Full wwPDB EM Validation Report ⓘ

Mar 9, 2026 – 05:57 AM UTC

PDB ID	:	8FZ5 / pdb_00008fz5
EMDB ID	:	EMD-29603
Title	:	The PI31-free Bovine 20S proteasome
Authors	:	Hsu, H.-C.; Li, H.
Deposited on	:	2023-01-27
Resolution	:	2.23 Å(reported)
Based on initial model	:	1IRU

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:

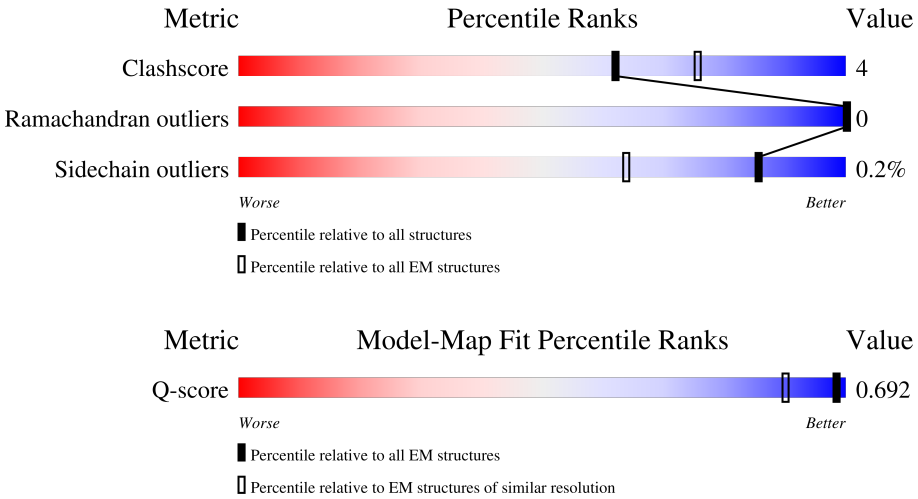
EMDB validation analysis	:	0.0.1.dev132
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & 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 2.23 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	3335 (1.73 - 2.73)

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 <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	246	5% 91% 9%
1	O	246	5% 94% 5%
2	B	234	88% 12%
2	P	234	88% 12%

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Mol	Chain	Length	Quality of chain
3	C	261	6% 86% 10%
3	Q	261	6% 86% 10%
4	D	248	8% 87% 11%
4	R	248	8% 87% 11%
5	E	241	85% 13%
5	S	241	84% 14%
6	F	263	76% 14% 10%
6	T	263	76% 15% 10%
7	G	255	80% 13% 5%
7	U	255	81% 13% 5%
8	H	239	78% 7% 15%
8	V	239	78% 7% 15%
9	I	277	69% 10% 21%
9	W	277	69% 11% 21%
10	J	205	92% 7%
10	X	205	95% 5%
11	K	201	85% 14%
11	Y	201	85% 14%
12	L	263	66% 11% 24%
12	Z	263	67% 10% 24%
13	M	241	78% 10% 12%
13	a	241	79% 10% 12%
14	N	264	72% 9% 19%
14	b	264	73% 8% 19%

2 Entry composition (i)

There are 14 unique types of molecules in this entry. The entry contains 48892 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 Proteasome subunit alpha type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	245	Total	C	N	O	S	0	0
			1911	1211	321	365	14		
1	O	245	Total	C	N	O	S	0	0
			1911	1211	321	365	14		

- Molecule 2 is a protein called Proteasome subunit alpha type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	233	Total	C	N	O	S	0	0
			1820	1163	308	342	7		
2	P	233	Total	C	N	O	S	0	0
			1820	1163	308	342	7		

- Molecule 3 is a protein called Proteasome subunit alpha type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	251	Total	C	N	O	S	0	0
			1979	1250	340	378	11		
3	Q	251	Total	C	N	O	S	0	0
			1979	1250	340	378	11		

- Molecule 4 is a protein called Proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	243	Total	C	N	O	S	0	0
			1922	1208	340	369	5		
4	R	243	Total	C	N	O	S	0	0
			1922	1208	340	369	5		

- Molecule 5 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	236	Total	C	N	O	S	0	0
			1805	1133	297	364	11		
5	S	236	Total	C	N	O	S	0	0
			1805	1133	297	364	11		

- Molecule 6 is a protein called Proteasome subunit alpha type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	238	Total	C	N	O	S	0	0
			1873	1172	337	353	11		
6	T	238	Total	C	N	O	S	0	0
			1873	1172	337	353	11		

- Molecule 7 is a protein called Proteasome subunit alpha type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	241	Total	C	N	O	S	0	0
			1888	1196	322	359	11		
7	U	241	Total	C	N	O	S	0	0
			1888	1196	322	359	11		

- Molecule 8 is a protein called Proteasome subunit beta type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	202	Total	C	N	O	S	0	0
			1519	955	258	294	12		
8	V	202	Total	C	N	O	S	0	0
			1519	955	258	294	12		

- Molecule 9 is a protein called Proteasome subunit beta type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	220	Total	C	N	O	S	0	0
			1660	1045	283	320	12		
9	W	220	Total	C	N	O	S	0	0
			1660	1045	283	320	12		

- Molecule 10 is a protein called Proteasome subunit beta type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	204	Total	C	N	O	S	0	0
			1594	1015	265	295	19		

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Mol	Chain	Residues	Atoms					AltConf	Trace
10	X	204	Total	C	N	O	S	0	0
			1594	1015	265	295	19		

- Molecule 11 is a protein called Proteasome subunit beta type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	199	Total	C	N	O	S	0	0
			1602	1028	272	294	8		
11	Y	199	Total	C	N	O	S	0	0
			1602	1028	272	294	8		

- Molecule 12 is a protein called Proteasome subunit beta type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	201	Total	C	N	O	S	0	0
			1557	980	272	296	9		
12	Z	201	Total	C	N	O	S	0	0
			1557	980	272	296	9		

- Molecule 13 is a protein called Proteasome subunit beta type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	213	Total	C	N	O	S	0	0
			1645	1042	282	311	10		
13	a	213	Total	C	N	O	S	0	0
			1645	1042	282	311	10		

- Molecule 14 is a protein called Proteasome subunit beta type-4.

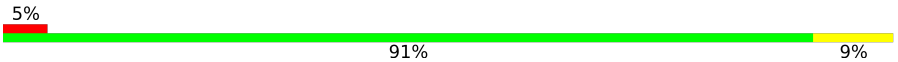
Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	214	Total	C	N	O	S	0	0
			1671	1056	287	316	12		
14	b	214	Total	C	N	O	S	0	0
			1671	1056	287	316	12		

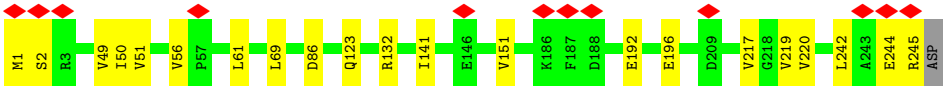
3 Residue-property plots (i)

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: Proteasome subunit alpha type-6

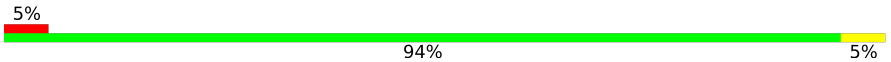
Chain A:

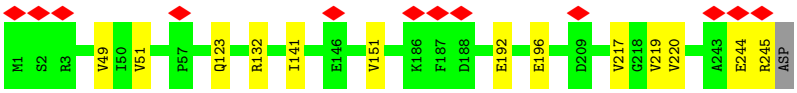




• Molecule 1: Proteasome subunit alpha type-6

Chain O:





• Molecule 2: Proteasome subunit alpha type-2

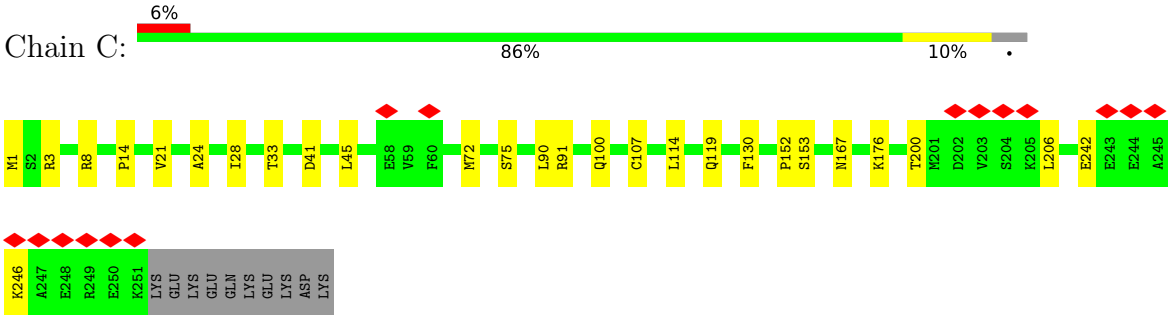
Chain B:

• Molecule 2: Proteasome subunit alpha type-2

Chain P:

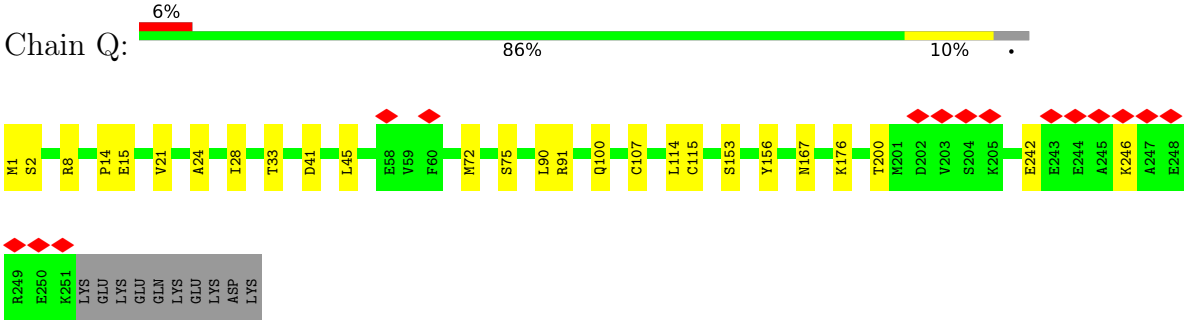
• Molecule 3: Proteasome subunit alpha type-4

Chain C:



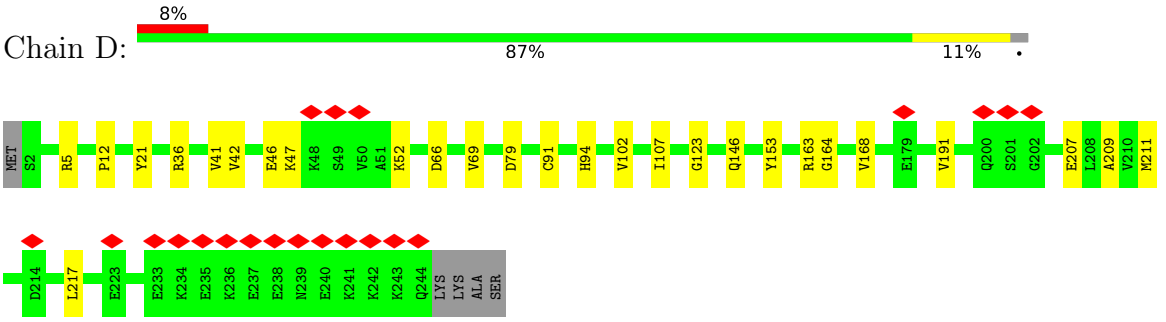
• Molecule 3: Proteasome subunit alpha type-4

Chain Q:



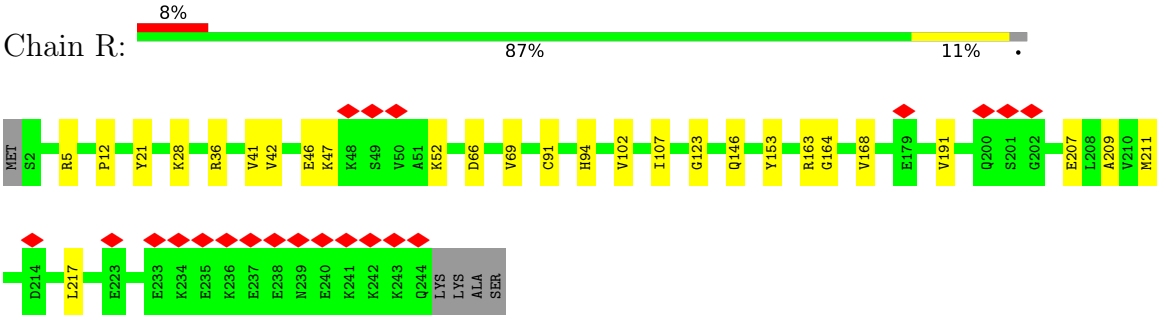
• Molecule 4: Proteasome subunit alpha type-7

Chain D:



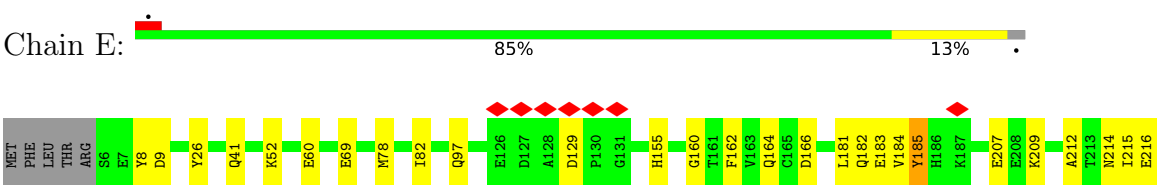
• Molecule 4: Proteasome subunit alpha type-7

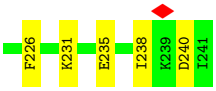
Chain R:



• Molecule 5: Proteasome subunit alpha type-5

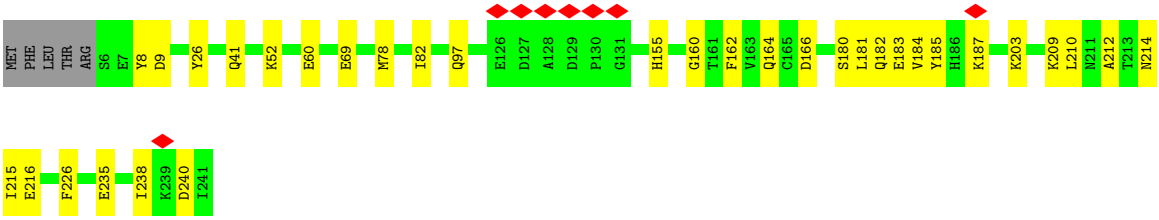
Chain E:





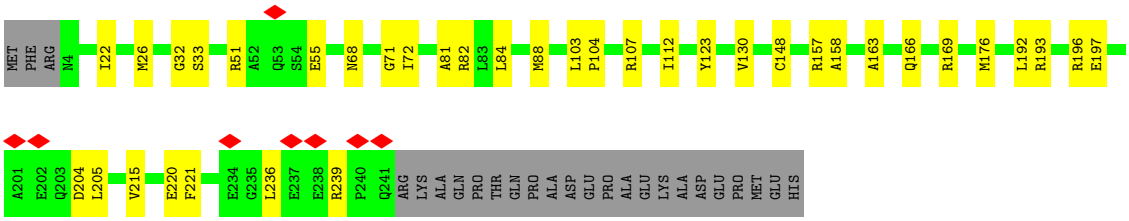
• Molecule 5: Proteasome subunit alpha type-5

Chain S:



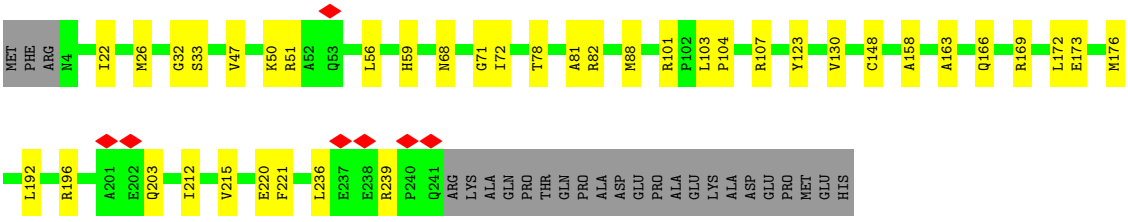
• Molecule 6: Proteasome subunit alpha type-1

Chain F:



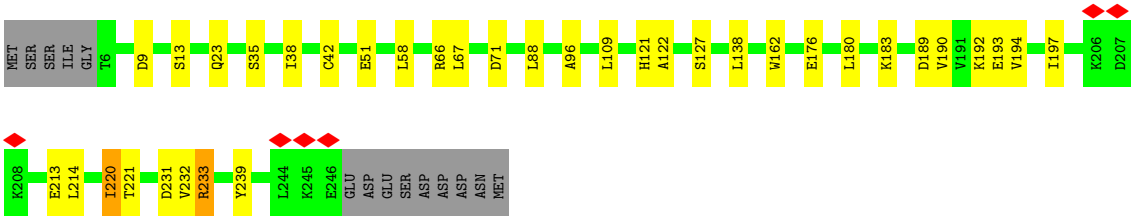
• Molecule 6: Proteasome subunit alpha type-1

Chain T:



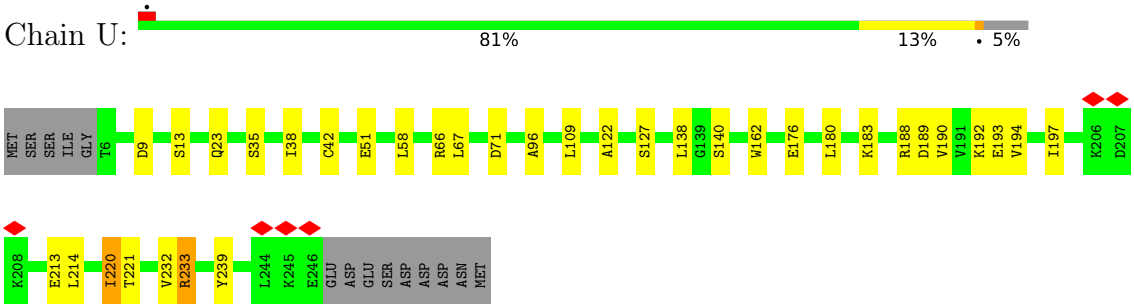
• Molecule 7: Proteasome subunit alpha type-3

Chain G:



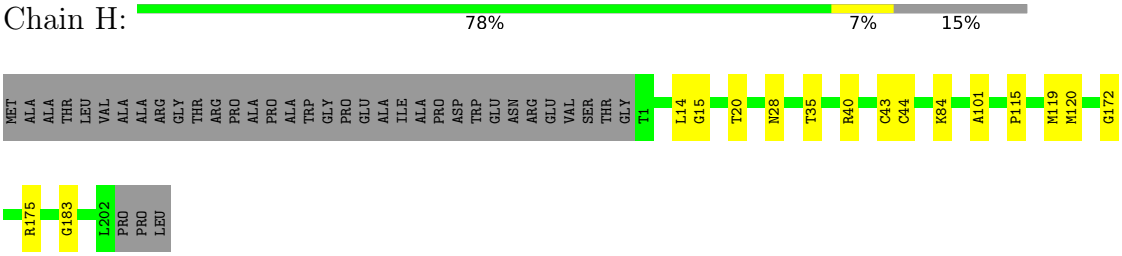
• Molecule 7: Proteasome subunit alpha type-3

Chain U:



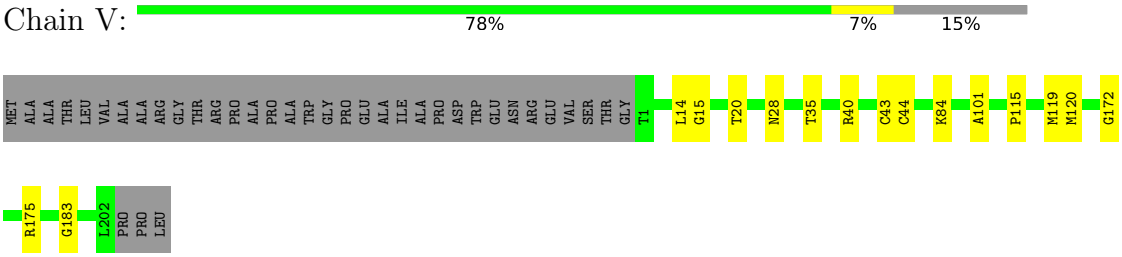
• Molecule 8: Proteasome subunit beta type-6

Chain H:



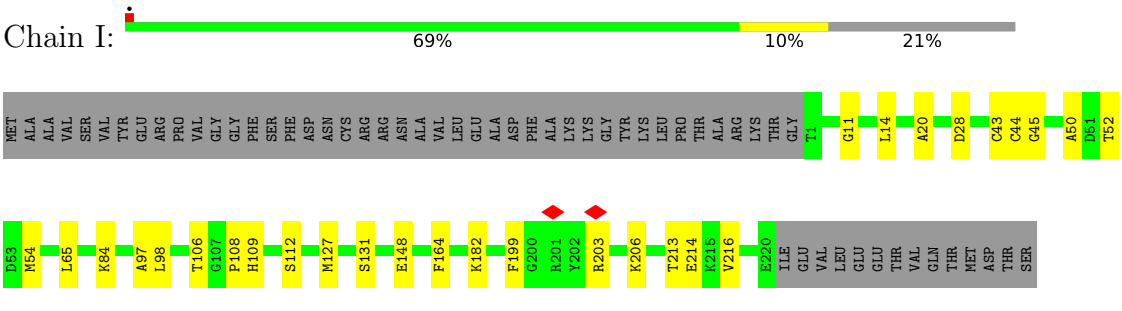
• Molecule 8: Proteasome subunit beta type-6

Chain V:



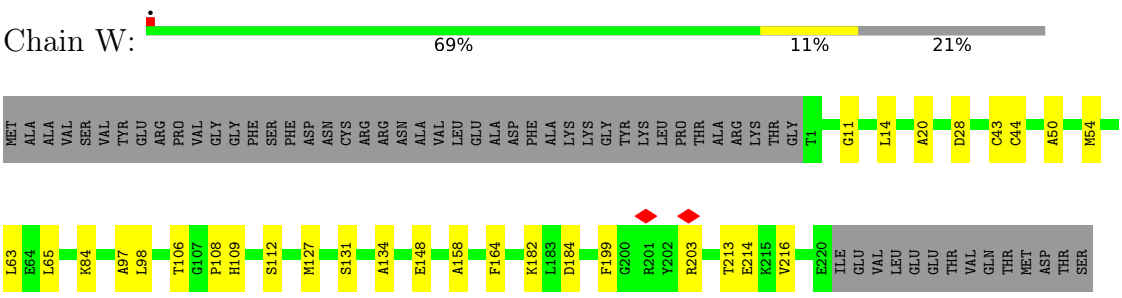
• Molecule 9: Proteasome subunit beta type-7

Chain I:



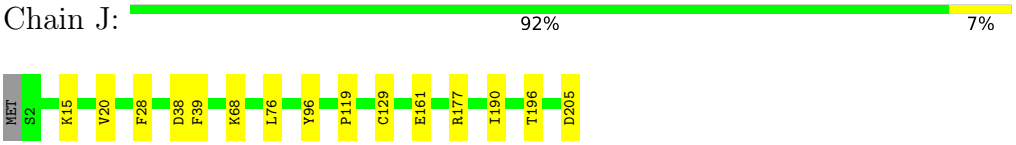
• Molecule 9: Proteasome subunit beta type-7

Chain W:



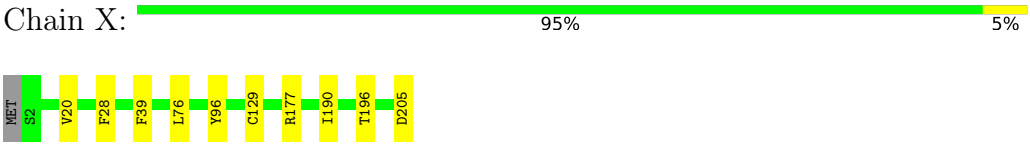
• Molecule 10: Proteasome subunit beta type-3

Chain J:



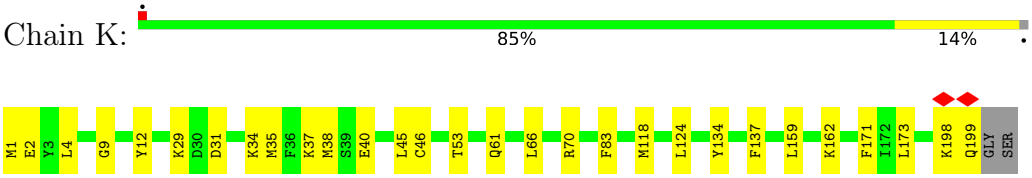
• Molecule 10: Proteasome subunit beta type-3

Chain X:



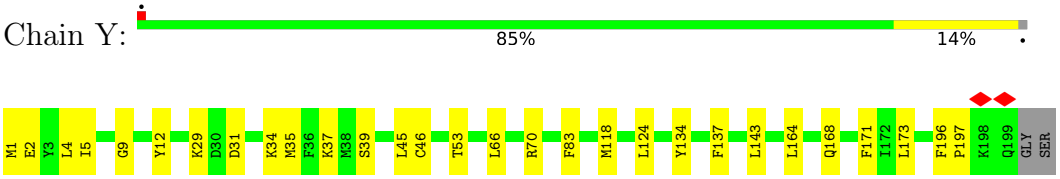
• Molecule 11: Proteasome subunit beta type-2

Chain K:



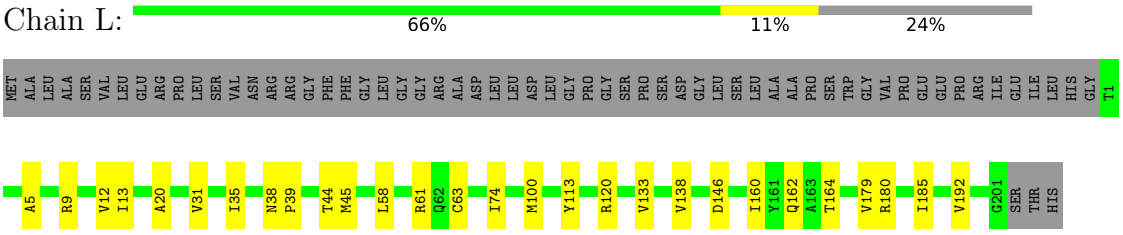
• Molecule 11: Proteasome subunit beta type-2

Chain Y:



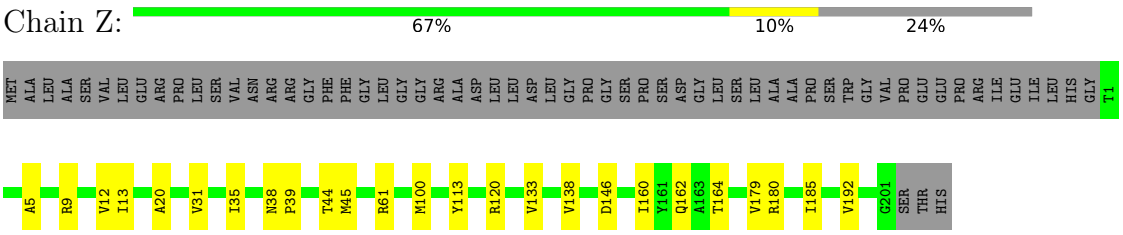
• Molecule 12: Proteasome subunit beta type-5

Chain L:



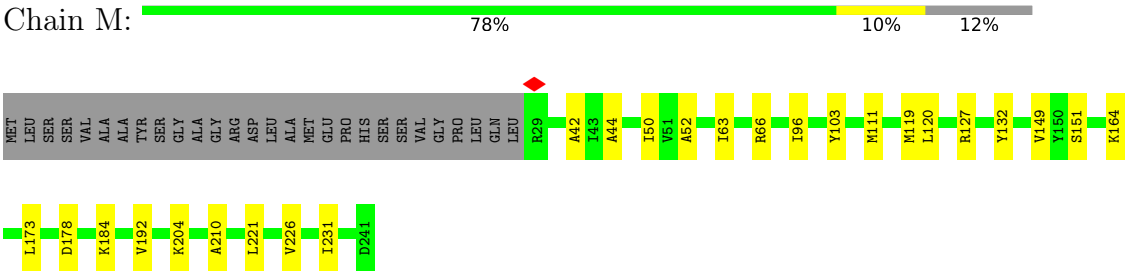
• Molecule 12: Proteasome subunit beta type-5

Chain Z:



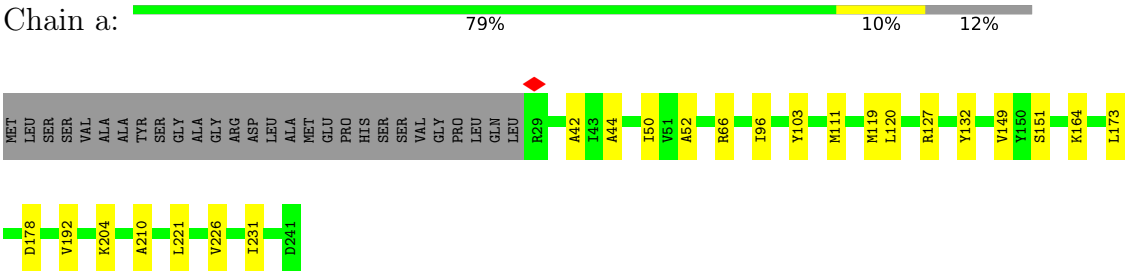
• Molecule 13: Proteasome subunit beta type-1

Chain M:



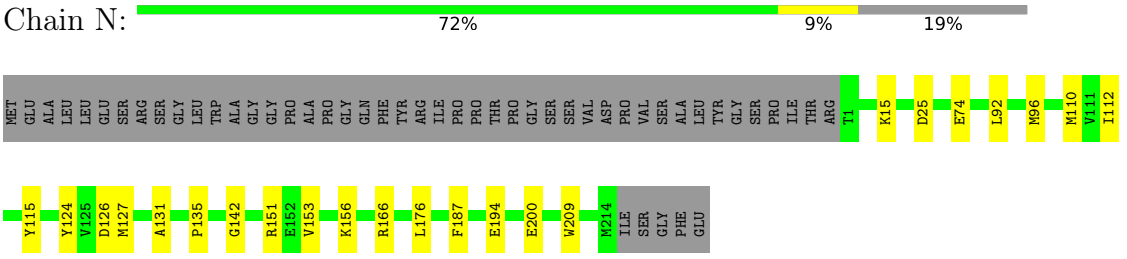
• Molecule 13: Proteasome subunit beta type-1

Chain a:



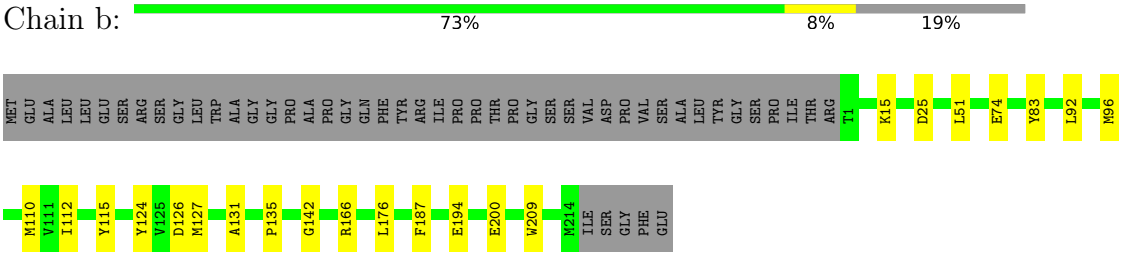
• Molecule 14: Proteasome subunit beta type-4

Chain N:



• Molecule 14: Proteasome subunit beta type-4

Chain b:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	675686	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 ($e^-/Å^2$)	60	Depositor
Minimum defocus (nm)	1300	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	3.124	Depositor
Minimum map value	-1.526	Depositor
Average map value	0.007	Depositor
Map value standard deviation	0.130	Depositor
Recommended contour level	0.45	Depositor
Map size (Å)	291.456, 291.456, 291.456	wwPDB
Map dimensions	352, 352, 352	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.828, 0.828, 0.828	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	A	0.21	0/1945	0.34	0/2627
1	O	0.21	0/1945	0.35	0/2627
2	B	0.22	0/1859	0.34	0/2517
2	P	0.22	0/1859	0.34	0/2517
3	C	0.21	0/2009	0.36	0/2704
3	Q	0.20	0/2009	0.36	0/2704
4	D	0.19	0/1949	0.32	0/2627
4	R	0.20	0/1949	0.32	0/2627
5	E	0.24	0/1833	0.38	1/2475 (0.0%)
5	S	0.24	0/1833	0.38	0/2475
6	F	0.21	0/1908	0.36	0/2579
6	T	0.21	0/1908	0.35	0/2579
7	G	0.27	0/1923	0.41	0/2590
7	U	0.27	0/1923	0.41	0/2590
8	H	0.23	0/1547	0.37	0/2097
8	V	0.23	0/1547	0.37	0/2097
9	I	0.21	0/1687	0.36	0/2280
9	W	0.21	0/1687	0.36	0/2280
10	J	0.22	0/1623	0.39	0/2188
10	X	0.22	0/1623	0.39	0/2188
11	K	0.25	0/1636	0.38	0/2213
11	Y	0.25	0/1636	0.38	0/2213
12	L	0.22	0/1588	0.36	0/2144
12	Z	0.22	0/1588	0.36	0/2144
13	M	0.23	0/1676	0.36	0/2258
13	a	0.23	0/1676	0.36	0/2258
14	N	0.23	0/1704	0.38	0/2305
14	b	0.23	0/1704	0.38	0/2305
All	All	0.22	0/49774	0.37	1/67208 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	E	185	TYR	N-CA-C	5.12	117.08	109.25

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1911	0	1923	13	0
1	O	1911	0	1923	8	0
2	B	1820	0	1818	20	0
2	P	1820	0	1818	20	0
3	C	1979	0	2004	23	0
3	Q	1979	0	2004	20	0
4	D	1922	0	1954	19	0
4	R	1922	0	1954	17	0
5	E	1805	0	1784	22	0
5	S	1805	0	1784	22	0
6	F	1873	0	1860	25	0
6	T	1873	0	1860	26	0
7	G	1888	0	1870	23	0
7	U	1888	0	1870	22	0
8	H	1519	0	1495	9	0
8	V	1519	0	1495	9	0
9	I	1660	0	1680	22	0
9	W	1660	0	1680	23	0
10	J	1594	0	1613	13	0
10	X	1594	0	1613	9	0
11	K	1602	0	1605	19	0
11	Y	1602	0	1605	19	0
12	L	1557	0	1518	16	0
12	Z	1557	0	1518	14	0
13	M	1645	0	1644	18	0
13	a	1645	0	1644	16	0
14	N	1671	0	1652	17	0
14	b	1671	0	1652	14	0
All	All	48892	0	48840	423	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 4.

All (423) 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)
7:U:35:SER:HB3	7:U:66:ARG:HH12	1.48	0.78
7:G:35:SER:HB3	7:G:66:ARG:HH12	1.48	0.77
6:F:26:MET:HE1	6:F:148:CYS:HB3	1.68	0.76
6:T:26:MET:HE1	6:T:148:CYS:HB3	1.68	0.76
5:E:52:LYS:HE2	5:E:216:GLU:HG3	1.73	0.70
12:Z:44:THR:HG21	12:Z:100:MET:HE3	1.72	0.70
12:L:44:THR:HG21	12:L:100:MET:HE3	1.72	0.69
5:E:78:MET:HG3	5:E:82:ILE:HD12	1.75	0.69
5:E:209:LYS:O	5:E:214:ASN:ND2	2.26	0.69
1:O:132:ARG:HB2	7:U:13:SER:HA	1.75	0.68
5:S:209:LYS:O	5:S:214:ASN:ND2	2.27	0.68
11:Y:2:GLU:HB3	11:Y:34:LYS:HE2	1.77	0.66
11:K:2:GLU:HB3	11:K:34:LYS:HE2	1.77	0.65
7:G:220:ILE:HG23	7:G:221:THR:HG23	1.79	0.64
12:L:192:VAL:HG11	10:X:205:ASP:HB3	1.80	0.64
7:U:220:ILE:HG23	7:U:221:THR:HG23	1.80	0.64
10:J:205:ASP:HB3	12:Z:192:VAL:HG11	1.80	0.64
5:S:160:GLY:O	6:T:82:ARG:NH2	2.25	0.64
14:N:96:MET:HE3	14:N:127:MET:HA	1.80	0.63
5:E:160:GLY:O	6:F:82:ARG:NH2	2.26	0.63
14:b:92:LEU:HD23	14:b:112:ILE:HD11	1.81	0.62
11:K:199:GLN:HB2	11:Y:197:PRO:HD2	1.82	0.62
14:b:96:MET:HE3	14:b:127:MET:HA	1.82	0.62
13:a:226:VAL:HG22	13:a:231:ILE:HG12	1.81	0.61
13:M:226:VAL:HG22	13:M:231:ILE:HG12	1.81	0.61
5:S:78:MET:HG3	5:S:82:ILE:HD12	1.82	0.61
3:Q:15:GLU:O	4:R:28:LYS:NZ	2.25	0.60
5:E:129:ASP:OD1	5:E:129:ASP:N	2.35	0.59
14:N:92:LEU:HD23	14:N:112:ILE:HD11	1.83	0.59
4:D:46:GLU:OE2	4:D:163:ARG:NH2	2.34	0.59
11:Y:164:LEU:O	11:Y:168:GLN:NE2	2.27	0.59
2:P:59:GLU:H	2:P:59:GLU:CD	2.11	0.58
12:Z:38:ASN:HB2	12:Z:39:PRO:HD2	1.85	0.58
2:B:59:GLU:H	2:B:59:GLU:CD	2.11	0.58
5:S:212:ALA:HB2	5:S:235:GLU:HG3	1.85	0.58
12:L:38:ASN:HB2	12:L:39:PRO:HD2	1.85	0.58
2:B:1:MET:HB2	7:G:122:ALA:HB1	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:R:46:GLU:OE2	4:R:163:ARG:NH2	2.34	0.57
13:M:103:TYR:CD1	13:M:111:MET:HG3	2.40	0.57
2:P:74:LEU:HD13	2:P:136:ILE:HG12	1.86	0.57
13:a:103:TYR:CD1	13:a:111:MET:HG3	2.39	0.57
4:D:42:VAL:HB	4:D:191:VAL:HG21	1.86	0.57
11:K:198:LYS:HE2	11:Y:168:GLN:OE1	2.04	0.57
6:T:166:GLN:OE1	6:T:169:ARG:NH1	2.38	0.57
2:B:74:LEU:HD13	2:B:136:ILE:HG12	1.85	0.57
5:E:9:ASP:OD1	5:E:9:ASP:N	2.37	0.56
4:R:42:VAL:HB	4:R:191:VAL:HG21	1.87	0.56
5:E:212:ALA:HB2	5:E:235:GLU:HG3	1.87	0.56
5:E:97:GLN:HB3	12:L:61:ARG:HG3	1.87	0.56
2:P:1:MET:HB2	7:U:122:ALA:HB1	1.87	0.56
4:D:36:ARG:NH1	5:E:60:GLU:OE2	2.39	0.55
1:O:141:ILE:HG22	1:O:151:VAL:HG22	1.87	0.55
6:F:192:LEU:HD23	6:F:236:LEU:HD11	1.89	0.55
1:A:141:ILE:HG22	1:A:151:VAL:HG22	1.89	0.55
5:S:52:LYS:HE3	5:S:216:GLU:HG3	1.88	0.55
14:N:166:ARG:NH2	14:N:200:GLU:OE1	2.40	0.54
11:K:35:MET:HG2	11:K:45:LEU:HG	1.90	0.54
1:O:192:GLU:O	1:O:196:GLU:HG2	2.08	0.54
14:b:166:ARG:NH2	14:b:200:GLU:OE1	2.40	0.54
6:T:173:GLU:HA	6:T:176:MET:HE2	1.89	0.54
3:C:167:ASN:HB2	3:C:200:THR:HG23	1.89	0.54
1:A:51:VAL:HG22	1:A:217:VAL:HG22	1.90	0.54
7:U:35:SER:OG	7:U:51:GLU:OE2	2.26	0.54
6:T:192:LEU:HD23	6:T:236:LEU:HD11	1.90	0.53
3:Q:33:THR:HG21	3:Q:200:THR:HG21	1.89	0.53
11:Y:35:MET:HG2	11:Y:45:LEU:HG	1.90	0.53
6:F:196:ARG:HD3	6:F:239:ARG:HE	1.74	0.53
7:U:42:CYS:HB3	7:U:190:VAL:HG21	1.90	0.53
1:A:192:GLU:O	1:A:196:GLU:HG2	2.09	0.53
5:S:9:ASP:N	5:S:9:ASP:OD1	2.38	0.53
7:G:35:SER:OG	7:G:51:GLU:OE2	2.26	0.53
3:C:33:THR:HG21	3:C:200:THR:HG21	1.90	0.53
5:E:240:ASP:OD1	5:E:240:ASP:N	2.41	0.53
4:R:36:ARG:NH1	5:S:60:GLU:OE2	2.41	0.53
5:S:97:GLN:HB3	12:Z:61:ARG:HG3	1.90	0.53
6:T:101:ARG:HH21	14:b:83:TYR:HE1	1.57	0.53
6:T:196:ARG:HD3	6:T:239:ARG:HG2	1.91	0.53
2:P:76:TYR:HB3	2:P:83:TYR:CD1	2.44	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:76:TYR:HB3	2:B:83:TYR:CD1	2.44	0.53
1:O:51:VAL:HG22	1:O:217:VAL:HG22	1.89	0.53
6:T:68:ASN:HB3	6:T:220:GLU:HG2	1.91	0.53
6:F:166:GLN:OE1	6:F:169:ARG:NH1	2.42	0.52
5:S:41:GLN:OE1	5:S:164:GLN:NE2	2.41	0.52
5:S:240:ASP:OD1	5:S:240:ASP:N	2.41	0.52
7:G:42:CYS:HB3	7:G:190:VAL:HG21	1.92	0.52
12:Z:9:ARG:NH2	12:Z:146:ASP:OD1	2.42	0.52
11:K:198:LYS:HB3	11:Y:196:PHE:HB3	1.92	0.52
3:Q:91:ARG:HG2	10:X:76:LEU:HD13	1.93	0.52
4:D:209:ALA:HB1	4:D:217:LEU:HD11	1.92	0.51
9:I:199:PHE:CD2	13:a:204:LYS:HD3	2.46	0.51
6:T:107:ARG:HH12	14:b:74:GLU:HG3	1.74	0.51
6:F:68:ASN:HB3	6:F:220:GLU:HG2	1.91	0.51
6:F:107:ARG:HH12	14:N:74:GLU:HG3	1.75	0.51
12:L:20:ALA:HB2	12:L:31:VAL:HG21	1.93	0.51
5:S:181:LEU:HA	5:S:184:VAL:HG22	1.93	0.51
6:T:101:ARG:HH12	6:T:104:PRO:HD3	1.76	0.51
4:R:209:ALA:HB1	4:R:217:LEU:HD11	1.91	0.51
4:R:12:PRO:HA	5:S:26:TYR:CD1	2.46	0.51
9:W:213:THR:HG22	9:W:214:GLU:N	2.26	0.51
3:Q:176:LYS:O	4:R:52:LYS:NZ	2.44	0.51
5:E:215:ILE:HD11	5:E:238:ILE:HD11	1.93	0.51
13:M:204:LYS:HD3	9:W:199:PHE:HD2	1.76	0.51
13:M:204:LYS:HD3	9:W:199:PHE:CD2	2.45	0.51
3:C:91:ARG:HG2	10:J:76:LEU:HD13	1.93	0.50
13:M:42:ALA:HA	13:M:50:ILE:O	2.11	0.50
3:C:1:MET:HG2	7:G:127:SER:HB2	1.92	0.50
12:L:9:ARG:NH2	12:L:146:ASP:OD1	2.43	0.50
12:L:35:ILE:HD11	12:L:45:MET:HB2	1.92	0.50
14:N:124:TYR:O	14:N:131:ALA:HA	2.12	0.50
12:Z:20:ALA:HB2	12:Z:31:VAL:HG21	1.93	0.50
14:b:51:LEU:HD11	14:b:110:MET:HE3	1.92	0.50
13:M:173:LEU:HD21	13:M:210:ALA:HB2	1.92	0.50
5:E:41:GLN:OE1	5:E:164:GLN:NE2	2.39	0.50
13:a:151:SER:HB3	13:a:164:LYS:HG2	1.93	0.50
10:J:20:VAL:HG23	10:J:190:ILE:HB	1.94	0.50
5:E:181:LEU:HA	5:E:184:VAL:HG22	1.92	0.50
8:V:115:PRO:HD2	8:V:119:MET:HG3	1.94	0.50
9:I:213:THR:HG22	9:I:214:GLU:N	2.25	0.50
6:T:32:GLY:O	6:T:163:ALA:N	2.43	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:41:VAL:HG23	4:D:211:MET:HB3	1.93	0.50
13:M:151:SER:HB3	13:M:164:LYS:HG2	1.92	0.50
14:N:15:LYS:HE2	14:N:135:PRO:HA	1.94	0.50
10:X:20:VAL:HG23	10:X:190:ILE:HB	1.94	0.50
12:Z:35:ILE:HD11	12:Z:45:MET:HB2	1.92	0.50
14:b:15:LYS:HE2	14:b:135:PRO:HA	1.94	0.50
4:D:12:PRO:HA	5:E:26:TYR:CD1	2.46	0.49
7:G:38:ILE:HD11	7:G:194:VAL:HG13	1.94	0.49
9:I:199:PHE:HD2	13:a:204:LYS:HD3	1.76	0.49
3:Q:167:ASN:HB2	3:Q:200:THR:HG23	1.94	0.49
7:U:176:GLU:HB3	7:U:197:ILE:HG12	1.94	0.49
11:Y:118:MET:HE2	11:Y:124:LEU:HD13	1.94	0.49
4:R:41:VAL:HG23	4:R:211:MET:HB3	1.93	0.49
5:S:215:ILE:HD11	5:S:238:ILE:HD11	1.95	0.49
14:b:124:TYR:O	14:b:131:ALA:HA	2.12	0.49
3:C:176:LYS:O	4:D:52:LYS:NZ	2.43	0.49
6:T:101:ARG:NH1	6:T:104:PRO:HD3	2.28	0.49
6:F:157:ARG:HD3	6:F:176:MET:SD	2.52	0.49
13:a:173:LEU:HD21	13:a:210:ALA:HB2	1.92	0.49
6:F:72:ILE:HG21	6:F:88:MET:HE1	1.94	0.49
13:a:42:ALA:HA	13:a:50:ILE:O	2.11	0.49
1:A:141:ILE:HD12	1:A:220:VAL:HG22	1.93	0.49
11:K:198:LYS:HD3	11:Y:168:GLN:HB3	1.94	0.49
1:O:141:ILE:HD12	1:O:220:VAL:HG22	1.95	0.49
6:T:72:ILE:HG21	6:T:88:MET:HE1	1.94	0.49
7:G:176:GLU:HB3	7:G:197:ILE:HG12	1.93	0.49
8:H:172:GLY:HA2	14:b:209:TRP:CH2	2.48	0.49
10:X:28:PHE:HB2	10:X:39:PHE:HB2	1.95	0.49
5:E:155:HIS:O	5:E:162:PHE:HA	2.12	0.49
14:N:209:TRP:CH2	8:V:172:GLY:HA2	2.48	0.49
8:H:115:PRO:HD2	8:H:119:MET:HG3	1.94	0.48
10:J:28:PHE:HB2	10:J:39:PHE:HB2	1.95	0.48
2:P:143:ARG:HD2	2:P:145:TYR:CZ	2.48	0.48
2:B:143:ARG:HD2	2:B:145:TYR:CZ	2.48	0.48
7:U:162:TRP:CE2	7:U:183:LYS:HE3	2.48	0.48
2:B:74:LEU:HD11	2:B:134:LEU:HB3	1.95	0.48
11:Y:46:CYS:HB2	11:Y:53:THR:HG23	1.95	0.48
9:I:20:ALA:HB3	9:I:28:ASP:HB3	1.95	0.48
11:K:46:CYS:HB2	11:K:53:THR:HG23	1.95	0.48
13:M:44:ALA:HB2	13:M:149:VAL:HG23	1.95	0.48
5:S:155:HIS:O	5:S:162:PHE:HA	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:U:38:ILE:HD11	7:U:194:VAL:HG13	1.96	0.48
8:V:14:LEU:HD23	8:V:44:CYS:SG	2.54	0.48
9:W:20:ALA:HB3	9:W:28:ASP:HB3	1.95	0.48
11:K:118:MET:HE2	11:K:124:LEU:HD13	1.94	0.48
1:O:49:VAL:HG22	1:O:219:VAL:HG12	1.96	0.48
14:b:25:ASP:HA	14:b:187:PHE:HA	1.96	0.48
8:H:14:LEU:HD23	8:H:44:CYS:SG	2.54	0.48
2:P:74:LEU:HD11	2:P:134:LEU:HB3	1.96	0.47
8:V:40:ARG:CZ	8:V:183:GLY:HA2	2.44	0.47
13:a:44:ALA:HB2	13:a:149:VAL:HG23	1.96	0.47
4:D:69:VAL:HG11	4:D:107:ILE:HG21	1.95	0.47
10:J:177:ARG:HH21	13:a:178:ASP:CG	2.23	0.47
5:S:166:ASP:HB3	5:S:185:TYR:CZ	2.49	0.47
2:P:93:LEU:HD13	2:P:113:ARG:HB3	1.97	0.47
8:H:40:ARG:CZ	8:H:183:GLY:HA2	2.44	0.47
14:N:25:ASP:HA	14:N:187:PHE:HA	1.96	0.47
2:B:22:ILE:HG21	2:B:152:SER:HB3	1.97	0.47
12:L:180:ARG:HH21	12:L:185:ILE:HG21	1.78	0.47
6:T:203:GLN:O	6:T:239:ARG:NH1	2.47	0.47
11:Y:66:LEU:HD21	11:Y:70:ARG:NH2	2.29	0.47
12:Z:180:ARG:HH21	12:Z:185:ILE:HG21	1.78	0.47
9:I:216:VAL:HG22	10:J:196:THR:HG23	1.97	0.47
4:R:69:VAL:HG11	4:R:107:ILE:HG21	1.95	0.47
12:Z:138:VAL:HG21	12:Z:162:GLN:HG3	1.97	0.47
1:A:49:VAL:HG22	1:A:219:VAL:HG12	1.97	0.47
11:K:66:LEU:HD21	11:K:70:ARG:NH2	2.29	0.47
3:Q:1:MET:HB3	6:T:123:TYR:CE2	2.50	0.47
7:U:67:LEU:HD12	7:U:213:GLU:HG2	1.97	0.47
4:D:12:PRO:HA	5:E:26:TYR:CE1	2.50	0.47
7:G:162:TRP:CE2	7:G:183:LYS:HE3	2.49	0.47
2:P:130:PHE:O	2:P:151:PRO:HB3	2.15	0.47
2:B:130:PHE:O	2:B:151:PRO:HB3	2.15	0.46
2:B:93:LEU:HD13	2:B:113:ARG:HB3	1.97	0.46
7:G:67:LEU:HD12	7:G:213:GLU:HG2	1.96	0.46
1:O:244:GLU:CD	1:O:245:ARG:HG3	2.41	0.46
2:P:22:ILE:HG21	2:P:152:SER:HB3	1.97	0.46
4:D:47:LYS:HE3	4:D:207:GLU:HB2	1.96	0.46
5:E:166:ASP:HB3	5:E:185:TYR:CZ	2.50	0.46
9:I:164:PHE:O	13:a:66:ARG:NH2	2.48	0.46
9:W:216:VAL:HG22	10:X:196:THR:HG23	1.97	0.46
6:F:71:GLY:HA3	6:F:221:PHE:CZ	2.51	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
12:L:138:VAL:HG21	12:L:162:GLN:HG3	1.97	0.46
4:R:47:LYS:HE3	4:R:207:GLU:HB2	1.96	0.46
14:N:142:GLY:HA2	14:N:176:LEU:HD21	1.98	0.46
13:M:178:ASP:CG	10:X:177:ARG:HH21	2.22	0.46
4:R:66:ASP:OD2	4:R:91:CYS:HB3	2.16	0.46
6:F:32:GLY:O	6:F:163:ALA:N	2.43	0.46
7:U:35:SER:HB3	7:U:66:ARG:NH1	2.25	0.46
6:T:71:GLY:HA3	6:T:221:PHE:CZ	2.51	0.46
11:K:1:MET:HG2	11:K:134:TYR:H	1.81	0.45
11:Y:1:MET:HG2	11:Y:134:TYR:H	1.82	0.45
14:b:142:GLY:HA2	14:b:176:LEU:HD21	1.98	0.45
4:D:66:ASP:OD2	4:D:91:CYS:HB3	2.16	0.45
6:T:215:VAL:HB	6:T:221:PHE:HD1	1.81	0.45
3:Q:45:LEU:HD13	3:Q:75:SER:HB2	1.97	0.45
10:J:205:ASP:OD1	10:J:205:ASP:N	2.49	0.45
4:R:12:PRO:HA	5:S:26:TYR:CE1	2.51	0.45
7:U:189:ASP:O	7:U:193:GLU:HG2	2.17	0.45
13:a:127:ARG:HD3	13:a:132:TYR:CZ	2.52	0.45
5:E:69:GLU:HB2	5:E:226:PHE:CD2	2.52	0.45
13:M:66:ARG:NH2	9:W:164:PHE:O	2.48	0.45
13:M:127:ARG:HD3	13:M:132:TYR:CE2	2.52	0.45
2:P:95:GLN:HG3	9:W:65:LEU:HG	1.99	0.45
5:S:187:LYS:HB2	5:S:187:LYS:HE2	1.84	0.45
5:S:69:GLU:HB2	5:S:226:PHE:CD2	2.51	0.45
7:U:192:LYS:HB3	7:U:239:TYR:CD2	2.51	0.45
13:a:127:ARG:HD3	13:a:132:TYR:CE2	2.52	0.45
3:C:45:LEU:HD13	3:C:75:SER:HB2	1.98	0.45
7:G:192:LYS:HB3	7:G:239:TYR:CD2	2.51	0.45
9:W:106:THR:HB	9:W:109:HIS:HE2	1.82	0.45
7:G:35:SER:HB3	7:G:66:ARG:NH1	2.25	0.45
3:Q:41:ASP:OD1	3:Q:41:ASP:N	2.49	0.45
10:X:205:ASP:OD1	10:X:205:ASP:N	2.50	0.45
2:B:95:GLN:HG3	9:I:65:LEU:HG	1.99	0.44
3:C:1:MET:SD	7:G:127:SER:OG	2.59	0.44
1:A:1:MET:HB3	1:A:2:SER:H	1.49	0.44
3:C:119:GLN:NE2	4:D:79:ASP:OD1	2.48	0.44
4:D:94:HIS:CG	4:D:102:VAL:HG12	2.52	0.44
9:W:11:GLY:HA2	9:W:108:PRO:HB3	1.99	0.44
13:a:111:MET:HE1	13:a:119:MET:SD	2.57	0.44
6:F:215:VAL:HB	6:F:221:PHE:HD1	1.82	0.44
13:M:127:ARG:HD3	13:M:132:TYR:CZ	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:R:94:HIS:CG	4:R:102:VAL:HG12	2.52	0.44
9:I:97:ALA:HB1	9:I:127:MET:SD	2.57	0.44
3:Q:72:MET:SD	3:Q:107:CYS:HA	2.58	0.44
6:F:103:LEU:HD12	6:F:104:PRO:HD2	1.99	0.44
9:I:106:THR:HB	9:I:109:HIS:HE2	1.82	0.44
11:K:37:LYS:HZ1	11:K:40:GLU:CD	2.26	0.44
6:F:81:ALA:HB2	6:F:130:VAL:HG21	1.98	0.44
4:R:5:ARG:O	4:R:123:GLY:N	2.47	0.44
7:U:109:LEU:HD11	7:U:138:LEU:HB3	1.98	0.44
9:W:97:ALA:HB1	9:W:127:MET:SD	2.58	0.44
12:L:5:ALA:HA	12:L:13:ILE:O	2.18	0.44
4:D:146:GLN:O	4:D:153:TYR:HA	2.18	0.44
3:Q:1:MET:HA	7:U:127:SER:HB2	2.00	0.44
9:W:43:CYS:SG	9:W:98:LEU:HB3	2.58	0.44
9:W:182:LYS:NZ	9:W:184:ASP:OD2	2.40	0.44
10:J:15:LYS:HG2	10:J:119:PRO:HB2	2.00	0.43
2:P:59:GLU:CD	2:P:59:GLU:N	2.76	0.43
2:B:74:LEU:HG	2:B:83:TYR:HE1	1.84	0.43
3:C:72:MET:SD	3:C:107:CYS:HA	2.58	0.43
9:I:43:CYS:SG	9:I:98:LEU:HB3	2.58	0.43
7:G:189:ASP:O	7:G:193:GLU:HG2	2.18	0.43
9:I:148:GLU:OE2	9:I:182:LYS:NZ	2.44	0.43
13:M:111:MET:HE1	13:M:119:MET:SD	2.58	0.43
7:U:188:ARG:HA	7:U:188:ARG:HD2	1.77	0.43
11:Y:9:GLY:HA3	11:Y:12:TYR:CZ	2.53	0.43
12:Z:5:ALA:HA	12:Z:13:ILE:O	2.18	0.43
7:G:109:LEU:HD11	7:G:138:LEU:HB3	1.99	0.43
11:Y:29:LYS:HE3	11:Y:31:ASP:O	2.19	0.43
11:Y:37:LYS:HZ3	11:Y:39:SER:C	2.27	0.43
3:C:14:PRO:HA	4:D:21:TYR:CE1	2.54	0.43
7:G:9:ASP:O	7:G:23:GLN:NE2	2.41	0.43
11:K:29:LYS:HE3	11:K:31:ASP:O	2.18	0.43
11:K:171:PHE:CE2	11:K:173:LEU:HB2	2.54	0.43
6:T:81:ALA:HB2	6:T:130:VAL:HG21	1.99	0.43
7:G:71:ASP:OD2	7:G:96:ALA:HB1	2.18	0.43
3:Q:21:VAL:HG11	3:Q:153:SER:HB3	2.01	0.43
4:R:146:GLN:O	4:R:153:TYR:HA	2.18	0.43
11:K:9:GLY:HA3	11:K:12:TYR:CZ	2.53	0.43
12:L:133:VAL:HG21	11:Y:137:PHE:HB3	2.00	0.43
3:Q:100:GLN:HE21	11:Y:83:PHE:HE1	1.66	0.43
5:S:203:LYS:HB2	5:S:210:LEU:HD22	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:21:VAL:HG11	3:C:153:SER:HB3	2.01	0.43
9:W:50:ALA:HB2	10:X:129:CYS:HB2	2.01	0.43
14:b:115:TYR:CE2	14:b:194:GLU:HG3	2.54	0.43
6:F:22:ILE:O	6:F:26:MET:HG2	2.19	0.43
6:T:103:LEU:HD12	6:T:104:PRO:HD2	2.01	0.43
7:G:214:LEU:HD12	7:G:233:ARG:HD2	2.01	0.43
14:N:153:VAL:HG22	14:N:156:LYS:HZ3	1.84	0.43
7:U:9:ASP:O	7:U:23:GLN:NE2	2.42	0.43
7:U:71:ASP:OD2	7:U:96:ALA:HB1	2.18	0.43
7:G:180:LEU:HD21	7:G:193:GLU:HB3	2.01	0.42
9:I:11:GLY:HA2	9:I:108:PRO:HB3	1.99	0.42
14:N:115:TYR:CE2	14:N:194:GLU:HG3	2.53	0.42
3:Q:14:PRO:HA	4:R:21:TYR:CE1	2.54	0.42
8:V:14:LEU:HD21	8:V:101:ALA:HB3	2.01	0.42
8:V:15:GLY:HA2	8:V:175:ARG:O	2.19	0.42
2:B:193:LEU:O	2:B:197:GLU:HG2	2.19	0.42
6:F:84:LEU:HD23	6:F:84:LEU:HA	1.89	0.42
8:H:84:LYS:HG3	8:H:120:MET:HB2	2.01	0.42
12:Z:113:TYR:O	12:Z:120:ARG:HA	2.19	0.42
14:N:96:MET:HE2	14:N:110:MET:HE1	2.01	0.42
3:C:72:MET:HE2	3:C:72:MET:HB3	1.89	0.42
11:K:137:PHE:HB3	12:Z:133:VAL:HG21	2.00	0.42
12:L:113:TYR:O	12:L:120:ARG:HA	2.19	0.42
13:M:63:ILE:O	14:N:151:ARG:NH2	2.35	0.42
6:T:22:ILE:O	6:T:26:MET:HG2	2.19	0.42
9:W:54:MET:HG3	10:X:96:TYR:CD2	2.55	0.42
2:B:50:LYS:HB2	2:B:50:LYS:HE3	1.78	0.42
2:B:59:GLU:CD	2:B:59:GLU:N	2.76	0.42
13:M:52:ALA:HB1	13:M:221:LEU:HD11	2.01	0.42
14:N:110:MET:HE2	14:N:110:MET:HB2	1.86	0.42
2:P:193:LEU:O	2:P:197:GLU:HG2	2.19	0.42
6:T:50:LYS:HB3	6:T:59:HIS:HB3	2.02	0.42
9:W:84:LYS:HE3	9:W:84:LYS:HB2	1.83	0.42
7:U:180:LEU:HD21	7:U:193:GLU:HB3	2.00	0.42
1:A:123:GLN:NE2	2:B:85:VAL:HG21	2.35	0.42
3:C:1:MET:HG3	6:F:123:TYR:CG	2.54	0.42
3:C:8:ARG:NH2	5:E:8:TYR:HB3	2.35	0.42
3:C:206:LEU:HD23	3:C:206:LEU:HA	1.85	0.42
14:N:124:TYR:CE1	14:N:126:ASP:HB3	2.54	0.42
2:P:8:PHE:HE1	3:Q:2:SER:HB3	1.84	0.42
6:T:33:SER:HB3	6:T:51:ARG:HG3	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:Y:171:PHE:CE2	11:Y:173:LEU:HB2	2.54	0.42
11:K:159:LEU:HA	11:K:162:LYS:HD3	2.01	0.42
8:V:84:LYS:HG3	8:V:120:MET:HB2	2.00	0.42
1:A:86:ASP:OD1	7:G:121:HIS:NE2	2.38	0.42
7:U:214:LEU:HD12	7:U:233:ARG:HD2	2.01	0.42
8:V:20:THR:HB	8:V:28:ASN:HB3	2.01	0.42
14:b:124:TYR:CE1	14:b:126:ASP:HB3	2.54	0.42
4:D:107:ILE:HD12	4:D:107:ILE:HA	1.92	0.42
5:E:207:GLU:H	5:E:207:GLU:HG2	1.70	0.42
9:I:213:THR:CG2	9:I:214:GLU:N	2.83	0.42
2:P:74:LEU:HD23	2:P:87:VAL:HG22	2.01	0.42
2:B:202:GLN:O	2:B:207:ASN:ND2	2.53	0.41
5:E:182:GLN:OE1	6:F:55:GLU:HB2	2.20	0.41
8:H:14:LEU:HD21	8:H:101:ALA:HB3	2.01	0.41
2:P:115:ALA:HB1	2:P:153:GLY:O	2.19	0.41
2:B:115:ALA:HB1	2:B:153:GLY:O	2.19	0.41
3:C:24:ALA:O	3:C:28:ILE:HG12	2.21	0.41
13:a:52:ALA:HB1	13:a:221:LEU:HD11	2.01	0.41
3:C:100:GLN:HE21	11:K:83:PHE:HE1	1.66	0.41
3:C:242:GLU:O	3:C:246:LYS:HG2	2.20	0.41
12:L:160:ILE:O	12:L:164:THR:HG23	2.21	0.41
9:W:63:LEU:HD23	9:W:63:LEU:HA	1.90	0.41
1:A:50:ILE:HD12	1:A:69:LEU:HD22	2.03	0.41
3:C:1:MET:HB2	6:F:123:TYR:CE1	2.55	0.41
6:F:33:SER:HB3	6:F:51:ARG:HG3	2.02	0.41
7:G:88:LEU:HD23	7:G:88:LEU:HA	1.89	0.41
9:I:50:ALA:HB2	10:J:129:CYS:HB2	2.02	0.41
10:J:38:ASP:N	10:J:38:ASP:OD1	2.53	0.41
10:J:68:LYS:HD2	10:J:68:LYS:HA	1.81	0.41
2:P:202:GLN:O	2:P:207:ASN:ND2	2.53	0.41
1:A:132:ARG:HB3	7:G:13:SER:HA	2.03	0.41
3:C:130:PHE:O	3:C:152:PRO:HB3	2.21	0.41
8:H:35:THR:HB	8:H:43:CYS:SG	2.60	0.41
11:Y:5:ILE:HD11	11:Y:143:LEU:HD11	2.03	0.41
9:I:112:SER:HB2	9:I:127:MET:HE1	2.03	0.41
3:Q:90:LEU:HG	3:Q:114:LEU:HD13	2.02	0.41
12:Z:12:VAL:HB	12:Z:179:VAL:HB	2.02	0.41
13:a:96:ILE:HD11	13:a:120:LEU:HD13	2.02	0.41
14:b:115:TYR:HE2	14:b:194:GLU:HG3	1.86	0.41
2:B:71:HIS:CE1	2:B:104:PRO:HB2	2.55	0.41
6:F:158:ALA:O	7:G:58:LEU:HB3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:I:54:MET:HG3	10:J:96:TYR:CD2	2.55	0.41
1:O:123:GLN:NE2	2:P:85:VAL:HG21	2.35	0.41
2:P:71:HIS:CE1	2:P:104:PRO:HB2	2.55	0.41
3:Q:24:ALA:O	3:Q:28:ILE:HG12	2.21	0.41
5:S:182:GLN:HA	6:T:56:LEU:HD11	2.03	0.41
9:W:148:GLU:OE2	9:W:182:LYS:NZ	2.44	0.41
3:C:3:ARG:HA	4:D:5:ARG:NH1	2.35	0.41
8:H:15:GLY:HA2	8:H:175:ARG:O	2.19	0.41
9:I:45:GLY:HA3	9:I:52:THR:HG21	2.03	0.41
11:K:38:MET:HE1	11:K:61:GLN:HB2	2.01	0.41
12:L:58:LEU:HD23	12:L:58:LEU:HA	1.88	0.41
12:L:63:CYS:SG	12:L:74:ILE:HG21	2.61	0.41
2:P:200:GLU:OE1	2:P:200:GLU:N	2.54	0.41
5:S:180:SER:O	5:S:184:VAL:HG13	2.21	0.41
6:T:158:ALA:O	7:U:58:LEU:HB3	2.21	0.41
1:A:244:GLU:CD	1:A:245:ARG:HG3	2.46	0.41
2:B:203:MET:HE3	2:B:203:MET:HB2	1.91	0.41
3:C:90:LEU:HG	3:C:114:LEU:HD13	2.02	0.41
4:D:5:ARG:O	4:D:123:GLY:N	2.46	0.41
6:F:107:ARG:NH1	14:N:74:GLU:HG3	2.36	0.41
8:H:20:THR:HB	8:H:28:ASN:HB3	2.02	0.41
9:I:84:LYS:HB2	9:I:84:LYS:HE3	1.84	0.41
12:L:12:VAL:HB	12:L:179:VAL:HB	2.02	0.41
13:M:178:ASP:HB3	13:M:184:LYS:HD2	2.03	0.41
14:N:115:TYR:HE2	14:N:194:GLU:HG3	1.86	0.41
3:Q:242:GLU:O	3:Q:246:LYS:HG2	2.20	0.41
6:T:172:LEU:O	6:T:176:MET:HG3	2.20	0.41
11:Y:4:LEU:HD22	11:Y:45:LEU:HD23	2.03	0.41
9:I:206:LYS:HE3	10:J:161:GLU:CB	2.51	0.41
13:M:192:VAL:HG11	9:W:203:ARG:HH22	1.86	0.41
2:P:74:LEU:HG	2:P:83:TYR:HE1	1.85	0.41
9:W:14:LEU:HB3	9:W:44:CYS:SG	2.61	0.41
9:W:127:MET:C	9:W:131:SER:HB3	2.47	0.41
1:A:56:VAL:HG13	1:A:61:LEU:HD23	2.04	0.40
9:I:203:ARG:HH22	13:a:192:VAL:HG11	1.85	0.40
3:Q:115:CYS:SG	3:Q:156:TYR:HB3	2.62	0.40
12:Z:160:ILE:O	12:Z:164:THR:HG23	2.21	0.40
2:B:200:GLU:N	2:B:200:GLU:OE1	2.54	0.40
3:C:41:ASP:OD1	3:C:41:ASP:N	2.49	0.40
4:D:164:GLY:O	4:D:168:VAL:HG23	2.21	0.40
9:I:127:MET:C	9:I:131:SER:HB3	2.46	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:K:4:LEU:HD22	11:K:45:LEU:HD23	2.03	0.40
13:M:96:ILE:HD11	13:M:120:LEU:HD13	2.02	0.40
3:Q:72:MET:HE2	3:Q:72:MET:HB3	1.90	0.40
6:T:47:VAL:HG12	6:T:212:ILE:HG12	2.04	0.40
7:U:109:LEU:HD13	7:U:140:SER:HB2	2.03	0.40
1:A:196:GLU:OE1	1:A:242:LEU:HB2	2.21	0.40
6:F:204:ASP:OD1	6:F:205:LEU:N	2.54	0.40
3:Q:8:ARG:NH2	5:S:8:TYR:HB3	2.36	0.40
4:R:164:GLY:O	4:R:168:VAL:HG23	2.21	0.40
8:V:35:THR:HB	8:V:43:CYS:SG	2.60	0.40
5:E:231:LYS:HE3	5:E:231:LYS:HB2	1.94	0.40
6:F:88:MET:HE3	6:F:112:ILE:HD11	2.03	0.40
9:W:112:SER:HB2	9:W:127:MET:HE1	2.03	0.40
6:F:193:ARG:O	6:F:197:GLU:HG2	2.22	0.40
9:I:14:LEU:HB3	9:I:44:CYS:SG	2.62	0.40
9:W:134:ALA:HB1	9:W:158:ALA:HB1	2.03	0.40
9:W:213:THR:CG2	9:W:214:GLU:N	2.84	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	243/246 (99%)	242 (100%)	1 (0%)	0	100	100
1	O	243/246 (99%)	241 (99%)	2 (1%)	0	100	100
2	B	231/234 (99%)	228 (99%)	3 (1%)	0	100	100
2	P	231/234 (99%)	228 (99%)	3 (1%)	0	100	100
3	C	249/261 (95%)	245 (98%)	4 (2%)	0	100	100
3	Q	249/261 (95%)	245 (98%)	4 (2%)	0	100	100
4	D	241/248 (97%)	238 (99%)	3 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	R	241/248 (97%)	238 (99%)	3 (1%)	0	100	100
5	E	234/241 (97%)	229 (98%)	5 (2%)	0	100	100
5	S	234/241 (97%)	231 (99%)	3 (1%)	0	100	100
6	F	236/263 (90%)	232 (98%)	4 (2%)	0	100	100
6	T	236/263 (90%)	232 (98%)	4 (2%)	0	100	100
7	G	239/255 (94%)	236 (99%)	3 (1%)	0	100	100
7	U	239/255 (94%)	236 (99%)	3 (1%)	0	100	100
8	H	200/239 (84%)	199 (100%)	1 (0%)	0	100	100
8	V	200/239 (84%)	199 (100%)	1 (0%)	0	100	100
9	I	218/277 (79%)	215 (99%)	3 (1%)	0	100	100
9	W	218/277 (79%)	215 (99%)	3 (1%)	0	100	100
10	J	202/205 (98%)	198 (98%)	4 (2%)	0	100	100
10	X	202/205 (98%)	198 (98%)	4 (2%)	0	100	100
11	K	197/201 (98%)	193 (98%)	4 (2%)	0	100	100
11	Y	197/201 (98%)	193 (98%)	4 (2%)	0	100	100
12	L	199/263 (76%)	196 (98%)	3 (2%)	0	100	100
12	Z	199/263 (76%)	196 (98%)	3 (2%)	0	100	100
13	M	211/241 (88%)	210 (100%)	1 (0%)	0	100	100
13	a	211/241 (88%)	210 (100%)	1 (0%)	0	100	100
14	N	212/264 (80%)	207 (98%)	5 (2%)	0	100	100
14	b	212/264 (80%)	207 (98%)	5 (2%)	0	100	100
All	All	6224/6876 (90%)	6137 (99%)	87 (1%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	209/210 (100%)	209 (100%)	0	100	100
1	O	209/210 (100%)	209 (100%)	0	100	100
2	B	191/191 (100%)	191 (100%)	0	100	100
2	P	191/191 (100%)	191 (100%)	0	100	100
3	C	211/221 (96%)	211 (100%)	0	100	100
3	Q	211/221 (96%)	211 (100%)	0	100	100
4	D	207/211 (98%)	207 (100%)	0	100	100
4	R	207/211 (98%)	207 (100%)	0	100	100
5	E	198/203 (98%)	197 (100%)	1 (0%)	81	86
5	S	198/203 (98%)	197 (100%)	1 (0%)	81	86
6	F	204/225 (91%)	204 (100%)	0	100	100
6	T	204/225 (91%)	203 (100%)	1 (0%)	81	86
7	G	199/212 (94%)	195 (98%)	4 (2%)	48	58
7	U	199/212 (94%)	196 (98%)	3 (2%)	57	66
8	H	158/184 (86%)	158 (100%)	0	100	100
8	V	158/184 (86%)	158 (100%)	0	100	100
9	I	181/228 (79%)	181 (100%)	0	100	100
9	W	181/228 (79%)	181 (100%)	0	100	100
10	J	174/175 (99%)	174 (100%)	0	100	100
10	X	174/175 (99%)	174 (100%)	0	100	100
11	K	170/171 (99%)	170 (100%)	0	100	100
11	Y	170/171 (99%)	170 (100%)	0	100	100
12	L	157/205 (77%)	157 (100%)	0	100	100
12	Z	157/205 (77%)	157 (100%)	0	100	100
13	M	177/198 (89%)	177 (100%)	0	100	100
13	a	177/198 (89%)	177 (100%)	0	100	100
14	N	176/215 (82%)	176 (100%)	0	100	100
14	b	176/215 (82%)	176 (100%)	0	100	100
All	All	5224/5698 (92%)	5214 (100%)	10 (0%)	85	92

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	E	183	GLU
7	G	220	ILE
7	G	231	ASP
7	G	232	VAL
7	G	233	ARG
5	S	183	GLU
6	T	78	THR
7	U	220	ILE
7	U	232	VAL
7	U	233	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (47) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	12	HIS
1	A	33	ASN
1	A	34	GLN
1	A	75	ASN
1	A	123	GLN
2	B	102	GLN
2	B	202	GLN
3	C	102	GLN
3	C	167	ASN
3	C	198	ASN
4	D	92	GLN
4	D	122	ASN
4	D	154	HIS
4	D	175	ASN
4	D	215	GLN
6	F	43	HIS
7	G	171	GLN
8	H	123	GLN
8	H	154	GLN
10	J	81	GLN
11	K	110	HIS
12	L	62	GLN
12	L	119	ASN
13	M	180	GLN
13	M	185	ASN
14	N	2	GLN
1	O	12	HIS
1	O	75	ASN
1	O	123	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	P	52	GLN
2	P	102	GLN
2	P	202	GLN
3	Q	102	GLN
3	Q	198	ASN
4	R	92	GLN
4	R	122	ASN
4	R	154	HIS
4	R	175	ASN
4	R	215	GLN
5	S	221	GLN
6	T	43	HIS
8	V	123	GLN
8	V	154	GLN
10	X	81	GLN
10	X	173	ASN
11	Y	110	HIS
14	b	2	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

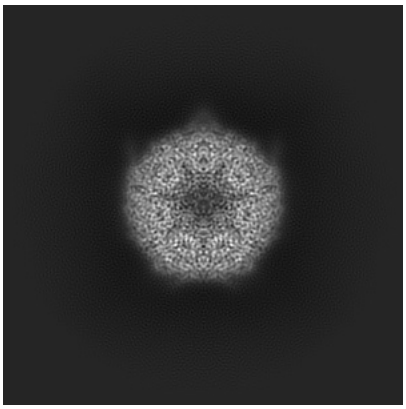
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-29603. These allow visual inspection of the internal detail of the map and identification of artifacts.

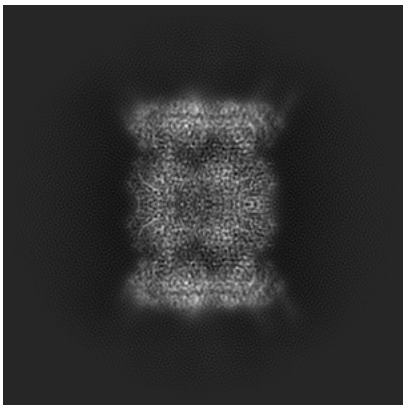
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

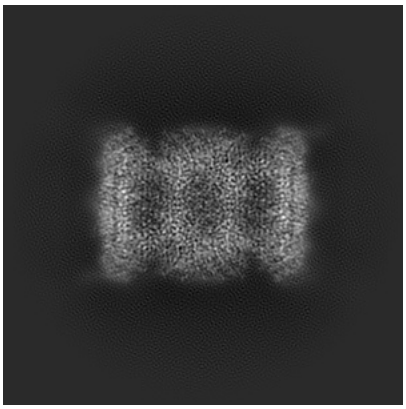
6.1.1 Primary map



X

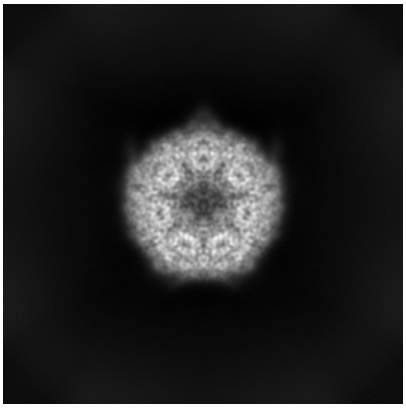


Y

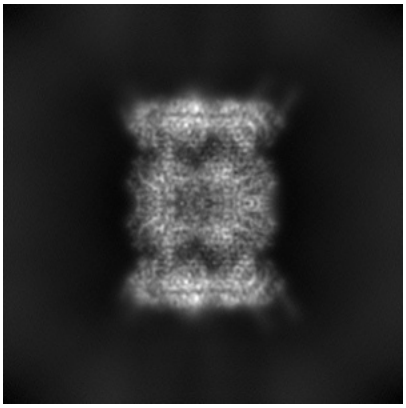


Z

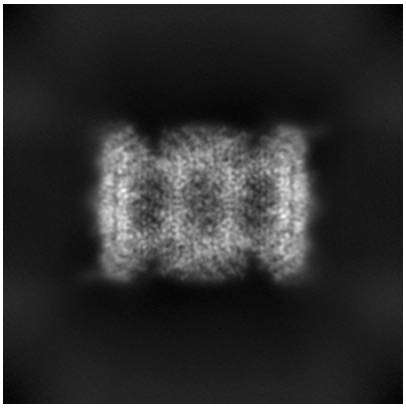
6.1.2 Raw map



X



Y

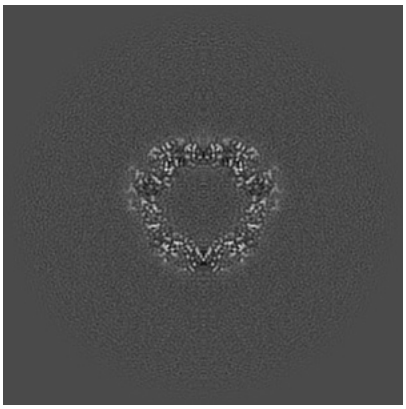


Z

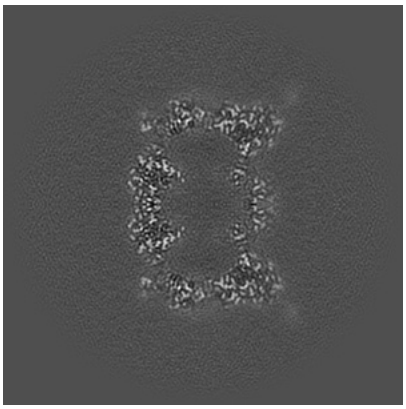
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

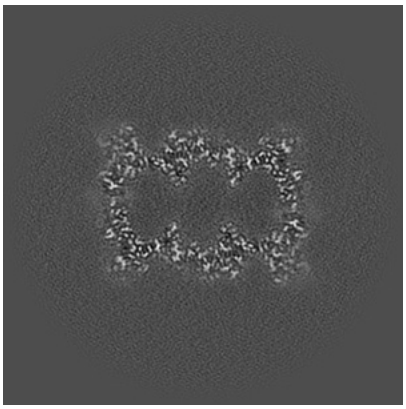
6.2.1 Primary map



X Index: 176

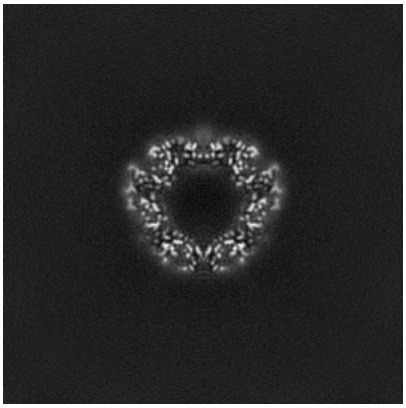


Y Index: 176

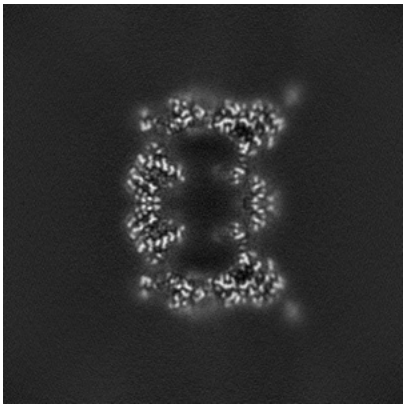


Z Index: 176

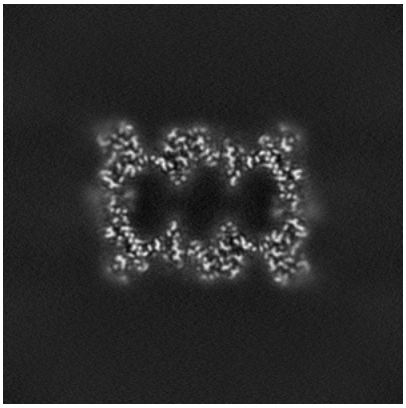
6.2.2 Raw map



X Index: 176



Y Index: 176

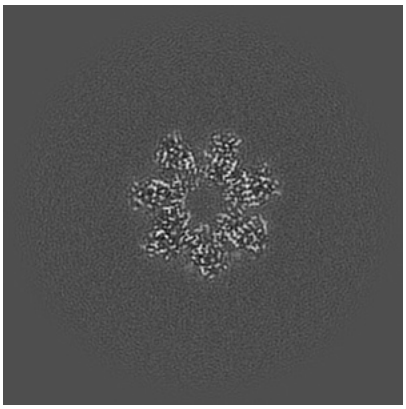


Z Index: 176

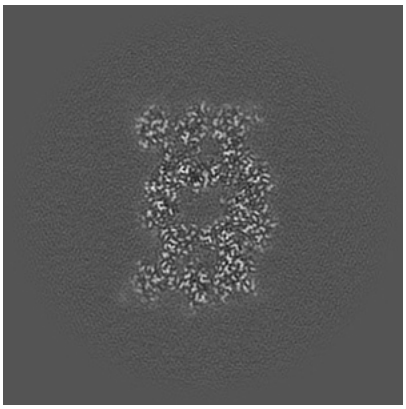
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

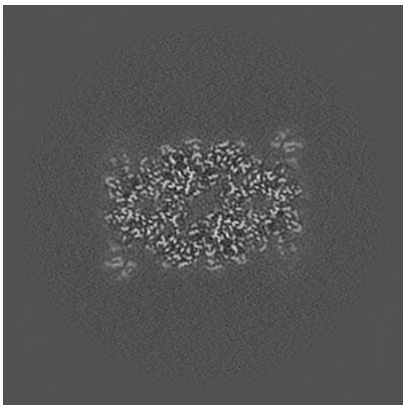
6.3.1 Primary map



X Index: 199

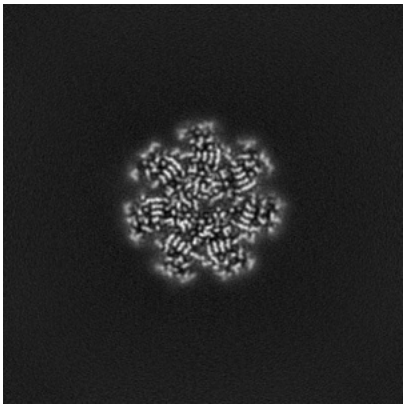


Y Index: 148

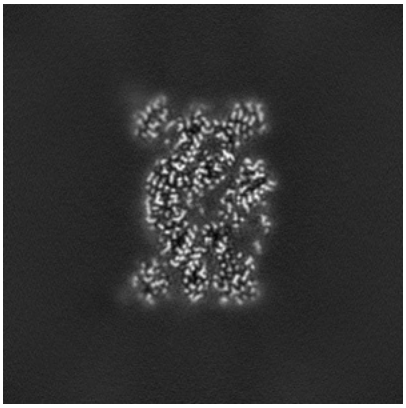


Z Index: 145

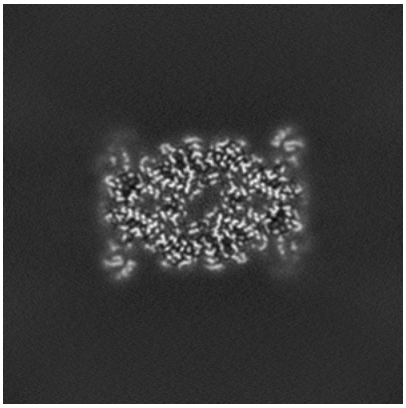
6.3.2 Raw map



X Index: 107



Y Index: 143

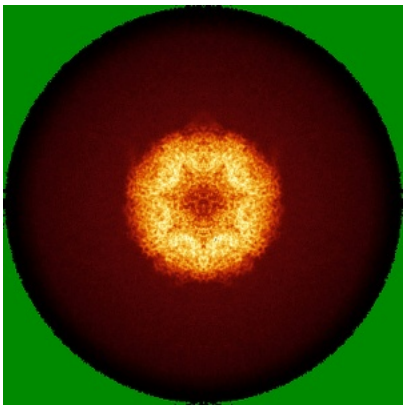


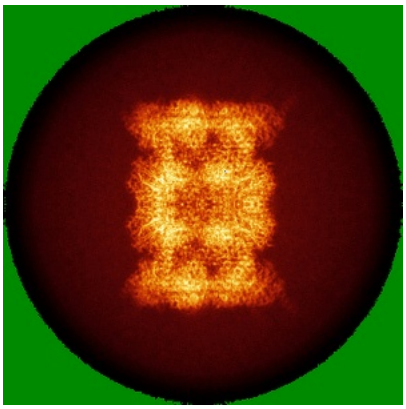
Z Index: 145

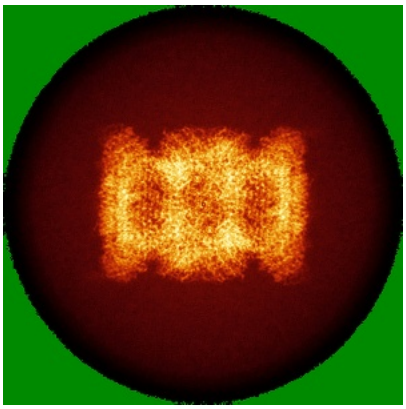
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

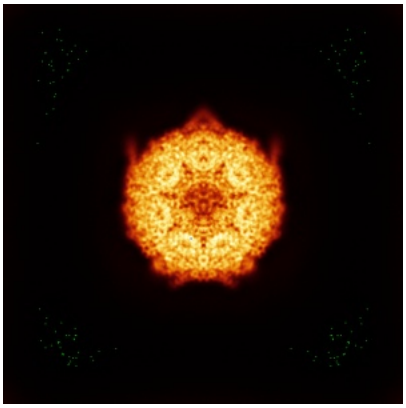
6.4.1 Primary map

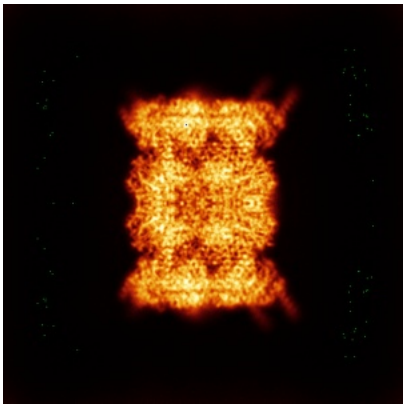

X

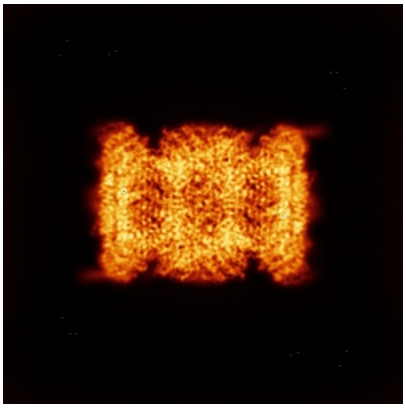

Y


Z

6.4.2 Raw map


X

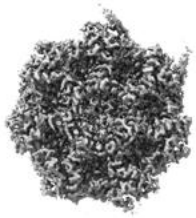

Y


Z

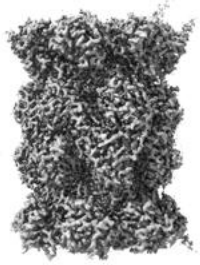
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

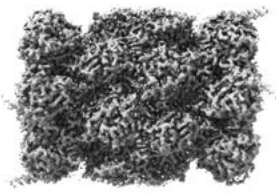
6.5.1 Primary map



X



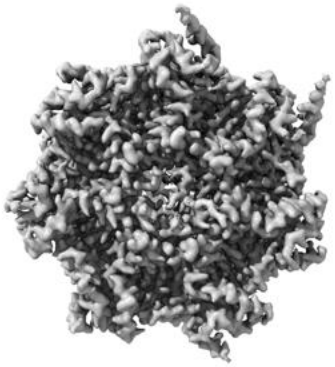
Y



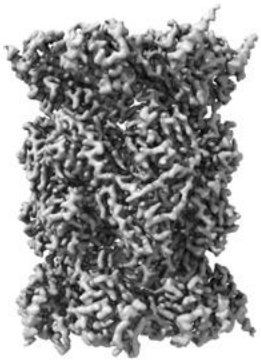
Z

The images above show the 3D surface view of the map at the recommended contour level 0.45. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

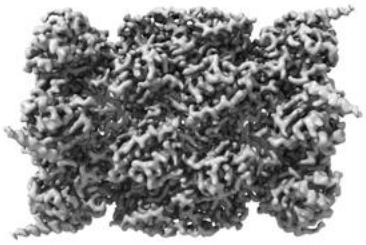
6.5.2 Raw map



X



Y



Z

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.

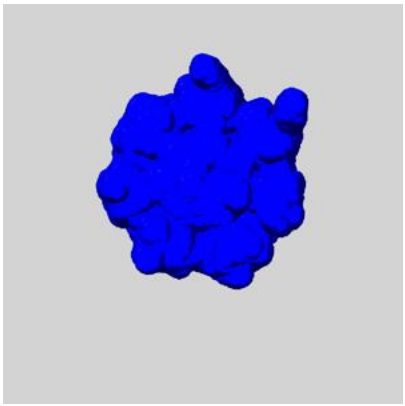
6.6 Mask visualisation (i)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

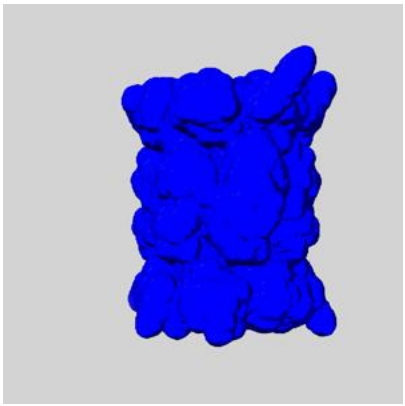
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

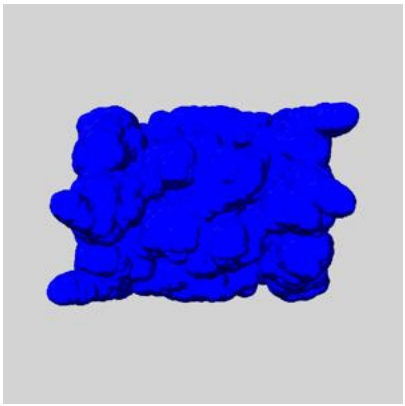
6.6.1 emd_29603_msk_1.map (i)



X



Y

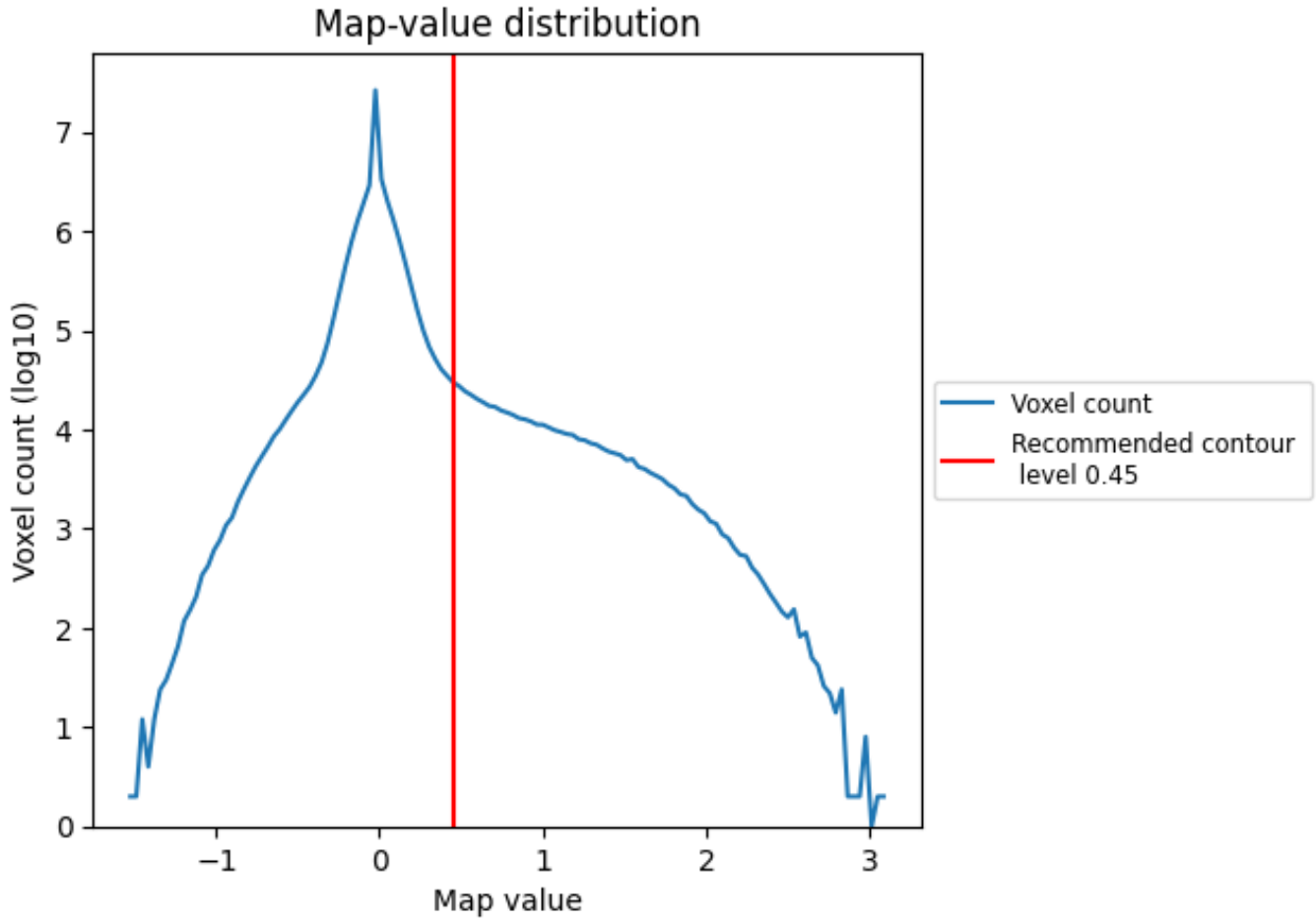


Z

7 Map analysis

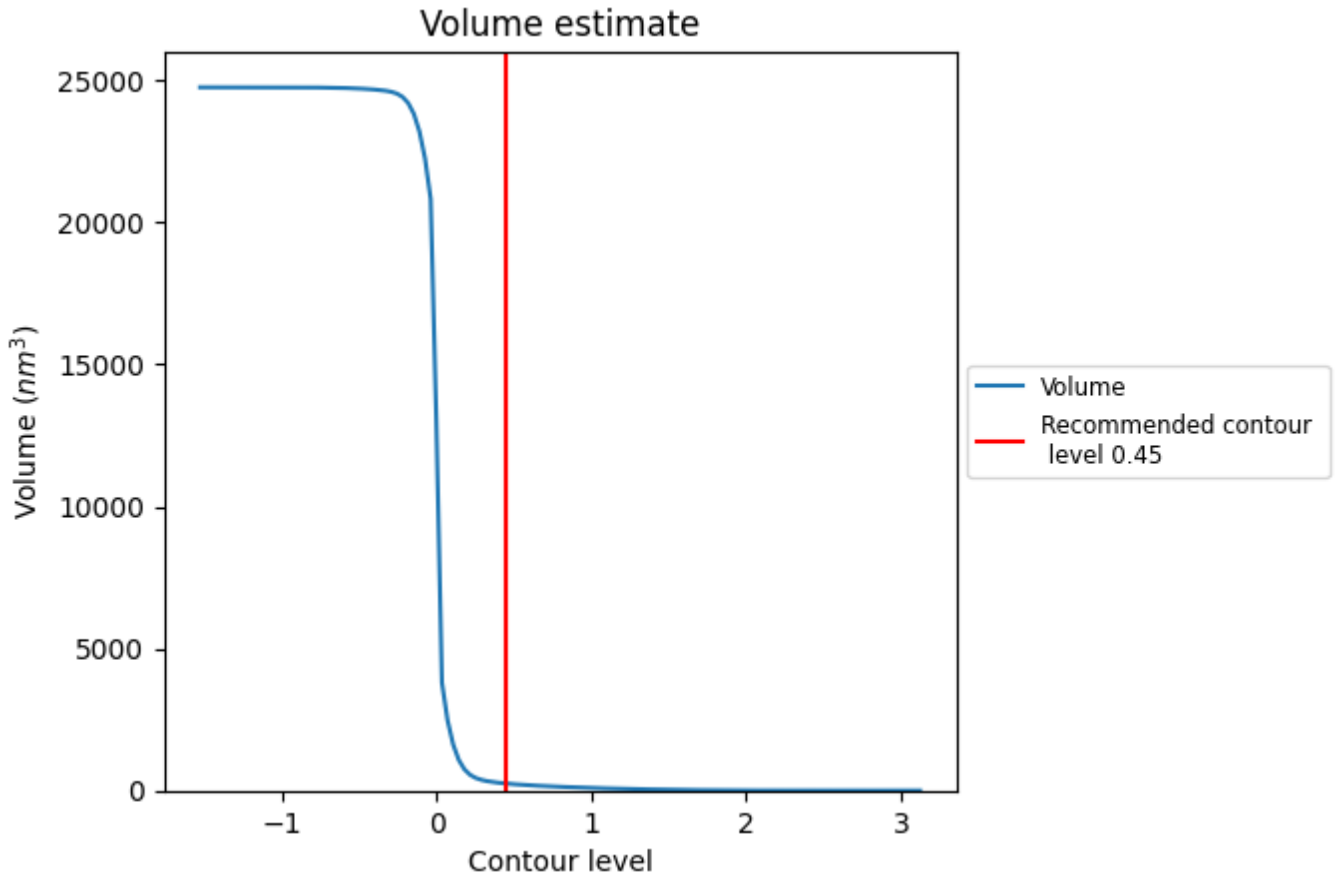
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

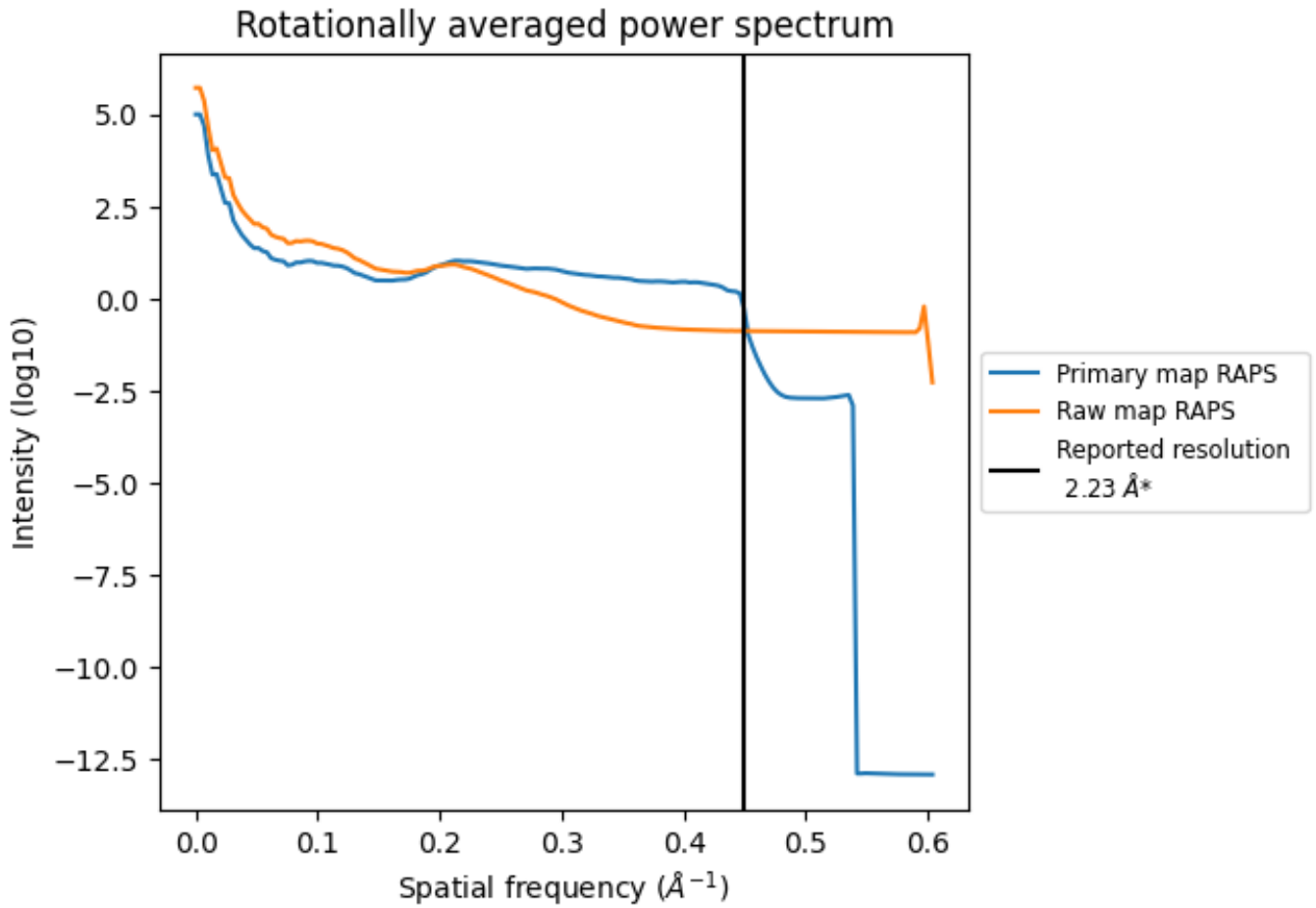
7.2 Volume estimate



The volume at the recommended contour level is 248 nm^3; this corresponds to an approximate mass of 224 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 (i)

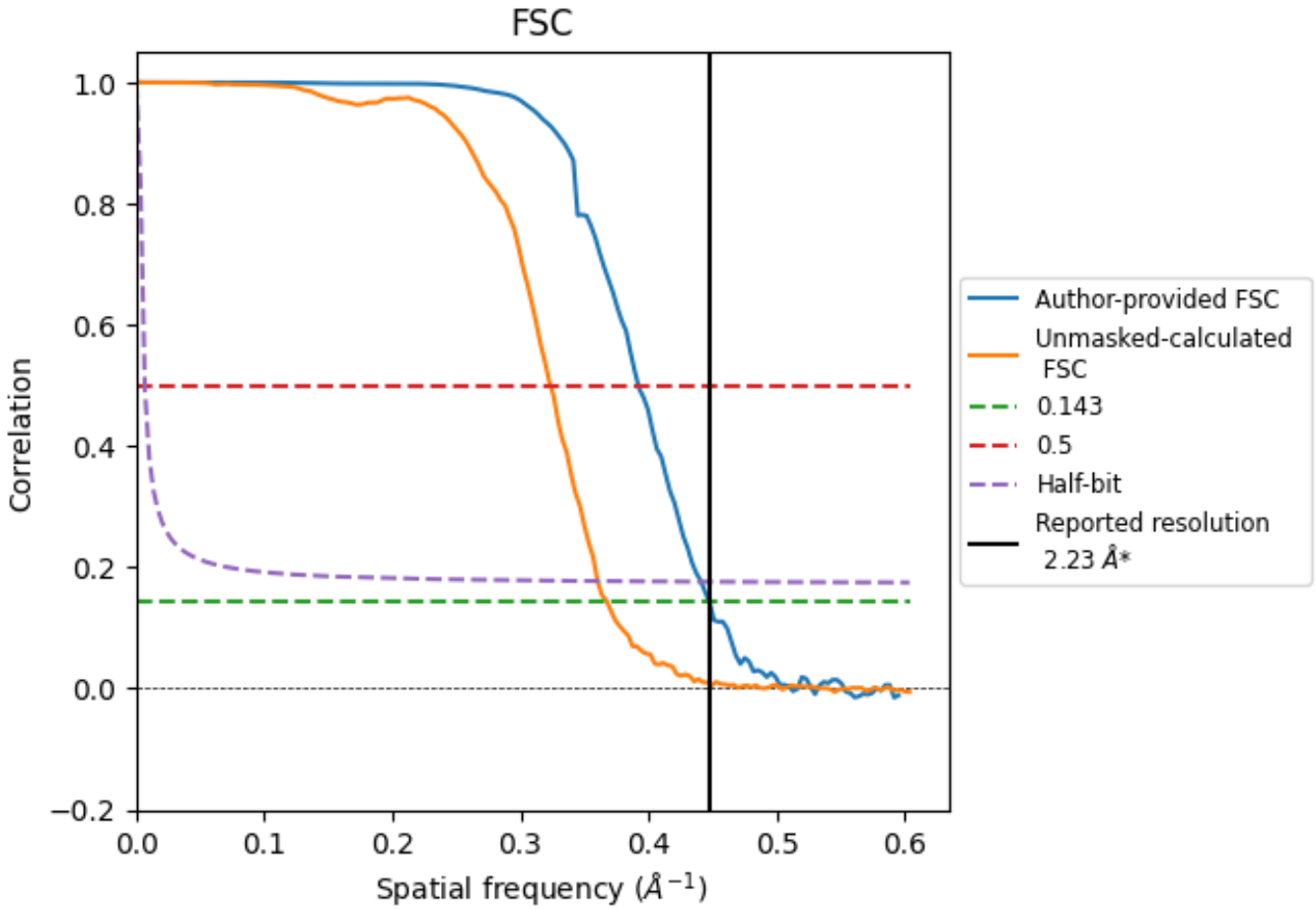


*Reported resolution corresponds to spatial frequency of 0.448 $Å^{-1}$

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.448 Å^{-1}

8.2 Resolution estimates (i)

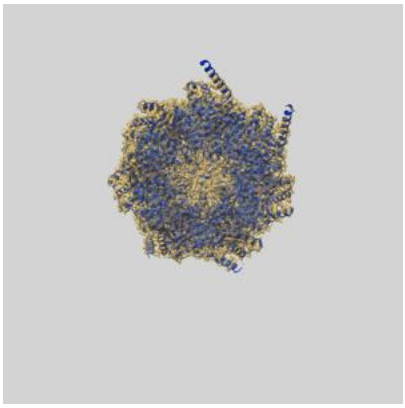
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.23	-	-
Author-provided FSC curve	2.23	2.55	2.27
Unmasked-calculated*	2.72	3.09	2.78

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 2.72 differs from the reported value 2.23 by more than 10 %

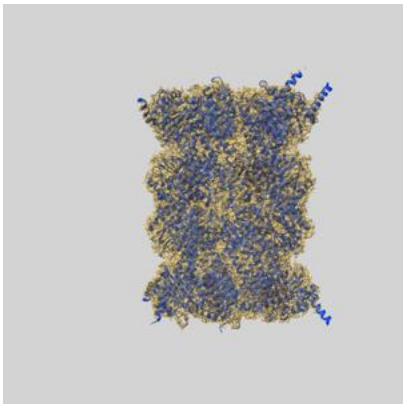
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-29603 and PDB model 8FZ5. Per-residue inclusion information can be found in section 3 on page 7.

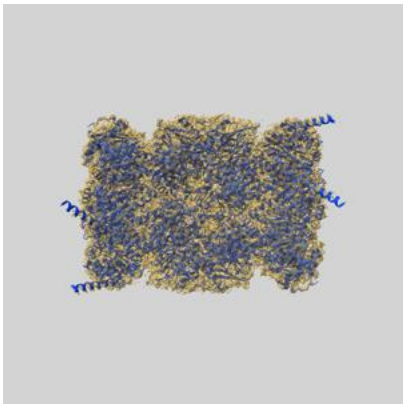
9.1 Map-model overlay



X



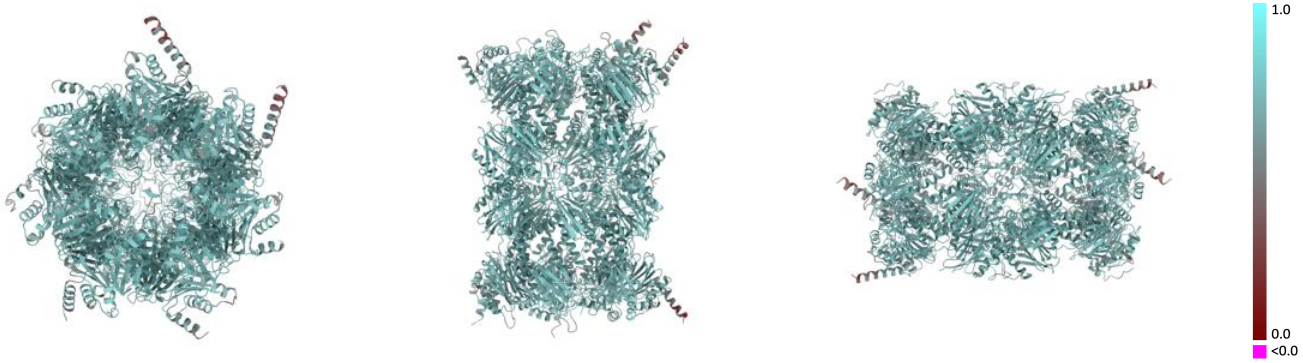
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.45 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.

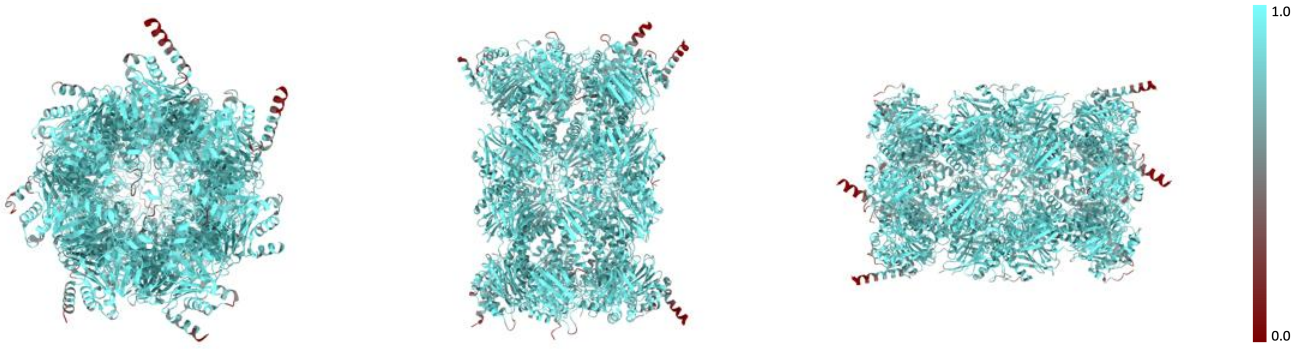
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according 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.

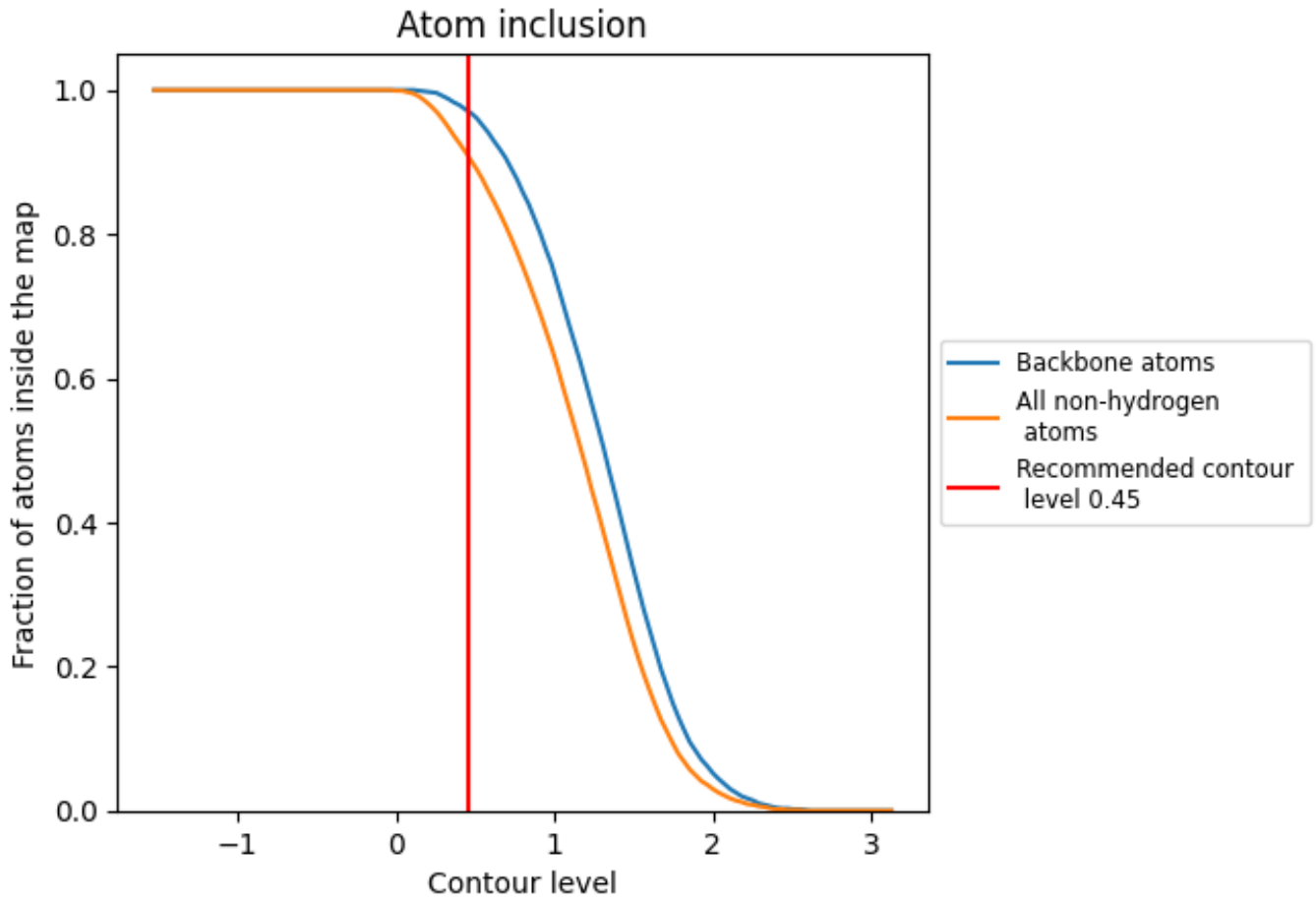
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.45).

9.4 Atom inclusion (i)



At the recommended contour level, 97% of all backbone atoms, 91% 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 (0.45) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9100	0.6920
A	0.8720	0.6790
B	0.9020	0.6860
C	0.8570	0.6650
D	0.8390	0.6550
E	0.8830	0.6760
F	0.8930	0.6780
G	0.8850	0.6770
H	0.9550	0.7210
I	0.9430	0.7110
J	0.9520	0.7150
K	0.9460	0.7130
L	0.9670	0.7180
M	0.9390	0.7080
N	0.9530	0.7190
O	0.8700	0.6750
P	0.9020	0.6860
Q	0.8570	0.6650
R	0.8390	0.6530
S	0.8790	0.6740
T	0.8980	0.6790
U	0.8860	0.6790
V	0.9540	0.7200
W	0.9440	0.7110
X	0.9530	0.7150
Y	0.9440	0.7130
Z	0.9680	0.7180
a	0.9390	0.7080
b	0.9530	0.7170