HB2	2.21	0.41
9:Q:337:ARG:HA	9:Q:340:GLU:OE1	2.20	0.41
2:V:57:MET:HE1	2:V:141:VAL:HG13	2.01	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:V:231:LEU:HD12	2:V:231:LEU:O	2.21	0.41
5:Z:820:GLY:HA3	5:Z:848:GLN:HB2	2.02	0.41
7:S:235:LEU:C	7:S:235:LEU:HD23	2.46	0.41
9:Q:147:LEU:HG	9:Q:176:THR:HG21	2.03	0.41
10:R:18:ARG:O	10:R:22:LEU:HB2	2.21	0.41
12:O:320:VAL:HG22	12:O:333:MET:HE1	2.03	0.41
5:Z:776:LEU:O	5:Z:802:SER:O	2.39	0.41
6:N:609:ASP:O	6:N:610:VAL:C	2.62	0.41
2:V:49:VAL:HB	2:V:50:PRO:CD	2.51	0.41
5:Z:677:HIS:CE1	5:Z:785:ARG:O	2.74	0.41
5:Z:684:PRO:HD2	5:Z:713:PHE:CE1	2.56	0.41
5:Z:738:ASN:O	5:Z:739:ALA:HB2	2.21	0.41
6:N:118:LEU:HB2	6:N:119:PRO:CD	2.51	0.41
6:N:769:PHE:O	6:N:770:TRP:C	2.63	0.41
7:S:86:VAL:HG21	7:S:91:PRO:HD2	2.03	0.41
8:P:57:ALA:HB1	8:P:62:SER:H	1.86	0.41
8:P:83:LEU:O	8:P:84:ASN:C	2.63	0.41
12:O:374:ILE:O	12:O:375:LEU:C	2.63	0.41
1:W:177:PRO:O	1:W:178:SER:C	2.63	0.41
2:V:39:LEU:HD12	11:U:17:LEU:HD12	2.02	0.41
2:V:84:VAL:HA	2:V:87:VAL:HB	2.03	0.41
5:Z:445:LEU:HD13	5:Z:481:SER:OG	2.21	0.41
6:N:434:GLY:O	6:N:435:SER:C	2.63	0.41
6:N:561:GLU:HA	6:N:564:ASP:HB2	2.03	0.41
6:N:742:HIS:CG	6:N:814:PRO:HG2	2.55	0.41
7:S:320:THR:O	7:S:321:ALA:HB2	2.20	0.41
9:Q:118:LYS:O	9:Q:119:SER:HB2	2.21	0.41
11:U:65:ASP:OD1	11:U:65:ASP:N	2.50	0.41
11:U:243:GLN:HG3	11:U:244:GLU:N	2.36	0.41
2:V:281:LYS:O	2:V:282:ARG:C	2.63	0.40
3:T:161:ILE:HB	3:T:162:PRO:HD3	2.03	0.40
4:Y:15:GLU:OE2	7:S:92:ARG:CG	2.69	0.40
5:Z:607:LEU:O	5:Z:607:LEU:HG	2.21	0.40
10:R:370:ILE:O	10:R:371:LYS:C	2.62	0.40
6:N:805:ASN:HB2	6:N:891:VAL:HA	2.03	0.40
9:Q:90:ARG:O	9:Q:93:LEU:HB3	2.20	0.40
1:W:173:VAL:O	1:W:174:PRO:C	2.65	0.40
2:V:123:SER:H	2:V:126:ASP:HB2	1.86	0.40
5:Z:242:GLU:N	5:Z:243:PRO:CD	2.85	0.40
5:Z:482:ILE:HB	5:Z:501:LEU:HG	2.02	0.40
6:N:649:ARG:O	6:N:650:TYR:C	2.63	0.40

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:N:741:GLY:C	6:N:742:HIS:CG	3.00	0.40
9:Q:70:LEU:O	9:Q:73:VAL:HG22	2.21	0.40
10:R:39:ASP:O	10:R:40:GLU:C	2.64	0.40
10:R:55:GLU:O	10:R:59:LYS:HB2	2.22	0.40
10:R:282:MET:HA	10:R:286:TRP:CD1	2.56	0.40
11:U:37:GLY:HA3	11:U:95:TYR:CE2	2.56	0.40
1:W:9:CYS:HB2	1:W:111:ALA:HA	2.03	0.40
2:V:295:ASN:HB3	11:U:256:GLN:CD	2.45	0.40
6:N:348:THR:CA	6:N:742:HIS:NE2	2.84	0.40
6:N:923:GLU:HA	6:N:926:GLU:HB2	2.03	0.40
8:P:359:VAL:O	8:P:362:ASN:HB2	2.22	0.40
8:P:420:ASP:OD1	8:P:420:ASP:C	2.64	0.40
11:U:34:ARG:CD	11:U:34:ARG:H	2.35	0.40
12:O:276:CYS:O	12:O:280:MET:HB2	2.21	0.40
2:V:36:LEU:C	2:V:36:LEU:HD13	2.47	0.40
2:V:189:ILE:HA	2:V:192:LEU:HB3	2.04	0.40
2:V:249:LEU:HD13	9:Q:402:GLU:HG3	2.04	0.40
3:T:345:GLN:OE1	7:S:484:LEU:HD12	2.21	0.40
5:Z:716:ASP:O	5:Z:761:MET:HG3	2.22	0.40
6:N:549:ALA:HB2	6:N:577:ILE:CG2	2.51	0.40
6:N:757:MET:N	6:N:758:PRO:CD	2.85	0.40
8:P:57:ALA:HB1	8:P:62:SER:HB2	2.03	0.40
12:O:229:ASP:O	12:O:232:TRP:CD1	2.74	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	W	194/377 (52%)	171 (88%)	21 (11%)	2 (1%)	12	45
2	V	291/310 (94%)	236 (81%)	41 (14%)	14 (5%)	2	18

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	T	270/350 (77%)	242 (90%)	17 (6%)	11 (4%)	2	20
4	Y	54/70 (77%)	46 (85%)	6 (11%)	2 (4%)	2	22
5	Z	877/908 (97%)	737 (84%)	108 (12%)	32 (4%)	2	23
6	N	870/953 (91%)	741 (85%)	104 (12%)	25 (3%)	3	26
7	S	489/534 (92%)	425 (87%)	52 (11%)	12 (2%)	4	29
8	P	454/456 (100%)	384 (85%)	57 (13%)	13 (3%)	3	26
9	Q	420/422 (100%)	349 (83%)	59 (14%)	12 (3%)	3	26
10	R	387/389 (100%)	321 (83%)	48 (12%)	18 (5%)	2	19
11	U	290/324 (90%)	245 (84%)	38 (13%)	7 (2%)	4	29
12	O	374/376 (100%)	329 (88%)	36 (10%)	9 (2%)	4	29
All	All	4970/5469 (91%)	4226 (85%)	587 (12%)	157 (3%)	5	25

All (157) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	W	23	PRO
3	T	180	GLU
3	T	332	SER
5	Z	311	VAL
5	Z	367	SER
5	Z	422	VAL
5	Z	739	ALA
6	N	12	LEU
6	N	33	ASP
6	N	645	ASN
6	N	916	ASP
7	S	111	TYR
7	S	321	ALA
7	S	351	PRO
7	S	466	ILE
8	P	93	ARG
8	P	397	VAL
8	P	399	ASN
9	Q	161	ASP
10	R	18	ARG
10	R	97	GLU
10	R	132	VAL
10	R	234	PRO

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
10	R	359	PRO
10	R	366	TYR
11	U	63	LYS
12	O	224	SER
12	O	255	TRP
2	V	183	HIS
2	V	227	GLU
3	T	242	ASN
4	Y	20	GLU
5	Z	66	LYS
5	Z	145	VAL
5	Z	182	GLU
5	Z	357	ARG
5	Z	513	GLU
5	Z	571	GLU
6	N	118	LEU
6	N	435	SER
6	N	506	ALA
6	N	572	ARG
6	N	699	THR
6	N	812	ALA
6	N	880	ASN
7	S	223	LYS
7	S	447	ILE
7	S	463	MET
8	P	99	GLN
9	Q	43	VAL
9	Q	183	LEU
9	Q	198	ASN
9	Q	374	PHE
10	R	17	LEU
10	R	94	ASN
10	R	193	ASP
10	R	216	TYR
10	R	344	HIS
10	R	365	GLN
11	U	7	GLN
11	U	27	GLY
11	U	45	LYS
2	V	50	PRO
2	V	152	LYS
2	V	186	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	V	198	ARG
2	V	231	LEU
3	T	160	ASP
3	T	163	SER
3	T	239	GLY
4	Y	38	VAL
5	Z	67	ASP
5	Z	102	HIS
5	Z	103	TYR
5	Z	114	ALA
5	Z	437	GLU
5	Z	643	PRO
5	Z	703	ARG
5	Z	789	SER
5	Z	849	ALA
5	Z	880	ALA
6	N	397	THR
6	N	429	LYS
6	N	490	ARG
6	N	539	THR
6	N	560	MET
7	S	303	SER
8	P	239	SER
8	P	335	SER
9	Q	18	THR
9	Q	62	GLN
10	R	4	GLU
10	R	34	ASP
10	R	195	LYS
10	R	288	PHE
10	R	360	ASP
11	U	71	ASP
12	O	288	HIS
1	W	22	LEU
2	V	164	ASN
2	V	181	LEU
2	V	184	LEU
2	V	190	GLN
5	Z	146	GLY
5	Z	221	ILE
5	Z	436	SER
5	Z	717	ALA

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
5	Z	821	LEU
6	N	75	GLU
6	N	475	HIS
6	N	524	LYS
6	N	754	HIS
7	S	448	GLU
8	P	98	LYS
8	P	135	LYS
8	P	220	GLU
8	P	322	GLU
11	U	129	LYS
11	U	228	TYR
12	O	68	GLU
12	O	280	MET
2	V	155	VAL
3	T	134	THR
3	T	169	ALA
5	Z	87	THR
5	Z	332	ALA
5	Z	457	ASN
5	Z	818	LEU
6	N	628	ARG
6	N	883	ARG
6	N	933	PRO
7	S	181	TYR
8	P	115	ILE
8	P	402	ILE
9	Q	123	THR
9	Q	159	LYS
9	Q	162	ASP
12	O	150	SER
12	O	370	GLN
6	N	813	TYR
7	S	222	ASP
8	P	137	TYR
9	Q	75	PRO
5	Z	37	GLY
12	O	111	VAL
2	V	25	VAL
2	V	127	ILE
3	T	130	PRO
5	Z	702	PRO

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
7	S	471	GLU
9	Q	238	GLY
12	O	148	VAL
5	Z	451	VAL
6	N	113	VAL
3	T	80	PRO
3	T	331	PRO
10	R	325	VAL

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	W	169/312 (54%)	162 (96%)	7 (4%)	27	51
2	V	257/268 (96%)	250 (97%)	7 (3%)	39	60
3	T	238/294 (81%)	232 (98%)	6 (2%)	42	62
4	Y	50/63 (79%)	49 (98%)	1 (2%)	48	65
5	Z	736/763 (96%)	705 (96%)	31 (4%)	26	50
6	N	747/816 (92%)	719 (96%)	28 (4%)	30	53
7	S	428/460 (93%)	412 (96%)	16 (4%)	30	53
8	P	416/416 (100%)	401 (96%)	15 (4%)	31	54
9	Q	362/362 (100%)	348 (96%)	14 (4%)	28	52
10	R	344/344 (100%)	322 (94%)	22 (6%)	16	42
11	U	263/295 (89%)	252 (96%)	11 (4%)	26	50
12	O	336/336 (100%)	328 (98%)	8 (2%)	43	63
All	All	4346/4729 (92%)	4180 (96%)	166 (4%)	30	52

All (166) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	W	10	VAL
1	W	41	THR

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	W	47	ASN
1	W	67	ASP
1	W	122	LYS
1	W	189	LEU
1	W	196	MET
2	V	26	ASP
2	V	82	VAL
2	V	120	CYS
2	V	126	ASP
2	V	209	LYS
2	V	238	CYS
2	V	307	VAL
3	T	178	TYR
3	T	231	SER
3	T	243	LYS
3	T	304	LYS
3	T	316	TYR
3	T	326	GLU
4	Y	35	ASP
5	Z	26	GLU
5	Z	148	GLN
5	Z	161	HIS
5	Z	175	ASP
5	Z	189	LYS
5	Z	304	PHE
5	Z	306	GLU
5	Z	385	PHE
5	Z	399	LEU
5	Z	435	SER
5	Z	446	LEU
5	Z	452	ASN
5	Z	458	GLU
5	Z	466	LEU
5	Z	472	HIS
5	Z	477	MET
5	Z	485	LEU
5	Z	571	GLU
5	Z	574	GLU
5	Z	606	VAL
5	Z	608	LYS
5	Z	609	VAL
5	Z	630	ASP

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
5	Z	685	THR
5	Z	694	LEU
5	Z	707	LEU
5	Z	741	LEU
5	Z	748	LEU
5	Z	759	LEU
5	Z	769	THR
5	Z	873	LEU
6	N	31	VAL
6	N	70	HIS
6	N	146	LYS
6	N	165	LYS
6	N	184	CYS
6	N	220	LEU
6	N	231	ASP
6	N	269	ARG
6	N	324	LYS
6	N	345	ASN
6	N	350	LEU
6	N	351	MET
6	N	369	THR
6	N	418	GLU
6	N	493	VAL
6	N	494	TYR
6	N	514	LEU
6	N	521	LEU
6	N	595	ASN
6	N	609	ASP
6	N	620	GLU
6	N	621	SER
6	N	672	LEU
6	N	765	VAL
6	N	810	THR
6	N	838	LYS
6	N	840	LYS
6	N	892	LEU
7	S	111	TYR
7	S	125	ASN
7	S	142	GLU
7	S	224	LEU
7	S	254	LEU
7	S	257	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
7	S	302	TYR
7	S	303	SER
7	S	318	GLN
7	S	353	LEU
7	S	354	LYS
7	S	356	SER
7	S	389	ASP
7	S	411	SER
7	S	468	SER
7	S	469	THR
8	P	54	THR
8	P	59	ASP
8	P	107	GLN
8	P	126	ASP
8	P	140	ILE
8	P	176	SER
8	P	192	LEU
8	P	228	ASN
8	P	242	SER
8	P	269	SER
8	P	322	GLU
8	P	332	SER
8	P	364	ARG
8	P	448	LYS
8	P	451	MET
9	Q	41	GLU
9	Q	45	VAL
9	Q	168	GLU
9	Q	173	GLU
9	Q	256	LEU
9	Q	266	ASP
9	Q	328	ASP
9	Q	333	GLN
9	Q	369	ILE
9	Q	382	GLU
9	Q	388	PHE
9	Q	406	ASN
9	Q	415	TYR
9	Q	421	LEU
10	R	22	LEU
10	R	61	LEU
10	R	63	TRP

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
10	R	73	MET
10	R	114	ILE
10	R	138	LEU
10	R	169	GLU
10	R	186	LEU
10	R	189	VAL
10	R	191	ILE
10	R	209	THR
10	R	210	SER
10	R	214	MET
10	R	234	PRO
10	R	235	ASP
10	R	236	LEU
10	R	256	VAL
10	R	291	HIS
10	R	305	SER
10	R	343	LEU
10	R	346	LYS
10	R	382	LYS
11	U	44	GLN
11	U	66	SER
11	U	100	LYS
11	U	143	GLU
11	U	181	ASP
11	U	240	VAL
11	U	243	GLN
11	U	250	TYR
11	U	252	LYS
11	U	253	THR
11	U	277	ASN
12	O	99	LYS
12	O	208	GLU
12	O	210	VAL
12	O	244	ASN
12	O	257	GLN
12	O	260	ASP
12	O	287	ASN
12	O	339	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (46) such sidechains are listed below:

Mol	Chain	Res	Type
1	W	30	GLN
1	W	101	GLN
2	V	199	HIS
2	V	237	HIS
3	T	170	GLN
3	T	234	GLN
5	Z	12	GLN
5	Z	213	GLN
5	Z	293	GLN
5	Z	378	ASN
5	Z	387	GLN
5	Z	493	ASN
5	Z	531	ASN
5	Z	610	GLN
5	Z	649	HIS
6	N	215	ASN
6	N	267	ASN
6	N	338	HIS
6	N	452	ASN
6	N	777	HIS
7	S	242	HIS
7	S	282	ASN
7	S	283	ASN
7	S	318	GLN
7	S	329	HIS
7	S	350	GLN
7	S	365	GLN
7	S	387	GLN
8	P	170	GLN
8	P	235	GLN
8	P	395	ASN
8	P	456	GLN
9	Q	148	HIS
9	Q	405	GLN
10	R	64	GLN
10	R	196	GLN
11	U	52	ASN
11	U	231	GLN
11	U	256	GLN
12	O	12	GLN
12	O	46	GLN
12	O	82	HIS
12	O	129	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
12	O	264	ASN
12	O	288	HIS
12	O	345	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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
10	R	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	R	28:LEU	C	29:PRO	N	1.93

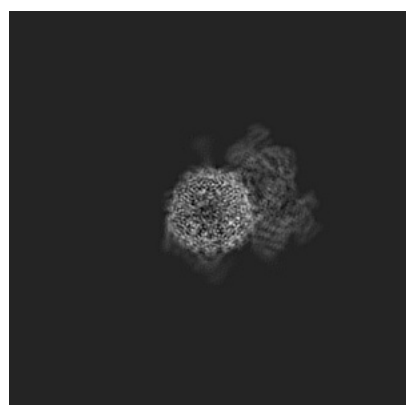
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-4002. These allow visual inspection of the internal detail of the map and identification of artifacts.

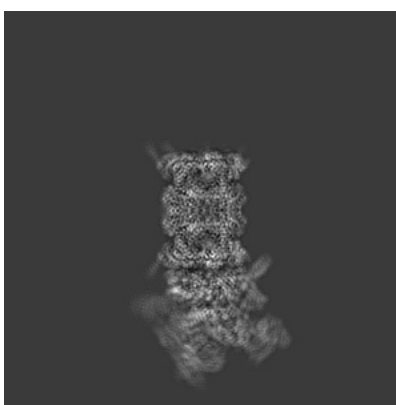
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

6.1.1 Primary map



X



Y

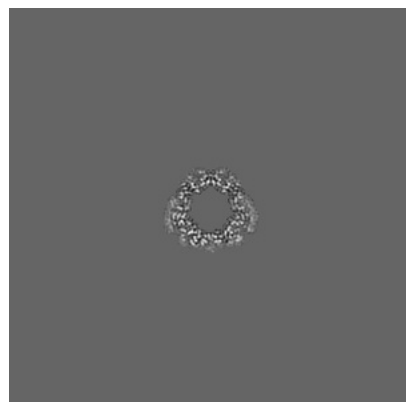


Z

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

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 192



Y Index: 192

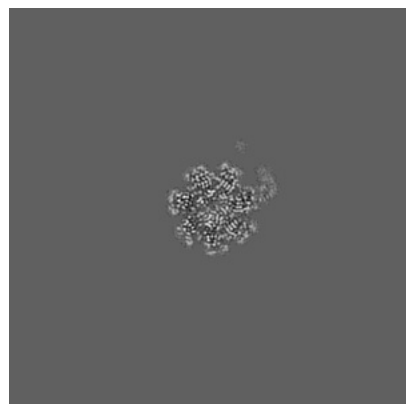


Z Index: 192

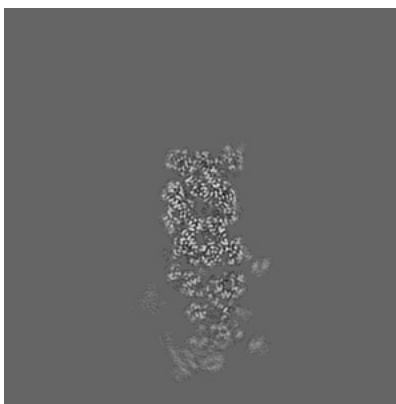
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

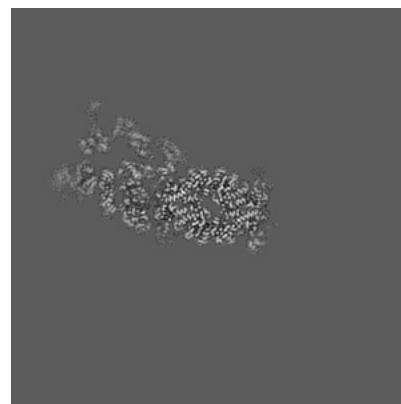
6.3.1 Primary map



X Index: 150



Y Index: 212

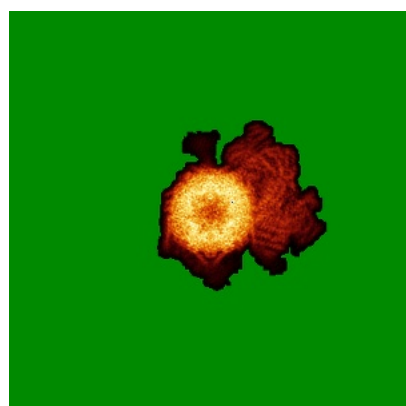


Z Index: 210

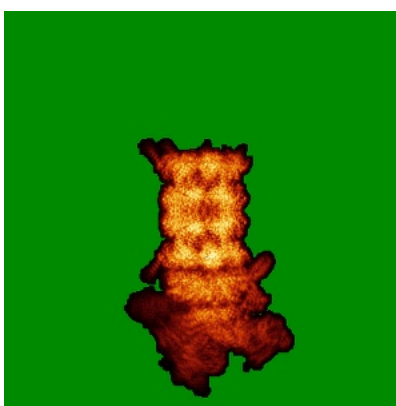
The images above show the largest variance slices of the map in three orthogonal directions.

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

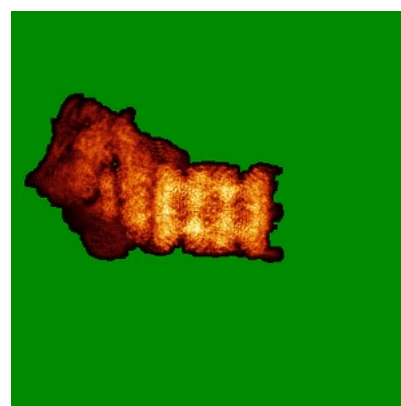
6.4.1 Primary map



X



Y

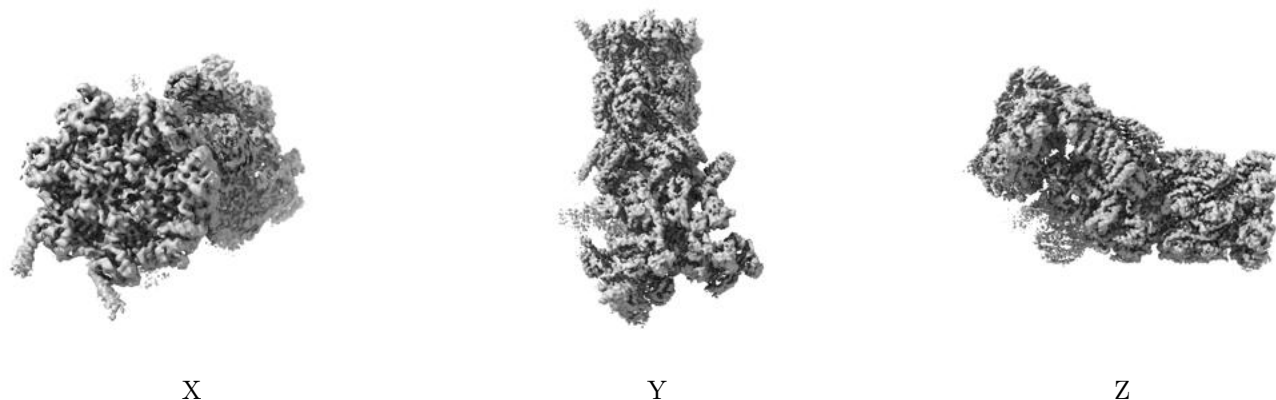


Z

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 0.035. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

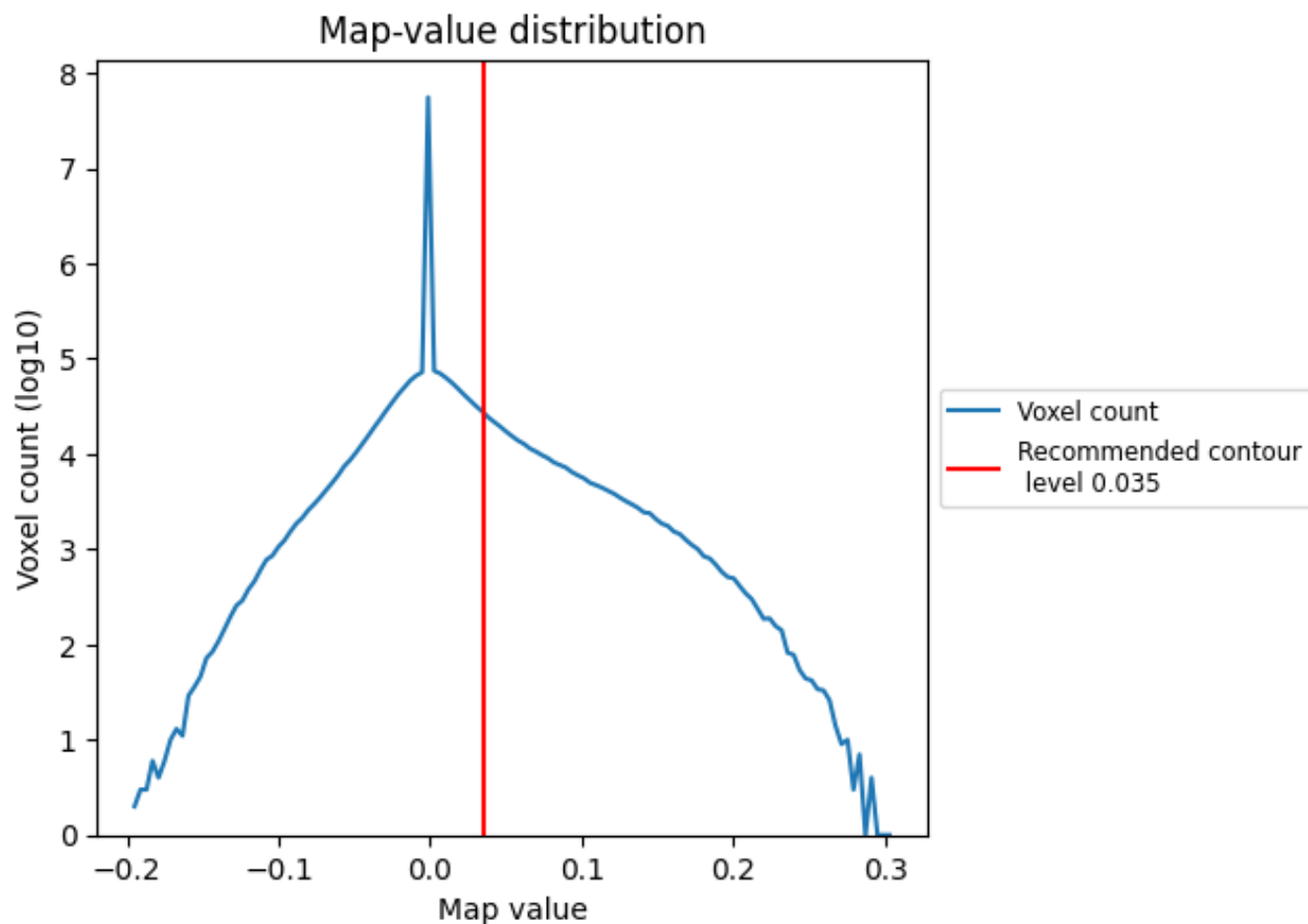
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

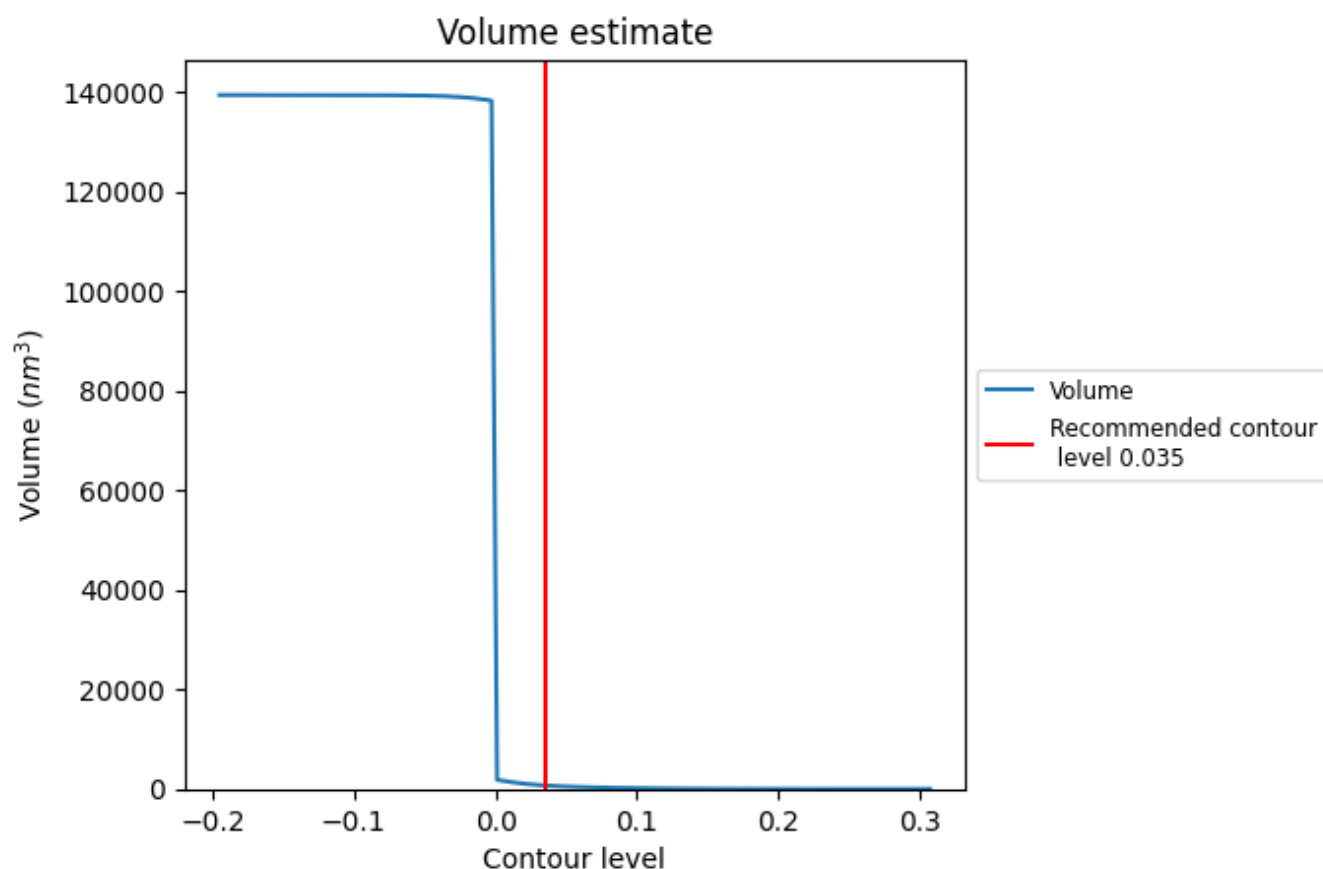
This section contains the results of statistical analysis of the map.

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.

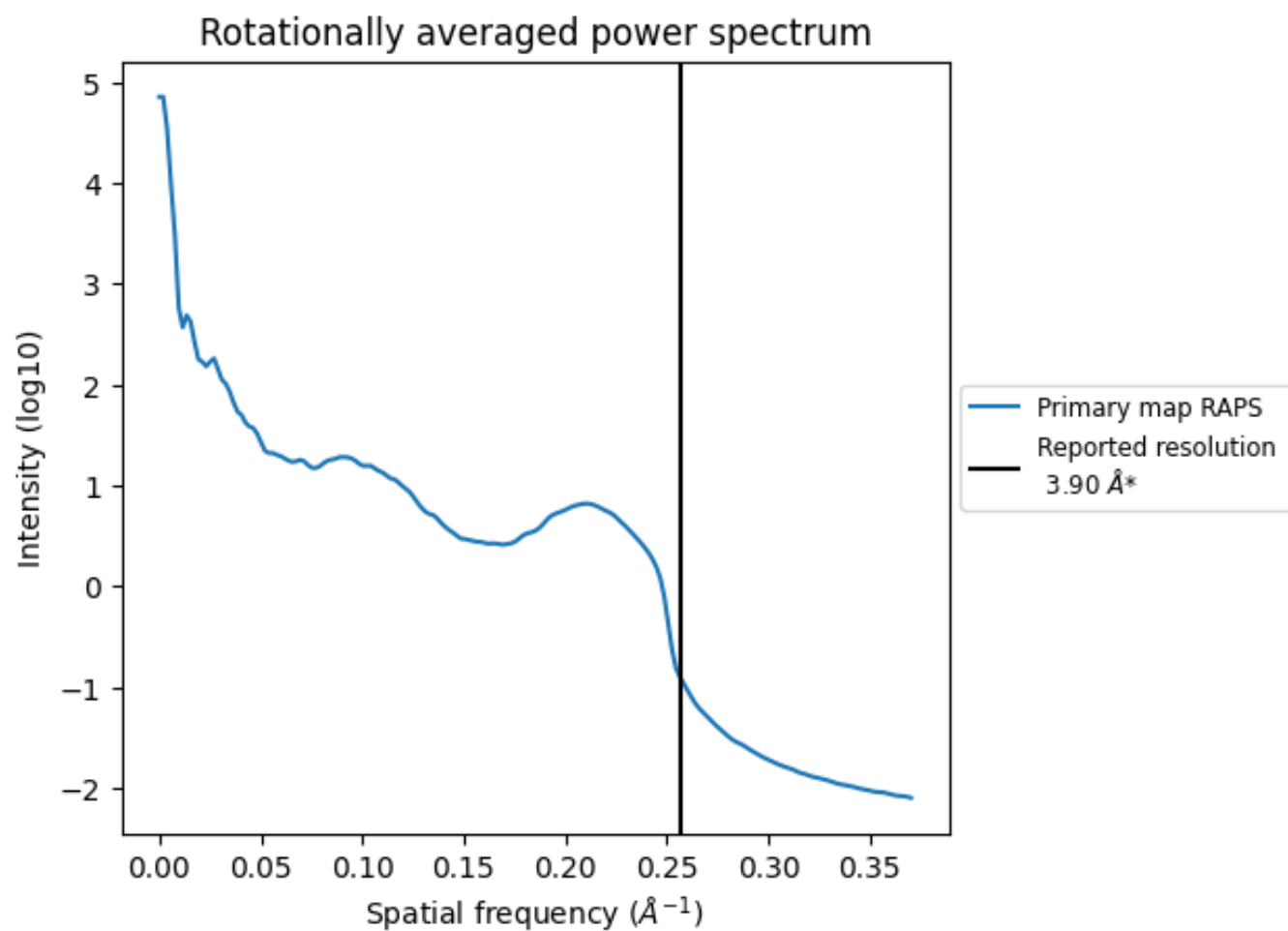
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 708 nm^3 ; this corresponds to an approximate mass of 639 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 0.256 $\text{\AA}^{-1}$

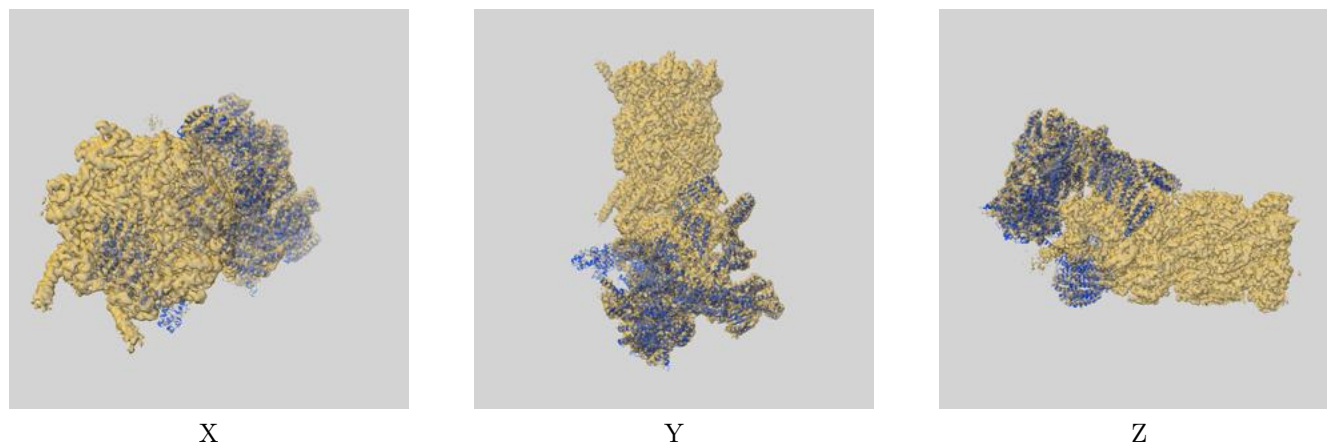
8 Fourier-Shell correlation ⓘ

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

9 Map-model fit [i](#)

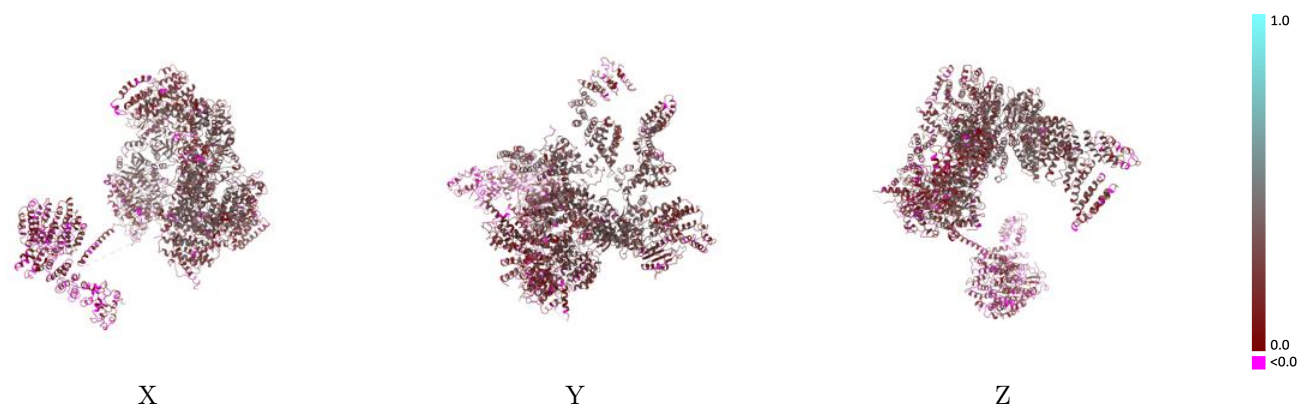
This section contains information regarding the fit between EMDB map EMD-4002 and PDB model 5L4K. Per-residue inclusion information can be found in section [3](#) on page [6](#).

9.1 Map-model overlay [i](#)



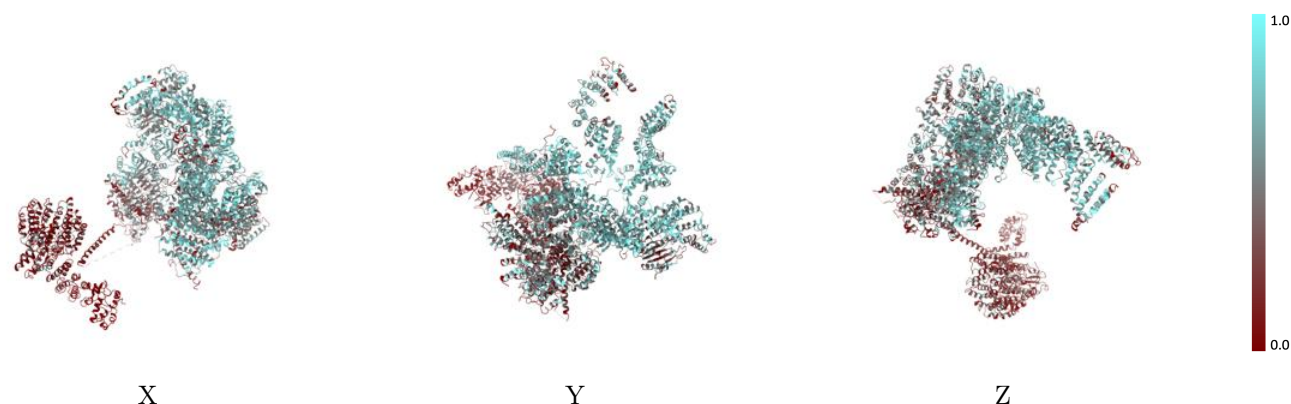
The images above show the 3D surface view of the map at the recommended contour level 0.035 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



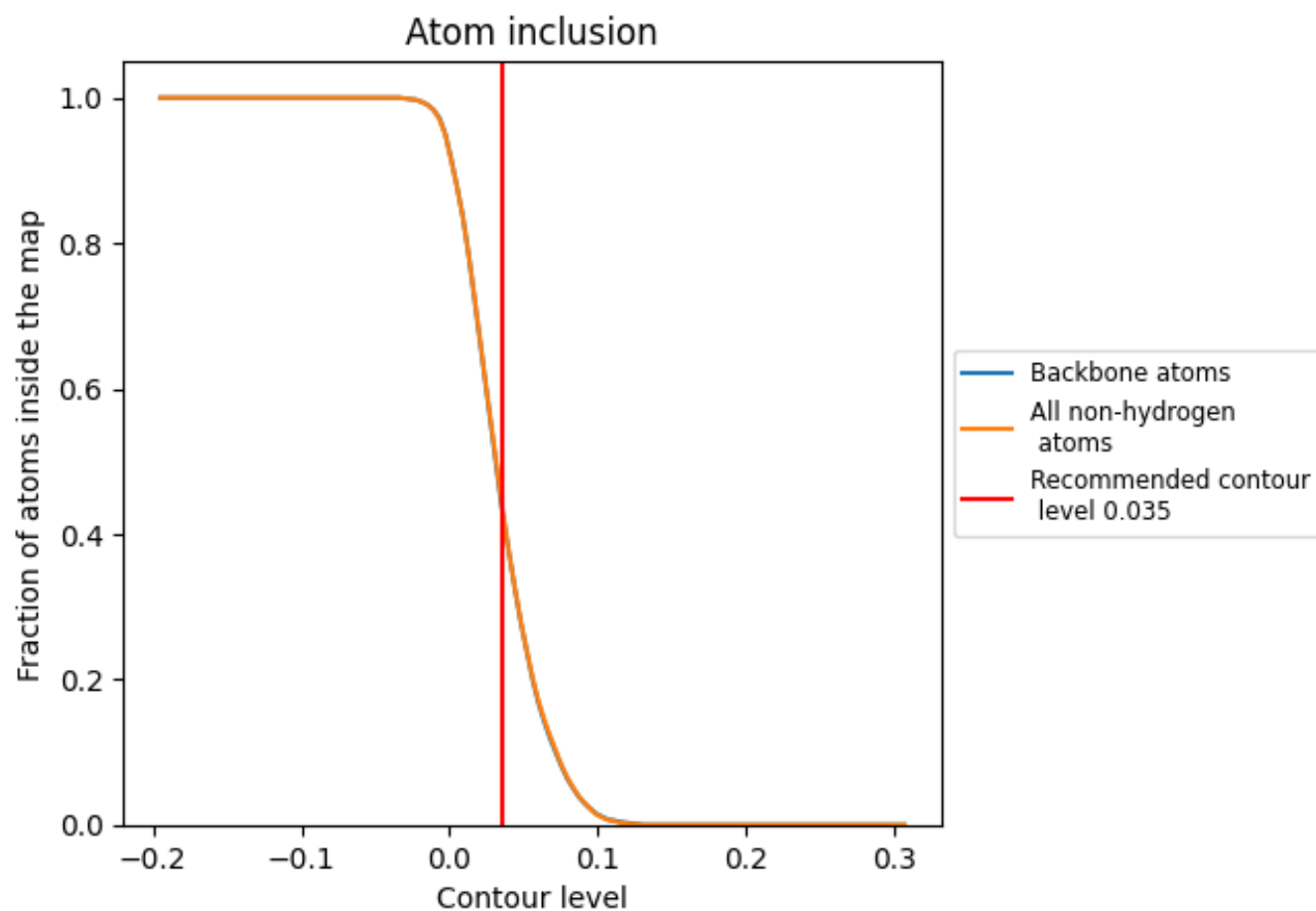
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.035).

9.4 Atom inclusion [i](#)



At the recommended contour level, 44% of all backbone atoms, 44% 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 (0.035) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4440	0.2300
N	0.3430	0.1980
O	0.6260	0.2510
P	0.6680	0.2840
Q	0.5680	0.2830
R	0.6880	0.3350
S	0.4730	0.2340
T	0.4410	0.2190
U	0.6280	0.3270
V	0.6000	0.3020
W	0.4460	0.2160
Y	0.3700	0.1830
Z	0.1070	0.1000

1.0

0.0

<0.0