Full wwPDB EM Validation Report ⓘ

Nov 2, 2024 – 09:13 AM EDT

PDB ID	:	8G6F
EMDB ID	:	EMD-29765
Title	:	Structure of the Plasmodium falciparum 20S proteasome beta-6 A117D mutant complexed with inhibitor WLW-vs
Authors	:	Hsu, H.-C.; Li, H.
Deposited on	:	2023-02-15
Resolution	:	2.58 Å(reported)
Based on initial model	:	8G6E

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:

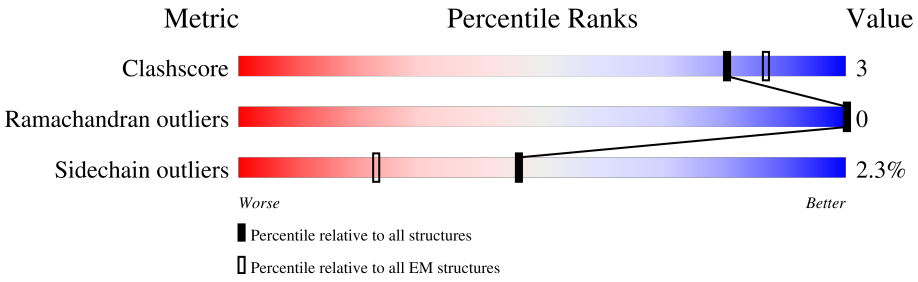
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 2.58 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	260	90% 7%
1	O	260	90% 7%
2	B	235	87% 10%
2	P	235	86% 10%
3	C	246	92% 7%
3	Q	246	89% 9%
4	D	241	90% 7%
4	R	241	5% 91% 7%

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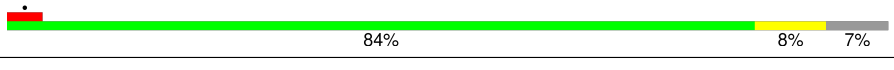
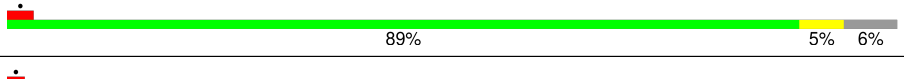
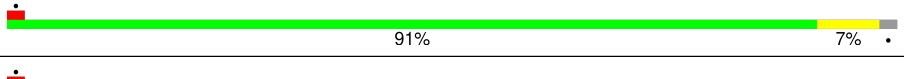
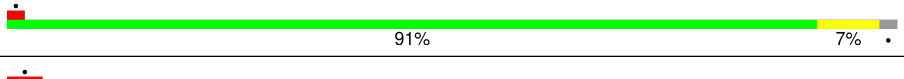
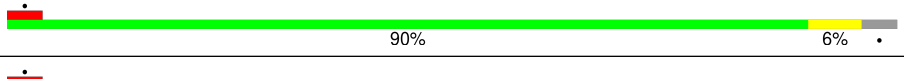
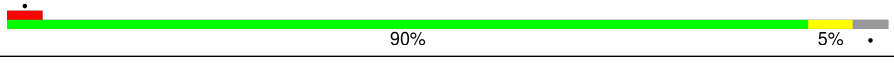
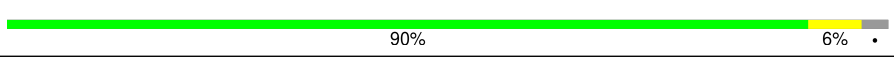
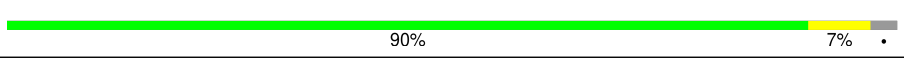
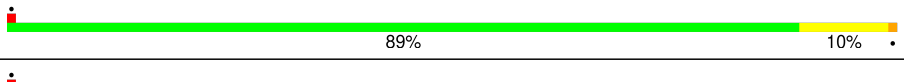
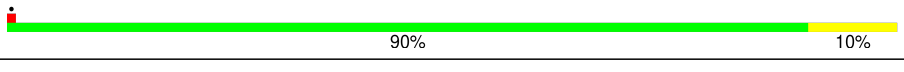
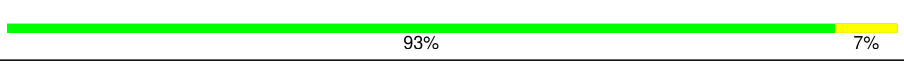
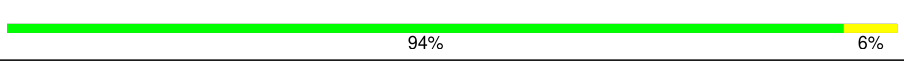
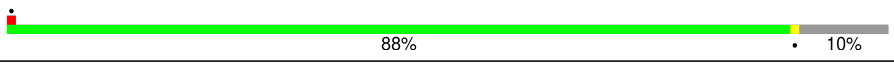
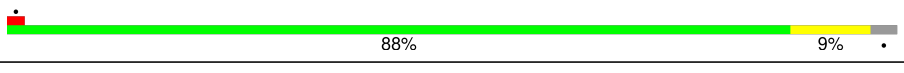
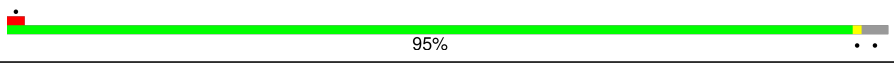
Mol	Chain	Length	Quality of chain
5	E	256	
5	S	256	
6	F	254	
6	T	254	
7	G	252	
7	U	252	
8	H	252	
8	V	252	
9	I	229	
9	W	229	
10	J	218	
10	X	218	
11	K	195	
11	Y	195	
12	L	211	
12	Z	211	
13	M	240	
13	a	240	
14	N	265	
14	b	265	

2 Entry composition (i)

There are 16 unique types of molecules in this entry. The entry contains 52394 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	253	Total	C	N	O	S	0	0
			2006	1259	337	395	15		
1	O	253	Total	C	N	O	S	0	0
			2006	1259	337	395	15		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	228	Total	C	N	O	S	0	0
			1817	1170	297	344	6		
2	P	228	Total	C	N	O	S	0	0
			1817	1170	297	344	6		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	243	Total	C	N	O	S	0	0
			1946	1246	316	380	4		
3	Q	243	Total	C	N	O	S	0	0
			1946	1246	316	380	4		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	236	Total	C	N	O	S	0	0
			1870	1192	318	352	8		
4	R	236	Total	C	N	O	S	0	0
			1870	1192	318	352	8		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	237	Total	C	N	O	S	0	0
			1829	1151	304	363	11		
5	S	237	Total	C	N	O	S	0	0
			1829	1151	304	363	11		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	239	Total	C	N	O	S	0	0
			1897	1204	313	369	11		
6	T	239	Total	C	N	O	S	0	0
			1897	1204	313	369	11		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	247	Total	C	N	O	S	0	0
			2025	1289	338	385	13		
7	U	247	Total	C	N	O	S	0	0
			2025	1289	338	385	13		

- Molecule 8 is a protein called Proteasome endopeptidase complex.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	241	Total	C	N	O	S	0	0
			1950	1237	330	371	12		
8	V	241	Total	C	N	O	S	0	0
			1950	1237	330	371	12		

- Molecule 9 is a protein called Proteasome subunit beta-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	221	Total	C	N	O	S	0	0
			1693	1070	294	315	14		
9	W	221	Total	C	N	O	S	0	0
			1693	1070	294	315	14		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	211	Total	C	N	O	S	0	0
			1661	1061	270	316	14		

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Mol	Chain	Residues	Atoms					AltConf	Trace
10	X	211	Total	C	N	O	S	0	0
			1662	1061	271	316	14		

- Molecule 11 is a protein called Proteasome subunit beta-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	195	Total	C	N	O	S	0	0
			1613	1042	266	297	8		
11	Y	195	Total	C	N	O	S	0	0
			1613	1042	266	297	8		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	211	Total	C	N	O	S	0	0
			1662	1060	275	319	8		
12	Z	211	Total	C	N	O	S	0	0
			1662	1060	275	319	8		

- Molecule 13 is a protein called Proteasome subunit beta-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	215	Total	C	N	O	S	1	0
			1725	1106	286	326	7		
13	a	215	Total	C	N	O	S	1	0
			1725	1106	286	326	7		

There are 2 discrepancies between the modelled and reference sequences:

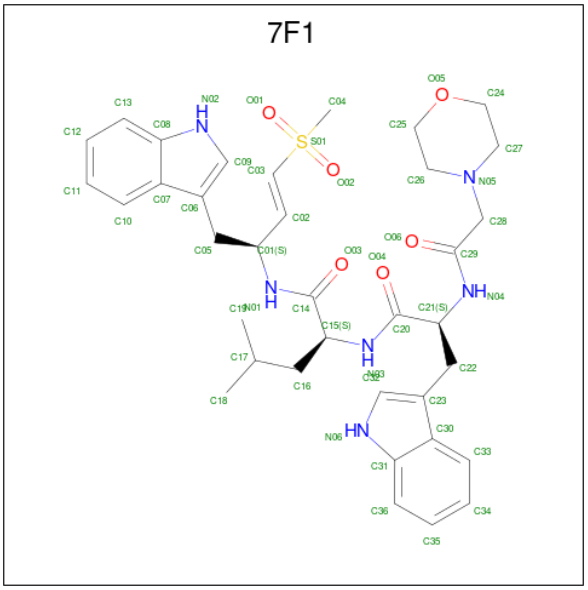
Chain	Residue	Modelled	Actual	Comment	Reference
M	117	ASP	ALA	engineered mutation	UNP A0A2I0BU46
a	117	ASP	ALA	engineered mutation	UNP A0A2I0BU46

- Molecule 14 is a protein called Proteasome subunit beta-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	256	Total	C	N	O	S	1	0
			2105	1342	357	396	10		
14	b	256	Total	C	N	O	S	1	0
			2105	1342	357	396	10		

- Molecule 15 is (2S)-N-[(E,2S)-1-(1H-indol-3-yl)-4-methylsulfonyl-but-3-en-2-yl]-2-[[(2S)-

3-(1H-indol-3-yl)-2-(2-morpholin-4-ylethanoylamino)propanoyl]amino]-4-methyl-pentanamide (three-letter code: 7F1) (formula: $C_{36}H_{46}N_6O_6S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	AltConf
15	I	1	Total C N O S 49 36 6 6 1	0
15	L	1	Total C N O S 49 36 6 6 1	0
15	W	1	Total C N O S 49 36 6 6 1	0
15	Z	1	Total C N O S 49 36 6 6 1	0

- Molecule 16 is water.

Mol	Chain	Residues	Atoms	AltConf
16	A	13	Total O 13 13	0
16	B	19	Total O 19 19	0
16	C	10	Total O 10 10	0
16	D	7	Total O 7 7	0
16	E	10	Total O 10 10	0
16	F	19	Total O 19 19	0

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Mol	Chain	Residues	Atoms	AltConf
16	G	44	Total O 44 44	0
16	H	38	Total O 38 38	0
16	I	26	Total O 26 26	0
16	J	28	Total O 28 28	0
16	K	25	Total O 25 25	0
16	L	18	Total O 18 18	0
16	M	21	Total O 21 21	0
16	N	35	Total O 35 35	0
16	O	17	Total O 17 17	0
16	P	13	Total O 13 13	0
16	Q	9	Total O 9 9	0
16	R	8	Total O 8 8	0
16	S	12	Total O 12 12	0
16	T	16	Total O 16 16	0
16	U	21	Total O 21 21	0
16	V	32	Total O 32 32	0
16	W	28	Total O 28 28	0
16	X	32	Total O 32 32	0
16	Y	25	Total O 25 25	0
16	Z	12	Total O 12 12	0
16	a	22	Total O 22 22	0

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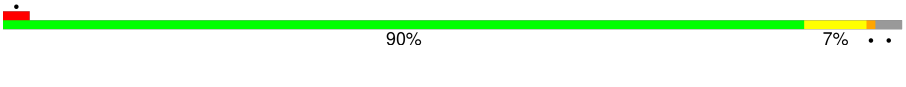
Mol	Chain	Residues	Atoms		AltConf
16	b	39	Total	O	0
			39	39	

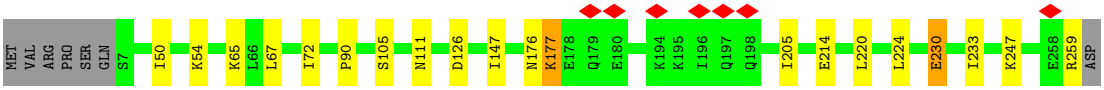
3 Residue-property plots (i)

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

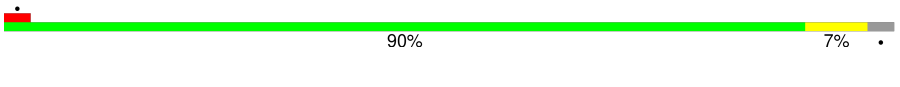
Chain A:

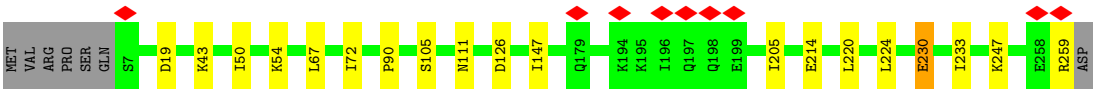




• Molecule 1: Proteasome subunit alpha type-6

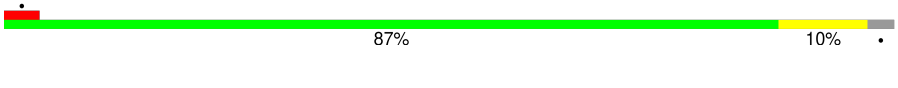
Chain O:

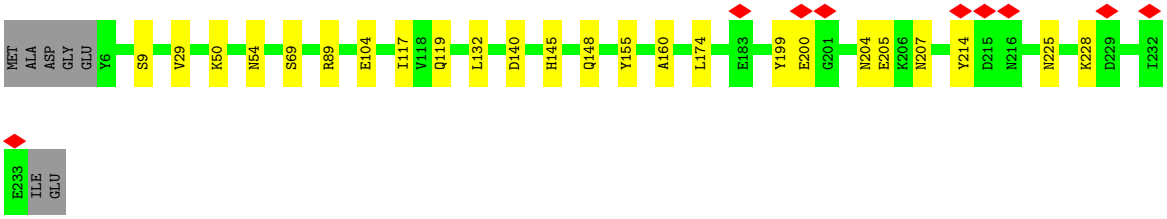




• Molecule 2: Proteasome subunit alpha type-2

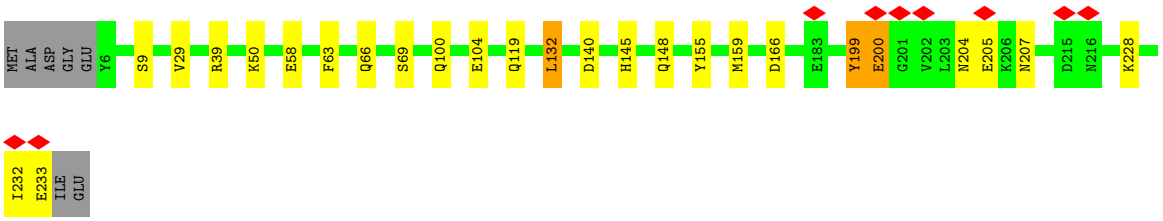
Chain B:





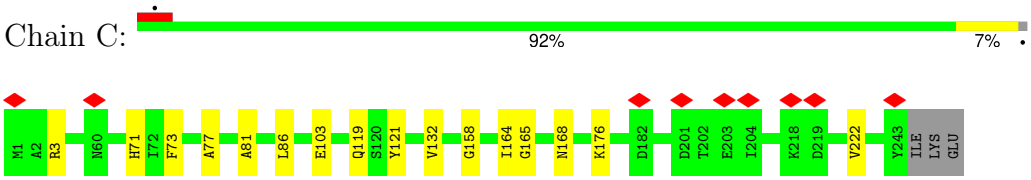
• Molecule 2: Proteasome subunit alpha type-2

Chain P:



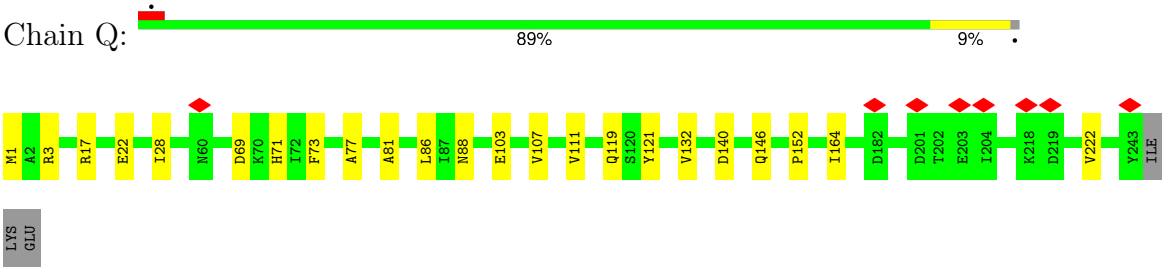
• Molecule 3: Proteasome subunit alpha type-3

Chain C:



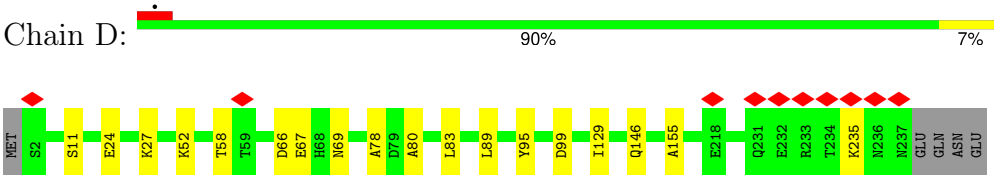
• Molecule 3: Proteasome subunit alpha type-3

Chain Q:



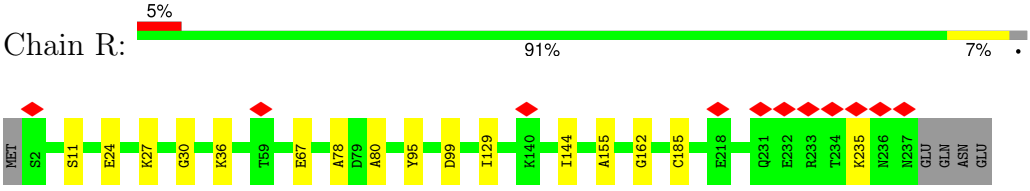
• Molecule 4: Proteasome subunit alpha type-4

Chain D:



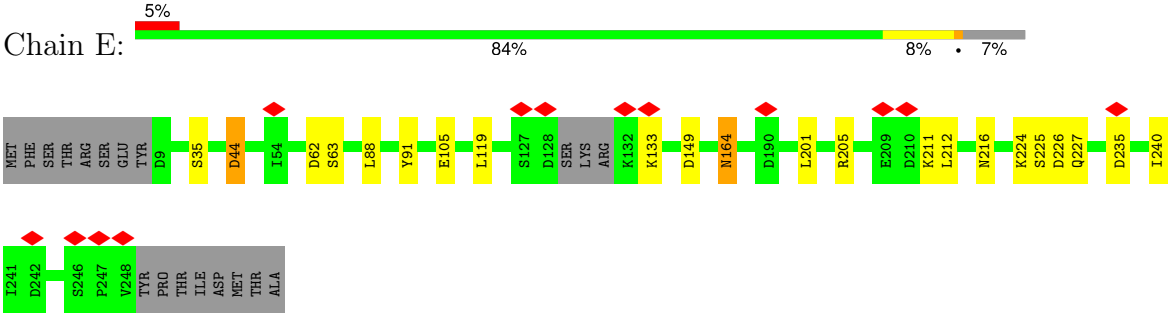
• Molecule 4: Proteasome subunit alpha type-4

Chain R:



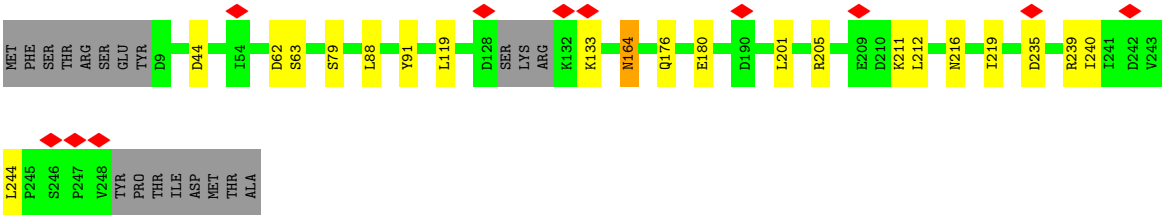
• Molecule 5: Proteasome subunit alpha type-5

Chain E:



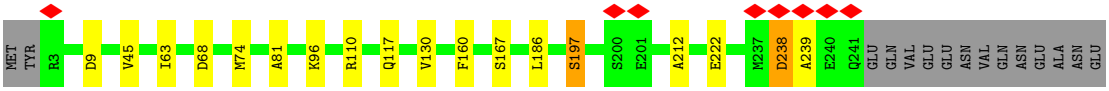
• Molecule 5: Proteasome subunit alpha type-5

Chain S:



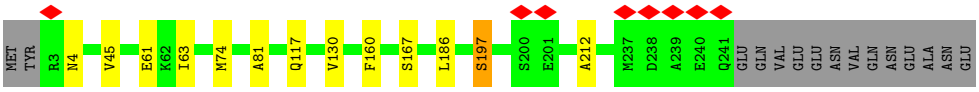
• Molecule 6: Proteasome subunit alpha type-1

Chain F:



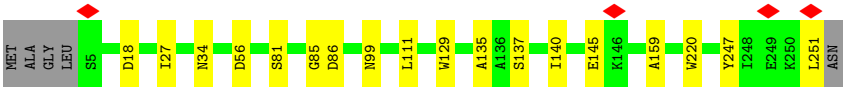
• Molecule 6: Proteasome subunit alpha type-1

Chain T:



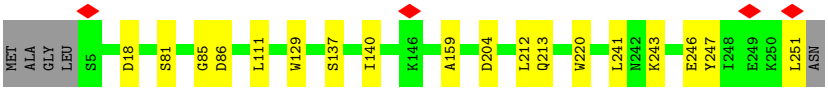
• Molecule 7: Proteasome subunit alpha type-3

Chain G:



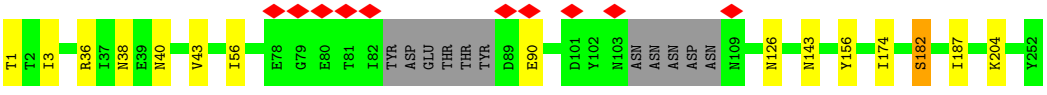
• Molecule 7: Proteasome subunit alpha type-3

Chain U:



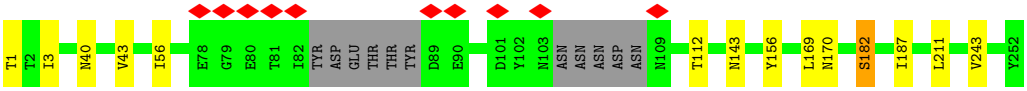
• Molecule 8: Proteasome endopeptidase complex

Chain H:



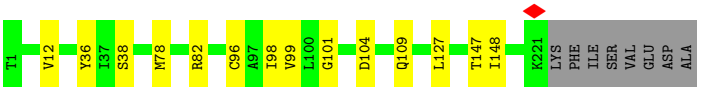
• Molecule 8: Proteasome endopeptidase complex

Chain V:



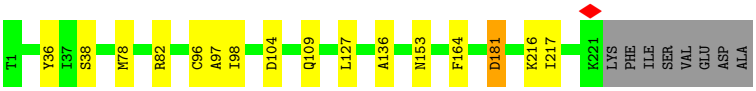
• Molecule 9: Proteasome subunit beta-2

Chain I:



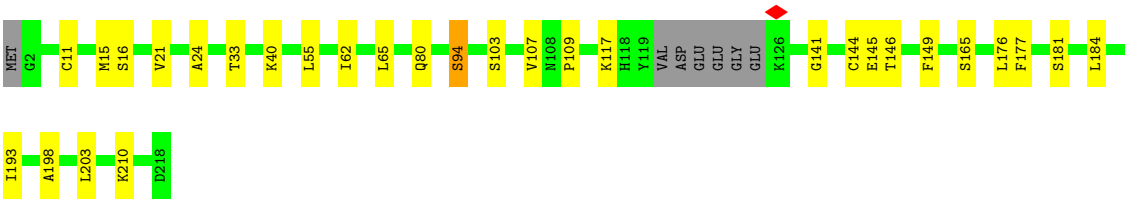
• Molecule 9: Proteasome subunit beta-2

Chain W:



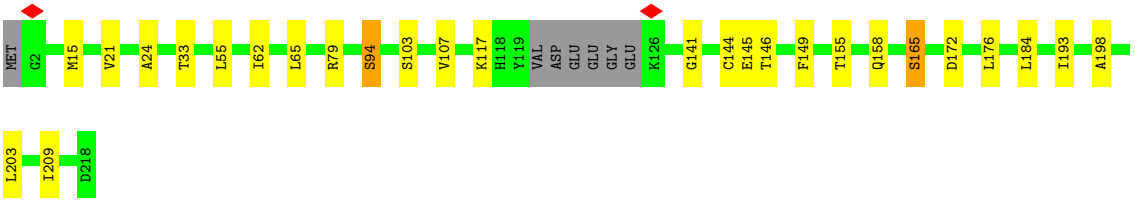
• Molecule 10: Proteasome subunit beta-3

Chain J:



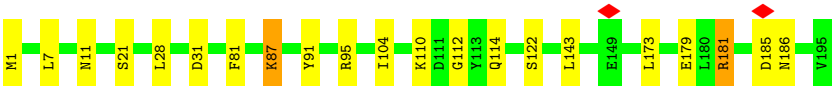
• Molecule 10: Proteasome subunit beta-3

Chain X:



• Molecule 11: Proteasome subunit beta-4

Chain K:

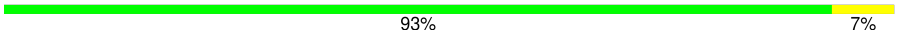


• Molecule 11: Proteasome subunit beta-4

Chain Y:

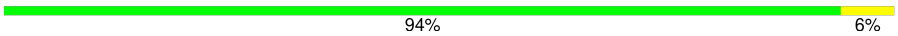
• Molecule 12: Proteasome subunit beta-5

Chain L:



• Molecule 12: Proteasome subunit beta-5

Chain Z:

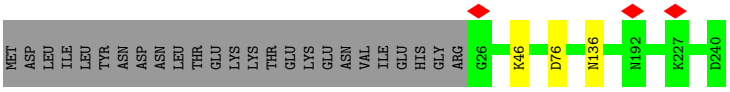


• Molecule 13: Proteasome subunit beta-6

Chain M:

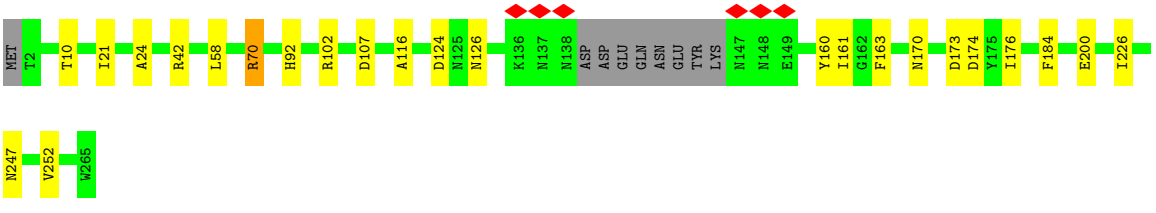
• Molecule 13: Proteasome subunit beta-6

Chain a:



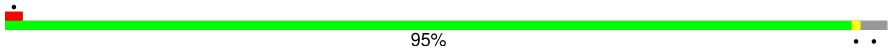
• Molecule 14: Proteasome subunit beta-7

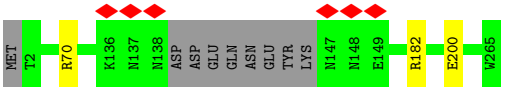
Chain N:



• Molecule 14: Proteasome subunit beta-7

Chain b:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	74883	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	2.545	Depositor
Minimum map value	-1.158	Depositor
Average map value	0.013	Depositor
Map value standard deviation	0.118	Depositor
Recommended contour level	0.48	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

Bond lengths and bond angles in the following residue types are not validated in this section: 7F1

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	0.29	0/2033	0.48	0/2741
1	O	0.30	0/2033	0.48	0/2741
2	B	0.30	0/1851	0.47	0/2500
2	P	0.30	0/1851	0.47	0/2500
3	C	0.31	0/1982	0.47	0/2683
3	Q	0.31	0/1982	0.47	0/2683
4	D	0.29	0/1900	0.47	0/2563
4	R	0.29	0/1900	0.47	0/2563
5	E	0.29	0/1853	0.48	0/2502
5	S	0.29	0/1853	0.49	0/2502
6	F	0.30	0/1931	0.45	0/2600
6	T	0.30	0/1931	0.45	0/2600
7	G	0.31	0/2069	0.47	0/2796
7	U	0.31	0/2069	0.46	0/2796
8	H	0.32	0/1982	0.49	0/2662
8	V	0.32	0/1982	0.48	0/2662
9	I	0.32	0/1729	0.50	0/2350
9	W	0.32	0/1729	0.49	0/2350
10	J	0.33	0/1689	0.49	0/2278
10	X	0.33	0/1690	0.49	0/2279
11	K	0.33	0/1648	0.49	0/2223
11	Y	0.33	0/1648	0.49	0/2223
12	L	0.32	0/1696	0.49	0/2286
12	Z	0.33	0/1696	0.49	0/2286
13	M	0.31	0/1759	0.49	0/2382
13	a	0.31	0/1759	0.49	0/2382
14	N	0.32	0/2151	0.50	0/2910
14	b	0.33	0/2151	0.50	0/2910
All	All	0.31	0/52547	0.48	0/70953

There are no bond length outliers.

There are no bond angle outliers.

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	2006	0	2003	9	0
1	O	2006	0	2003	9	0
2	B	1817	0	1838	13	0
2	P	1817	0	1838	16	0
3	C	1946	0	1944	12	0
3	Q	1946	0	1944	13	0
4	D	1870	0	1903	11	0
4	R	1870	0	1903	7	0
5	E	1829	0	1835	14	0
5	S	1829	0	1835	11	0
6	F	1897	0	1892	8	0
6	T	1897	0	1892	7	0
7	G	2025	0	1973	10	0
7	U	2025	0	1973	9	0
8	H	1950	0	1935	8	0
8	V	1950	0	1935	8	0
9	I	1693	0	1697	6	0
9	W	1693	0	1697	10	0
10	J	1661	0	1656	13	0
10	X	1662	0	1658	18	0
11	K	1613	0	1584	11	0
11	Y	1613	0	1584	10	0
12	L	1662	0	1617	6	0
12	Z	1662	0	1617	8	0
13	M	1725	0	1726	8	0
13	a	1725	0	1726	0	0
14	N	2105	0	2062	15	0
14	b	2105	0	2062	0	0
15	I	49	0	0	0	0
15	L	49	0	0	0	0
15	W	49	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
15	Z	49	0	0	0	0
16	A	13	0	0	0	0
16	B	19	0	0	0	0
16	C	10	0	0	0	0
16	D	7	0	0	0	0
16	E	10	0	0	0	0
16	F	19	0	0	0	0
16	G	44	0	0	0	0
16	H	38	0	0	1	0
16	I	26	0	0	0	0
16	J	28	0	0	0	0
16	K	25	0	0	0	0
16	L	18	0	0	0	0
16	M	21	0	0	0	0
16	N	35	0	0	0	0
16	O	17	0	0	0	0
16	P	13	0	0	0	0
16	Q	9	0	0	0	0
16	R	8	0	0	0	0
16	S	12	0	0	0	0
16	T	16	0	0	0	0
16	U	21	0	0	0	0
16	V	32	0	0	0	0
16	W	28	0	0	1	0
16	X	32	0	0	0	0
16	Y	25	0	0	0	0
16	Z	12	0	0	0	0
16	a	22	0	0	0	0
16	b	39	0	0	0	0
All	All	52394	0	51332	234	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 3.

All (234) 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)
5:E:224:LYS:O	5:E:227:GLN:NE2	2.24	0.71
3:Q:1:MET:SD	3:Q:3:ARG:NH1	2.64	0.71
9:I:104:ASP:OD1	9:I:109:GLN:NE2	2.27	0.68
1:O:43:LYS:NZ	2:P:58:GLU:OE2	2.28	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:68:ASP:OD2	6:F:96:LYS:NZ	2.27	0.66
3:C:103:GLU:OE2	11:K:110:LYS:NZ	2.28	0.66
11:Y:91:TYR:O	11:Y:95:ARG:NH1	2.29	0.65
11:K:91:TYR:O	11:K:95:ARG:NH1	2.31	0.64
1:A:111:ASN:OD1	9:I:82:ARG:NH2	2.32	0.63
1:O:111:ASN:OD1	9:W:82:ARG:NH2	2.32	0.63
7:U:247:TYR:CZ	7:U:251:LEU:HD21	2.34	0.62
6:F:117:GLN:NE2	7:G:86:ASP:OD1	2.33	0.61
1:A:214:GLU:OE1	1:A:259:ARG:NH2	2.34	0.60
9:W:104:ASP:OD1	9:W:109:GLN:NE2	2.33	0.60
10:X:21:VAL:HG23	10:X:203:LEU:HB2	1.84	0.60
1:O:214:GLU:OE1	1:O:259:ARG:NH2	2.33	0.60
5:S:91:TYR:CG	5:S:119:LEU:HD22	2.38	0.59
10:X:94:SER:OG	10:X:141:GLY:O	2.21	0.59
4:R:99:ASP:OD2	12:Z:120:LYS:NZ	2.36	0.58
10:J:94:SER:OG	10:J:141:GLY:O	2.21	0.58
2:P:119:GLN:HG3	3:Q:81:ALA:HB1	1.86	0.58
1:A:54:LYS:HG3	1:A:230:GLU:HG2	1.85	0.58
10:J:21:VAL:HG23	10:J:203:LEU:HB2	1.86	0.58
11:K:112:GLY:O	11:K:114:GLN:NE2	2.36	0.58
11:Y:112:GLY:O	11:Y:114:GLN:NE2	2.36	0.58
13:M:66:ARG:NH2	9:W:164:PHE:O	2.37	0.58
5:E:91:TYR:CG	5:E:119:LEU:HD22	2.39	0.57
4:D:99:ASP:OD2	12:L:120:LYS:NZ	2.38	0.57
5:S:88:LEU:HD23	5:S:119:LEU:HD23	1.87	0.57
10:J:65:LEU:HD22	10:J:107:VAL:HG11	1.86	0.57
8:H:36:ARG:NH1	16:H:302:HOH:O	2.33	0.57
5:E:88:LEU:HD23	5:E:119:LEU:HD23	1.87	0.57
2:B:205:GLU:OE2	2:B:228:LYS:NZ	2.38	0.56
8:H:187:ILE:HG22	8:V:187:ILE:HG22	1.87	0.56
4:D:83:LEU:CD2	4:D:129:ILE:HD11	2.36	0.56
2:B:50:LYS:N	2:B:207:ASN:O	2.38	0.55
14:N:24:ALA:HB2	14:N:226:ILE:HD13	1.87	0.55
2:P:50:LYS:N	2:P:207:ASN:O	2.39	0.55
2:B:119:GLN:HG3	3:C:81:ALA:HB1	1.87	0.55
10:X:65:LEU:HD22	10:X:107:VAL:HG11	1.88	0.55
14:N:161:ILE:HG22	14:N:176:ILE:HG13	1.89	0.55
7:G:18:ASP:OD1	7:G:18:ASP:N	2.40	0.55
14:N:10:THR:O	14:N:42:ARG:NH1	2.40	0.55
3:C:119:GLN:HG3	4:D:78:ALA:HB1	1.89	0.54
12:Z:34:ILE:HG12	12:Z:44:THR:HG22	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:M:163:HIS:NE2	13:M:178:ASP:OD1	2.38	0.54
13:M:204:ASP:OD2	10:X:165:SER:OG	2.25	0.54
6:T:117:GLN:NE2	7:U:86:ASP:OD1	2.41	0.54
5:E:211:LYS:O	5:E:216:ASN:ND2	2.40	0.53
5:S:205:ARG:HB2	5:S:212:LEU:HD22	1.90	0.53
14:N:92:HIS:ND1	14:N:160:TYR:OH	2.41	0.53
3:Q:119:GLN:HG3	4:R:78:ALA:HB1	1.89	0.53
3:Q:140:ASP:OD1	3:Q:146:GLN:NE2	2.41	0.53
3:C:176:LYS:O	4:D:52:LYS:NZ	2.42	0.52
2:P:119:GLN:CG	3:Q:81:ALA:HB1	2.40	0.52
11:Y:179:GLU:OE2	11:Y:181:ARG:NH1	2.38	0.52
2:B:119:GLN:CG	3:C:81:ALA:HB1	2.39	0.52
13:M:75:THR:HG22	13:M:76:ASP:N	2.25	0.52
2:P:29:VAL:HG22	2:P:132:LEU:HA	1.92	0.52
14:N:102:ARG:NH1	14:N:107:ASP:O	2.42	0.52
4:D:83:LEU:HD23	4:D:129:ILE:HD11	1.91	0.52
3:Q:17:ARG:NH1	3:Q:22:GLU:OE2	2.43	0.52
4:D:155:ALA:HB3	5:E:63:SER:HB3	1.92	0.51
3:C:86:LEU:HD12	3:C:132:VAL:HG11	1.91	0.51
13:M:82:SER:HB2	13:M:89:ILE:HG23	1.93	0.51
2:B:29:VAL:HG22	2:B:132:LEU:HA	1.92	0.51
6:F:63:ILE:HD12	6:F:212:ALA:HB2	1.93	0.50
4:D:80:ALA:HA	4:D:129:ILE:HD13	1.94	0.50
1:O:54:LYS:HG3	1:O:230:GLU:HG2	1.93	0.49
5:E:201:LEU:HD22	5:E:212:LEU:HD21	1.94	0.49
12:Z:105:ASP:OD1	12:Z:105:ASP:N	2.45	0.49
13:M:75:THR:HG22	13:M:76:ASP:H	1.77	0.49
5:S:201:LEU:HD12	5:S:240:ILE:HG22	1.95	0.49
8:H:174:ILE:HD11	14:N:58:LEU:HD21	1.95	0.49
10:J:24:ALA:HB1	10:J:184:LEU:HD22	1.95	0.49
5:E:201:LEU:HD12	5:E:240:ILE:HG22	1.95	0.48
5:E:205:ARG:HB2	5:E:212:LEU:HD22	1.94	0.48
1:A:90:PRO:HG2	7:G:159:ALA:HB2	1.96	0.48
3:Q:103:GLU:OE2	11:Y:110:LYS:NZ	2.46	0.48
2:P:205:GLU:OE2	2:P:228:LYS:NZ	2.46	0.48
1:O:67:LEU:HD21	1:O:72:ILE:HD11	1.96	0.48
4:R:155:ALA:HB3	5:S:63:SER:HB3	1.96	0.48
10:J:33:THR:O	10:J:193:ILE:HG22	2.14	0.48
10:X:33:THR:O	10:X:193:ILE:HG22	2.14	0.47
2:B:140:ASP:OD1	2:B:145:HIS:NE2	2.46	0.47
10:J:184:LEU:HD23	10:J:198:ALA:HB1	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:S:211:LYS:O	5:S:216:ASN:ND2	2.44	0.47
8:H:40:ASN:ND2	8:H:156:TYR:O	2.46	0.47
6:F:45:VAL:HG23	6:F:186:LEU:HD23	1.95	0.47
5:S:91:TYR:CD2	5:S:119:LEU:HD22	2.50	0.47
1:O:90:PRO:HG2	7:U:159:ALA:HB2	1.96	0.47
2:P:204:ASN:OD1	2:P:204:ASN:N	2.48	0.47
11:K:81:PHE:CE2	11:K:104:ILE:HG23	2.50	0.47
11:K:179:GLU:OE2	11:K:181:ARG:NH1	2.42	0.47
7:U:18:ASP:OD1	7:U:18:ASP:N	2.41	0.47
10:X:103:SER:O	10:X:103:SER:OG	2.30	0.47
11:Y:81:PHE:CE2	11:Y:104:ILE:HG23	2.50	0.47
8:H:43:VAL:HG11	8:H:56:ILE:HD12	1.98	0.46
11:K:173:LEU:HD23	11:Y:173:LEU:HD23	1.97	0.46
13:M:41:ILE:HD11	13:M:173:ILE:HD13	1.96	0.46
6:T:63:ILE:HD12	6:T:212:ALA:HB2	1.97	0.46
7:U:111:LEU:HD11	7:U:140:ILE:HG22	1.97	0.46
14:N:124:ASP:OD2	14:N:126:ASN:ND2	2.48	0.46
4:R:24:GLU:OE2	4:R:27:LYS:NZ	2.37	0.46
5:S:201:LEU:HB3	5:S:244:LEU:HD11	1.98	0.46
2:B:69:SER:OG	2:B:104:GLU:OE2	2.34	0.46
1:O:220:LEU:HD12	1:O:224:LEU:HD21	1.98	0.46
11:Y:7:LEU:HD13	11:Y:143:LEU:HD22	1.97	0.46
7:G:99:ASN:HA	14:N:70:ARG:HD2	1.98	0.46
10:X:15:MET:HB3	10:X:176:LEU:HD11	1.98	0.45
7:G:247:TYR:CE2	7:G:251:LEU:HD21	2.52	0.45
2:P:140:ASP:OD1	2:P:145:HIS:NE2	2.46	0.45
11:K:185:ASP:O	11:K:186:ASN:OD1	2.34	0.45
14:N:163:PHE:O	14:N:170:ASN:HA	2.16	0.45
1:A:177:LYS:H	1:A:177:LYS:HD2	1.81	0.45
5:E:91:TYR:CD2	5:E:119:LEU:HD22	2.50	0.45
11:K:31:ASP:N	11:K:31:ASP:OD1	2.49	0.45
10:J:15:MET:HB3	10:J:176:LEU:HD11	1.97	0.45
3:Q:88:ASN:OD1	10:X:79:ARG:NH1	2.49	0.45
6:T:45:VAL:HG23	6:T:186:LEU:HD23	1.98	0.45
10:J:103:SER:O	10:J:103:SER:OG	2.29	0.45
3:Q:107:VAL:O	3:Q:111:VAL:HG23	2.17	0.45
9:W:217:ILE:HD12	10:X:209:ILE:HG12	1.99	0.45
5:S:164:ASN:OD1	5:S:164:ASN:N	2.50	0.45
10:X:172:ASP:OD1	10:X:172:ASP:N	2.49	0.45
11:Y:185:ASP:O	11:Y:186:ASN:OD1	2.34	0.45
9:I:147:THR:HG22	9:I:148:ILE:N	2.32	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:R:36:LYS:HB2	4:R:144:ILE:HD12	1.98	0.44
7:G:247:TYR:CZ	7:G:251:LEU:HD21	2.53	0.44
4:R:80:ALA:HB2	4:R:129:ILE:CD1	2.47	0.44
2:P:63:PHE:HB3	2:P:66:GLN:OE1	2.18	0.44
9:W:96:CYS:HB3	9:W:98:ILE:HD11	1.99	0.44
12:Z:35:ILE:HD11	12:Z:56:GLU:HB3	2.00	0.44
5:E:225:SER:OG	5:E:226:ASP:N	2.50	0.44
2:P:132:LEU:O	2:P:132:LEU:HD12	2.17	0.44
10:X:184:LEU:HD23	10:X:198:ALA:HB1	1.99	0.44
11:Y:31:ASP:N	11:Y:31:ASP:OD1	2.51	0.44
1:A:220:LEU:HD12	1:A:224:LEU:HD21	1.99	0.44
3:C:77:ALA:HB3	3:C:164:ILE:HD12	1.99	0.44
9:I:96:CYS:HB3	9:I:98:ILE:HD11	2.00	0.43
11:K:87:LYS:HB2	11:K:87:LYS:HE2	1.54	0.43
7:U:247:TYR:CE1	7:U:251:LEU:HD21	2.53	0.43
9:W:217:ILE:CD1	10:X:209:ILE:HG23	2.48	0.43
1:A:67:LEU:HD21	1:A:72:ILE:HD11	2.00	0.43
5:E:201:LEU:HD12	5:E:240:ILE:CG2	2.48	0.43
5:S:176:GLN:NE2	5:S:180:GLU:OE2	2.51	0.43
4:D:66:ASP:OD2	4:D:69:ASN:ND2	2.50	0.43
11:K:7:LEU:HD13	11:K:143:LEU:HD22	1.98	0.43
14:N:21:ILE:HG21	14:N:116:ALA:HB1	2.01	0.43
3:C:71:HIS:HA	3:C:222:VAL:HG11	2.00	0.43
1:A:205:ILE:HG23	1:A:233:ILE:CD1	2.48	0.43
2:P:69:SER:OG	2:P:104:GLU:OE2	2.36	0.43
5:S:201:LEU:HD21	5:S:219:ILE:HD11	2.00	0.43
5:E:164:ASN:N	5:E:164:ASN:OD1	2.51	0.43
10:J:177:PHE:O	10:J:181:SER:OG	2.23	0.43
12:L:12:ILE:HD13	12:L:102:SER:HB3	2.00	0.43
1:O:205:ILE:HG23	1:O:233:ILE:CD1	2.49	0.43
2:P:228:LYS:O	2:P:232:ILE:HG12	2.19	0.43
8:V:43:VAL:HG11	8:V:56:ILE:HD12	1.99	0.43
8:H:3:ILE:HD11	8:H:182:SER:HB3	2.01	0.43
14:N:252:VAL:CG1	8:V:112:THR:HG22	2.48	0.43
3:Q:28:ILE:HD11	3:Q:152:PRO:HG3	2.01	0.43
5:E:149:ASP:N	5:E:149:ASP:OD1	2.51	0.43
14:N:252:VAL:HG11	8:V:112:THR:HG22	1.99	0.43
3:Q:77:ALA:HB3	3:Q:164:ILE:HD12	2.01	0.43
2:B:204:ASN:OD1	2:B:207:ASN:ND2	2.52	0.42
14:N:247:ASN:OD1	14:N:247:ASN:N	2.50	0.42
2:P:199:TYR:HD1	2:P:200:GLU:N	2.16	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:T:167:SER:OG	6:T:197:SER:HB3	2.19	0.42
10:J:146:THR:HG21	10:J:149:PHE:O	2.20	0.42
14:N:173:ASP:OD1	14:N:174:ASP:N	2.49	0.42
9:I:99:VAL:HG23	9:I:127:LEU:HD12	2.01	0.42
12:L:3:THR:HG22	12:L:16:VAL:HG12	2.01	0.42
8:V:169:LEU:O	8:V:170:ASN:HB2	2.18	0.42
3:C:158:GLY:H	4:D:58:THR:HG21	1.84	0.42
10:X:155:THR:HG22	10:X:158:GLN:HB2	2.02	0.42
2:B:54:ASN:N	2:B:54:ASN:OD1	2.51	0.42
3:C:86:LEU:HD12	3:C:132:VAL:CG1	2.49	0.42
6:F:81:ALA:HB2	6:F:130:VAL:HG21	2.02	0.42
9:W:97:ALA:HB1	9:W:127:LEU:HD13	2.01	0.42
10:X:24:ALA:HB1	10:X:184:LEU:HD22	2.01	0.42
3:C:158:GLY:N	4:D:58:THR:HG21	2.34	0.42
6:F:117:GLN:HG3	7:G:85:GLY:HA3	2.02	0.42
6:F:238:ASP:OD1	6:F:239:ALA:N	2.53	0.42
10:J:55:LEU:HB2	10:J:62:ILE:HG23	2.01	0.42
9:W:153:ASN:OD1	16:W:401:HOH:O	2.22	0.42
10:X:33:THR:O	10:X:33:THR:HG22	2.19	0.42
6:F:167:SER:OG	6:F:197:SER:HB3	2.20	0.42
10:J:33:THR:O	10:J:33:THR:HG22	2.20	0.42
8:V:40:ASN:ND2	8:V:156:TYR:O	2.53	0.41
11:Y:39:ILE:HG21	11:Y:65:VAL:HG11	2.02	0.41
2:P:233:GLU:OE1	2:P:233:GLU:N	2.53	0.41
6:T:4:ASN:OD1	6:T:4:ASN:N	2.52	0.41
10:X:146:THR:HG21	10:X:149:PHE:O	2.19	0.41
12:L:34:ILE:HG21	12:L:177:PHE:CD2	2.55	0.41
2:P:148:GLN:O	2:P:155:TYR:HA	2.21	0.41
3:Q:71:HIS:HA	3:Q:222:VAL:HG11	2.02	0.41
4:R:30:GLY:O	4:R:162:GLY:HA3	2.20	0.41
9:W:181:ASP:OD1	9:W:181:ASP:N	2.54	0.41
10:X:184:LEU:CD2	10:X:198:ALA:HB1	2.51	0.41
7:G:56:ASP:OD1	7:G:56:ASP:N	2.53	0.41
2:P:39:ARG:NH1	2:P:159:MET:SD	2.94	0.41
2:B:89:ARG:HG2	2:B:117:ILE:HD13	2.01	0.41
2:B:132:LEU:HD12	2:B:132:LEU:O	2.20	0.41
4:D:24:GLU:OE2	4:D:27:LYS:NZ	2.40	0.41
1:O:50:ILE:HD12	1:O:147:ILE:HG12	2.03	0.41
3:C:165:GLY:O	3:C:168:ASN:ND2	2.53	0.41
8:V:3:ILE:HD11	8:V:182:SER:HB3	2.01	0.41
1:A:50:ILE:HD12	1:A:147:ILE:HG12	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:G:111:LEU:HD11	7:G:140:ILE:HG22	2.02	0.41
13:M:153:ASP:O	13:M:154:SER:OG	2.30	0.41
14:N:184:PHE:HA	9:W:136:ALA:HB2	2.02	0.41
6:T:117:GLN:HG3	7:U:85:GLY:HA3	2.03	0.41
12:Z:12:ILE:HD13	12:Z:102:SER:HB3	2.03	0.41
2:B:148:GLN:O	2:B:155:TYR:HA	2.20	0.41
8:H:90:GLU:OE1	8:H:204:LYS:N	2.50	0.41
9:I:12:VAL:HG11	9:I:101:GLY:HA3	2.02	0.41
12:L:2:THR:HG21	12:L:163:ALA:CB	2.51	0.41
6:T:81:ALA:HB2	6:T:130:VAL:HG21	2.03	0.41
5:E:44:ASP:OD1	5:E:44:ASP:N	2.54	0.40
7:G:27:ILE:HG23	7:G:135:ALA:HA	2.03	0.40
8:H:38:ASN:ND2	8:H:126:ASN:OD1	2.51	0.40
10:J:55:LEU:HD23	10:J:109:PRO:HB3	2.01	0.40
10:X:55:LEU:HB2	10:X:62:ILE:HG23	2.03	0.40
12:Z:39:LYS:H	12:Z:39:LYS:HD3	1.85	0.40
12:Z:14:VAL:HG13	12:Z:44:THR:HG21	2.02	0.40
2:B:160:ALA:HB1	2:B:174:LEU:HD21	2.02	0.40
7:U:243:LYS:O	7:U:246:GLU:HG3	2.21	0.40
8:V:211:LEU:HD11	8:V:243:VAL:HG11	2.03	0.40
11:K:21:SER:O	11:K:28:LEU:N	2.54	0.40
12:L:139:LEU:O	12:L:143:TYR:HB2	2.22	0.40
3:Q:86:LEU:HD12	3:Q:132:VAL:HG11	2.02	0.40
7:U:212:LEU:HB3	7:U:241:LEU:HD11	2.04	0.40
12:Z:105:ASP:OD1	12:Z:110:ASN:ND2	2.53	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	251/260 (96%)	250 (100%)	1 (0%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	O	251/260 (96%)	250 (100%)	1 (0%)	0	100	100
2	B	226/235 (96%)	223 (99%)	3 (1%)	0	100	100
2	P	226/235 (96%)	222 (98%)	4 (2%)	0	100	100
3	C	241/246 (98%)	237 (98%)	4 (2%)	0	100	100
3	Q	241/246 (98%)	237 (98%)	4 (2%)	0	100	100
4	D	234/241 (97%)	227 (97%)	7 (3%)	0	100	100
4	R	234/241 (97%)	229 (98%)	5 (2%)	0	100	100
5	E	233/256 (91%)	230 (99%)	3 (1%)	0	100	100
5	S	233/256 (91%)	230 (99%)	3 (1%)	0	100	100
6	F	237/254 (93%)	232 (98%)	5 (2%)	0	100	100
6	T	237/254 (93%)	233 (98%)	4 (2%)	0	100	100
7	G	245/252 (97%)	240 (98%)	5 (2%)	0	100	100
7	U	245/252 (97%)	240 (98%)	5 (2%)	0	100	100
8	H	235/252 (93%)	233 (99%)	2 (1%)	0	100	100
8	V	235/252 (93%)	232 (99%)	3 (1%)	0	100	100
9	I	219/229 (96%)	216 (99%)	3 (1%)	0	100	100
9	W	219/229 (96%)	216 (99%)	3 (1%)	0	100	100
10	J	207/218 (95%)	201 (97%)	6 (3%)	0	100	100
10	X	207/218 (95%)	202 (98%)	5 (2%)	0	100	100
11	K	193/195 (99%)	186 (96%)	7 (4%)	0	100	100
11	Y	193/195 (99%)	187 (97%)	6 (3%)	0	100	100
12	L	209/211 (99%)	205 (98%)	4 (2%)	0	100	100
12	Z	209/211 (99%)	206 (99%)	3 (1%)	0	100	100
13	M	214/240 (89%)	209 (98%)	5 (2%)	0	100	100
13	a	214/240 (89%)	208 (97%)	6 (3%)	0	100	100
14	N	253/265 (96%)	249 (98%)	4 (2%)	0	100	100
14	b	253/265 (96%)	248 (98%)	5 (2%)	0	100	100
All	All	6394/6708 (95%)	6278 (98%)	116 (2%)	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	224/231 (97%)	217 (97%)	7 (3%)	35	59
1	O	224/231 (97%)	219 (98%)	5 (2%)	47	70
2	B	200/205 (98%)	195 (98%)	5 (2%)	42	66
2	P	200/205 (98%)	194 (97%)	6 (3%)	36	60
3	C	210/213 (99%)	207 (99%)	3 (1%)	62	81
3	Q	210/213 (99%)	207 (99%)	3 (1%)	62	81
4	D	202/207 (98%)	196 (97%)	6 (3%)	36	60
4	R	202/207 (98%)	197 (98%)	5 (2%)	42	66
5	E	205/223 (92%)	198 (97%)	7 (3%)	32	56
5	S	205/223 (92%)	198 (97%)	7 (3%)	32	56
6	F	213/227 (94%)	206 (97%)	7 (3%)	33	57
6	T	213/227 (94%)	209 (98%)	4 (2%)	52	74
7	G	226/229 (99%)	220 (97%)	6 (3%)	40	64
7	U	226/229 (99%)	220 (97%)	6 (3%)	40	64
8	H	220/231 (95%)	217 (99%)	3 (1%)	62	81
8	V	220/231 (95%)	217 (99%)	3 (1%)	62	81
9	I	187/194 (96%)	184 (98%)	3 (2%)	58	78
9	W	187/194 (96%)	182 (97%)	5 (3%)	40	64
10	J	185/191 (97%)	175 (95%)	10 (5%)	18	37
10	X	185/191 (97%)	180 (97%)	5 (3%)	40	64
11	K	174/174 (100%)	169 (97%)	5 (3%)	37	62
11	Y	174/174 (100%)	171 (98%)	3 (2%)	56	76
12	L	176/176 (100%)	173 (98%)	3 (2%)	56	76
12	Z	176/176 (100%)	174 (99%)	2 (1%)	70	86
13	M	194/217 (89%)	191 (98%)	3 (2%)	60	80
13	a	194/217 (89%)	191 (98%)	3 (2%)	60	80

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
14	N	231/239 (97%)	229 (99%)	2 (1%)	75 89
14	b	231/239 (97%)	228 (99%)	3 (1%)	65 83
All	All	5694/5914 (96%)	5564 (98%)	130 (2%)	46 69

All (130) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	65	LYS
1	A	105	SER
1	A	126	ASP
1	A	176	ASN
1	A	177	LYS
1	A	230	GLU
1	A	247	LYS
2	B	9	SER
2	B	199	TYR
2	B	200	GLU
2	B	214	TYR
2	B	225	ASN
3	C	3	ARG
3	C	73	PHE
3	C	121	TYR
4	D	11	SER
4	D	67	GLU
4	D	89	LEU
4	D	95	TYR
4	D	146	GLN
4	D	235	LYS
5	E	35	SER
5	E	44	ASP
5	E	62	ASP
5	E	105	GLU
5	E	133	LYS
5	E	164	ASN
5	E	235	ASP
6	F	9	ASP
6	F	74	MET
6	F	110	ARG
6	F	160	PHE
6	F	197	SER
6	F	222	GLU

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Mol	Chain	Res	Type
6	F	238	ASP
7	G	34	ASN
7	G	81	SER
7	G	129	TRP
7	G	137	SER
7	G	145	GLU
7	G	220	TRP
8	H	1	THR
8	H	143	ASN
8	H	182	SER
9	I	36	TYR
9	I	38	SER
9	I	78	MET
10	J	11	CYS
10	J	16	SER
10	J	40	LYS
10	J	80	GLN
10	J	94	SER
10	J	117	LYS
10	J	144	CYS
10	J	145	GLU
10	J	165	SER
10	J	210	LYS
11	K	1	MET
11	K	11	ASN
11	K	87	LYS
11	K	122	SER
11	K	181	ARG
12	L	136	TYR
12	L	192	ASP
12	L	206	LYS
13	M	27	PHE
13	M	64	TYR
13	M	136	ASN
14	N	70	ARG
14	N	200	GLU
1	O	19	ASP
1	O	105	SER
1	O	126	ASP
1	O	230	GLU
1	O	247	LYS
2	P	9	SER

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Mol	Chain	Res	Type
2	P	100	GLN
2	P	132	LEU
2	P	166	ASP
2	P	199	TYR
2	P	200	GLU
3	Q	69	ASP
3	Q	73	PHE
3	Q	121	TYR
4	R	11	SER
4	R	67	GLU
4	R	95	TYR
4	R	185	CYS
4	R	235	LYS
5	S	44	ASP
5	S	62	ASP
5	S	79	SER
5	S	133	LYS
5	S	164	ASN
5	S	235	ASP
5	S	239	ARG
6	T	61	GLU
6	T	74	MET
6	T	160	PHE
6	T	197	SER
7	U	81	SER
7	U	129	TRP
7	U	137	SER
7	U	204	ASP
7	U	213	GLN
7	U	220	TRP
8	V	1	THR
8	V	143	ASN
8	V	182	SER
9	W	36	TYR
9	W	38	SER
9	W	78	MET
9	W	181	ASP
9	W	216	LYS
10	X	94	SER
10	X	117	LYS
10	X	144	CYS
10	X	145	GLU

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Mol	Chain	Res	Type
10	X	165	SER
11	Y	32	ASP
11	Y	111	ASP
11	Y	122	SER
12	Z	136	TYR
12	Z	192	ASP
13	a	46	LYS
13	a	76	ASP
13	a	136	ASN
14	b	70	ARG
14	b	182	ARG
14	b	200	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	207	ASN
8	H	109	ASN
1	O	21	ASN
8	V	109	ASN

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)

4 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and

the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
15	7F1	I	301	9	50,53,53	0.67	1 (2%)	61,74,74	0.88	3 (4%)
15	7F1	W	301	9	50,53,53	0.67	1 (2%)	61,74,74	0.88	3 (4%)
15	7F1	Z	301	12	50,53,53	0.62	1 (2%)	61,74,74	0.74	2 (3%)
15	7F1	L	301	12	50,53,53	0.62	1 (2%)	61,74,74	0.70	2 (3%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
15	7F1	I	301	9	-	7/39/50/50	0/5/5/5
15	7F1	W	301	9	-	7/39/50/50	0/5/5/5
15	7F1	Z	301	12	-	9/39/50/50	0/5/5/5
15	7F1	L	301	12	-	13/39/50/50	0/5/5/5

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	I	301	7F1	C03-S01	-2.84	1.70	1.75
15	W	301	7F1	C03-S01	-2.81	1.70	1.75
15	L	301	7F1	C03-S01	-2.52	1.70	1.75
15	Z	301	7F1	C03-S01	-2.43	1.70	1.75

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
15	W	301	7F1	O02-S01-C04	-3.41	101.94	108.28
15	I	301	7F1	O02-S01-C04	-3.36	102.03	108.28
15	I	301	7F1	C12-C13-C08	-2.22	117.05	120.09
15	W	301	7F1	C12-C13-C08	-2.20	117.08	120.09
15	Z	301	7F1	C12-C13-C08	-2.12	117.19	120.09
15	L	301	7F1	C35-C36-C31	-2.11	117.20	120.09
15	L	301	7F1	C12-C13-C08	-2.11	117.20	120.09

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
15	Z	301	7F1	C35-C36-C31	-2.11	117.21	120.09
15	W	301	7F1	C35-C36-C31	-2.10	117.22	120.09
15	I	301	7F1	C35-C36-C31	-2.10	117.22	120.09

There are no chirality outliers.

All (36) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
15	I	301	7F1	C02-C03-S01-O01
15	I	301	7F1	C02-C03-S01-O02
15	I	301	7F1	C01-C02-C03-S01
15	L	301	7F1	C02-C03-S01-O01
15	L	301	7F1	C02-C03-S01-O02
15	L	301	7F1	C01-C02-C03-S01
15	L	301	7F1	C29-C28-N05-C27
15	W	301	7F1	C02-C03-S01-O01
15	W	301	7F1	C02-C03-S01-O02
15	W	301	7F1	C01-C02-C03-S01
15	Z	301	7F1	C02-C03-S01-O01
15	Z	301	7F1	C02-C03-S01-O02
15	Z	301	7F1	C01-C02-C03-S01
15	L	301	7F1	C28-C29-N04-C21
15	L	301	7F1	O06-C29-N04-C21
15	L	301	7F1	N05-C28-C29-N04
15	L	301	7F1	N05-C28-C29-O06
15	L	301	7F1	C21-C22-C23-C32
15	I	301	7F1	C05-C01-C02-C03
15	L	301	7F1	C05-C01-C02-C03
15	W	301	7F1	C05-C01-C02-C03
15	Z	301	7F1	C05-C01-C02-C03
15	I	301	7F1	N01-C01-C02-C03
15	L	301	7F1	N01-C01-C02-C03
15	W	301	7F1	N01-C01-C02-C03
15	Z	301	7F1	N01-C01-C02-C03
15	L	301	7F1	C29-C28-N05-C26
15	I	301	7F1	C01-C05-C06-C09
15	I	301	7F1	C21-C22-C23-C32
15	L	301	7F1	C01-C05-C06-C09
15	W	301	7F1	C01-C05-C06-C09
15	W	301	7F1	C21-C22-C23-C32
15	Z	301	7F1	C01-C05-C06-C09
15	Z	301	7F1	C21-C22-C23-C32

Continued on next page...

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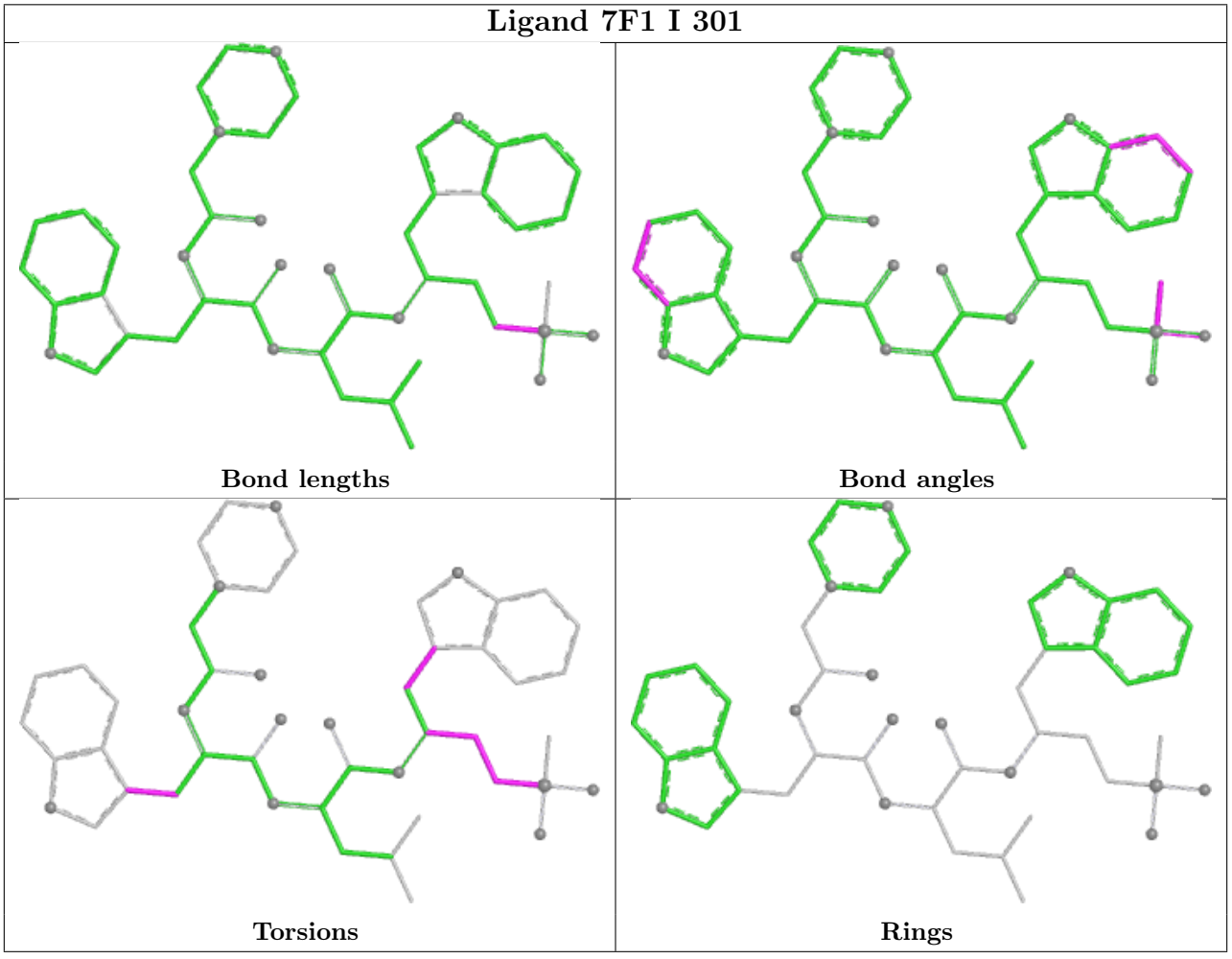
Mol	Chain	Res	Type	Atoms
15	Z	301	7F1	N05-C28-C29-N04
15	Z	301	7F1	N05-C28-C29-O06

There are no ring outliers.

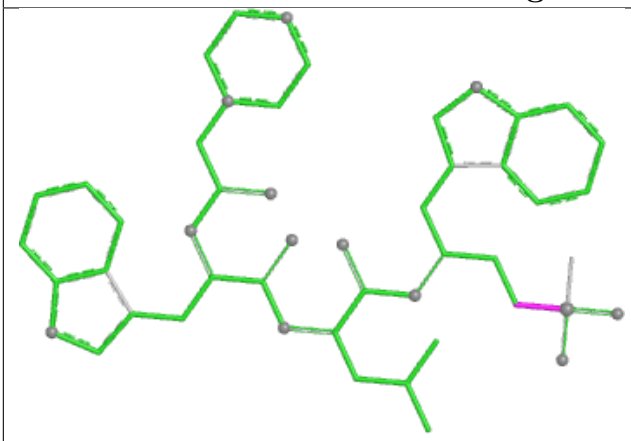
No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

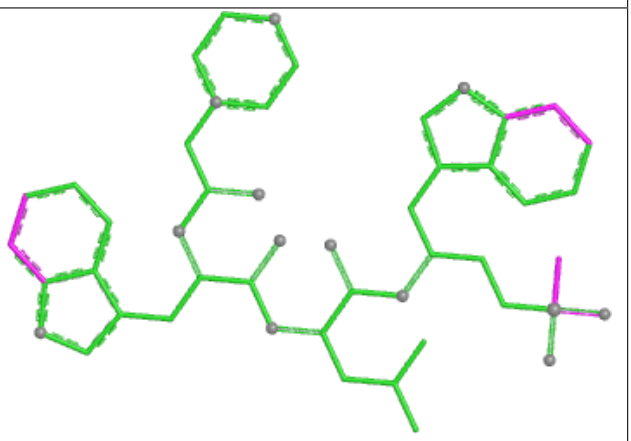
Ligand 7F1 I 301



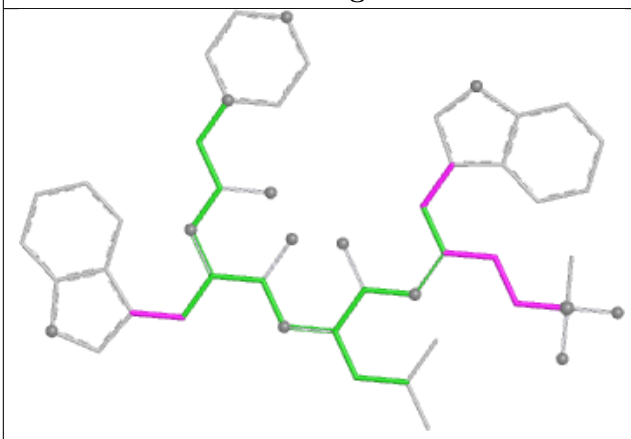
Ligand 7F1 W 301



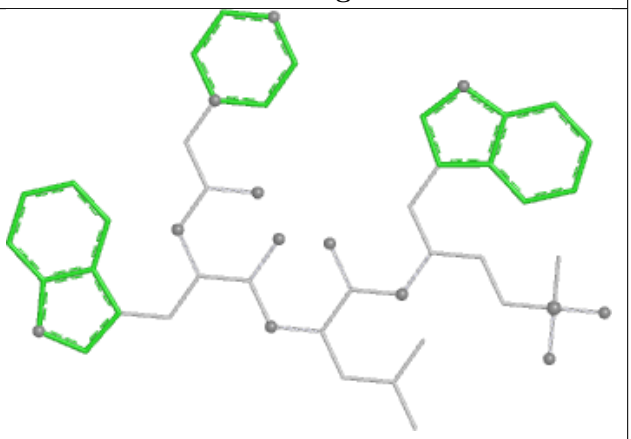
Bond lengths



Bond angles

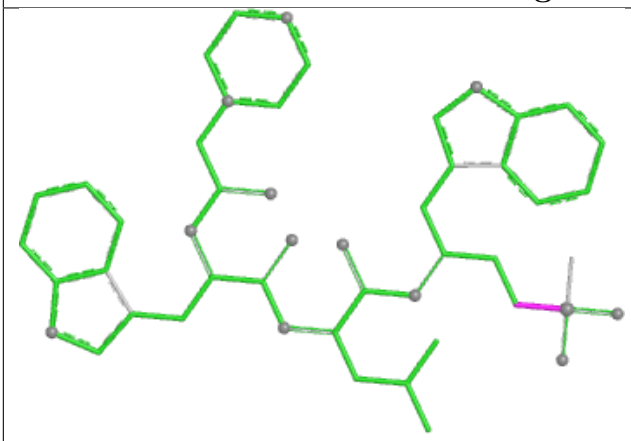


Torsions

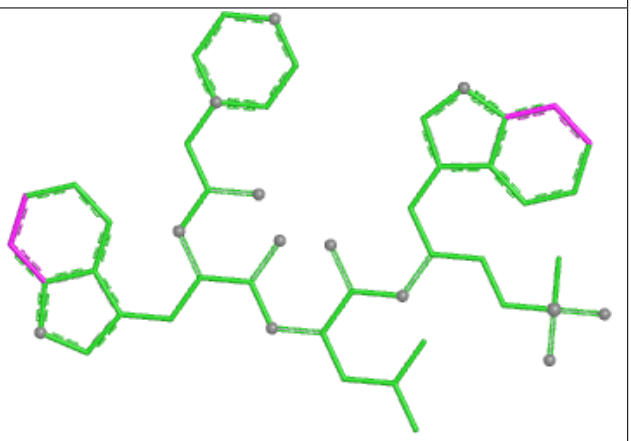


Rings

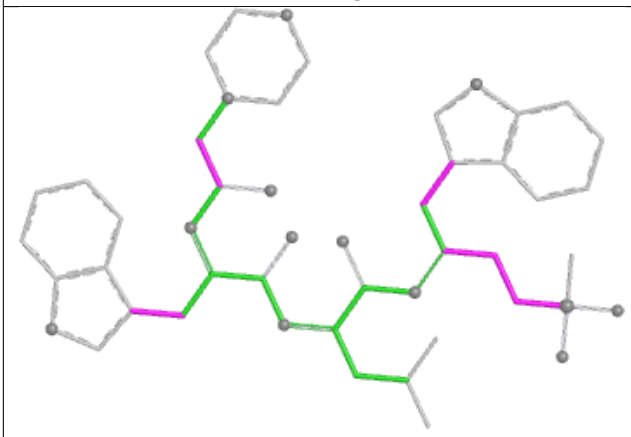
Ligand 7F1 Z 301



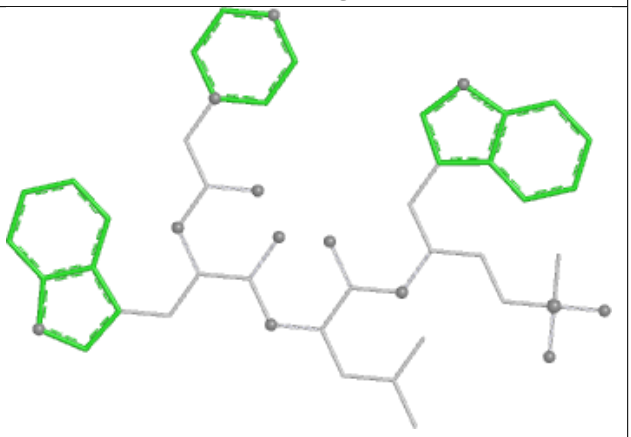
Bond lengths



Bond angles

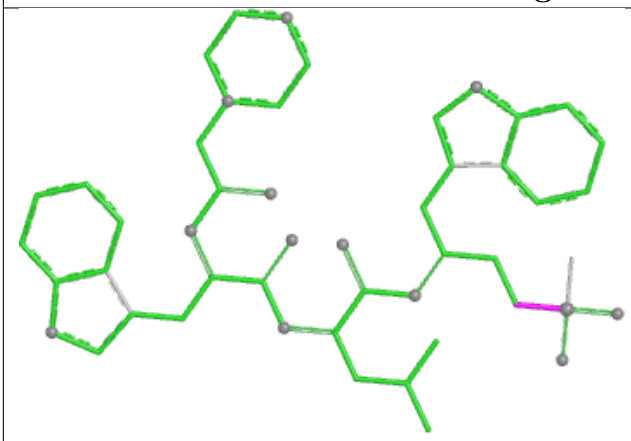


Torsions

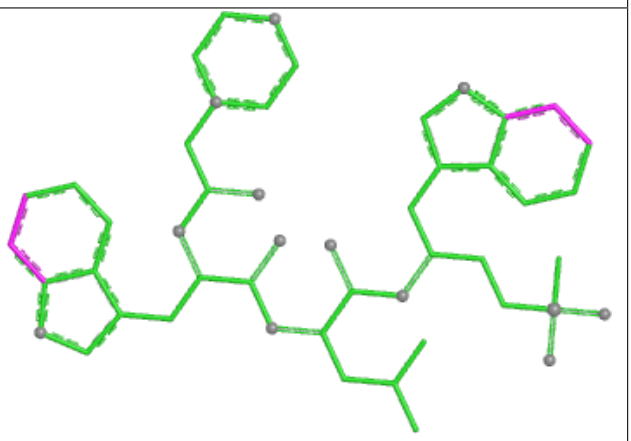


Rings

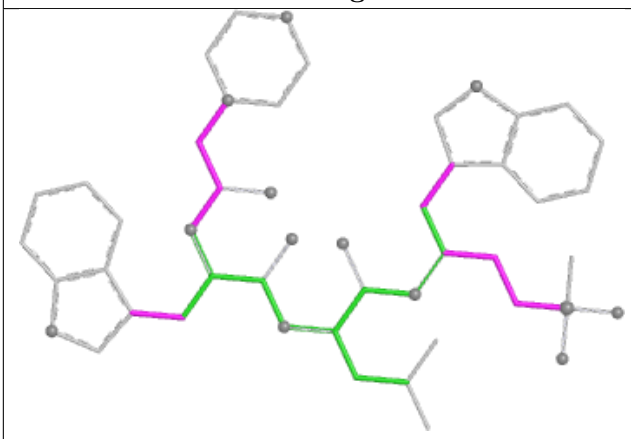
Ligand 7F1 L 301



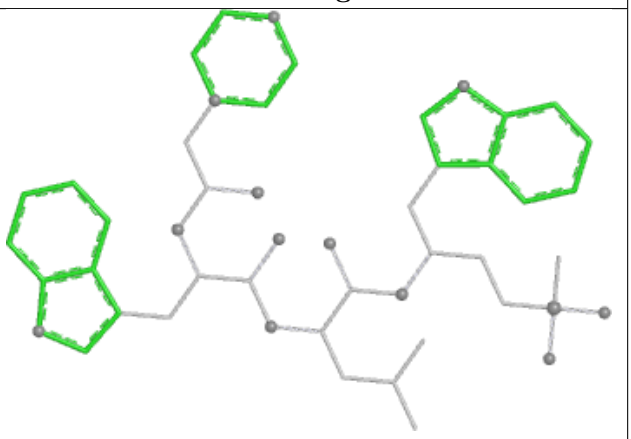
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

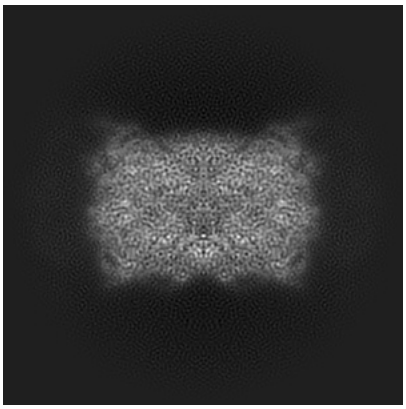
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-29765. These allow visual inspection of the internal detail of the map and identification of artifacts.

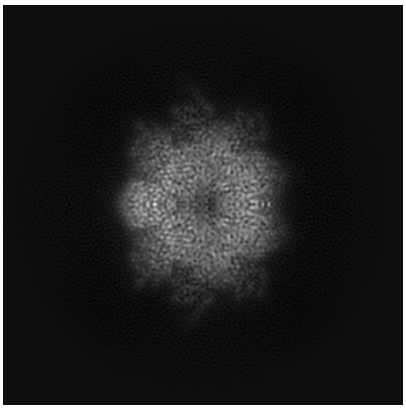
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

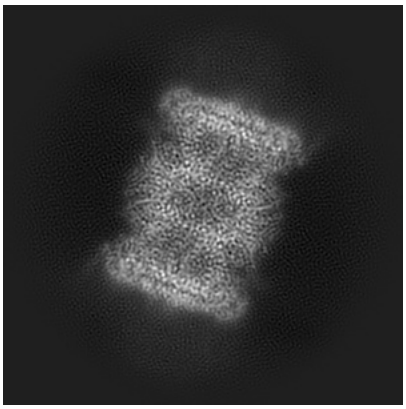
6.1.1 Primary map



X

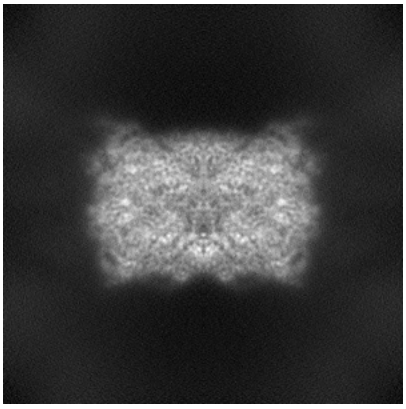


Y

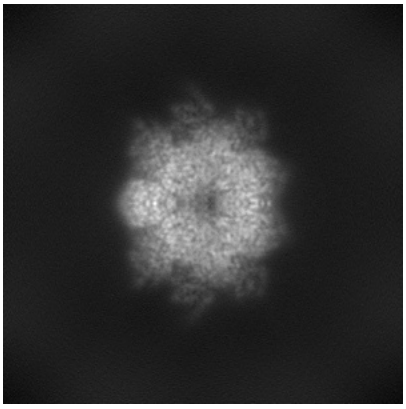


Z

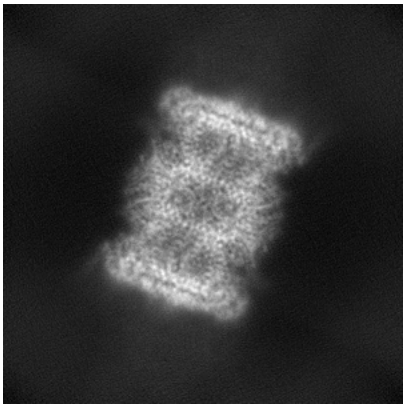
6.1.2 Raw map



X



Y

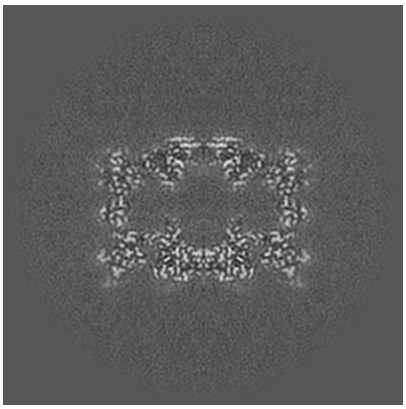


Z

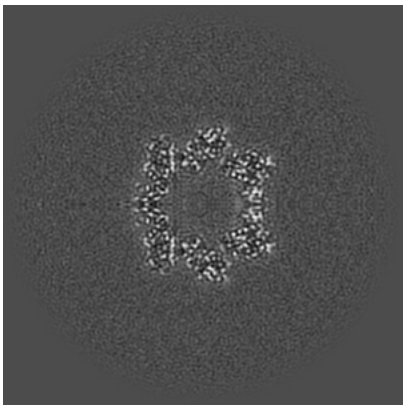
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

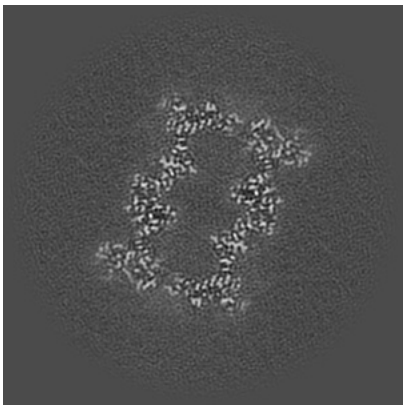
6.2.1 Primary map



X Index: 176

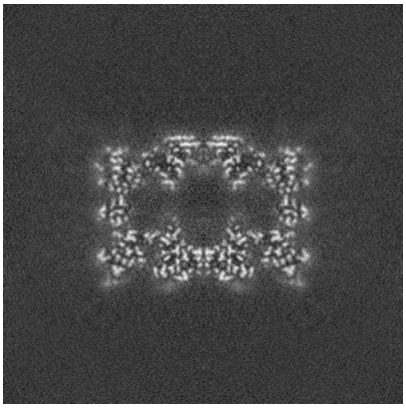


Y Index: 176

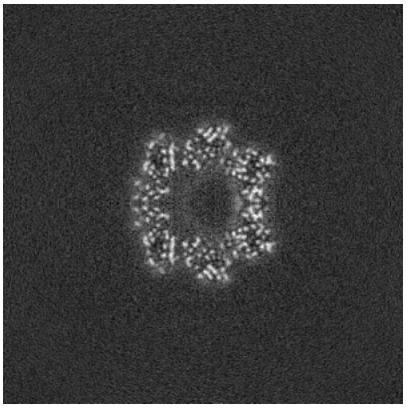


Z Index: 176

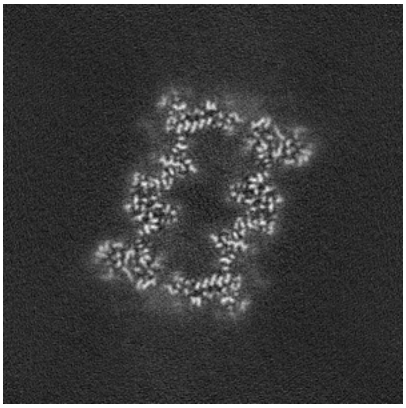
6.2.2 Raw map



X Index: 176



Y Index: 176

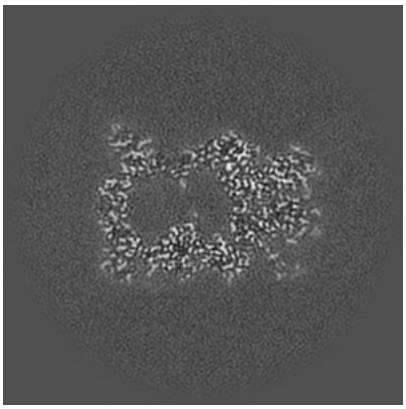


Z Index: 176

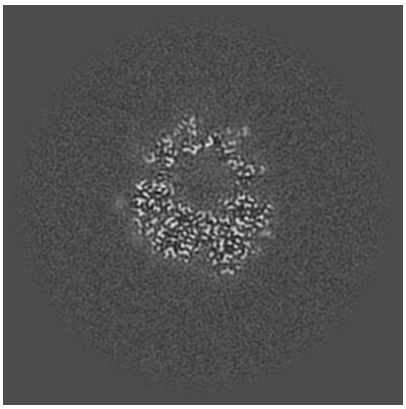
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

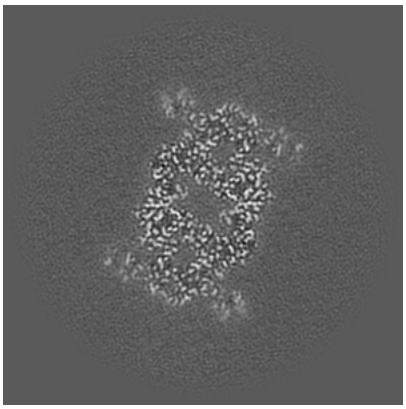
6.3.1 Primary map



X Index: 162

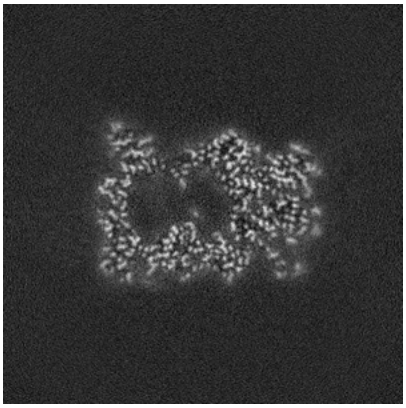


Y Index: 206

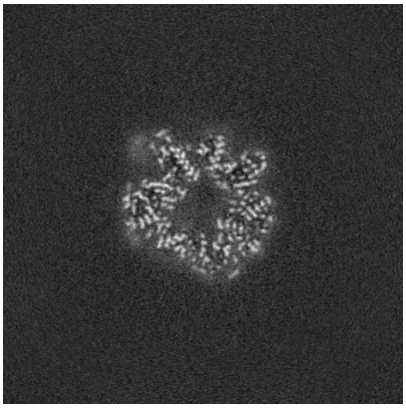


Z Index: 148

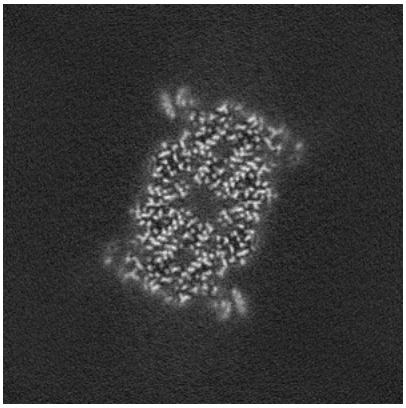
6.3.2 Raw map



X Index: 162



Y Index: 195

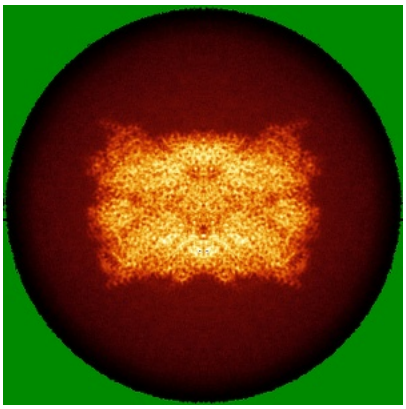


Z Index: 147

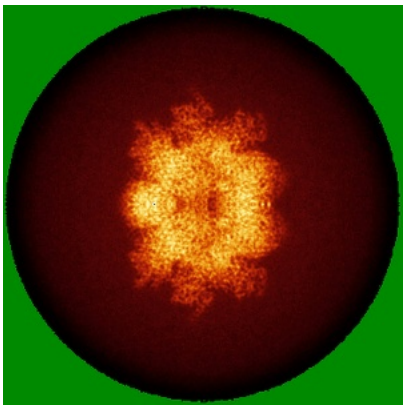
The images above show the largest variance slices of the map in three orthogonal directions.

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

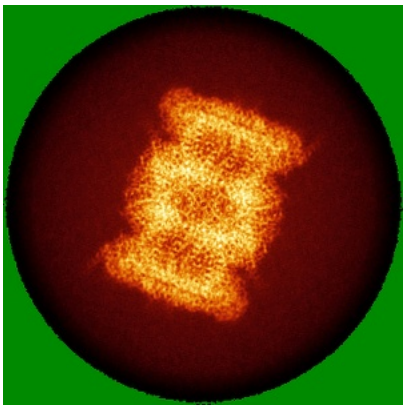
6.4.1 Primary map



X

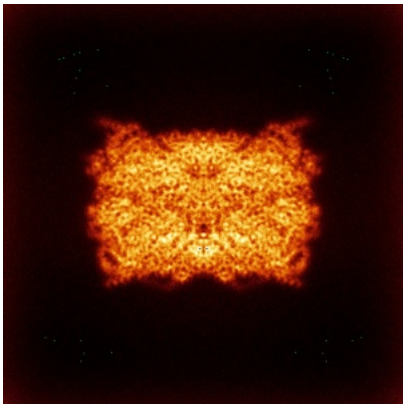


Y

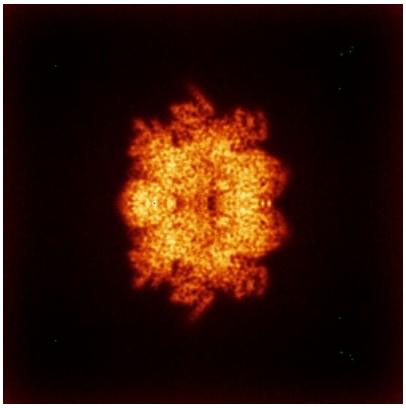


Z

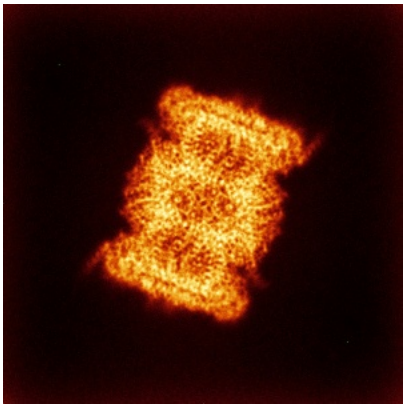
6.4.2 Raw map



X



Y

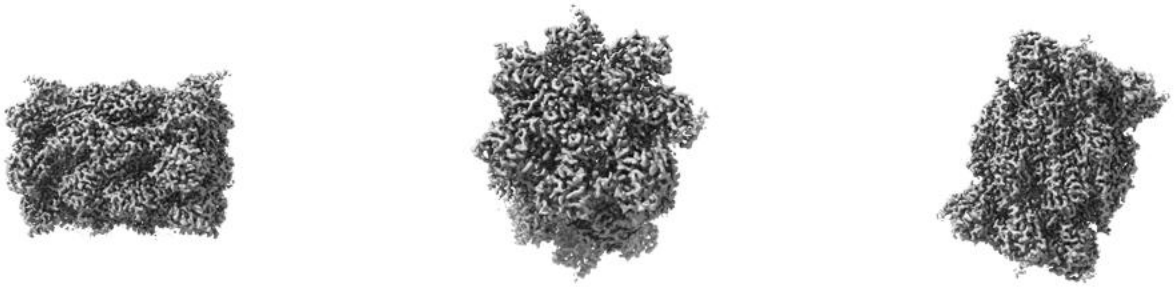


Z

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 0.48. 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.

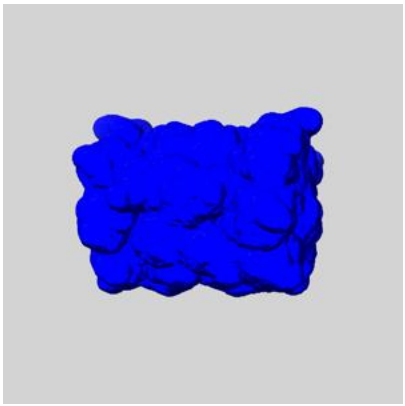
6.6 Mask visualisation

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

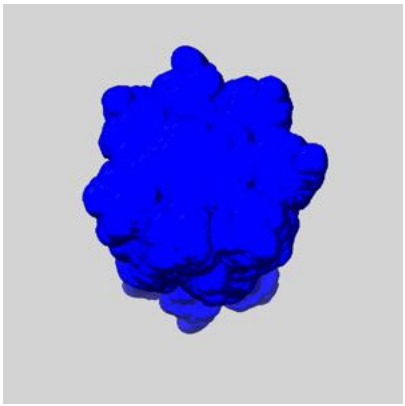
A mask typically either:

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

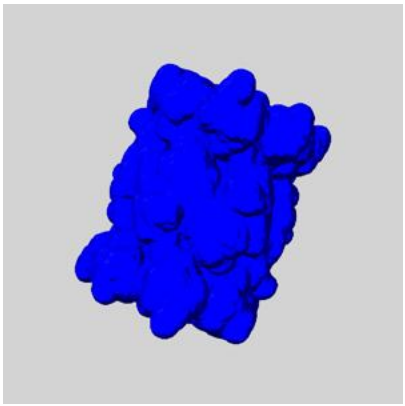
6.6.1 emd_29765_msk_1.map



X



Y

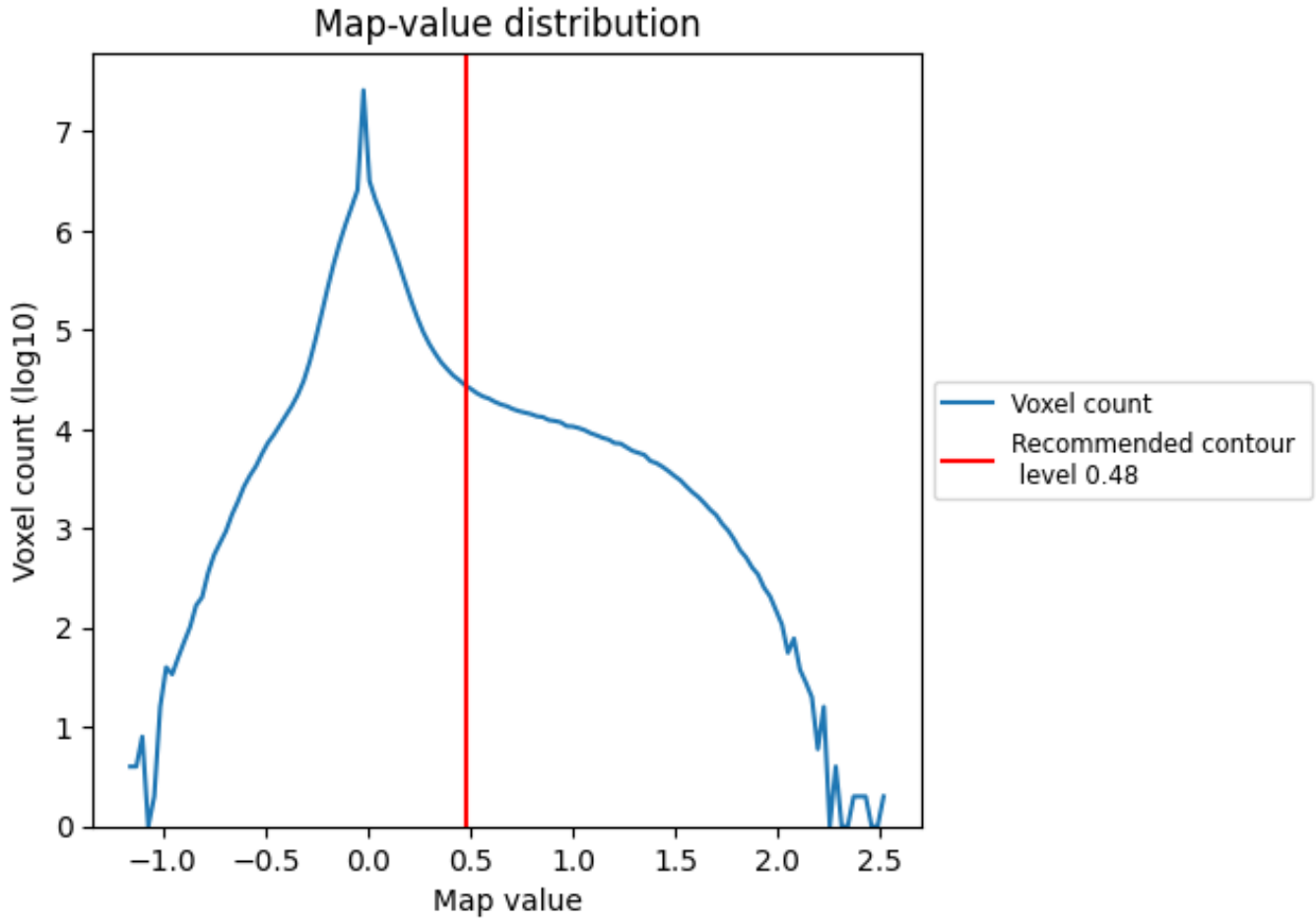


Z

7 Map analysis

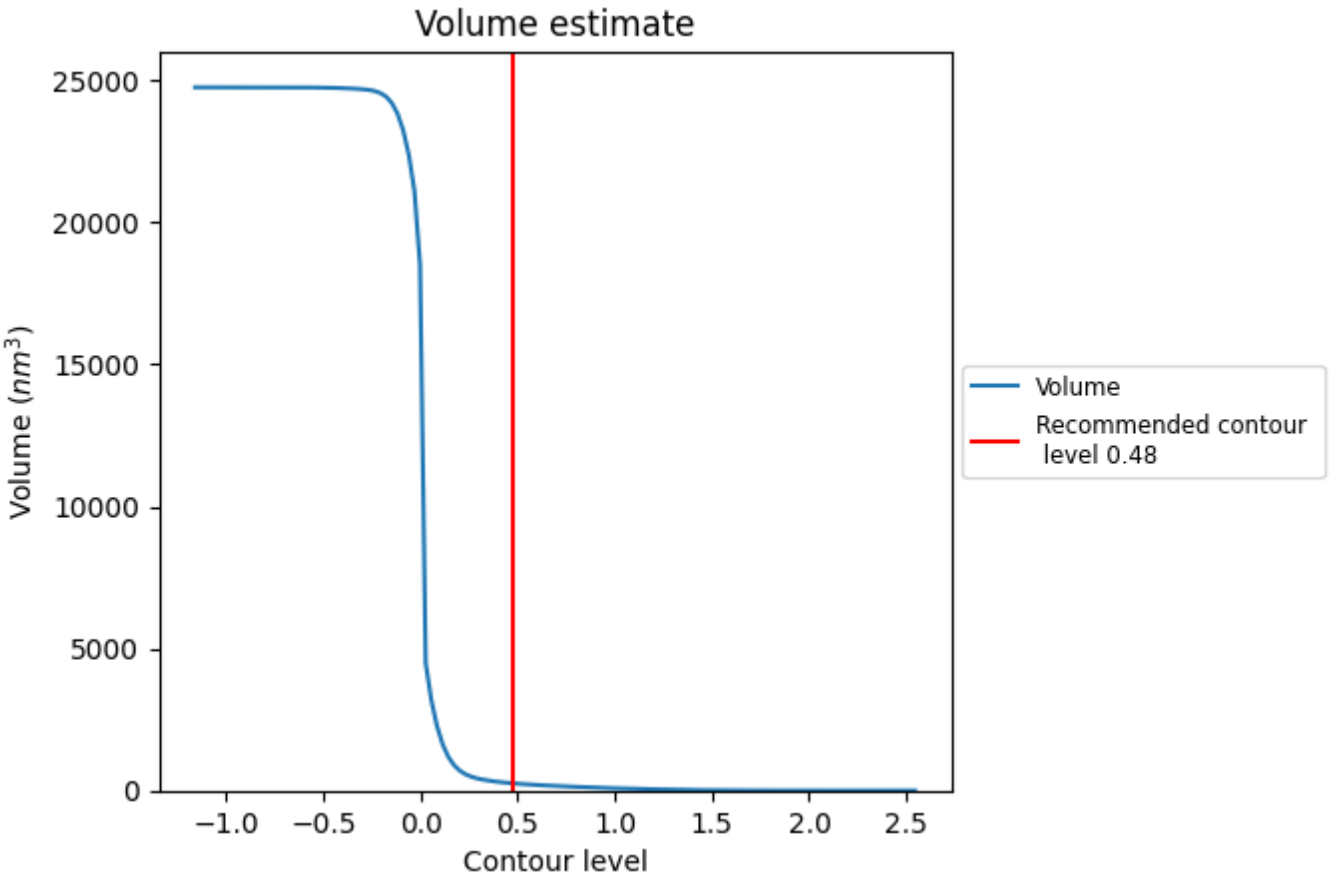
This section contains the results of statistical analysis of the map.

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.

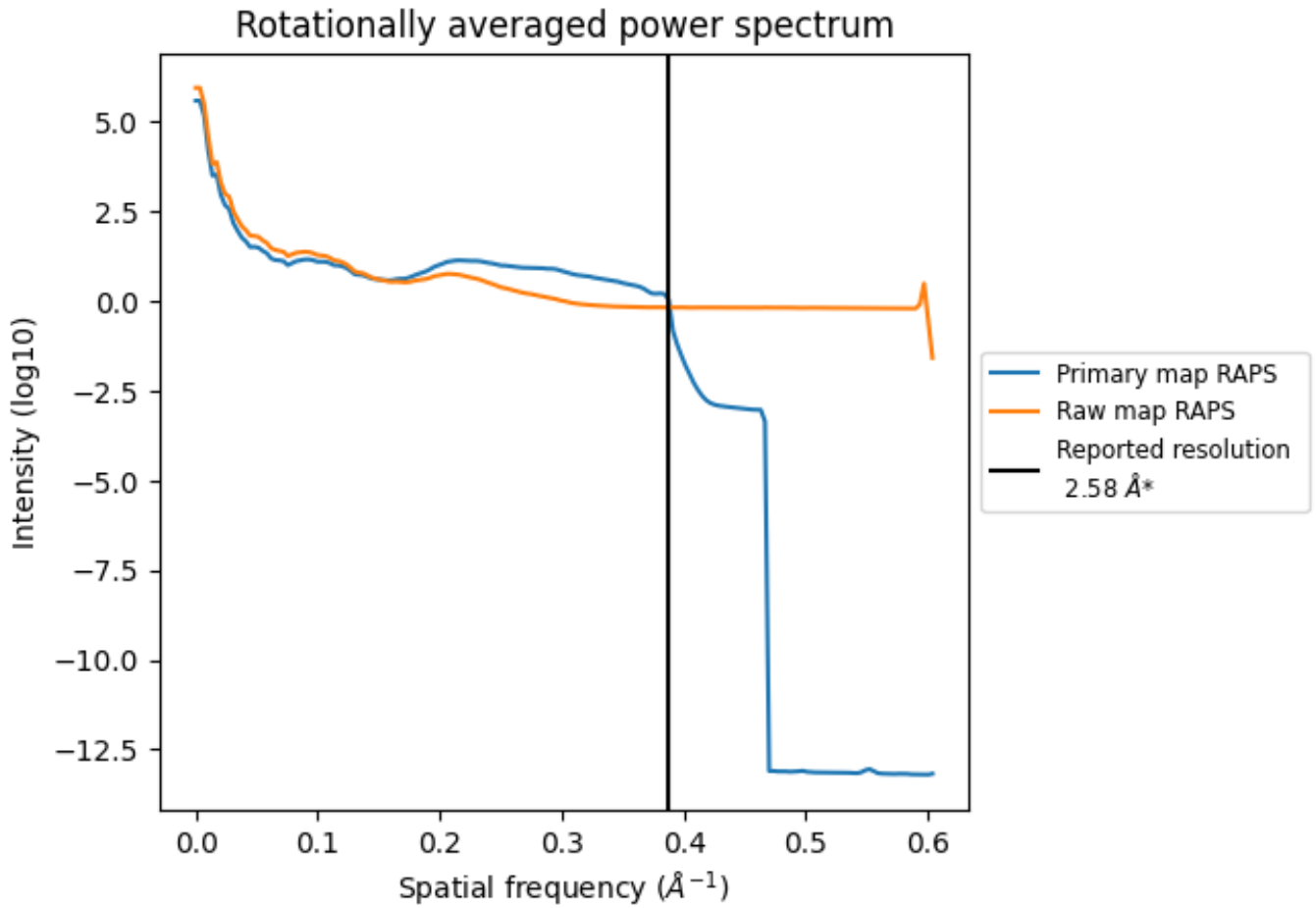
7.2 Volume estimate



The volume at the recommended contour level is 253 nm^3; this corresponds to an approximate mass of 228 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)

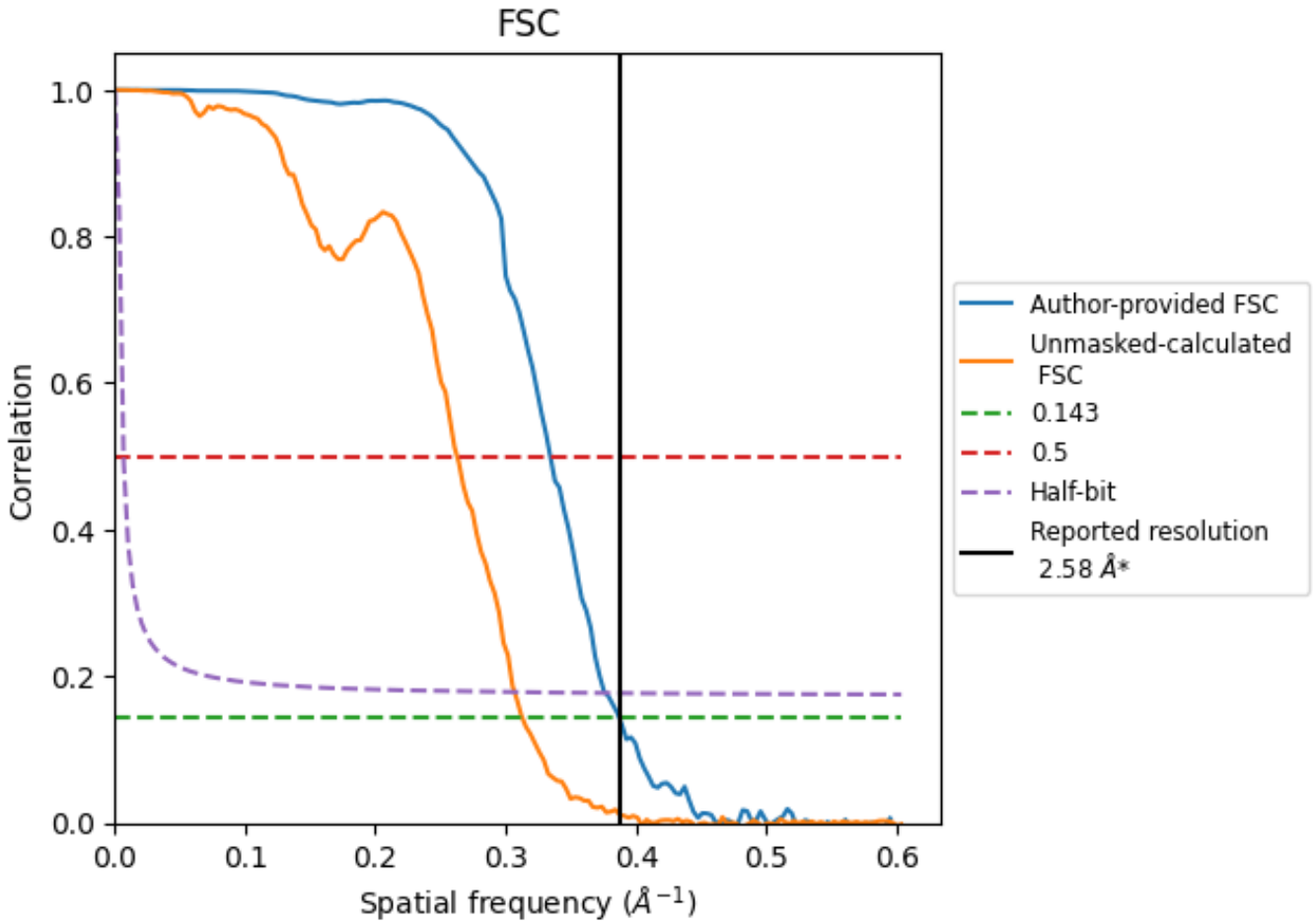


*Reported resolution corresponds to spatial frequency of 0.388 $Å^{-1}$

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 0.388 Å^{-1}

8.2 Resolution estimates (i)

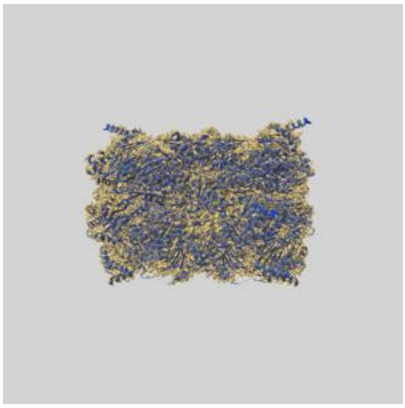
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.58	-	-
Author-provided FSC curve	2.58	2.99	2.65
Unmasked-calculated*	3.20	3.81	3.26

*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 3.20 differs from the reported value 2.58 by more than 10 %

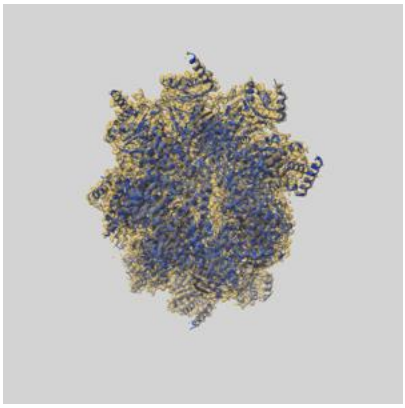
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-29765 and PDB model 8G6F. Per-residue inclusion information can be found in section 3 on page 10.

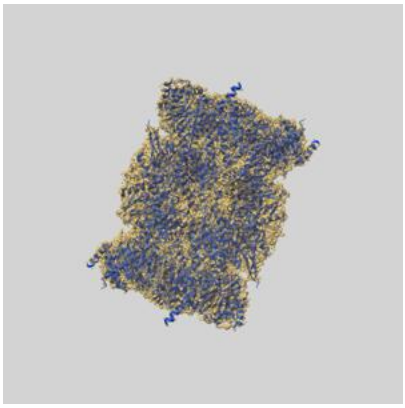
9.1 Map-model overlay



X



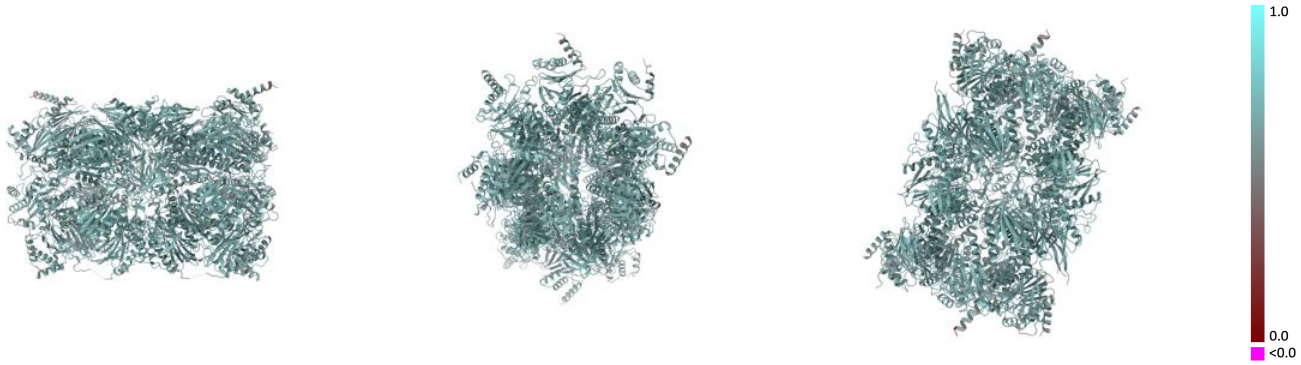
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.48 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.

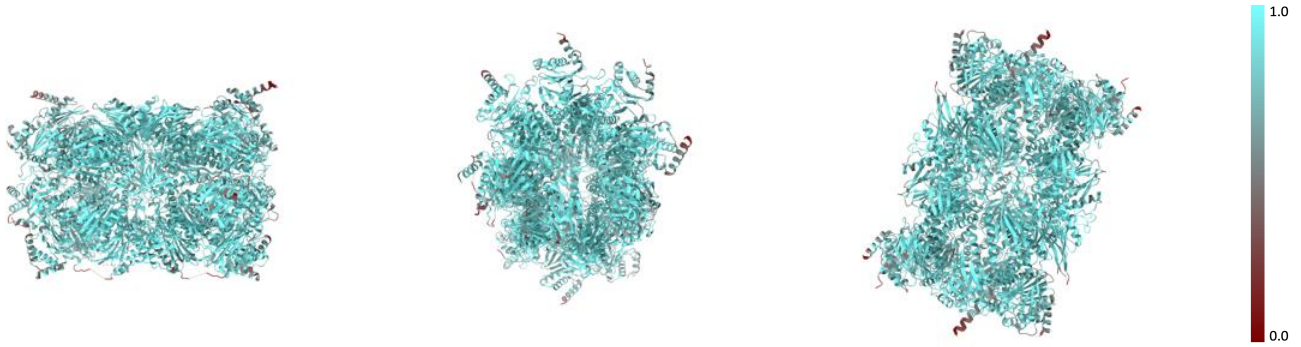
9.2 Q-score mapped to coordinate model (i)



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.

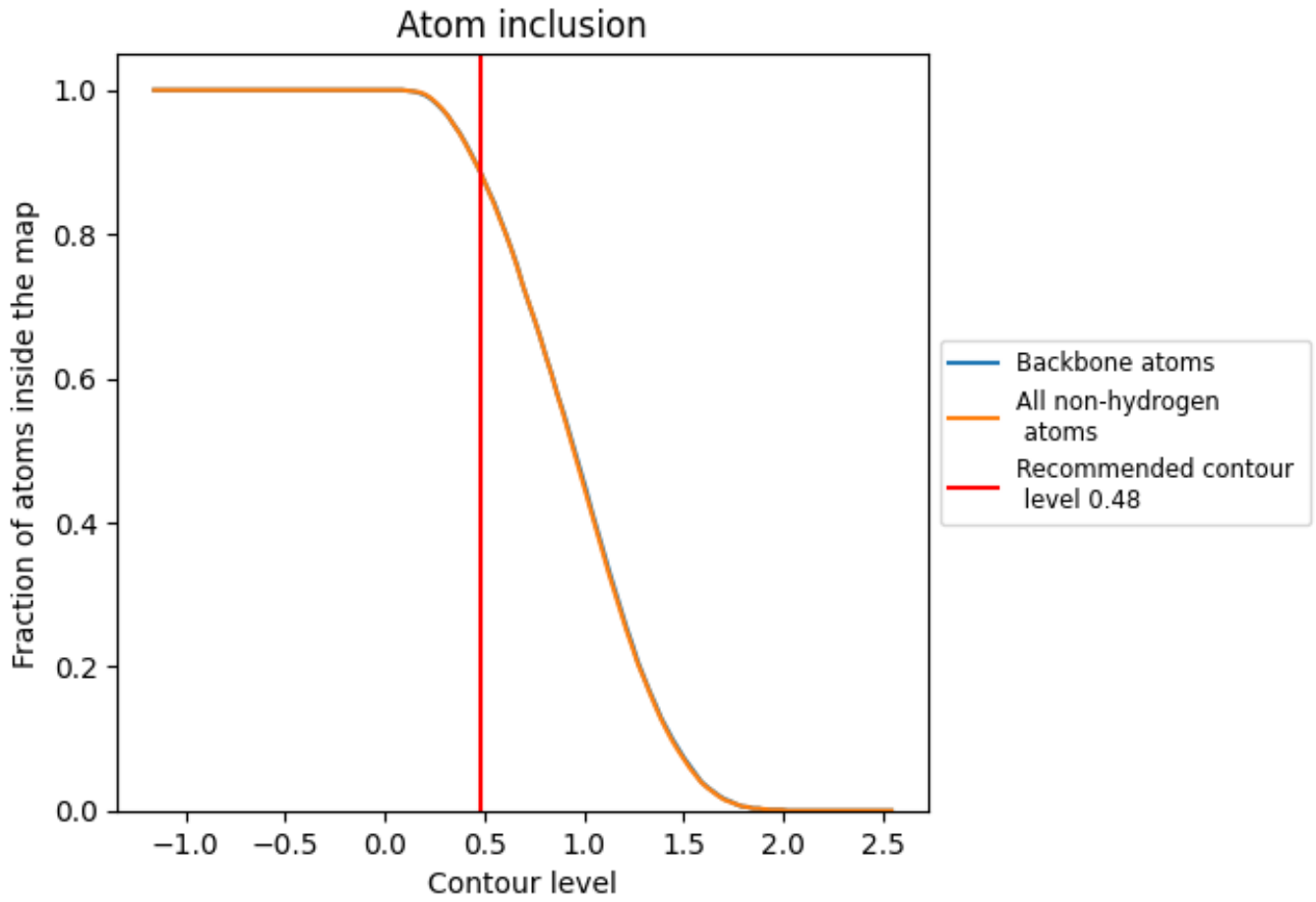
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.48).

9.4 Atom inclusion (i)



At the recommended contour level, 89% of all backbone atoms, 89% 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 (0.48) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8860	0.6450
A	0.8650	0.6370
B	0.8340	0.6230
C	0.8500	0.6300
D	0.8210	0.6230
E	0.8200	0.6230
F	0.8560	0.6350
G	0.8940	0.6460
H	0.9110	0.6570
I	0.9510	0.6660
J	0.9410	0.6630
K	0.9330	0.6600
L	0.9320	0.6600
M	0.9240	0.6550
N	0.9280	0.6630
O	0.8590	0.6390
P	0.8310	0.6230
Q	0.8510	0.6320
R	0.8190	0.6220
S	0.8210	0.6230
T	0.8570	0.6350
U	0.9000	0.6450
V	0.9120	0.6570
W	0.9480	0.6670
X	0.9390	0.6630
Y	0.9320	0.6610
Z	0.9360	0.6590
a	0.9240	0.6550
b	0.9260	0.6620