WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB EM Validation Report ⓘ

Mar 10, 2026 – 12:50 pm GMT

PDB ID	:	9RLT / pdb_00009rlt
EMDB ID	:	EMD-54045
Title	:	dimerised 13S-13S+Beta5 proteasome precursor complexes
Authors	:	Mark, E.; Ramos, P.C.; Nunes, M.M.; Dohmen, R.J.; Wendler, P.
Deposited on	:	2025-06-17
Resolution	:	3.09 Å(reported)
Based on initial model	:	8RVL

The following versions of software and data (see references ⓘ) were used in the production of this report:
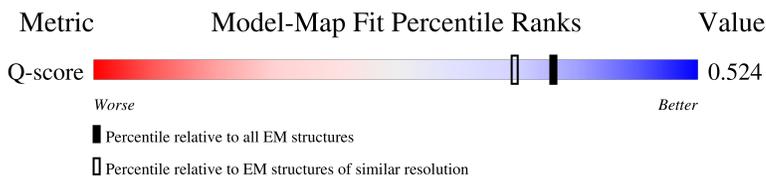
EMDB validation analysis	:	0.0.1.dev132
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.48.1

1   Overall quality at a glance ⓘ

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

The reported resolution of this entry is 3.09 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	Percentile Ranks	Value
Clashscore		3
Ramachandran outliers		0.0%
Sidechain outliers		2.4%

Worse   *Better*

▮ Percentile relative to all structures

❏ Percentile relative to all EM structures

Metric	Model-Map Fit Percentile Ranks	Value
Q-score		0.524

Worse   *Better*

▮ Percentile relative to all EM structures

❏ Percentile relative to EM structures of similar resolution

Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	14003 (2.59 - 3.59)

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	252	88% 10% •
1	O	252	88% 10% •
2	D	254	8% 85% 12% •
2	R	254	6% 86% 12% •

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Mol	Chain	Length	Quality of chain
3	E	260	9% 86% 8% 5%
3	S	260	85% 10% 5%
4	F	234	88% 12%
4	T	234	89% 10%
5	3	162	5% 64% 5% 31%
5	6	162	7% 73% 23%
6	B	250	90% 10%
6	P	250	88% 11%
7	C	258	82% 10% 8%
7	Q	258	81% 11% 8%
8	G	288	77% 6% 15%
8	U	288	75% 9% 15%
9	I	261	76% 9% 14%
9	W	261	6% 78% 7% 14%
10	J	205	7% 82% 10% 8%
10	X	205	75% 15% 9%
11	K	198	7% 80% 8% 11%
11	Y	198	9% 82% 16%
12	Z	287	22% 51% 8% 40%
13	4	276	7% 90% 9%
13	7	276	6% 85% 14%
14	5	267	88% 11%
14	8	267	88% 12%

2 Entry composition ⓘ

There are 14 unique types of molecules in this entry. The entry contains 47532 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-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	246	Total 1921	C 1221	N 324	O 368	S 8	0	0
1	O	246	Total 1918	C 1221	N 321	O 368	S 8	0	0

- Molecule 2 is a protein called Proteasome subunit alpha type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	D	249	Total 1957	C 1220	N 343	O 389	S 5	0	0
2	R	249	Total 1949	C 1214	N 341	O 389	S 5	0	0

- Molecule 3 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	E	247	Total 1914	C 1198	N 322	O 386	S 8	0	0
3	S	247	Total 1914	C 1198	N 322	O 386	S 8	0	0

- Molecule 4 is a protein called Proteasome subunit alpha type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	F	234	Total 1802	C 1134	N 313	O 350	S 5	0	0
4	T	234	Total 1802	C 1134	N 313	O 350	S 5	0	0

- Molecule 5 is a protein called Proteasome maturation factor UMP1.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	3	111	Total	C	N	O	S	0	0
			911	557	167	181	6		
5	6	124	Total	C	N	O	S	0	0
			989	610	176	197	6		

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
3	-14	ASP	-	expression tag	UNP P38293
3	-13	TYR	-	expression tag	UNP P38293
3	-12	LYS	-	expression tag	UNP P38293
3	-11	ASP	-	expression tag	UNP P38293
3	-10	ASP	-	expression tag	UNP P38293
3	-9	ASP	-	expression tag	UNP P38293
3	-8	ASP	-	expression tag	UNP P38293
3	-7	LYS	-	expression tag	UNP P38293
3	-6	HIS	-	expression tag	UNP P38293
3	-5	HIS	-	expression tag	UNP P38293
3	-4	HIS	-	expression tag	UNP P38293
3	-3	HIS	-	expression tag	UNP P38293
3	-2	HIS	-	expression tag	UNP P38293
3	-1	HIS	-	expression tag	UNP P38293
6	-13	ASP	-	expression tag	UNP P38293
6	-12	TYR	-	expression tag	UNP P38293
6	-11	LYS	-	expression tag	UNP P38293
6	-10	ASP	-	expression tag	UNP P38293
6	-9	ASP	-	expression tag	UNP P38293
6	-8	ASP	-	expression tag	UNP P38293
6	-7	ASP	-	expression tag	UNP P38293
6	-6	LYS	-	expression tag	UNP P38293
6	-5	HIS	-	expression tag	UNP P38293
6	-4	HIS	-	expression tag	UNP P38293
6	-3	HIS	-	expression tag	UNP P38293
6	-2	HIS	-	expression tag	UNP P38293
6	-1	HIS	-	expression tag	UNP P38293
6	0	HIS	-	expression tag	UNP P38293

- Molecule 6 is a protein called Proteasome subunit alpha type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	B	248	Total	C	N	O	S	0	0
			1900	1210	313	373	4		

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Mol	Chain	Residues	Atoms					AltConf	Trace
6	P	249	Total 1906	C 1213	N 314	O 375	S 4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
7	C	238	Total 1868	C 1182	N 314	O 369	S 3	0	0
7	Q	238	Total 1868	C 1182	N 314	O 369	S 3	0	0

- Molecule 8 is a protein called Probable proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	G	244	Total 1888	C 1200	N 328	O 356	S 4	0	0
8	U	244	Total 1892	C 1203	N 329	O 356	S 4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	224	Total 1701	C 1067	N 294	O 334	S 6	0	0
9	W	224	Total 1694	C 1064	N 291	O 333	S 6	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	189	Total 1473	C 950	N 237	O 278	S 8	0	0
10	X	186	Total 1444	C 935	N 230	O 271	S 8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	176	Total 1401	C 889	N 240	O 269	S 3	0	0
11	Y	195	Total 1549	C 983	N 262	O 299	S 5	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
12	Z	172	Total	C	N	O	S	0	0
			1319	841	220	250	8		

• Molecule 13 is a protein called Proteasome chaperone 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	7	276	Total	C	N	O	S	0	0
			2108	1362	332	401	13		
13	4	276	Total	C	N	O	S	0	0
			2122	1369	333	407	13		

• Molecule 14 is a protein called Proteasome assembly chaperone 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	8	266	Total	C	N	O	S	0	0
			2161	1396	347	410	8		
14	5	266	Total	C	N	O	S	0	0
			2161	1396	347	410	8		

3   Residue-property plots ⓘ

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

• Molecule 1: Proteasome subunit alpha type-1

Chain A:

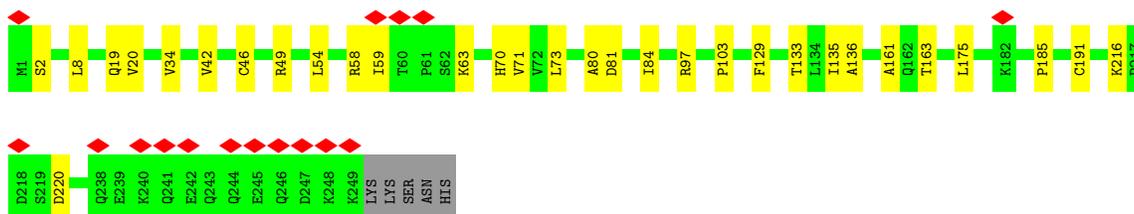• Molecule 1: Proteasome subunit alpha type-1

Chain O:

• Molecule 2: Proteasome subunit alpha type-4

Chain D:

• Molecule 2: Proteasome subunit alpha type-4
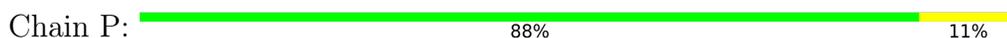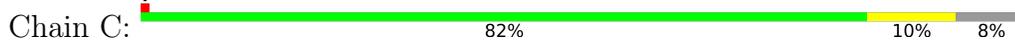
Chain R:

• Molecule 3: Proteasome subunit alpha type-5

Chain E:

• Molecule 3: Proteasome subunit alpha type-5

Chain S:

• Molecule 4: Proteasome subunit alpha type-6

Chain F:

• Molecule 4: Proteasome subunit alpha type-6
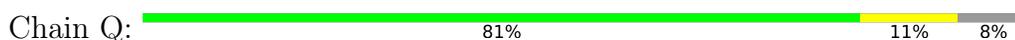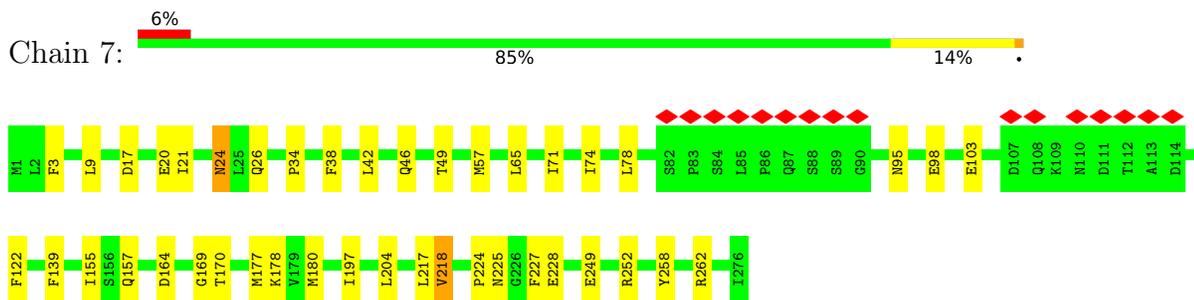
Chain T:

• Molecule 5: Proteasome maturation factor UMP1

Chain 3:

• Molecule 5: Proteasome maturation factor UMP1

Chain 6:

ASP TYR LYS ASP ASP ASP LYS HIS HIS HIS HIS HIS MET ASN ILE VAL PRO GLN ASP THR PHE LYS SER GLN VAL THR ASP ASP GLN ASP LYS SER V21 L22 S23 S24 A25 V26 P27 S28 L29 L43 S44 T45 Q46 L47 N48 D49 R73 G77 E80 R84

I109 T126 GLY LEU GLN ALA S131 I148

• Molecule 6: Proteasome subunit alpha type-2

Chain B: 90%   10%   •

M1 I21 A46 S51 SER S53 K63 L66 Y75 Y82 R83 H94 Y97 K98 R99 T122 P129 D140 N143 Q149 S153 Y156 F174 K177 L183 I191 L196 F235 A249 LEU

• Molecule 6: Proteasome subunit alpha type-2

Chain P: 88%   11%

M1 T10 L18 I37 Q42 V43 A46 L55 A56 M57 K63 V74 Y75 Y82 H94 K98 T122 P129 L135 Q149 Y156 A161 V169 L175 L185 L196 E201 L211 A212 I213 D230 R236 A249 LEU

• Molecule 7: Proteasome subunit alpha type-3

Chain C: 82%   10%   8%

MET GLY S3 R4 A32 K51 V52 T53 L66 K72 K100 P107 I110 Y144 T150 A162 I163 S164 V165 G166 A167 L194 K195 T201 S204 A205 L206 L211 E212 F213 A214 K218 G219 ALA ASN ASP GLY E224 V225 K228 I244 THR LYS

LYS ASP GLU ASP GLU GLU ALA ASP GLU ASP MET LYS

• Molecule 7: Proteasome subunit alpha type-3

Chain Q: 81%   11%   8%

MET GLY S3 L26 T63 L66 A82 I86 P107 I110 Q120 I136 Y144 Q147 T150 P153 A162 I163 L175 M184 K185 V186 L192 L197 S198 K199 T200 T201 L206 A214 T215 I216 R217 K218 G219 ALA ASN ASP GLY E224

Q227 I244 THR LYS LYS ASP GLU ASP GLU GLU ALA ASP GLU ASP MET LYS

• Molecule 8: Probable proteasome subunit alpha type-7

Chain G: 77%   6%   •   15%

MET T2 D18 V24 V50 E51 K52 L53 I54 K57 L58 K63 K66 R86 I107 S154 Q170 K178 E185 E205 D206 N207 K208 E209 K210 K229 K232 K245 GLU ILE ASN GLY ASP ASP ASP GLU ASP GLU ASP ASP SER ASP ASN VAL

MET SER SER ASP GLU ASN ALA PRO VAL ALA THR ASN ALA ASN ALA THR THR ASP GLN GLU GLY ASP ILE HIS LEU GLU

• Molecule 8: Probable proteasome subunit alpha type-7

Chain U:
75% 9% 15%

MET T2 V24 N43 K52 L53 I54 T55 S56 K57 L58 L59 Q62 K66 V70 C76 H87 L88 R91 Y103 K104 F112 L116 S128 S154 G186 K194 I200 Y201 E205 D206 N207 K208 E209 K210 D211 F212 E213 L214 C219

K232 G233 Q237 K245 GLU ILE ASN GLY ASP ASP ASP GLU ASP GLU ASP SER ASP SER ASN VAL MET SER SER ASP GLU GLN ASN ALA PRO VAL ALA THR ASN ALA ASN ALA THR THR ASP GLN GLU GLY ASP ILE HIS LEU GLU

• Molecule 9: Proteasome subunit beta type-2

Chain I:
76% 9% 14%

MET A-28 D-23 F-16 H-10 T-9 Q-8 P-7 K-6 A-5 I3 K7 F8 V12 R19 S20 THR GLN GLY PRO ILE VAL ALA ASP LYS ASN CYS ALA K33 L34 S38 P39 K40 I41 A44 I63 R75 A79 D104 S112 L125 A151 G162

N165 G168 S169 G170 S171 N172 C176 V177 M178 N189 T192 PRO ASN VAL ARG GLU GLU LYS GLN LYS SER TYR LYS PHE LYS PRO ARG GLY THR THR ALA VAL LEU LYS GLU S216 T231 ALA

• Molecule 9: Proteasome subunit beta type-2

Chain W:
6%
78% 7% 14%

MET A-28 D-23 E-13 H-10 T-9 Q-8 T-4 F8 V12 V13 R19 SER THR GLN GLY PRO ILE VAL ALA ASP LYS ASN CYS A32 S38 I41 L80 D104 P105 F111 V121 D145 A151 I163 W164 N165 D166 L167 G168 S169 G170 S171

V177 M178 L191 T192 PRO ASN VAL ARG GLU GLU LYS GLN LYS SER TYR LYS PHE LYS PRO ARG GLY THR THR ALA VAL LEU LYS GLU S216 N219 Q227 T231 ALA

• Molecule 10: Proteasome subunit beta type-3

Chain J:
7%
82% 10% 8%

MET SER ASP PRO S5 M15 V21 R28 L29 GLY SER GLN SER LEU GLY VAL SER ASN K39 H45 F50 L63 K70 T88 Q89 L90 G101 V105 G106 P107 F124 D125 L126 E132 T141 A142 S143 D144 E155 I167 A175 D176 R177 D178

A179 L180 S181 G182 I190 K191 V195 M202 ARG GLN ASP

• Molecule 10: Proteasome subunit beta type-3

Chain X:
75% 15% · 9%

MET SER ASP P4 S5 S6 I7 M15 V21 A22 I23 A24 R28 L29 GLY SER GLN SER LEU GLY VAL SER ASN K39 K42 H45 F50 L51 G52 T58 R80 E83 T88 G101 P107 F124 I130 D144 Q145 L146 Y154 E155 L171

L172 N173 A174 A175 ASP ARG ASP ALA L180 Y188 I189 I190 K191 K192 D193 E194 V195 V196 K197 M202 ARG GLN ASP

• Molecule 11: Proteasome subunit beta type-4

Chain K:

7%

80% 8% • 11%

MET D2 V9 Q10 L15 S18 LYS ALA VAL THR ARG GLY ILE SER VAL LEU LYS ASP SER ASP D33 H41 T42 L43 L66 Y67 E71 K90 R93 R96 K109 K110 K111 N112 K113 G134 TYR SER GLY PHE TYR T140 D145 H146 H147 D151

D159 L163 K170 R171 M172 P173 M174 D175 G178 K182 I183 V184 I189 D193 D194 F195 Q196 ALA GLN

• Molecule 11: Proteasome subunit beta type-4

Chain Y:

9%

82% 16% •

MET D2 I3 I14 S18 K19 A20 V21 T22 R23 G24 I25 D30 S31 D32 D33 Q37 L43 T53 V100 K113 E127 F141 S142 L143 L144 D145 H146 R149 M152 L158 L161 K162 L163 C164 V165 L168 P173 M174 D175 F176 K177 G178 V179

I180 I183 K186 I189 R190 Q191 V192 D193 D194 F195 Q196 ALA GLN

• Molecule 12: Proteasome subunit beta type-5

Chain Z:

22%

51% 8% • 40%

M-75 Q-74 A-73 D-70 S-69 F-68 S-67 VAL PRO ASN ARG LEU VAL LYS GLU LEU GLN TYR ASP ASN GLU GLN ASN LEU GLU ASP SER ASP PHE VAL THR GLY ALA SER GLN PHE GLN ARG LEU ILE ALA PRO SER LEU THR VAL PRO PRO ILE ALA SER PRO GLN GLN LEU PHE LEU ARG ALA HIS THR ASP

ASP SER ARG ASN PRO ASP CYS LYS ILE ILE LYS ILE ALA HIS GLY T1 T2 Q9 V16 D17 S18 R19 ALA THR ALA GLY ASN TRP VAL ALA SER GLN THR VAL LYS LYS VAL I35 E36 I37 N38 L42 M45 A46 G47 G48 A49 A50 D51 C52 D53 F54 W55 E56 T57 W58

L65 K71 L86 Y90 K91 G92 A93 G94 L95 S96 M97 M100 G103 Y104 T105 R106 K107 E108 G109 P110 Y113 D116 S117 D118 K123 G130 S131 G132 Q133 T134 F135 A136 Y137 G138 V139 LEU ASP SER N143 Y144 K145 W146 D147 L148 S149 V150 E151 D152 Y155 L156

R159 S160 I161 L162 A163 A164 A165 HIS ARG ASP ALA TYR SER GLY S174 V175 N176 L177 E182 G189 ASN HIS ASP VAL GLY LEU PHE TRP LYS VAL LYS GLU GLU GLY GLY SER PHE ASN ASN VAL ILE GLY

• Molecule 13: Proteasome chaperone 1

Chain 7:

• Molecule 13: Proteasome chaperone 1

Chain 4:

• Molecule 14: Proteasome assembly chaperone 2

Chain 8:

• Molecule 14: Proteasome assembly chaperone 2

Chain 5:

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	156855	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	64	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2800	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.195	Depositor
Minimum map value	-0.726	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.023	Depositor
Recommended contour level	0.134	Depositor
Map size (Å)	498.0, 498.0, 498.0	wwPDB
Map dimensions	500, 500, 500	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.996, 0.996, 0.996	Depositor

5   Model quality (i)

5.1   Standard geometry (i)

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$ >5	RMSZ	#$|Z|$ >5
1	A	0.13	0/1959	0.26	0/2654
1	O	0.13	0/1956	0.28	0/2651
2	D	0.11	0/1986	0.24	0/2685
2	R	0.12	0/1978	0.25	0/2677
3	E	0.09	0/1941	0.23	0/2614
3	S	0.10	0/1941	0.22	0/2614
4	F	0.10	0/1830	0.25	0/2473
4	T	0.11	0/1830	0.25	0/2473
5	3	0.11	0/929	0.26	0/1252
5	6	0.11	0/1005	0.25	0/1359
6	B	0.13	0/1936	0.24	0/2620
6	P	0.13	0/1943	0.26	0/2631
7	C	0.13	0/1897	0.24	0/2566
7	Q	0.13	0/1897	0.24	0/2566
8	G	0.12	0/1928	0.27	0/2605
8	U	0.12	0/1932	0.27	0/2609
9	I	0.10	0/1730	0.26	0/2346
9	W	0.10	0/1723	0.24	0/2338
10	J	0.11	0/1501	0.25	0/2025
10	X	0.11	0/1472	0.25	0/1986
11	K	0.09	0/1424	0.23	0/1921
11	Y	0.10	0/1577	0.24	0/2127
12	Z	0.09	0/1343	0.23	0/1812
13	4	0.10	0/2175	0.25	0/2961
13	7	0.10	0/2160	0.26	0/2941
14	5	0.10	0/2214	0.24	0/3010
14	8	0.10	0/2214	0.23	0/3010
All	All	0.11	0/48421	0.25	0/65526

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	1921	0	1911	11	0
1	O	1918	0	1909	16	0
2	D	1957	0	1969	19	0
2	R	1949	0	1947	19	0
3	E	1914	0	1892	14	0
3	S	1914	0	1892	12	0
4	F	1802	0	1809	16	0
4	T	1802	0	1809	13	0
5	3	911	0	841	3	0
5	6	989	0	971	3	0
6	B	1900	0	1912	11	0
6	P	1906	0	1918	12	0
7	C	1868	0	1872	12	0
7	Q	1868	0	1872	17	0
8	G	1888	0	1875	11	0
8	U	1892	0	1886	13	0
9	I	1701	0	1671	14	0
9	W	1694	0	1660	10	0
10	J	1473	0	1474	11	0
10	X	1444	0	1444	20	0
11	K	1401	0	1389	10	0
11	Y	1549	0	1533	15	0
12	Z	1319	0	1284	11	0
13	4	2122	0	2069	16	0
13	7	2108	0	2048	22	0
14	5	2161	0	2115	16	0
14	8	2161	0	2115	18	0
All	All	47532	0	47087	327	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 (327) 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)
3:E:85:ALA:HB2	3:E:140:VAL:HG21	1.68	0.74
7:C:150:THR:HG21	7:C:163:ILE:HG12	1.71	0.73
9:W:-10:HIS:HB3	9:W:-8:GLN:HE22	1.55	0.71
2:D:73:LEU:HD11	2:D:133:THR:HB	1.72	0.70
13:4:49:THR:HG22	13:4:164:ASP:HB2	1.73	0.70
3:S:85:ALA:HB2	3:S:140:VAL:HG21	1.73	0.69
10:J:21:VAL:HG23	10:J:190:ILE:HB	1.74	0.69
6:B:46:ALA:HB1	6:B:196:LEU:HD11	1.74	0.68
13:7:74:ILE:HB	13:7:122:PHE:HB3	1.75	0.68
10:X:21:VAL:HG23	10:X:190:ILE:HB	1.77	0.67
14:5:72:VAL:HG22	14:5:83:ILE:HG12	1.77	0.66
8:U:200:ILE:HG21	8:U:214:LEU:HD13	1.78	0.66
12:Z:103:GLY:O	12:Z:110:PRO:HA	1.97	0.65
13:7:178:LYS:HB2	13:7:218:VAL:HG23	1.79	0.65
13:4:74:ILE:HB	13:4:122:PHE:HB3	1.79	0.65
12:Z:16:VAL:HG23	12:Z:176:ASN:HB2	1.78	0.64
13:4:205:ILE:HG22	13:4:206:VAL:HG13	1.79	0.63
11:Y:180:ILE:HG23	11:Y:191:GLN:HE21	1.64	0.63
4:T:74:LEU:HD22	4:T:81:ALA:HB1	1.81	0.62
2:R:73:LEU:HD13	2:R:135:ILE:HG12	1.80	0.62
2:D:54:LEU:HD13	7:C:162:ALA:HB3	1.82	0.61
2:R:73:LEU:HD11	2:R:133:THR:HB	1.82	0.61
2:D:73:LEU:HD13	2:D:135:ILE:HG12	1.81	0.61
1:A:228:ALA:HB2	1:A:233:PHE:HD1	1.65	0.61
10:X:24:ALA:HB1	10:X:171:LEU:HD11	1.83	0.61
11:Y:14:ILE:HG12	11:Y:183:ILE:HG12	1.83	0.60
3:S:31:ILE:HD13	3:S:141:ALA:HB2	1.84	0.60
13:7:49:THR:HG22	13:7:164:ASP:HB2	1.83	0.60
4:T:201:LEU:HD11	4:T:206:LEU:HG	1.84	0.60
11:Y:165:VAL:HG21	11:Y:196:GLN:HG2	1.84	0.59
3:E:31:ILE:HD13	3:E:141:ALA:HB2	1.84	0.59
6:B:174:PHE:HA	6:B:177:LYS:HE2	1.84	0.59
14:8:29:GLU:HG2	14:8:77:LYS:HD2	1.84	0.58
3:E:126:GLY:HA3	3:E:130:GLU:HB2	1.85	0.58
13:4:169:GLY:HA3	13:4:197:ILE:HG13	1.84	0.58
10:X:107:PRO:HG2	10:X:124:PHE:HB2	1.86	0.58
4:F:74:LEU:HD13	4:F:81:ALA:HB1	1.85	0.58
14:5:33:LEU:HD22	14:5:74:TYR:HB2	1.86	0.57
7:Q:184:MET:HE1	7:Q:192:LEU:HD22	1.86	0.57
13:4:74:ILE:HG13	13:4:124:ILE:HD11	1.87	0.57
14:5:132:VAL:HG23	14:5:133:ARG:HG2	1.86	0.57
14:8:225:LEU:HD23	14:8:243:PHE:HE1	1.70	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:37:LYS:HE2	2:D:160:SER:HA	1.86	0.56
2:R:161:ALA:HB1	2:R:175:LEU:HD13	1.87	0.56
3:E:70:ILE:HG21	3:E:112:LEU:HD21	1.87	0.56
5:3:-14:ASP:HB3	8:G:229:LYS:HD2	1.88	0.56
13:7:65:LEU:HD13	13:7:252:ARG:HE	1.71	0.56
14:5:4:LEU:HD11	14:5:83:ILE:HG13	1.87	0.56
13:7:139:PHE:HB3	13:7:225:ASN:HB3	1.87	0.56
7:Q:175:LEU:HD13	7:Q:199:LYS:HE3	1.88	0.56
3:E:45:GLY:HA3	3:E:223:THR:HG22	1.87	0.56
11:K:111:LYS:HG3	11:K:113:LYS:HG2	1.87	0.56
14:8:4:LEU:HD11	14:8:83:ILE:HG13	1.88	0.56
12:Z:136:ALA:HB2	12:Z:164:ALA:HB2	1.87	0.55
10:J:15:MET:HE2	10:J:167:ILE:HB	1.89	0.55
13:7:34:PRO:HB3	13:7:78:LEU:HB2	1.88	0.55
13:7:224:PRO:HG2	13:7:227:PHE:HB2	1.87	0.55
1:A:119:LYS:HE3	6:B:83:ARG:HD2	1.89	0.55
3:S:122:ARG:HH11	3:S:133:LEU:HB2	1.71	0.55
2:R:49:ARG:HH21	13:7:103:GLU:H	1.55	0.55
14:5:242:LYS:HG3	14:5:244:VAL:HG23	1.88	0.55
10:X:15:MET:HE3	10:X:154:TYR:HD1	1.72	0.55
2:R:81:ASP:HB3	2:R:129:PHE:HD1	1.72	0.54
6:P:94:HIS:HA	6:P:98:LYS:HB3	1.89	0.54
4:F:180:ILE:HG23	4:F:181:LYS:HG3	1.90	0.54
3:S:169:ALA:HB1	3:S:183:LEU:HD22	1.90	0.53
14:8:119:ASP:O	14:8:209:SER:HA	2.08	0.53
3:S:122:ARG:HB3	3:S:133:LEU:HB3	1.90	0.53
4:T:176:LEU:HD23	8:U:57:LYS:HE2	1.88	0.53
13:4:68:LEU:HD23	13:4:127:PHE:HB3	1.90	0.53
10:J:107:PRO:HG2	10:J:124:PHE:HB2	1.91	0.53
10:X:7:ILE:HG22	10:X:28:ARG:HH12	1.73	0.53
7:C:66:LEU:HD12	7:C:212:GLU:HG2	1.90	0.53
10:J:63:LEU:HD11	10:J:105:VAL:HG21	1.91	0.53
13:7:24:ASN:HB2	13:7:26:GLN:HE22	1.74	0.53
6:P:10:THR:HG22	6:P:18:LEU:HD22	1.91	0.53
2:D:91:VAL:HG11	5:3:134:VAL:HG13	1.90	0.52
6:B:183:LEU:HD21	6:B:191:ILE:HD12	1.92	0.52
9:I:63:ILE:HD11	9:I:79:ALA:HB2	1.91	0.52
1:O:11:GLY:HA3	14:8:124:MET:HE2	1.92	0.52
11:K:184:VAL:HG22	11:K:189:ILE:HG13	1.92	0.51
14:8:72:VAL:HG22	14:8:83:ILE:HG12	1.92	0.51
2:D:39:LYS:HG2	2:D:184:PRO:HG2	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:T:63:ILE:HG21	4:T:214:ALA:HB2	1.92	0.51
9:W:13:VAL:HG22	9:W:177:VAL:HG13	1.92	0.51
2:D:94:GLN:HG3	11:K:66:LEU:HB2	1.93	0.51
9:I:7:LYS:HG2	9:I:12:VAL:HG23	1.93	0.51
14:5:100:VAL:HG13	14:5:101:GLU:HG3	1.93	0.51
14:5:146:ASP:HB3	14:5:203:ARG:HH21	1.74	0.51
7:Q:144:TYR:HB2	7:Q:147:GLN:HE21	1.75	0.51
12:Z:145:LYS:HZ3	12:Z:148:LEU:HD21	1.76	0.51
1:O:127:ILE:HD11	5:6:109:ILE:HB	1.91	0.51
8:U:52:LYS:HB3	8:U:66:LYS:HG3	1.93	0.51
10:X:23:ILE:HG23	10:X:188:TYR:HB2	1.92	0.51
2:D:81:ASP:HB3	2:D:129:PHE:HD1	1.76	0.51
9:I:75:ARG:HA	9:I:104:ASP:HB3	1.93	0.51
2:R:54:LEU:HD13	7:Q:162:ALA:HB3	1.91	0.51
7:C:194:LEU:HB3	7:C:244:ILE:HD11	1.92	0.51
2:D:67:ILE:HG21	2:D:109:LEU:HD21	1.92	0.51
3:E:70:ILE:HA	3:E:93:ARG:HE	1.77	0.50
13:7:258:TYR:CZ	13:7:262:ARG:HD2	2.47	0.50
14:8:9:VAL:HG11	14:8:88:PRO:HB3	1.93	0.50
11:K:9:VAL:HG23	11:K:10:GLN:H	1.77	0.50
13:7:21:ILE:HG13	14:8:94:TYR:HE2	1.76	0.50
1:A:115:ASP:HB3	1:A:155:TYR:CZ	2.47	0.50
4:F:66:CYS:HA	4:F:89:ARG:HG2	1.92	0.50
8:G:50:VAL:HG11	8:G:66:LYS:HG2	1.94	0.50
6:P:42:GLY:HA3	6:P:185:LEU:HD13	1.93	0.50
6:P:74:VAL:HG12	6:P:135:LEU:HB2	1.93	0.50
8:U:128:SER:HB3	13:7:3:PHE:HA	1.93	0.50
10:J:70:LYS:HD3	10:J:90:LEU:HD11	1.94	0.49
14:5:107:LEU:HD23	14:5:112:ILE:HD13	1.92	0.49
2:R:34:VAL:HG13	2:R:163:THR:HG22	1.93	0.49
2:D:96:HIS:ND1	2:D:104:VAL:HG12	2.27	0.49
7:C:107:PRO:HD2	7:C:110:ILE:HD12	1.94	0.49
13:7:42:LEU:HD13	13:7:71:ILE:HG21	1.93	0.49
4:F:44:ALA:HB3	4:F:216:VAL:HG12	1.93	0.49
7:C:206:LEU:HD11	7:C:211:LEU:HD21	1.93	0.49
12:Z:37:ILE:HG22	12:Z:38:ASN:HD22	1.77	0.49
8:G:50:VAL:HG12	8:G:51:GLU:H	1.76	0.49
4:T:156:LEU:HD22	4:T:159:THR:HB	1.94	0.49
6:P:161:ALA:HB1	6:P:175:LEU:HD13	1.95	0.49
14:8:115:ILE:HG22	14:8:202:LEU:HD11	1.94	0.49
14:5:115:ILE:HG22	14:5:202:LEU:HD11	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:Y:18:SER:HA	11:Y:179:VAL:HG12	1.94	0.48
9:W:38:SER:HB3	9:W:41:ILE:HB	1.94	0.48
9:I:-16:PHE:HD1	11:K:96:ARG:HE	1.62	0.48
2:D:58:ARG:HH12	7:C:144:TYR:HB3	1.79	0.48
6:B:75:TYR:HB3	6:B:82:TYR:CD1	2.49	0.48
9:I:-7:PRO:HG2	10:J:126:LEU:HD13	1.96	0.48
7:Q:136:ILE:HG12	7:Q:150:THR:HG22	1.96	0.48
7:Q:144:TYR:HB2	7:Q:147:GLN:NE2	2.27	0.48
1:O:228:ALA:HB2	1:O:233:PHE:HD1	1.79	0.48
4:F:176:LEU:HD23	8:G:57:LYS:HE2	1.95	0.48
10:J:190:ILE:HG23	10:J:195:VAL:HG22	1.95	0.48
2:R:2:SER:HB2	13:7:17:ASP:HB3	1.95	0.48
13:4:34:PRO:HG2	13:4:149:MET:HG3	1.94	0.48
4:F:26:LEU:HD23	4:F:149:PRO:HG2	1.94	0.47
4:F:173:GLU:HA	8:G:58:LEU:HD21	1.97	0.47
6:B:94:HIS:HA	6:B:98:LYS:HB3	1.95	0.47
11:Y:142:SER:O	11:Y:146:HIS:HB2	2.14	0.47
7:Q:150:THR:HG21	7:Q:163:ILE:HG12	1.96	0.47
3:S:205:LYS:HB2	3:S:212:LEU:HD22	1.97	0.47
5:3:80:GLU:HB3	5:3:81:PRO:HD3	1.95	0.47
14:8:155:LEU:HD23	14:8:155:LEU:H	1.79	0.47
4:F:88:LEU:HD11	4:F:108:ALA:HB1	1.96	0.47
9:I:172:ASN:HB3	9:I:189:ASN:HA	1.97	0.47
4:T:70:MET:HE2	4:T:105:VAL:HG22	1.97	0.47
7:Q:201:THR:HG21	7:Q:206:LEU:HD13	1.96	0.47
7:Q:216:ILE:HG13	7:Q:227:GLN:HG2	1.97	0.47
12:Z:35:ILE:HG12	12:Z:56:GLU:HB3	1.96	0.47
3:S:184:LEU:HD22	4:T:55:GLU:HG2	1.96	0.47
2:R:80:ALA:HB1	7:Q:120:GLN:HG3	1.97	0.47
10:X:190:ILE:HG23	10:X:195:VAL:HG22	1.97	0.47
1:A:46:ARG:HD2	1:A:152:PRO:HB2	1.97	0.47
9:I:-23:ASP:O	10:J:101:GLY:HA3	2.14	0.47
4:T:144:LEU:HD21	4:T:159:THR:HG22	1.97	0.47
3:E:68:VAL:HG11	3:E:89:ILE:HD13	1.97	0.46
2:R:97:ARG:HG2	2:R:103:PRO:HA	1.97	0.46
9:I:12:VAL:HG13	9:I:178:MET:HE3	1.97	0.46
10:X:45:HIS:HB3	10:X:50:PHE:CE2	2.51	0.46
8:U:52:LYS:HG3	8:U:213:GLU:HB2	1.97	0.46
11:Y:19:LYS:HB2	11:Y:180:ILE:HG13	1.96	0.46
13:7:38:PHE:CG	13:7:157:GLN:HG3	2.51	0.46
6:B:21:ILE:HG21	6:B:153:SER:HB3	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:P:149:GLN:O	6:P:156:TYR:HA	2.15	0.46
3:S:67:ILE:HG22	3:S:228:PHE:HZ	1.80	0.46
9:W:-23:ASP:O	10:X:101:GLY:HA3	2.16	0.46
4:F:3:ARG:HB2	14:5:253:TYR:HA	1.98	0.46
4:F:176:LEU:HA	4:F:179:PHE:CE2	2.51	0.46
9:W:111:PHE:HD1	9:W:121:VAL:HG22	1.81	0.46
13:4:206:VAL:HG21	14:5:68:SER:HB3	1.97	0.46
1:A:214:LEU:HD12	1:A:218:PHE:HZ	1.81	0.46
2:R:58:ARG:HG3	2:R:59:ILE:HG23	1.96	0.46
9:W:104:ASP:HB2	9:W:105:PRO:HD2	1.97	0.46
4:T:44:ALA:HB3	4:T:216:VAL:HG12	1.98	0.45
9:W:8:PHE:HB3	9:W:151:ALA:HB2	1.98	0.45
11:Y:53:THR:HG23	11:Y:100:VAL:HG23	1.99	0.45
2:R:42:VAL:HG11	2:R:136:ALA:HB1	1.97	0.45
1:A:210:MET:HE3	1:A:214:LEU:HD11	1.99	0.45
7:Q:186:VAL:HG21	7:Q:217:ARG:HG3	1.98	0.45
11:Y:158:LEU:O	11:Y:162:LYS:HG3	2.17	0.45
3:E:25:GLU:HB3	13:4:229:LYS:HE3	1.98	0.45
3:E:46:VAL:HB	3:E:222:ILE:HG23	1.97	0.45
7:Q:217:ARG:HG2	7:Q:218:LYS:H	1.82	0.45
13:4:105:ASP:HB3	13:4:108:GLN:HB3	1.99	0.45
6:B:122:THR:HG22	6:B:129:PRO:HB3	1.99	0.45
8:G:232:LYS:HE2	8:G:232:LYS:HB2	1.82	0.45
6:P:122:THR:HG22	6:P:129:PRO:HB3	1.98	0.45
8:U:24:VAL:HG11	8:U:154:SER:HB3	1.97	0.45
4:T:29:ILE:HD11	4:T:149:PRO:HD3	1.99	0.44
10:X:88:THR:HG23	10:X:124:PHE:CZ	2.52	0.44
1:O:115:ASP:HB3	1:O:155:TYR:CZ	2.53	0.44
6:P:75:TYR:HB3	6:P:82:TYR:CD1	2.52	0.44
5:6:80:GLU:O	5:6:84:ARG:HG2	2.17	0.44
8:U:201:TYR:O	8:U:205:GLU:HG2	2.17	0.44
3:E:127:ALA:HA	4:F:83:VAL:HG22	1.98	0.44
8:G:53:LEU:HD11	8:G:209:GLU:HB3	1.99	0.44
9:I:3:ILE:HG21	9:I:44:ALA:HB3	1.99	0.44
8:U:43:ASN:HD21	8:U:186:GLY:HA3	1.83	0.44
10:X:80:ARG:HH21	10:X:83:GLU:HG2	1.82	0.44
11:Y:43:LEU:HB2	11:Y:189:ILE:HD13	1.98	0.44
2:D:161:ALA:HB1	2:D:175:LEU:HD13	1.98	0.44
6:B:140:ASP:OD1	6:B:143:ASN:HB2	2.18	0.44
13:7:95:ASN:OD1	13:7:98:GLU:HB3	2.17	0.44
9:I:112:SER:HB2	9:I:125:LEU:HD13	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:Y:149:ARG:HB2	11:Y:152:MET:HG3	2.00	0.44
14:8:229:ILE:HG21	14:8:239:PRO:HA	1.98	0.44
2:D:97:ARG:HD3	2:D:103:PRO:HB3	1.99	0.44
9:I:38:SER:HB3	9:I:41:ILE:HB	1.98	0.44
2:R:46:CYS:HB3	2:R:63:LYS:HD3	2.00	0.44
2:R:216:LYS:HB2	2:R:220:ASP:HB3	1.99	0.44
10:X:124:PHE:CE2	10:X:130:ILE:HG12	2.53	0.44
7:C:66:LEU:HD13	7:C:214:ALA:HB2	2.00	0.44
7:Q:197:LEU:O	7:Q:201:THR:HG23	2.18	0.44
4:F:135:ILE:HD11	4:F:222:PHE:HE1	1.83	0.43
5:6:73:ARG:HA	5:6:77:GLY:O	2.17	0.43
13:4:42:LEU:HD13	13:4:71:ILE:HD12	2.00	0.43
14:5:157:LEU:HD23	14:5:190:PHE:HZ	1.83	0.43
12:Z:65:LEU:HD13	12:Z:65:LEU:HA	1.88	0.43
2:D:49:ARG:HH12	13:4:97:ASP:HA	1.83	0.43
2:D:70:HIS:ND1	2:D:71:VAL:HG23	2.33	0.43
7:Q:82:ALA:O	7:Q:86:ILE:HG12	2.18	0.43
3:S:70:ILE:HG21	3:S:112:LEU:HD21	1.99	0.43
1:A:117:LEU:O	1:A:121:MET:HG2	2.19	0.43
13:7:57:MET:HE2	13:7:170:THR:HG23	2.00	0.43
11:K:41:HIS:CD2	11:K:109:LYS:HD2	2.54	0.43
7:Q:26:LEU:HD23	7:Q:153:PRO:HD2	2.01	0.43
11:Y:143:LEU:HD21	11:Y:163:LEU:HB3	2.00	0.43
13:7:169:GLY:HA3	13:7:197:ILE:HG13	2.01	0.43
10:J:45:HIS:HB3	10:J:50:PHE:CE2	2.53	0.43
13:4:125:TYR:HB2	13:4:132:LEU:HB3	2.01	0.43
1:O:156:LYS:HE3	1:O:169:THR:HG21	2.01	0.42
1:O:194:ILE:HG22	1:O:196:GLU:HG2	2.01	0.42
12:Z:144:TYR:HA	12:Z:156:LEU:HD11	2.01	0.42
8:G:208:LYS:HG3	8:G:209:GLU:H	1.84	0.42
11:K:182:LYS:HE2	11:K:182:LYS:HB3	1.82	0.42
1:O:144:VAL:HG12	1:O:154:ILE:HG12	2.01	0.42
4:T:176:LEU:HA	4:T:179:PHE:CE1	2.54	0.42
11:Y:141:PHE:HA	11:Y:144:LEU:HB2	2.00	0.42
7:C:32:ALA:O	7:C:167:ALA:HB2	2.19	0.42
11:K:90:LYS:O	11:K:93:ARG:HG2	2.19	0.42
8:U:116:LEU:HD23	8:U:116:LEU:HA	1.89	0.42
2:D:157:SER:HB3	2:D:159:TRP:HE1	1.85	0.42
11:K:15:LEU:HD12	11:K:43:LEU:HD23	2.01	0.42
3:S:39:GLY:HA2	3:S:48:LEU:HD23	2.00	0.42
9:I:8:PHE:HB3	9:I:151:ALA:HB2	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:X:50:PHE:CZ	10:X:195:VAL:HG11	2.54	0.42
10:X:124:PHE:HE2	10:X:130:ILE:HG12	1.84	0.42
13:7:177:MET:HE3	13:7:217:LEU:HD11	2.02	0.42
2:R:216:LYS:HB2	2:R:216:LYS:HE2	1.92	0.42
6:P:213:ILE:HD11	6:P:236:ARG:HH11	1.84	0.42
11:Y:191:GLN:HE22	11:Y:193:ASP:HB3	1.84	0.42
13:7:9:LEU:HD12	14:8:124:MET:HE1	2.01	0.42
1:O:203:VAL:HG11	1:O:245:LEU:HD13	2.02	0.42
8:U:70:VAL:HG11	8:U:112:PHE:CZ	2.54	0.42
14:8:9:VAL:HG22	14:8:16:GLN:NE2	2.34	0.42
1:A:83:VAL:HG13	1:A:141:LEU:HD23	2.00	0.42
10:J:107:PRO:HG2	10:J:124:PHE:CD2	2.55	0.42
1:O:3:GLY:HA3	14:8:128:ASN:HA	2.02	0.42
12:Z:100:MET:HE2	12:Z:100:MET:HB2	1.90	0.42
14:8:78:ARG:HB3	14:8:236:ASN:HB3	2.02	0.42
9:W:12:VAL:HG13	9:W:178:MET:HE3	2.00	0.42
3:E:179:ALA:HB2	3:E:207:VAL:HG11	2.02	0.42
8:G:24:VAL:HG11	8:G:154:SER:HB3	2.01	0.42
9:I:-6:LYS:HD3	9:I:-5:ALA:N	2.35	0.42
10:X:39:LYS:NZ	11:Y:127:GLU:H	2.18	0.42
6:B:149:GLN:O	6:B:156:TYR:HA	2.19	0.41
1:O:156:LYS:O	1:O:163:TYR:HA	2.19	0.41
8:U:87:HIS:O	8:U:91:ARG:HG2	2.20	0.41
13:4:219:ALA:HB2	13:4:238:LEU:HD21	2.02	0.41
2:D:1:MET:HG2	2:D:22:TYR:OH	2.21	0.41
11:K:67:TYR:CZ	11:K:71:GLU:HG3	2.55	0.41
10:X:146:LEU:HD13	10:X:174:ALA:HB2	2.02	0.41
3:E:169:ALA:HB3	4:F:56:LEU:HD13	2.02	0.41
10:J:88:THR:HG23	10:J:124:PHE:CZ	2.55	0.41
2:R:70:HIS:CD2	2:R:71:VAL:HG13	2.56	0.41
10:X:42:LYS:O	10:X:52:GLY:HA2	2.21	0.41
2:D:58:ARG:NH1	7:C:144:TYR:HB3	2.36	0.41
2:R:185:PRO:HB2	2:R:191:CYS:SG	2.60	0.41
3:S:68:VAL:HG21	3:S:89:ILE:HD13	2.02	0.41
13:7:155:ILE:HD12	13:7:204:LEU:HD21	2.03	0.41
7:C:4:ARG:HA	7:C:4:ARG:HH11	1.86	0.41
8:G:205:GLU:C	8:G:207:ASN:H	2.27	0.41
1:O:117:LEU:O	1:O:121:MET:HG2	2.21	0.41
1:O:210:MET:HE3	1:O:214:LEU:HD11	2.03	0.41
2:R:80:ALA:O	2:R:84:ILE:HG12	2.21	0.41
12:Z:58:TRP:CE3	12:Z:86:LEU:HD22	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:42:VAL:HG11	2:D:136:ALA:HB1	2.03	0.41
9:I:34:LEU:HD13	9:I:176:CYS:HB2	2.02	0.41
1:O:190:LYS:HE2	1:O:190:LYS:HB2	1.88	0.41
2:R:8:LEU:HD23	2:R:19:GLN:HB3	2.03	0.41
7:Q:66:LEU:HD13	7:Q:214:ALA:HB2	2.02	0.41
8:U:103:TYR:O	8:U:104:LYS:HG2	2.21	0.41
9:W:111:PHE:CD1	9:W:121:VAL:HG22	2.56	0.41
10:X:172:LEU:HD21	10:X:202:MET:SD	2.61	0.41
10:X:189:ILE:HB	10:X:196:VAL:HG23	2.02	0.41
11:Y:37:GLN:HG3	11:Y:189:ILE:HD12	2.02	0.41
12:Z:113:TYR:CE2	12:Z:123:LYS:HB2	2.56	0.41
14:8:33:LEU:HD22	14:8:74:TYR:HB2	2.02	0.41
3:S:218:GLN:HE21	3:S:230:ILE:HG21	1.86	0.41
7:Q:107:PRO:HD2	7:Q:110:ILE:HD12	2.03	0.41
14:8:44:PHE:HB3	14:8:69:ALA:HB2	2.03	0.41
13:4:122:PHE:HE2	13:4:135:MET:HA	1.85	0.41
1:A:164:VAL:HG13	1:A:166:TYR:CE2	2.56	0.40
3:E:45:GLY:HA2	3:E:153:TYR:CE2	2.56	0.40
4:F:81:ALA:HB2	4:F:130:VAL:HG21	2.02	0.40
1:A:190:LYS:HE2	1:A:190:LYS:HB2	1.82	0.40
4:F:153:VAL:H	8:G:86:ARG:HH12	1.69	0.40
14:5:143:PHE:HB3	14:5:205:ILE:HB	2.02	0.40
14:5:155:LEU:HB3	14:5:156:HIS:H	1.59	0.40
1:A:194:ILE:HG22	1:A:196:GLU:HG2	2.04	0.40
6:B:66:LEU:HD12	6:B:235:PHE:CD2	2.57	0.40
1:O:167:LYS:HG2	6:P:55:LEU:O	2.22	0.40
4:T:215:ILE:O	4:T:222:PHE:HA	2.21	0.40
9:W:227:GLN:HE22	10:X:194:GLU:HG3	1.86	0.40
13:7:180:MET:HE3	14:8:66:TYR:HE2	1.86	0.40
13:4:34:PRO:HB3	13:4:78:LEU:HB2	2.02	0.40
7:C:218:LYS:HB2	7:C:225:VAL:HG22	2.04	0.40
1:O:95:LEU:HD23	1:O:95:LEU:HA	1.86	0.40
14:5:97:ASN:HA	14:5:100:VAL:HG12	2.03	0.40
3:E:121:LEU:HD22	4:F:79:PRO:HB3	2.03	0.40
1:O:167:LYS:HB3	6:P:57:MET:HE3	2.03	0.40
4:T:33:SER:HB2	4:T:62:LYS:NZ	2.36	0.40
6:P:46:ALA:HB1	6:P:196:LEU:HD11	2.03	0.40
8:U:88:LEU:HA	8:U:88:LEU:HD23	1.85	0.40
14:5:146:ASP:HB3	14:5:203:ARG:NH2	2.37	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	244/252 (97%)	236 (97%)	8 (3%)	0	100	100
1	O	244/252 (97%)	238 (98%)	6 (2%)	0	100	100
2	D	247/254 (97%)	240 (97%)	6 (2%)	1 (0%)	30	63
2	R	247/254 (97%)	239 (97%)	8 (3%)	0	100	100
3	E	245/260 (94%)	240 (98%)	5 (2%)	0	100	100
3	S	245/260 (94%)	239 (98%)	6 (2%)	0	100	100
4	F	232/234 (99%)	226 (97%)	6 (3%)	0	100	100
4	T	232/234 (99%)	223 (96%)	9 (4%)	0	100	100
5	3	105/162 (65%)	96 (91%)	9 (9%)	0	100	100
5	6	120/162 (74%)	111 (92%)	9 (8%)	0	100	100
6	B	244/250 (98%)	240 (98%)	4 (2%)	0	100	100
6	P	247/250 (99%)	244 (99%)	3 (1%)	0	100	100
7	C	234/258 (91%)	225 (96%)	9 (4%)	0	100	100
7	Q	234/258 (91%)	230 (98%)	4 (2%)	0	100	100
8	G	242/288 (84%)	235 (97%)	7 (3%)	0	100	100
8	U	242/288 (84%)	234 (97%)	8 (3%)	0	100	100
9	I	218/261 (84%)	207 (95%)	11 (5%)	0	100	100
9	W	218/261 (84%)	213 (98%)	5 (2%)	0	100	100
10	J	185/205 (90%)	175 (95%)	10 (5%)	0	100	100
10	X	180/205 (88%)	172 (96%)	8 (4%)	0	100	100
11	K	170/198 (86%)	162 (95%)	8 (5%)	0	100	100
11	Y	193/198 (98%)	184 (95%)	9 (5%)	0	100	100
12	Z	162/287 (56%)	160 (99%)	1 (1%)	1 (1%)	22	53
13	4	274/276 (99%)	258 (94%)	16 (6%)	0	100	100
13	7	274/276 (99%)	263 (96%)	11 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
14	5	264/267 (99%)	256 (97%)	8 (3%)	0	100	100
14	8	264/267 (99%)	259 (98%)	5 (2%)	0	100	100
All	All	6006/6617 (91%)	5805 (97%)	199 (3%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	101	GLU
12	Z	107	LYS

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	204/210 (97%)	198 (97%)	6 (3%)	37	65
1	O	204/210 (97%)	201 (98%)	3 (2%)	60	80
2	D	221/226 (98%)	219 (99%)	2 (1%)	75	88
2	R	219/226 (97%)	218 (100%)	1 (0%)	86	92
3	E	205/215 (95%)	203 (99%)	2 (1%)	73	86
3	S	205/215 (95%)	201 (98%)	4 (2%)	50	74
4	F	193/193 (100%)	187 (97%)	6 (3%)	35	63
4	T	193/193 (100%)	189 (98%)	4 (2%)	48	72
5	3	101/150 (67%)	97 (96%)	4 (4%)	27	58
5	6	114/150 (76%)	112 (98%)	2 (2%)	54	76
6	B	207/209 (99%)	204 (99%)	3 (1%)	62	81
6	P	208/209 (100%)	201 (97%)	7 (3%)	32	62
7	C	200/216 (93%)	192 (96%)	8 (4%)	27	58
7	Q	200/216 (93%)	199 (100%)	1 (0%)	86	92
8	G	200/239 (84%)	189 (94%)	11 (6%)	18	47
8	U	201/239 (84%)	194 (96%)	7 (4%)	31	61

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
9	I	183/214 (86%)	181 (99%)	2 (1%)	70	84
9	W	181/214 (85%)	176 (97%)	5 (3%)	38	66
10	J	159/173 (92%)	153 (96%)	6 (4%)	28	59
10	X	156/173 (90%)	151 (97%)	5 (3%)	34	63
11	K	153/175 (87%)	152 (99%)	1 (1%)	81	90
11	Y	169/175 (97%)	163 (96%)	6 (4%)	30	60
12	Z	135/235 (57%)	128 (95%)	7 (5%)	19	48
13	4	238/251 (95%)	235 (99%)	3 (1%)	65	82
13	7	233/251 (93%)	227 (97%)	6 (3%)	41	68
14	5	243/244 (100%)	237 (98%)	6 (2%)	42	69
14	8	243/244 (100%)	238 (98%)	5 (2%)	48	72
All	All	5168/5665 (91%)	5045 (98%)	123 (2%)	45	70

All (123) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	14	ARG
1	A	64	LEU
1	A	95	LEU
1	A	169	THR
1	A	216	THR
1	A	232	LYS
2	D	104	VAL
2	D	153	SER
3	E	186	GLU
3	E	222	ILE
4	F	4	ASN
4	F	34	VAL
4	F	35	THR
4	F	50	LYS
4	F	72	LEU
4	F	74	LEU
5	3	-13	TYR
5	3	-3	HIS
5	3	64	GLN
5	3	65	ARG
6	B	63	LYS
6	B	97	TYR

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Mol	Chain	Res	Type
6	B	99	ARG
7	C	51	LYS
7	C	72	LYS
7	C	100	LYS
7	C	165	VAL
7	C	195	LYS
7	C	201	THR
7	C	213	PHE
7	C	228	LYS
8	G	18	ASP
8	G	50	VAL
8	G	53	LEU
8	G	54	ILE
8	G	63	LYS
8	G	107	ILE
8	G	170	GLN
8	G	178	LYS
8	G	208	LYS
8	G	229	LYS
8	G	232	LYS
9	I	40	LYS
9	I	63	ILE
10	J	21	VAL
10	J	29	LEU
10	J	39	LYS
10	J	132	GLU
10	J	141	THR
10	J	191	LYS
11	K	182	LYS
1	O	169	THR
1	O	230	LYS
1	O	232	LYS
2	R	20	VAL
3	S	9	ASP
3	S	90	GLU
3	S	202	LYS
3	S	222	ILE
4	T	34	VAL
4	T	35	THR
4	T	74	LEU
4	T	180	ILE
5	6	47	LEU

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Mol	Chain	Res	Type
5	6	73	ARG
6	P	37	ILE
6	P	43	VAL
6	P	57	MET
6	P	63	LYS
6	P	169	VAL
6	P	211	LEU
6	P	230	ASP
7	Q	63	THR
8	U	52	LYS
8	U	54	ILE
8	U	59	LEU
8	U	76	CYS
8	U	194	LYS
8	U	210	LYS
8	U	219	CYS
9	W	-10	HIS
9	W	-4	THR
9	W	80	LEU
9	W	163	ILE
9	W	191	LEU
10	X	21	VAL
10	X	28	ARG
10	X	58	THR
10	X	192	LYS
10	X	197	LYS
11	Y	3	ILE
11	Y	30	ASP
11	Y	113	LYS
11	Y	168	LEU
11	Y	186	LYS
11	Y	195	PHE
12	Z	16	VAL
12	Z	42	LEU
12	Z	65	LEU
12	Z	71	LYS
12	Z	145	LYS
12	Z	147	ASP
12	Z	151	GLU
13	7	20	GLU
13	7	24	ASN
13	7	46	GLN

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Mol	Chain	Res	Type
13	7	218	VAL
13	7	228	GLU
13	7	249	GLU
14	8	14	ILE
14	8	45	VAL
14	8	197	GLN
14	8	200	LYS
14	8	235	LYS
13	4	71	ILE
13	4	92	HIS
13	4	276	ILE
14	5	31	GLU
14	5	77	LYS
14	5	155	LEU
14	5	200	LYS
14	5	235	LYS
14	5	264	ASP

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

Mol	Chain	Res	Type
1	A	84	ASN
3	E	147	HIS
3	E	218	GLN
4	F	91	GLN
5	3	-5	HIS
5	3	-1	HIS
6	B	143	ASN
6	B	190	HIS
7	C	21	GLN
7	C	168	ASN
8	G	33	ASN
8	G	64	ASN
9	I	10	ASN
10	J	8	ASN
10	J	64	ASN
1	O	37	GLN
3	S	154	GLN
3	S	180	GLN
4	T	90	GLN
4	T	110	HIS
5	6	36	GLN

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Mol	Chain	Res	Type
5	6	48	ASN
7	Q	227	GLN
8	U	123	HIS
8	U	207	ASN
9	W	219	ASN
9	W	227	GLN
10	X	8	ASN
11	Y	191	GLN
12	Z	143	ASN
12	Z	179	HIS
13	7	26	GLN
13	7	64	ASN
14	8	24	ASN
14	8	156	HIS
14	8	236	ASN
13	4	99	ASN
13	4	102	ASN
13	4	157	GLN
13	4	183	ASN
13	4	271	GLN
14	5	13	ASN
14	5	84	GLN
14	5	156	HIS
14	5	158	ASN
14	5	213	ASN

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 ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-54045. 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
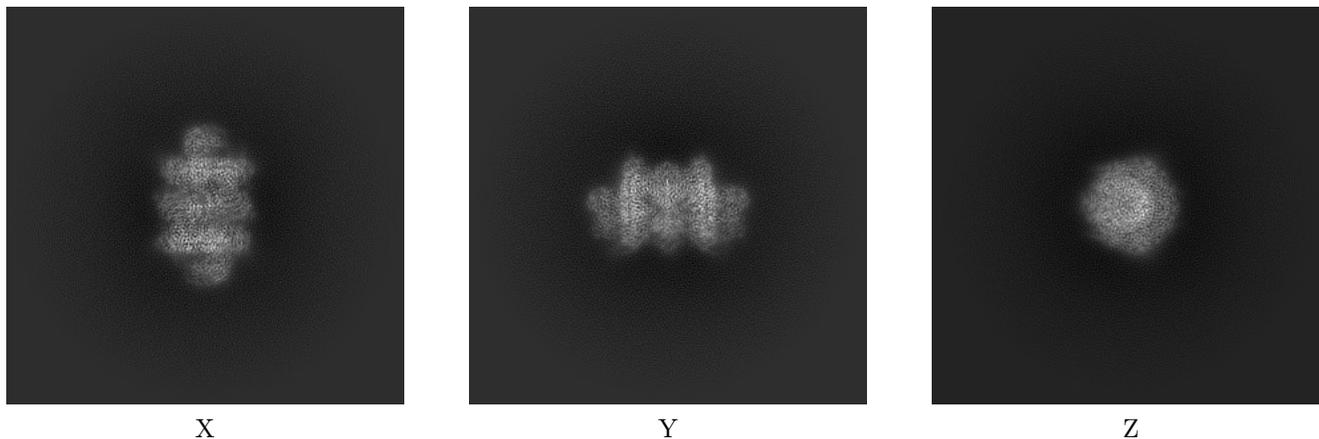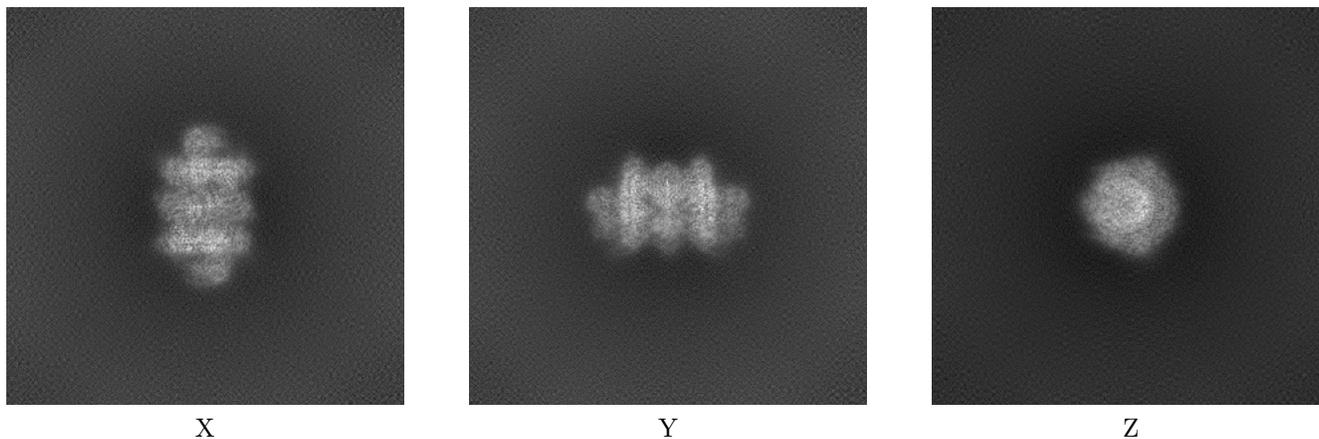
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map
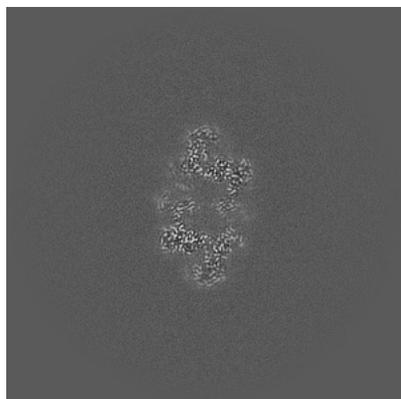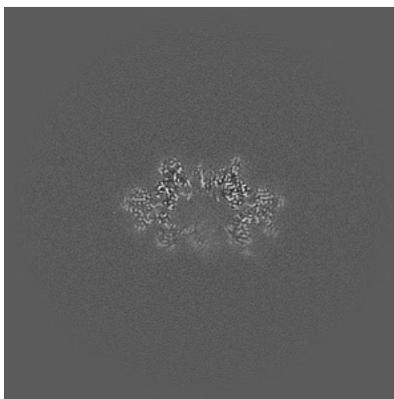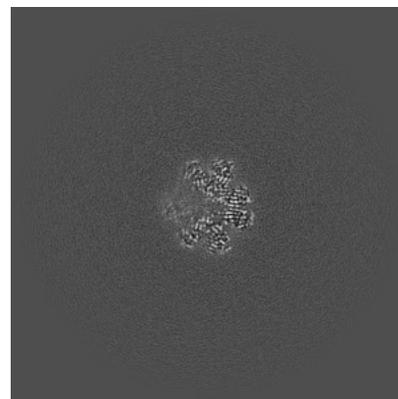
X Index: 250	Y Index: 250	Z Index: 250

6.2.2 Raw map
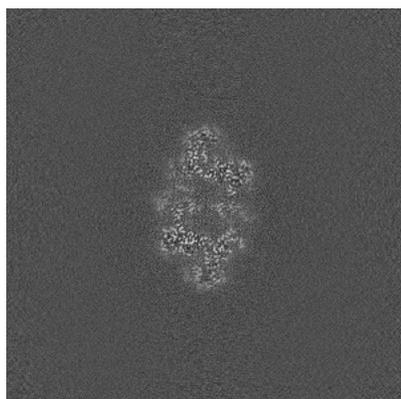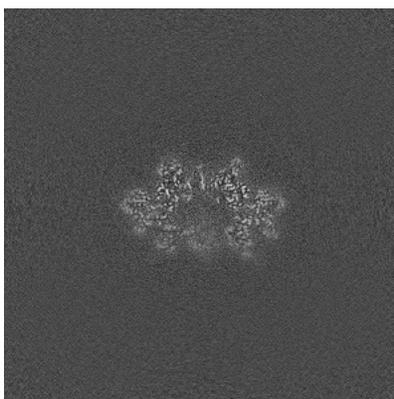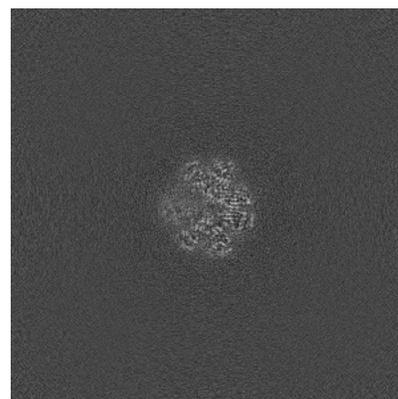
X Index: 250	Y Index: 250	Z Index: 250

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

6.3 Largest variance slices ⓘ
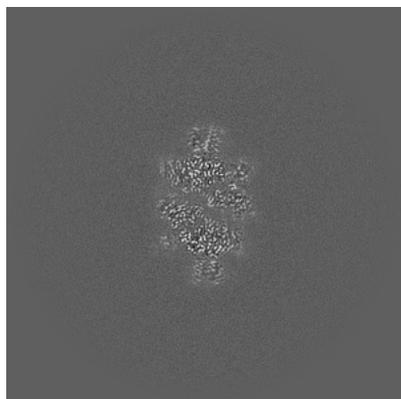
6.3.1 Primary map
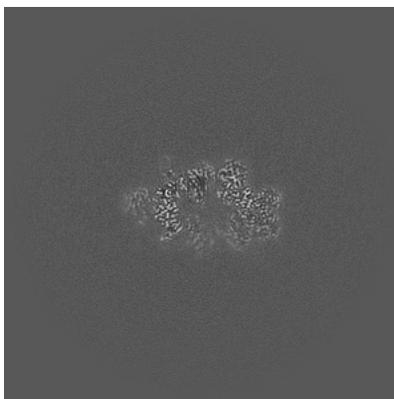
| X Index: 264 | Y Index: 238 | Z Index: 207 |
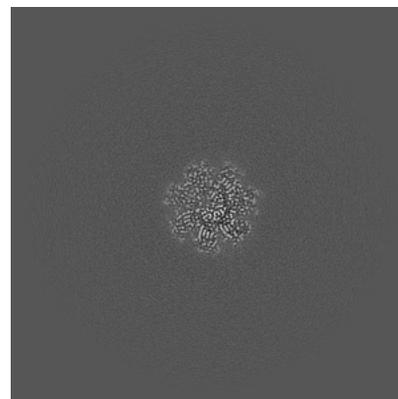
6.3.2 Raw map
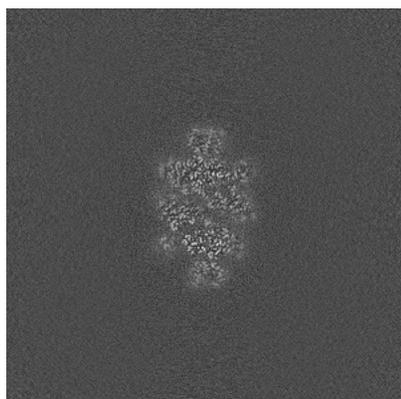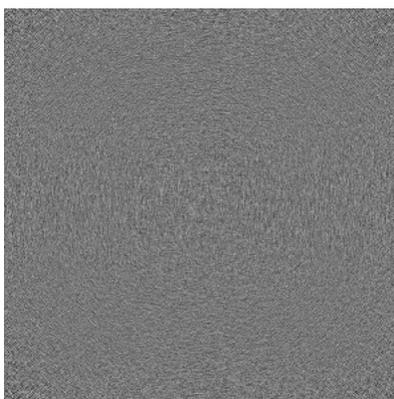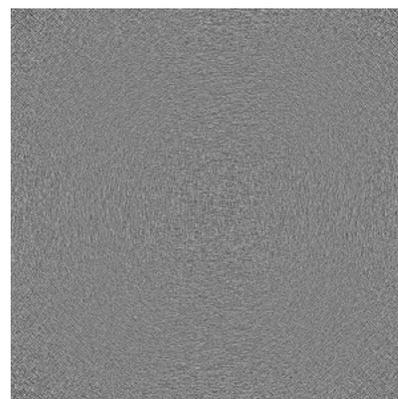
| X Index: 263 | Y Index: 0 | Z Index: 499 |

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

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

6.4.1 Primary map

X Y Z

6.4.2 Raw map

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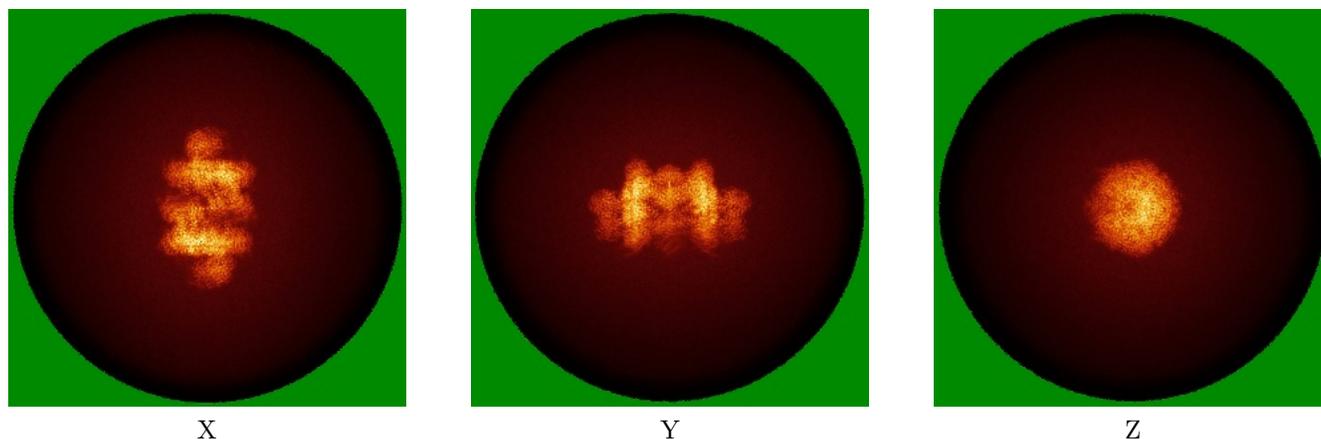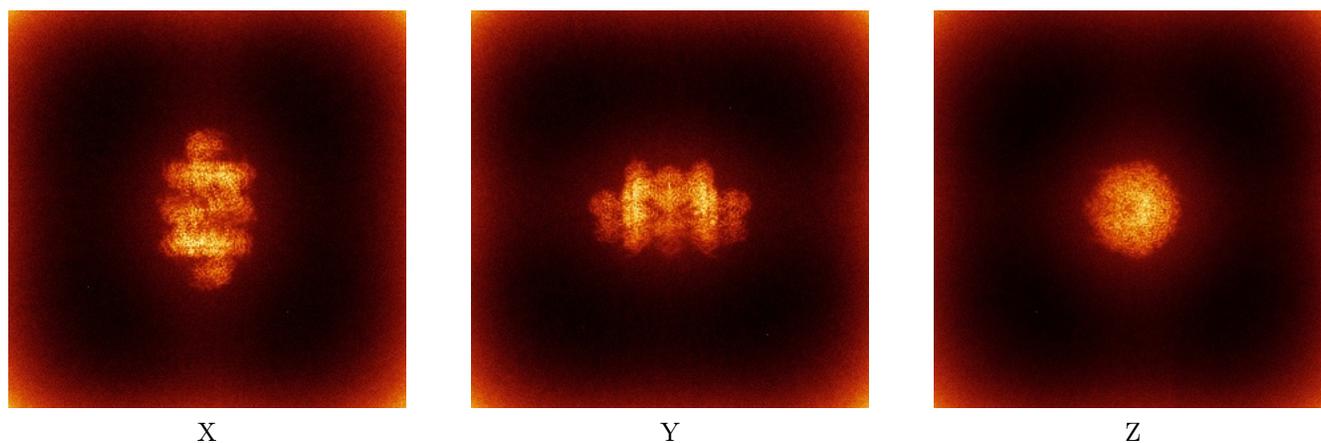
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

| X | Y | Z |
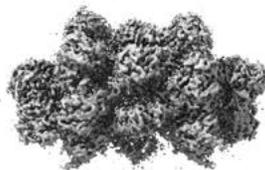
The images above show the 3D surface view of the map at the recommended contour level 0.134. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map
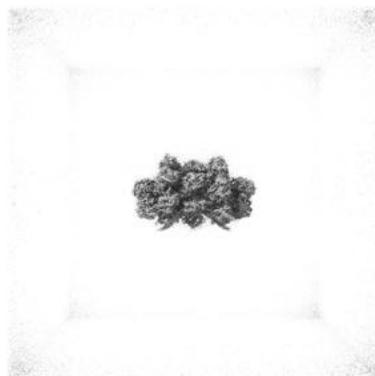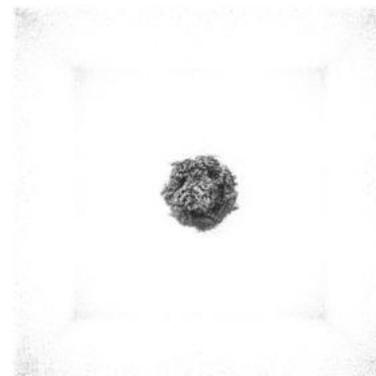
| X | Y | Z |

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_54045_msk_1.map (i)

X   Y   Z
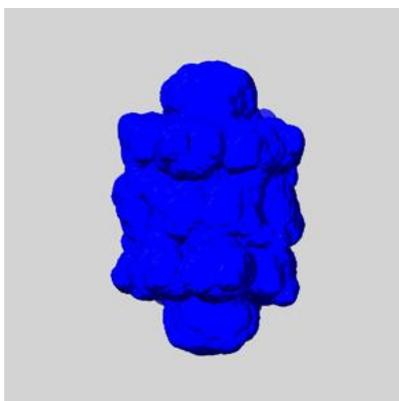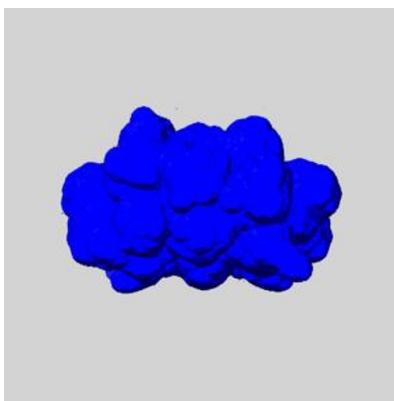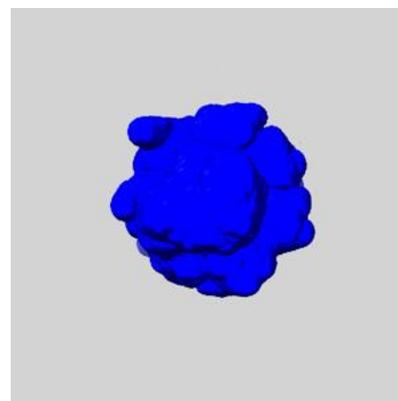
7 Map analysis ⓘ

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

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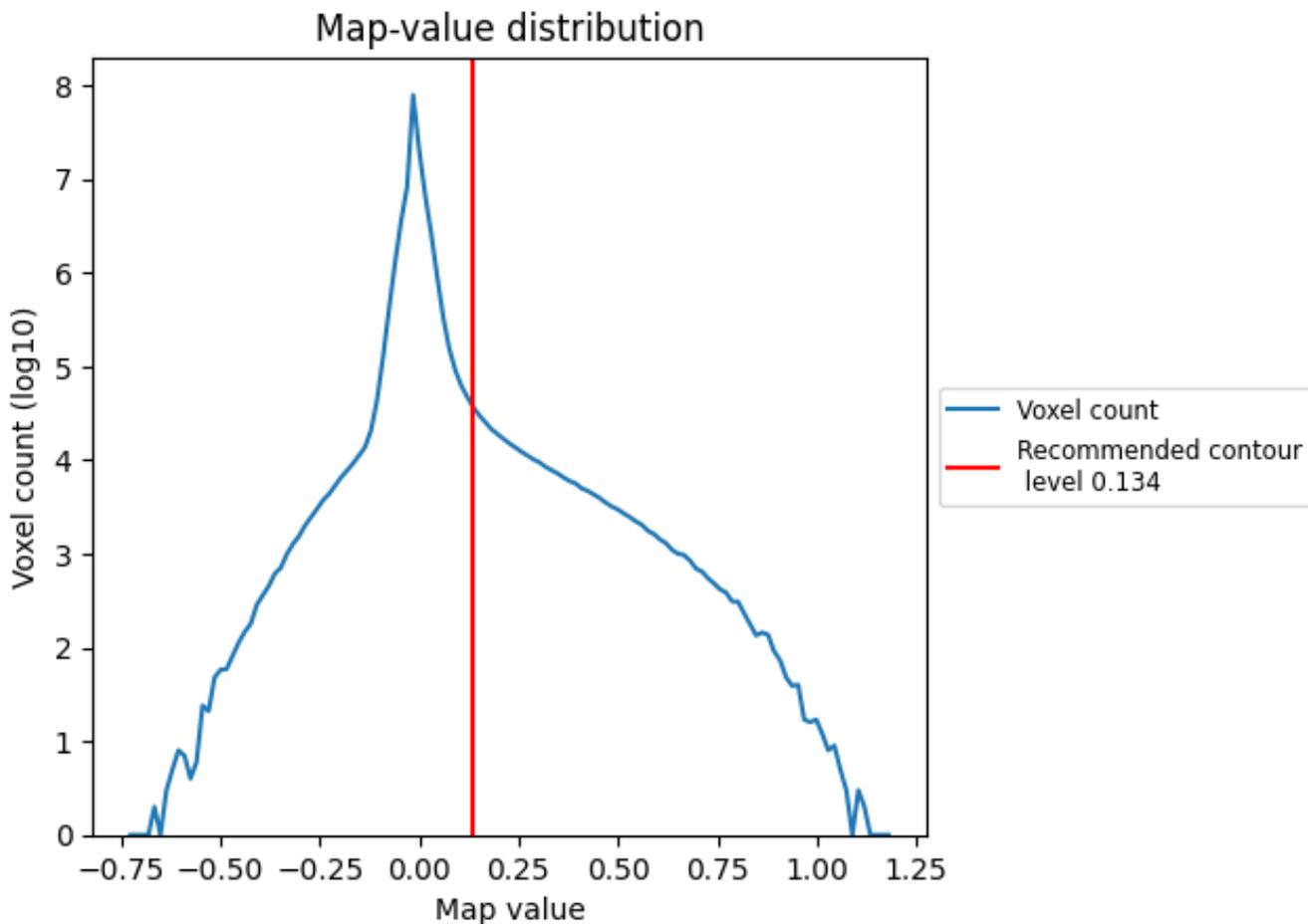
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate ⓘ
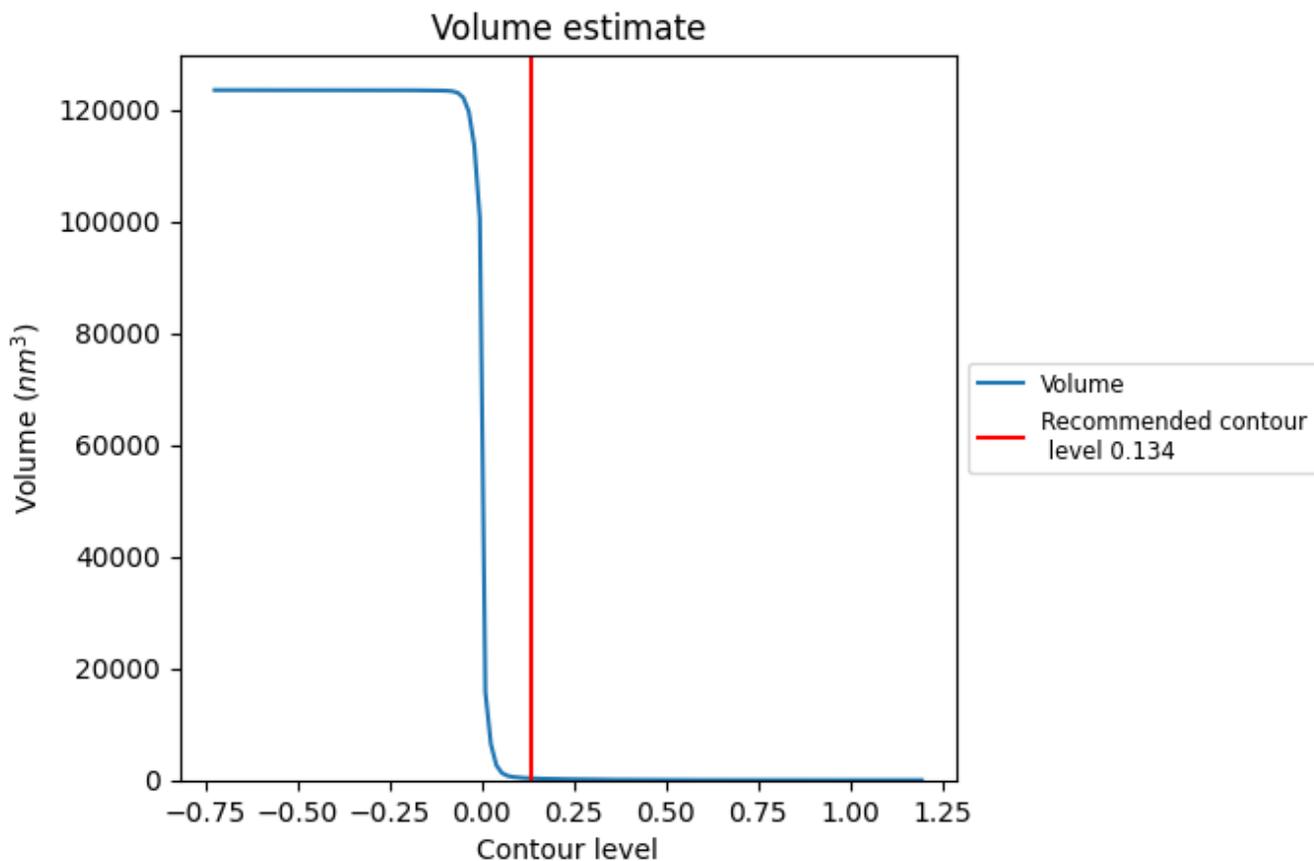
The volume at the recommended contour level is 319 nm^3; this corresponds to an approximate mass of 288 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ
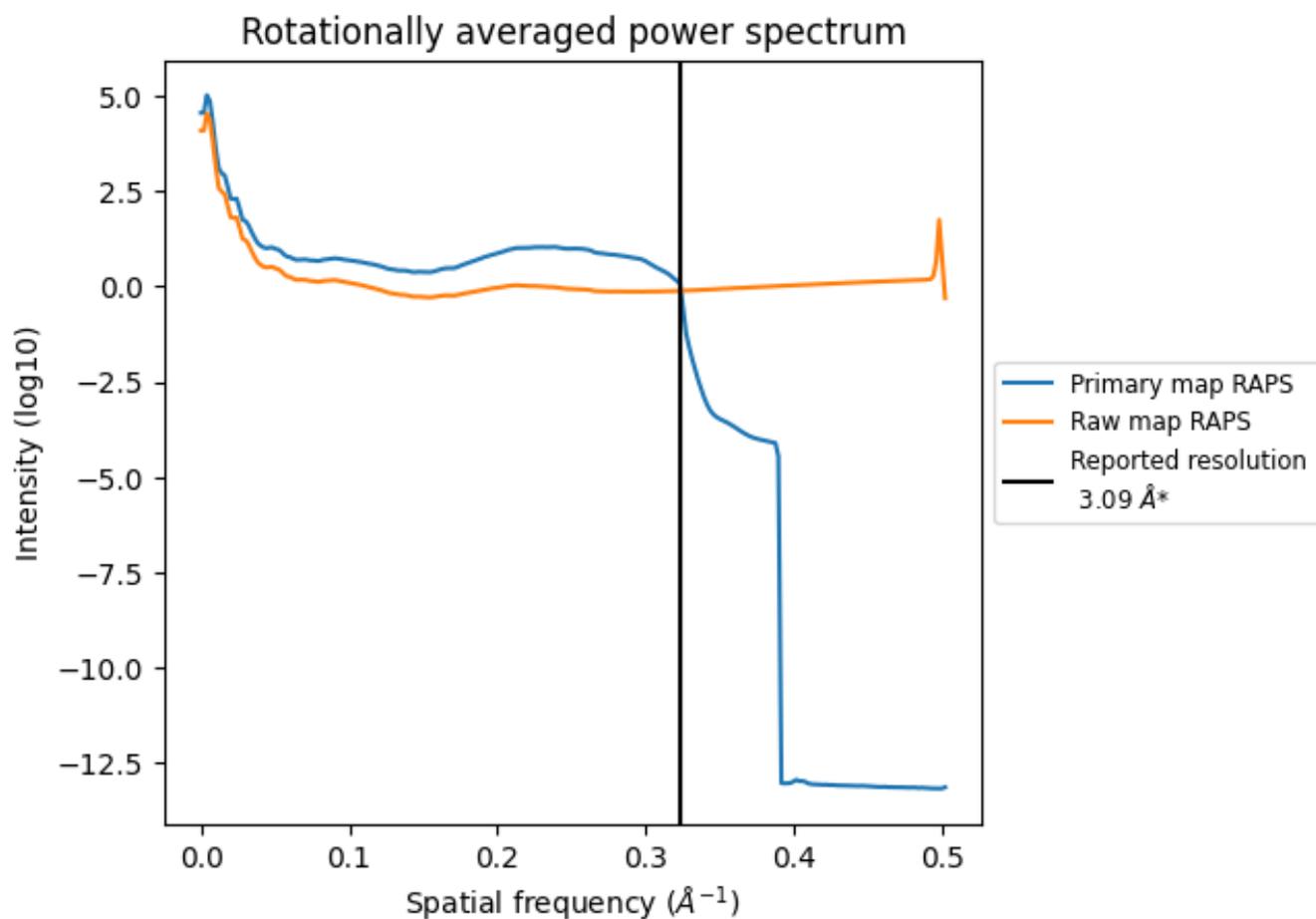
*Reported resolution corresponds to spatial frequency of 0.324 Å^{-1}

8 Fourier-Shell correlation (i)

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

8.1 FSC (i)
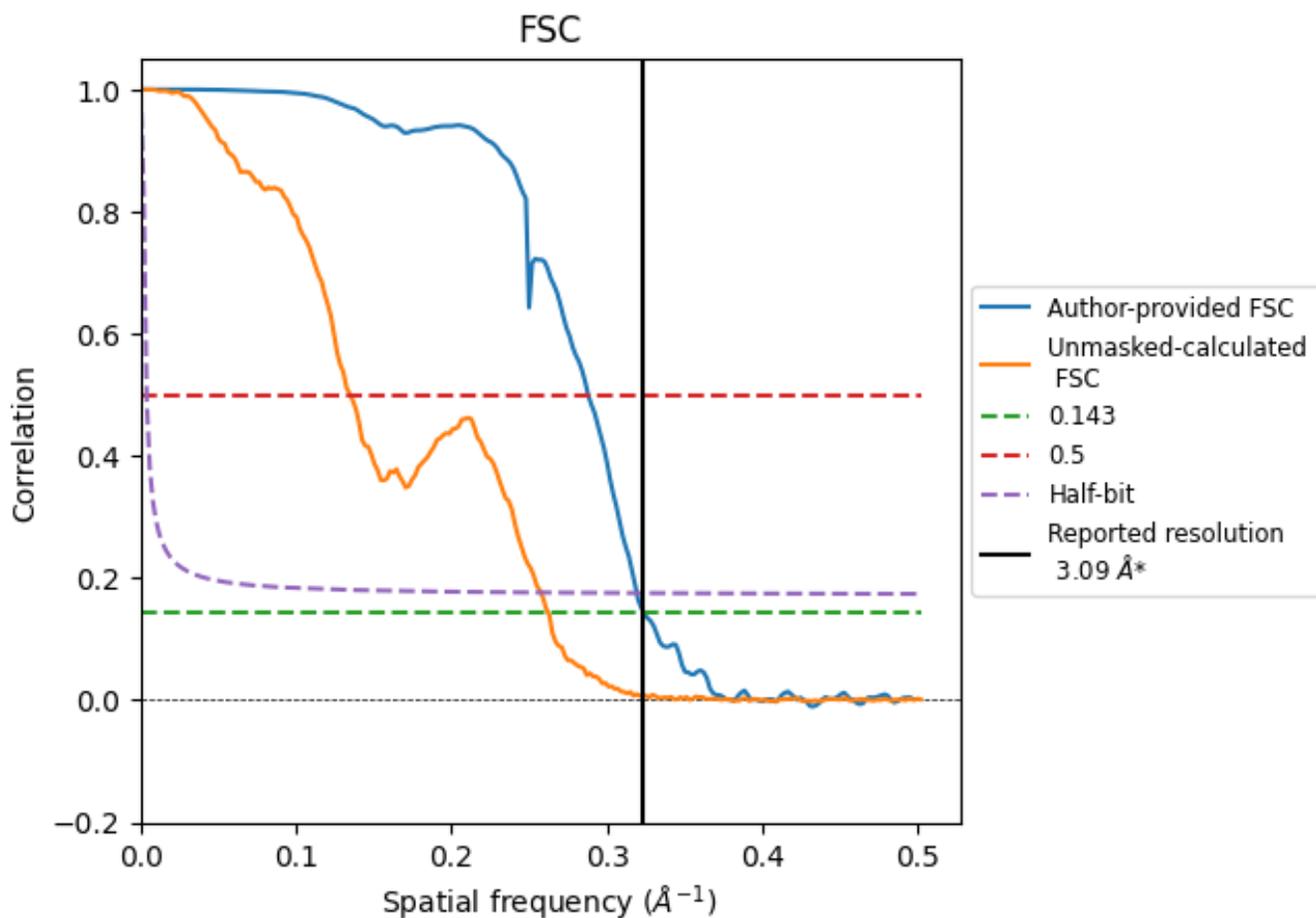
*Reported resolution corresponds to spatial frequency of 0.324 Å^{-1}

8.2   Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.09	-	-
Author-provided FSC curve	3.09	3.47	3.13
Unmasked-calculated*	3.81	7.41	3.88

*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 3.81 differs from the reported value 3.09 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-54045 and PDB model 9RLT. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay ⓘ

| X | Y | Z |
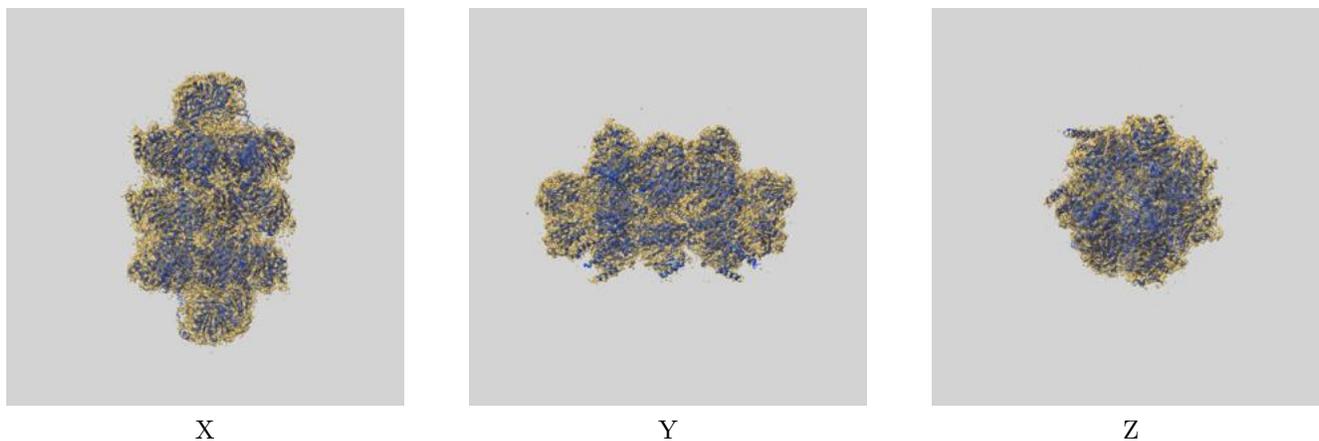
The images above show the 3D surface view of the map at the recommended contour level 0.134 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model ⓘ

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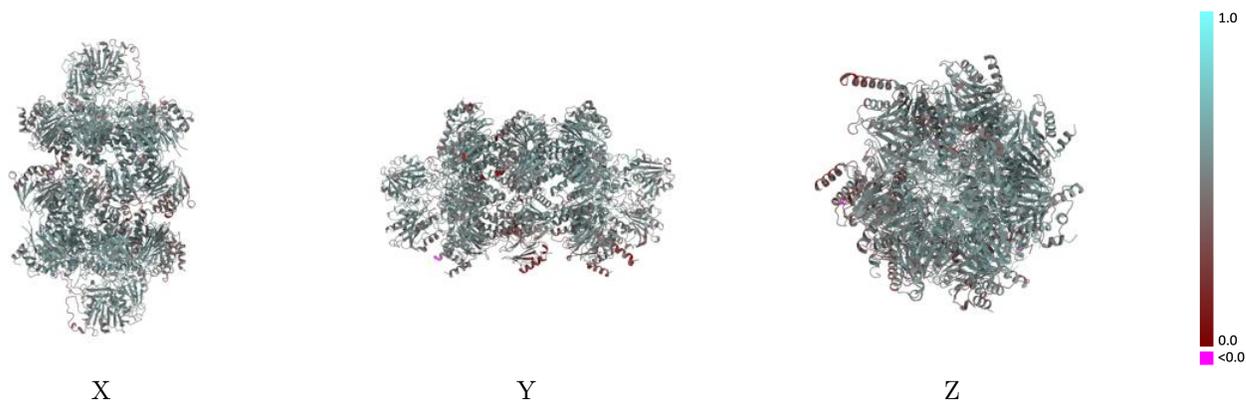
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

X Y Z
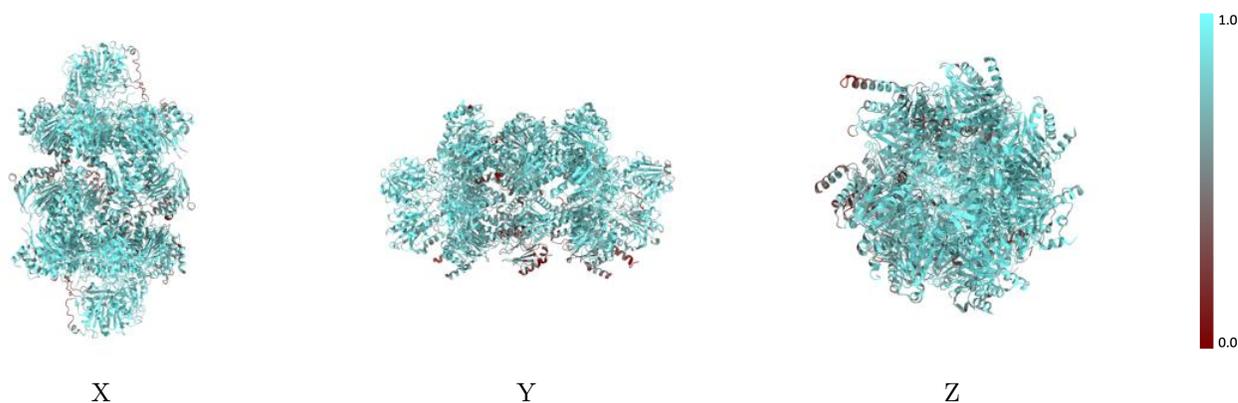
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.134).

9.4　Atom inclusion　ⓘ
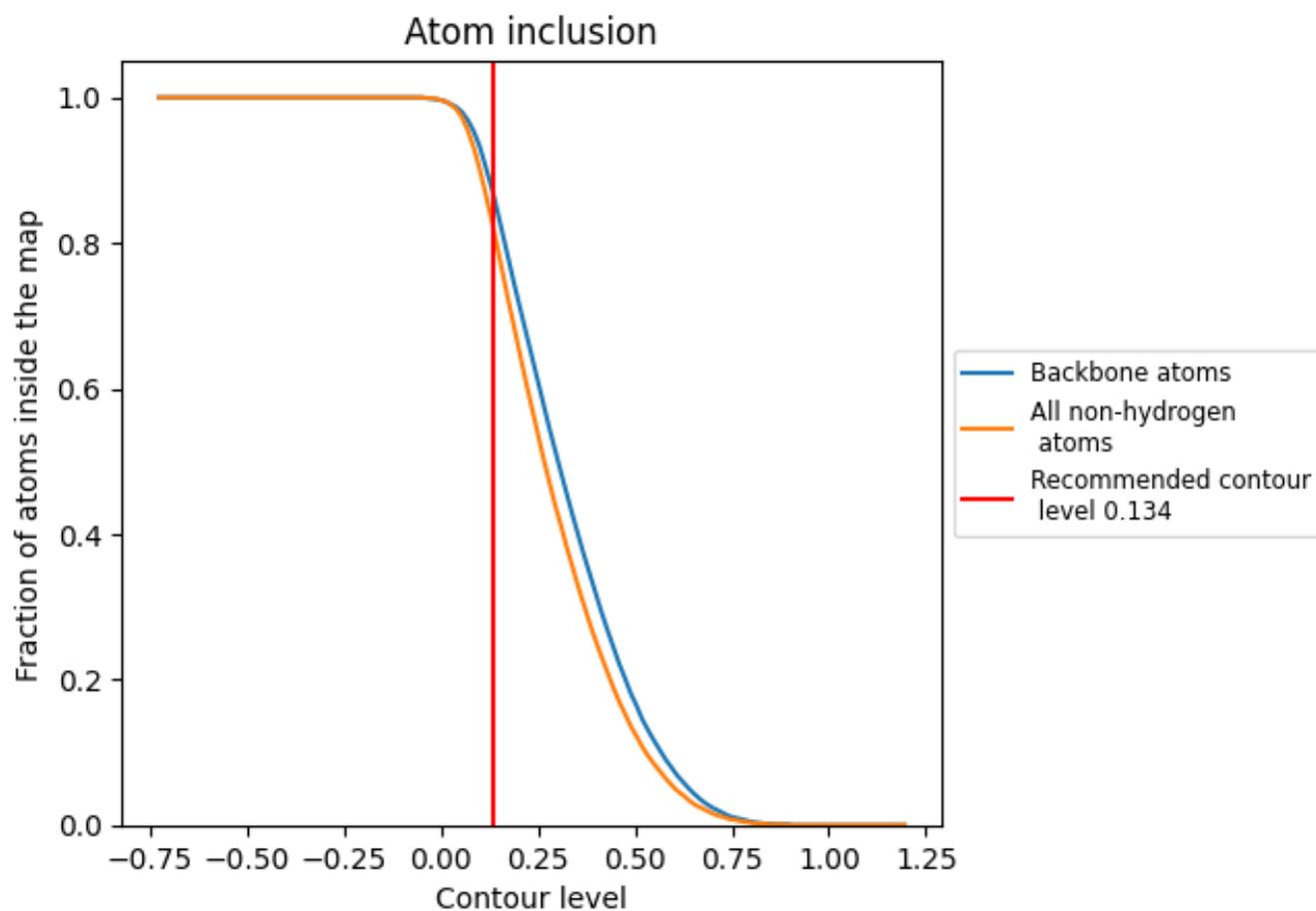
At the recommended contour level, 87% of all backbone atoms, 82% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.134) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8240	0.5240
3	0.8330	0.5300
4	0.7930	0.5040
5	0.8420	0.5250
6	0.8010	0.5360
7	0.8160	0.5110
8	0.8390	0.5170
A	0.8940	0.5610
B	0.8970	0.5690
C	0.8710	0.5490
D	0.7930	0.5040
E	0.7180	0.4680
F	0.8410	0.5290
G	0.8560	0.5320
I	0.8230	0.5250
J	0.8180	0.5200
K	0.7580	0.4950
O	0.8940	0.5590
P	0.9080	0.5740
Q	0.8860	0.5560
R	0.8290	0.5280
S	0.8060	0.5150
T	0.8570	0.5390
U	0.8370	0.5270
W	0.8090	0.5240
X	0.8610	0.5440
Y	0.7380	0.4820
Z	0.5150	0.3910

1.0

0.0
<0.0