



# wwPDB EM Validation Summary Report ⓘ

Jan 15, 2025 – 08:44 PM JST

PDB ID : 8YIY  
EMDB ID : EMD-39333  
Title : Cryo-EM structure of human proteasome assembly intermediate preholo-1  
Authors : Han, Y.; Han, Q.; Tang, Q.; Zhang, Y.; Liu, K.  
Deposited on : 2024-02-29  
Resolution : 3.41 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev113  
MolProbity : 4.02b-467  
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) : 2.40

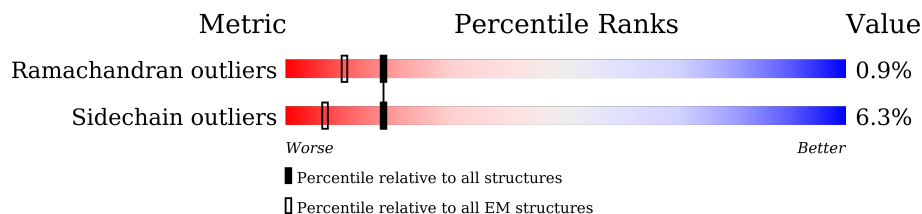
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.41 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)
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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	234	88% 8% ..
1	O	234	88% 8% ..
2	B	261	83% 10% • 6%
2	P	261	83% 10% • 6%
3	C	248	86% 8% • •
3	Q	248	86% 8% • •
4	D	241	5% 90% 10%
4	R	241	90% 10%
5	E	263	90% 10%

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Mol	Chain	Length	Quality of chain
5	S	263	90% 10%
6	F	255	94% 6%
6	T	255	94% 6%
7	G	246	90% 9%
7	U	246	90% 9%
8	H	277	12% 88% 5% • 5%
8	V	277	11% 88% 5% • 5%
9	I	205	98%
9	W	205	98%
10	J	201	94% ••••
10	X	201	94% ••••
11	K	263	7% 81% •• 15%
11	Y	263	5% 81% •• 15%
12	L	241	88% 12%
12	Z	241	88% 12%
13	M	253	81% • 19%
13	a	253	81% • 19%
14	N	239	83% • 16%
14	b	239	83% • 16%
15	c	288	73% 97% ••
15	f	288	22% 97% ••
16	d	264	58% 85% 14% •
16	g	264	9% 85% 14% •
17	e	141	66% 67% 11% • 20%
17	h	141	50% 67% 11% • 20%

## 2 Entry composition [i](#)

There are 17 unique types of molecules in this entry. The entry contains 59560 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-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	O	228	Total	C	N	O	S	0	0
			1760	1124	296	334	6		
1	A	228	Total	C	N	O	S	0	0
			1760	1124	296	334	6		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	P	245	Total	C	N	O	S	0	0
			1894	1196	321	367	10		
2	B	245	Total	C	N	O	S	0	0
			1894	1196	321	367	10		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	Q	239	Total	C	N	O	S	0	0
			1849	1159	325	360	5		
3	C	239	Total	C	N	O	S	0	0
			1849	1159	325	360	5		

- Molecule 4 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	R	241	Total	C	N	O	S	0	0
			1840	1159	305	364	12		
4	D	241	Total	C	N	O	S	0	0
			1840	1159	305	364	12		

- Molecule 5 is a protein called Proteasome subunit alpha type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	S	238	1859	1165	335	348	11	1	0
5	E	238	1859	1165	335	348	11	1	0

- Molecule 6 is a protein called Proteasome subunit alpha type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	T	239	1858	1180	318	348	12	1	0
6	F	239	1858	1180	318	348	12	1	0

- Molecule 7 is a protein called Proteasome subunit alpha type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	U	245	1893	1201	317	361	14	0	0
7	G	245	1893	1201	317	361	14	0	0

- Molecule 8 is a protein called Proteasome subunit beta type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	V	263	1984	1252	339	378	15	2	0
8	H	263	1984	1252	339	378	15	2	0

- Molecule 9 is a protein called Proteasome subunit beta type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	W	200	1576	1004	265	289	18	2	0
9	I	200	1576	1004	265	289	18	2	0

- Molecule 10 is a protein called Proteasome subunit beta type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	X	196	1581	1013	269	289	10	2	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	J	196	1581	1013	269	289	10	2	0

- Molecule 11 is a protein called Proteasome subunit beta type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	Y	224	1737	1097	302	327	11	3	0
11	K	224	1737	1097	302	327	11	3	0

- Molecule 12 is a protein called Proteasome subunit beta type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	Z	213	1644	1043	281	309	11	1	0
12	L	213	1644	1043	281	309	11	1	0

- Molecule 13 is a protein called Proteasome subunit beta type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	a	206	1605	1012	277	305	11	1	0
13	M	206	1605	1012	277	305	11	1	0

- Molecule 14 is a protein called Proteasome subunit beta type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	b	200	1504	943	256	292	13	1	0
14	N	200	1504	943	256	292	13	1	0

- Molecule 15 is a protein called Proteasome assembly chaperone 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	f	280	2230	1421	374	416	19	0	0
15	c	280	2230	1421	374	416	19	0	0

- Molecule 16 is a protein called Proteasome assembly chaperone 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	g	264	2062	1323	336	388	15	0	0
16	d	264	2062	1323	336	388	15	0	0


- Molecule 17 is a protein called Proteasome maturation protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	h	113	904	574	152	173	5	0	0
17	e	113	904	574	152	173	5	0	0

### 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-2

Chain O:  88% 8% ..




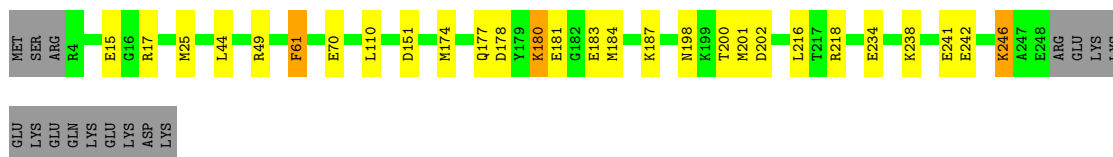
- Molecule 1: Proteasome subunit alpha type-2

Chain A:  88% 8% ..




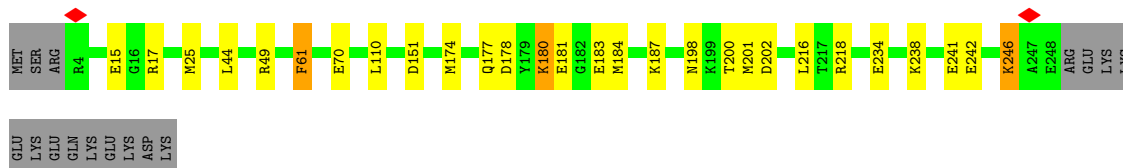
- Molecule 2: Proteasome subunit alpha type-4

Chain P:  83% 10% • 6%




- Molecule 2: Proteasome subunit alpha type-4

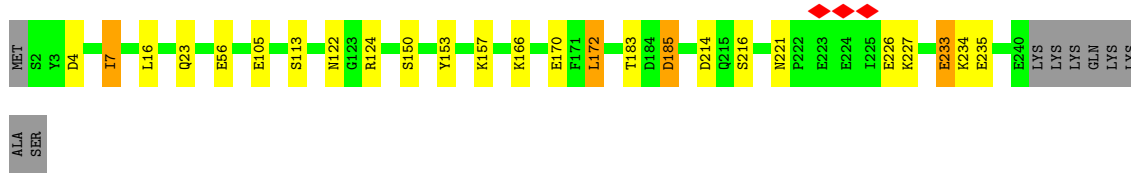
Chain B:  83% 10% • 6%



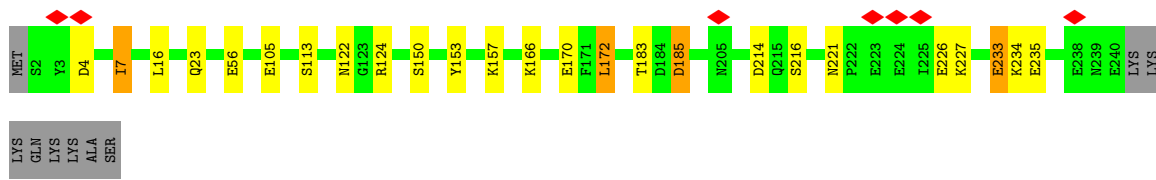
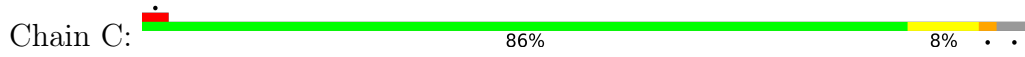
- Molecule 3: Proteasome subunit alpha type-7

Chain Q:  86% 8% ..

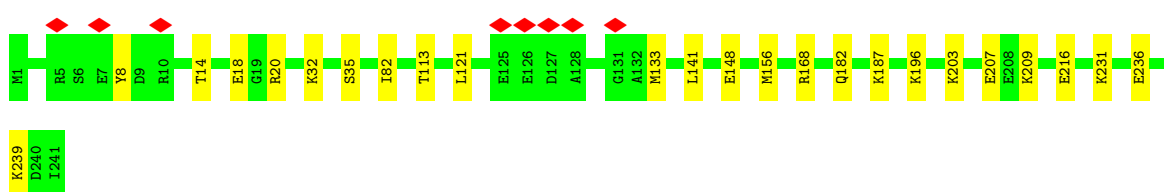
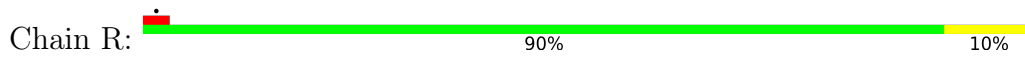




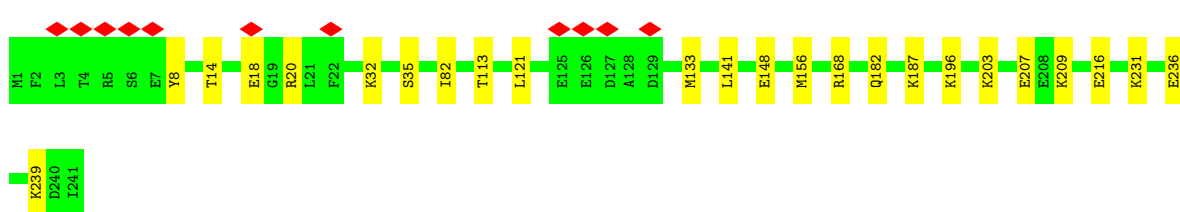
• Molecule 3: Proteasome subunit alpha type-7



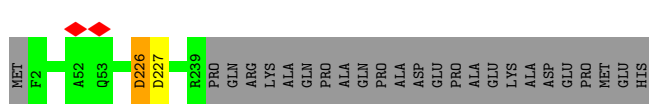
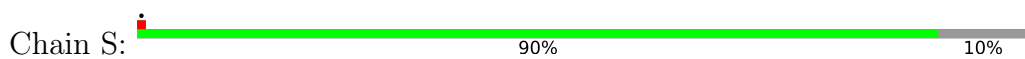
• Molecule 4: Proteasome subunit alpha type-5



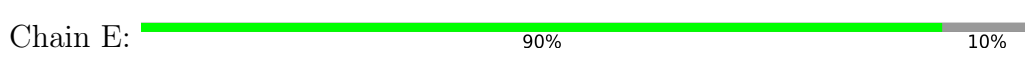
• Molecule 4: Proteasome subunit alpha type-5

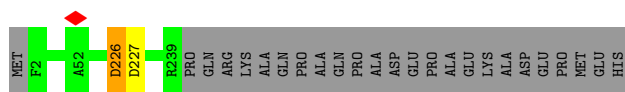


• Molecule 5: Proteasome subunit alpha type-1

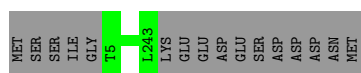


• Molecule 5: Proteasome subunit alpha type-1

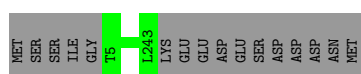




• Molecule 6: Proteasome subunit alpha type-3



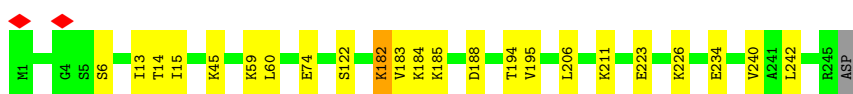
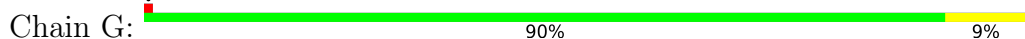
• Molecule 6: Proteasome subunit alpha type-3



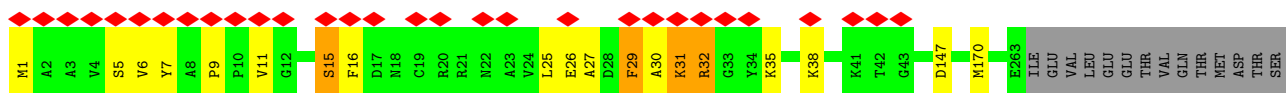
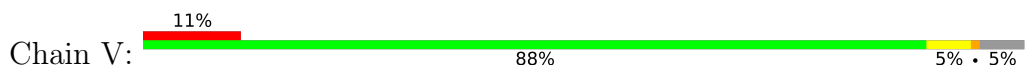
• Molecule 7: Proteasome subunit alpha type-6



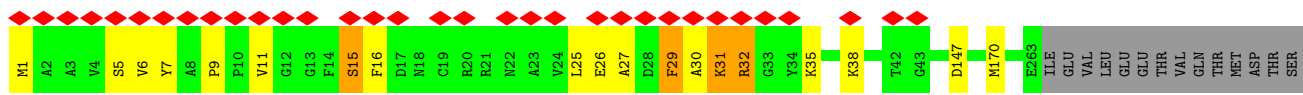
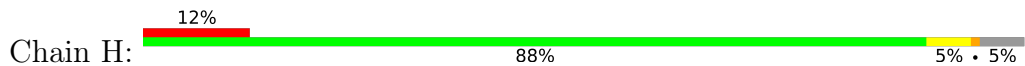
• Molecule 7: Proteasome subunit alpha type-6



• Molecule 8: Proteasome subunit beta type-7

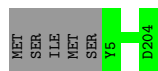


• Molecule 8: Proteasome subunit beta type-7



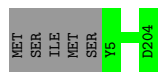
• Molecule 9: Proteasome subunit beta type-3

Chain W:  98%



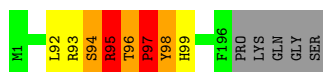
- Molecule 9: Proteasome subunit beta type-3

Chain I:  98%



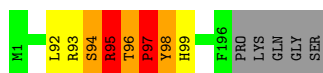
- Molecule 10: Proteasome subunit beta type-2

Chain X:  94%




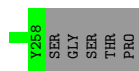
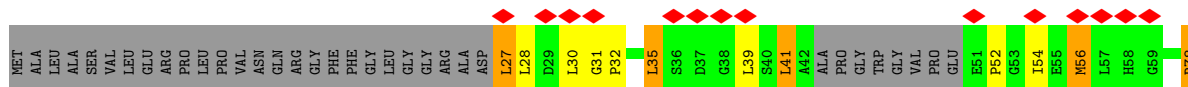
- Molecule 10: Proteasome subunit beta type-2

Chain J:  94%




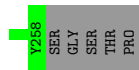
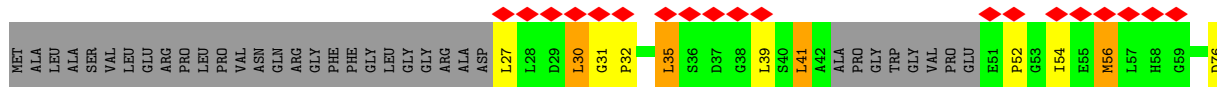
- Molecule 11: Proteasome subunit beta type-5

Chain Y:  5% 81% 15%




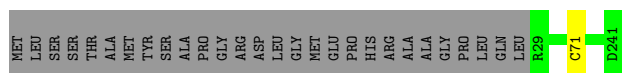
- Molecule 11: Proteasome subunit beta type-5

Chain K:  7% 81% 15%




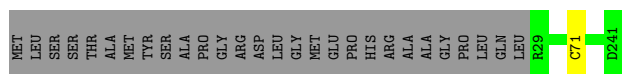
- Molecule 12: Proteasome subunit beta type-1

Chain Z:  88% 12%




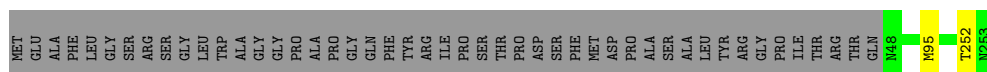
• Molecule 12: Proteasome subunit beta type-1

Chain L:  88% 12%




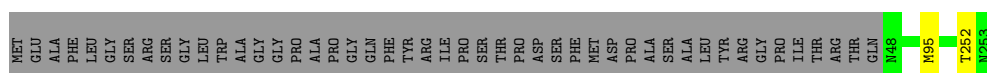
• Molecule 13: Proteasome subunit beta type-4

Chain a:  81% 19%




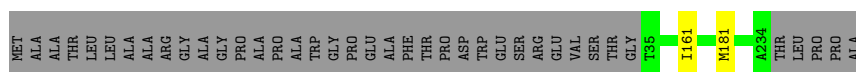
• Molecule 13: Proteasome subunit beta type-4

Chain M:  81% 19%




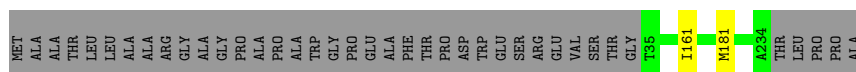
• Molecule 14: Proteasome subunit beta type-6

Chain b:  83% 16%



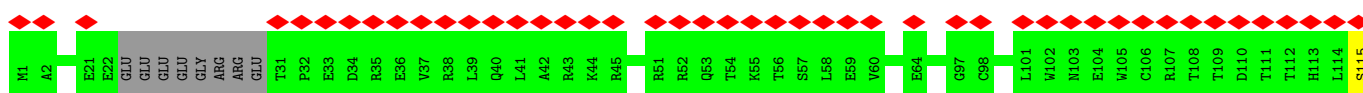
• Molecule 14: Proteasome subunit beta type-6

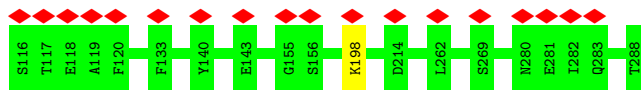
Chain N:  83% 16%



• Molecule 15: Proteasome assembly chaperone 1

Chain f:  22% 97%

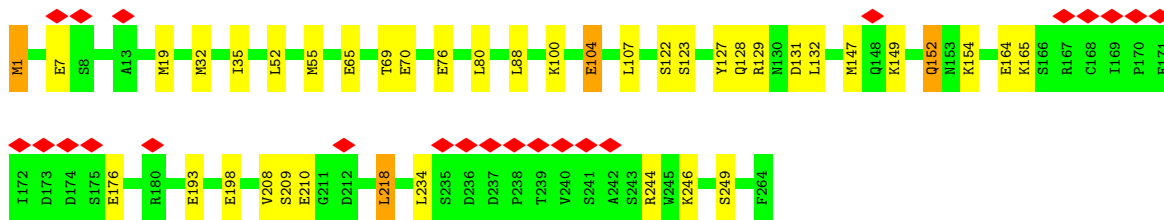
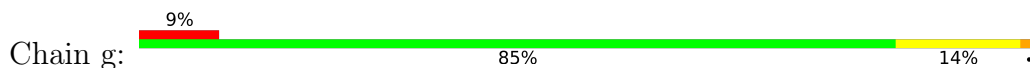




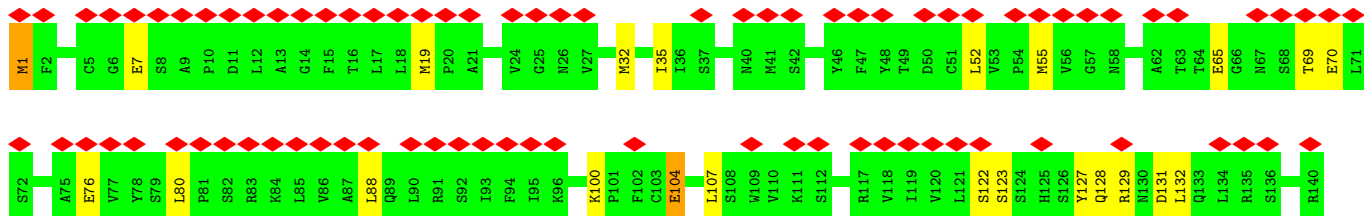
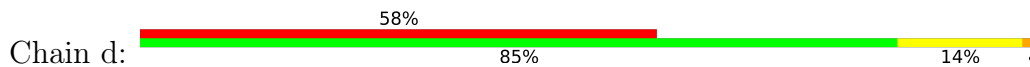
• Molecule 15: Proteasome assembly chaperone 1

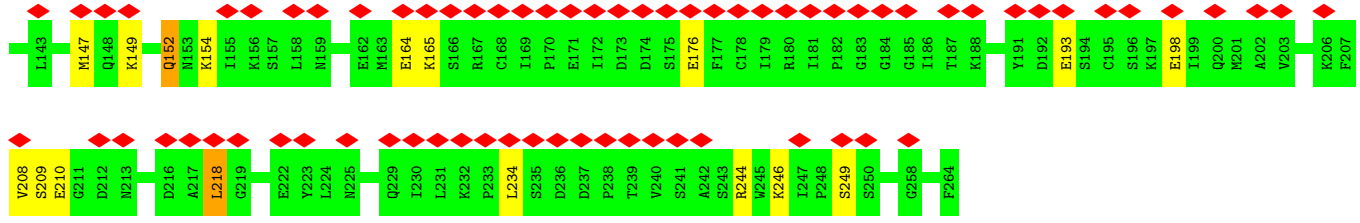


• Molecule 16: Proteasome assembly chaperone 2

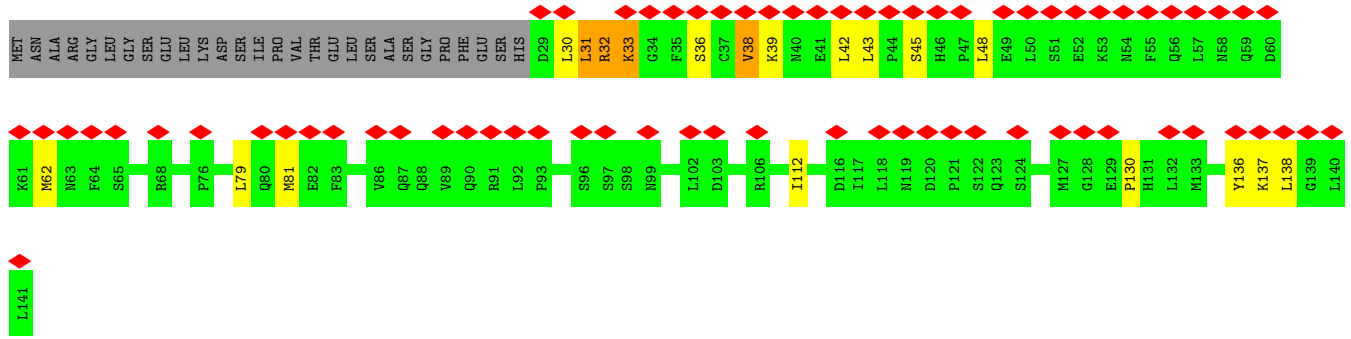


• Molecule 16: Proteasome assembly chaperone 2

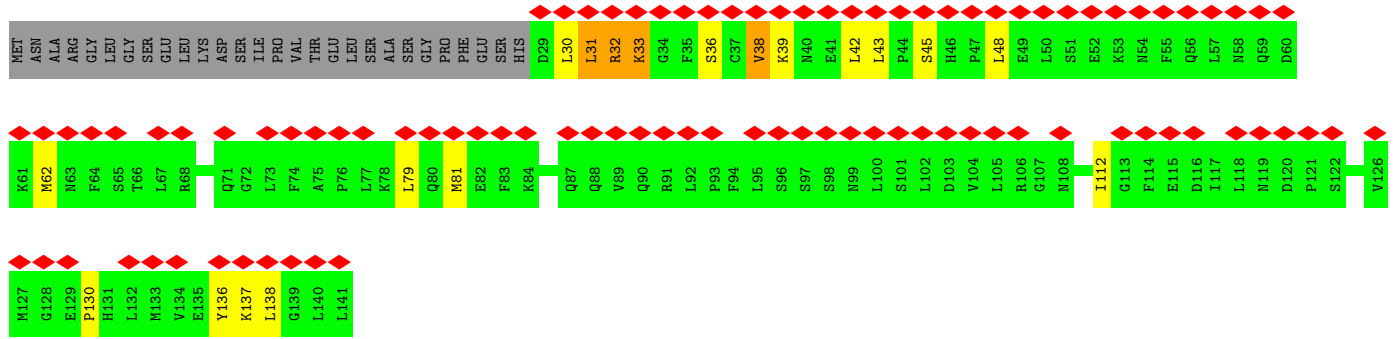




• Molecule 17: Proteasome maturation protein



• Molecule 17: Proteasome maturation protein



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	14636	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TECNAI 12	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	49.41	Depositor
Minimum defocus (nm)	1400	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.307	Depositor
Minimum map value	-1.388	Depositor
Average map value	0.009	Depositor
Map value standard deviation	0.088	Depositor
Recommended contour level	0.237	Depositor
Map size ( $\text{\AA}$ )	316.49997, 316.49997, 316.49997	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.055, 1.055, 1.055	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	0.43	0/1799	0.62	3/2442 (0.1%)
1	O	0.43	0/1799	0.62	3/2442 (0.1%)
2	B	0.40	0/1924	0.64	3/2602 (0.1%)
2	P	0.40	0/1924	0.64	3/2602 (0.1%)
3	C	0.39	0/1875	0.63	3/2540 (0.1%)
3	Q	0.38	0/1875	0.63	3/2540 (0.1%)
4	D	0.37	0/1869	0.59	1/2523 (0.0%)
4	R	0.37	0/1869	0.59	1/2523 (0.0%)
5	E	0.36	0/1896	0.49	0/2563
5	S	0.36	0/1896	0.49	0/2563
6	F	0.39	0/1896	0.50	0/2556
6	T	0.39	0/1896	0.50	0/2556
7	G	0.42	0/1927	0.58	1/2606 (0.0%)
7	U	0.41	0/1927	0.58	1/2606 (0.0%)
8	H	0.42	0/2025	0.57	0/2742
8	V	0.42	0/2025	0.57	0/2742
9	I	0.42	0/1608	0.52	0/2168
9	W	0.41	0/1608	0.52	0/2168
10	J	0.50	2/1620 (0.1%)	0.63	5/2191 (0.2%)
10	X	0.50	2/1620 (0.1%)	0.63	5/2191 (0.2%)
11	K	0.48	0/1779	0.59	0/2401
11	Y	0.48	0/1779	0.60	1/2401 (0.0%)
12	L	0.40	0/1677	0.52	0/2260
12	Z	0.41	0/1677	0.52	0/2260
13	M	0.41	0/1638	0.51	0/2216
13	a	0.41	0/1638	0.51	0/2216
14	N	0.41	0/1533	0.52	1/2074 (0.0%)
14	b	0.41	0/1533	0.52	1/2074 (0.0%)
15	c	0.29	0/2276	0.52	0/3085
15	f	0.29	0/2276	0.52	0/3085
16	d	0.35	0/2108	0.66	4/2858 (0.1%)
16	g	0.35	0/2108	0.66	4/2858 (0.1%)
17	e	0.40	0/919	0.59	0/1236
17	h	0.40	0/919	0.59	0/1236



Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
All	All	0.40	4/60738 (0.0%)	0.57	43/82126 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
3	C	0	3
3	Q	0	3
5	E	0	1
5	S	0	1
8	H	0	5
8	V	0	5
10	J	0	2
10	X	0	2
11	K	0	1
11	Y	0	1
15	c	0	1
15	f	0	1
17	e	0	1
17	h	0	1
All	All	0	28

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	J	99[A]	HIS	C-O	6.57	1.35	1.23
10	J	99[B]	HIS	C-O	6.57	1.35	1.23
10	X	99[A]	HIS	C-O	6.55	1.35	1.23
10	X	99[B]	HIS	C-O	6.55	1.35	1.23

The worst 5 of 43 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	d	218	LEU	CA-CB-CG	9.71	137.63	115.30
16	g	218	LEU	CA-CB-CG	9.69	137.60	115.30
16	g	104	GLU	CA-CB-CG	7.70	130.34	113.40
16	d	104	GLU	CA-CB-CG	7.69	130.32	113.40
1	O	140	GLU	CA-CB-CG	7.68	130.29	113.40

There are no chirality outliers.

5 of 28 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	Q	122	ASN	Peptide
3	Q	16	LEU	Peptide
3	Q	4	ASP	Peptide
5	S	226	ASP	Peptide
8	V	15	SER	Peptide

## 5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 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	226/234 (97%)	204 (90%)	21 (9%)	1 (0%)	30	61
1	O	226/234 (97%)	204 (90%)	21 (9%)	1 (0%)	30	61
2	B	243/261 (93%)	220 (90%)	23 (10%)	0	100	100
2	P	243/261 (93%)	220 (90%)	23 (10%)	0	100	100
3	C	237/248 (96%)	198 (84%)	38 (16%)	1 (0%)	30	61
3	Q	237/248 (96%)	198 (84%)	38 (16%)	1 (0%)	30	61
4	D	239/241 (99%)	217 (91%)	22 (9%)	0	100	100
4	R	239/241 (99%)	217 (91%)	22 (9%)	0	100	100
5	E	237/263 (90%)	214 (90%)	21 (9%)	2 (1%)	16	45
5	S	237/263 (90%)	214 (90%)	21 (9%)	2 (1%)	16	45
6	F	238/255 (93%)	226 (95%)	12 (5%)	0	100	100
6	T	238/255 (93%)	226 (95%)	12 (5%)	0	100	100
7	G	243/246 (99%)	216 (89%)	25 (10%)	2 (1%)	16	45
7	U	243/246 (99%)	216 (89%)	25 (10%)	2 (1%)	16	45

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
8	H	263/277 (95%)	223 (85%)	32 (12%)	8 (3%)	3	19
8	V	263/277 (95%)	223 (85%)	32 (12%)	8 (3%)	3	19
9	I	200/205 (98%)	190 (95%)	10 (5%)	0	100	100
9	W	200/205 (98%)	190 (95%)	10 (5%)	0	100	100
10	J	196/201 (98%)	178 (91%)	13 (7%)	5 (3%)	4	22
10	X	196/201 (98%)	178 (91%)	13 (7%)	5 (3%)	4	22
11	K	223/263 (85%)	187 (84%)	28 (13%)	8 (4%)	3	17
11	Y	223/263 (85%)	190 (85%)	26 (12%)	7 (3%)	3	19
12	L	212/241 (88%)	204 (96%)	8 (4%)	0	100	100
12	Z	212/241 (88%)	204 (96%)	8 (4%)	0	100	100
13	M	205/253 (81%)	196 (96%)	9 (4%)	0	100	100
13	a	205/253 (81%)	196 (96%)	9 (4%)	0	100	100
14	N	199/239 (83%)	189 (95%)	10 (5%)	0	100	100
14	b	199/239 (83%)	188 (94%)	11 (6%)	0	100	100
15	c	276/288 (96%)	242 (88%)	34 (12%)	0	100	100
15	f	276/288 (96%)	242 (88%)	34 (12%)	0	100	100
16	d	262/264 (99%)	230 (88%)	31 (12%)	1 (0%)	30	61
16	g	262/264 (99%)	230 (88%)	31 (12%)	1 (0%)	30	61
17	e	111/141 (79%)	88 (79%)	17 (15%)	6 (5%)	1	10
17	h	111/141 (79%)	89 (80%)	16 (14%)	6 (5%)	1	10
All	All	7620/8240 (92%)	6847 (90%)	706 (9%)	67 (1%)	17	43

5 of 67 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	S	227	ASP
8	V	27	ALA
8	V	32	ARG
10	X	95	ARG
10	X	97	PRO

### 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	182/191 (95%)	161 (88%)	21 (12%)	4	17
1	O	182/191 (95%)	161 (88%)	21 (12%)	4	17
2	B	197/221 (89%)	169 (86%)	28 (14%)	2	11
2	P	197/221 (89%)	169 (86%)	28 (14%)	2	11
3	C	193/211 (92%)	171 (89%)	22 (11%)	4	17
3	Q	193/211 (92%)	171 (89%)	22 (11%)	4	17
4	D	200/203 (98%)	177 (88%)	23 (12%)	4	17
4	R	200/203 (98%)	177 (88%)	23 (12%)	4	17
5	E	200/224 (89%)	200 (100%)	0	100	100
5	S	200/224 (89%)	200 (100%)	0	100	100
6	F	193/212 (91%)	193 (100%)	0	100	100
6	T	193/212 (91%)	193 (100%)	0	100	100
7	G	205/210 (98%)	184 (90%)	21 (10%)	6	22
7	U	205/210 (98%)	184 (90%)	21 (10%)	6	22
8	H	213/228 (93%)	201 (94%)	12 (6%)	17	43
8	V	213/228 (93%)	201 (94%)	12 (6%)	17	43
9	I	170/174 (98%)	170 (100%)	0	100	100
9	W	170/174 (98%)	170 (100%)	0	100	100
10	J	169/171 (99%)	163 (96%)	6 (4%)	30	55
10	X	169/171 (99%)	163 (96%)	6 (4%)	30	55
11	K	176/202 (87%)	170 (97%)	6 (3%)	32	57
11	Y	176/202 (87%)	168 (96%)	8 (4%)	23	50
12	L	176/199 (88%)	174 (99%)	2 (1%)	70	81
12	Z	176/199 (88%)	174 (99%)	2 (1%)	70	81
13	M	170/206 (82%)	168 (99%)	2 (1%)	67	79
13	a	170/206 (82%)	168 (99%)	2 (1%)	67	79
14	N	156/181 (86%)	154 (99%)	2 (1%)	65	78
14	b	156/181 (86%)	154 (99%)	2 (1%)	65	78
15	c	255/262 (97%)	254 (100%)	1 (0%)	89	93

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
15	f	255/262 (97%)	254 (100%)	1 (0%)	89	93
16	d	237/237 (100%)	197 (83%)	40 (17%)	1	7
16	g	237/237 (100%)	197 (83%)	40 (17%)	1	7
17	e	105/128 (82%)	89 (85%)	16 (15%)	2	9
17	h	105/128 (82%)	89 (85%)	16 (15%)	2	9
All	All	6394/6920 (92%)	5988 (94%)	406 (6%)	17	40

5 of 406 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	70	GLU
4	D	156	MET
17	e	62	MET
2	B	181	GLU
3	C	153	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 33 such sidechains are listed below:

Mol	Chain	Res	Type
9	I	172	ASN
10	J	32	HIS
17	e	40	ASN
9	W	172	ASN
9	W	92	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](#)

There are no ligands in this entry.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

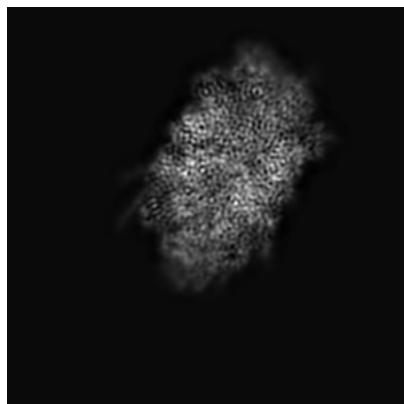
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-39333. These allow visual inspection of the internal detail of the map and identification of artifacts.

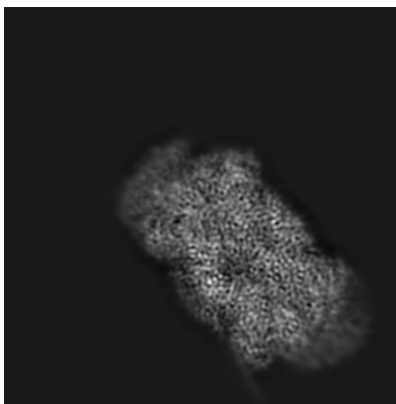
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

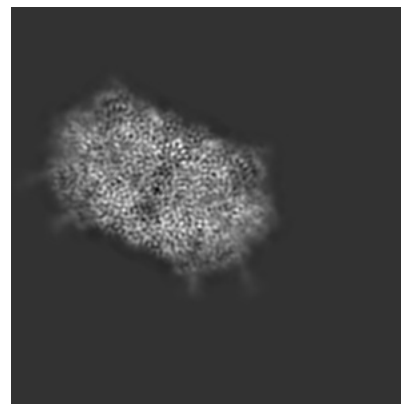
#### 6.1.1 Primary map



X

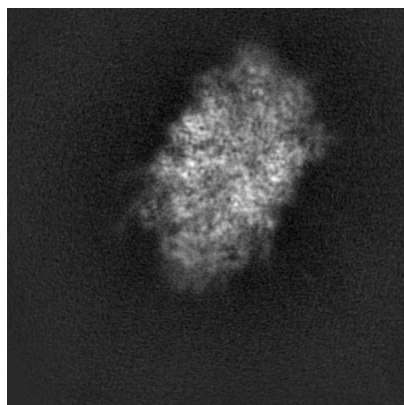


Y

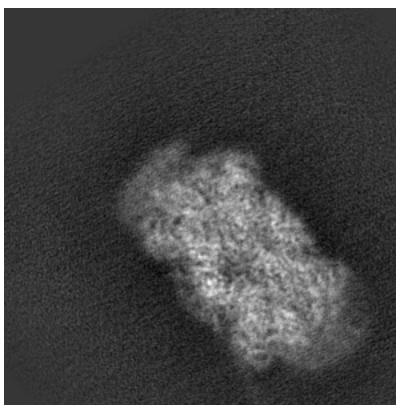


Z

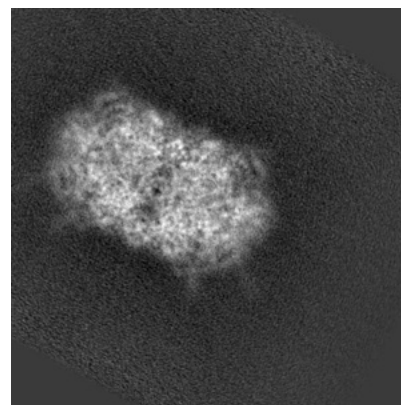
#### 6.1.2 Raw map



X



Y

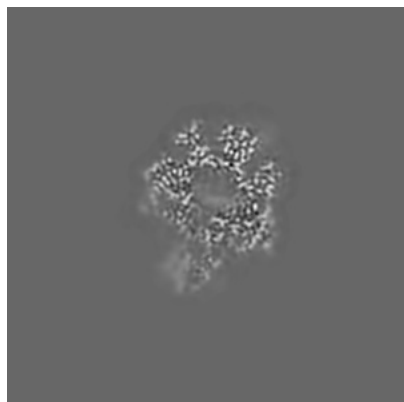


Z

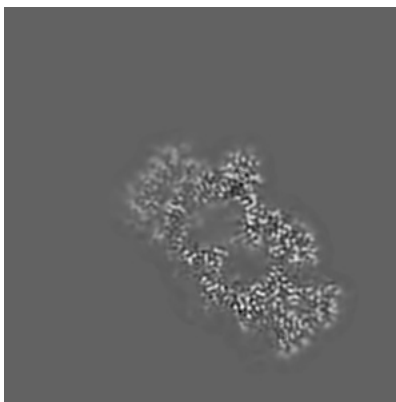
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

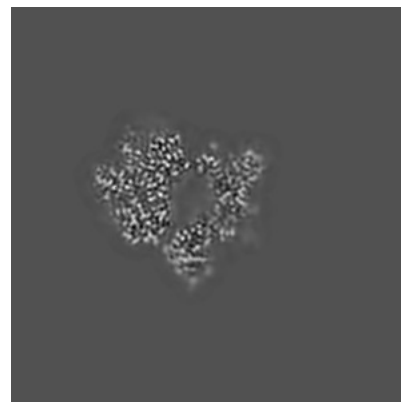
### 6.2.1 Primary map



X Index: 150

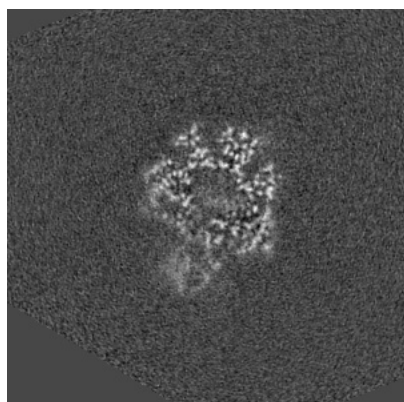


Y Index: 150

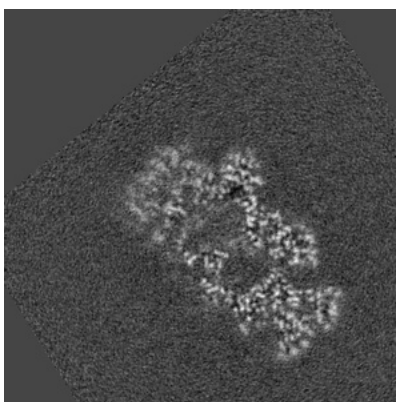


Z Index: 150

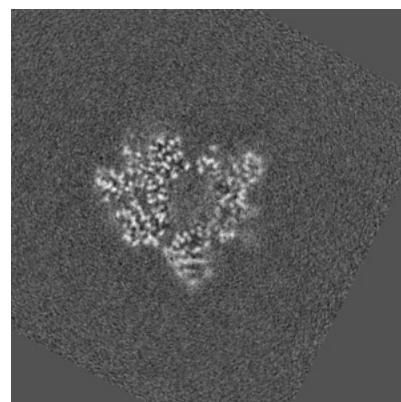
### 6.2.2 Raw map



X Index: 150



Y Index: 150



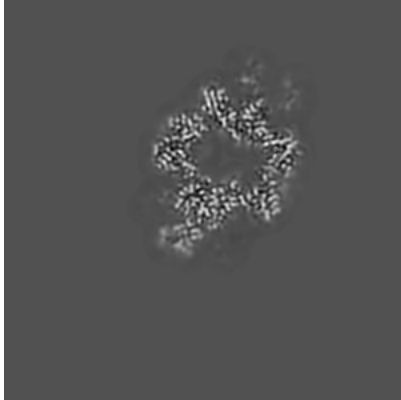
Z Index: 150

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

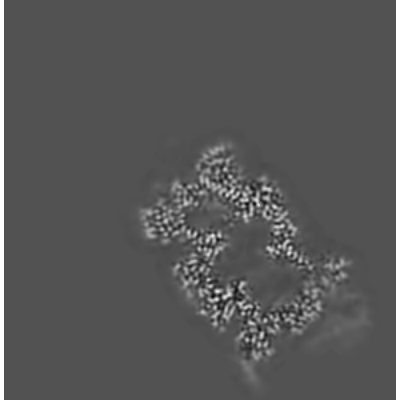


## 6.3 Largest variance slices [i](#)

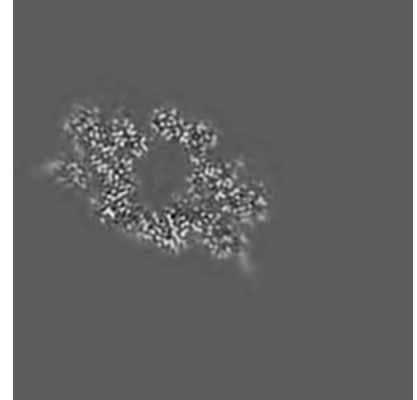
### 6.3.1 Primary map



X Index: 113

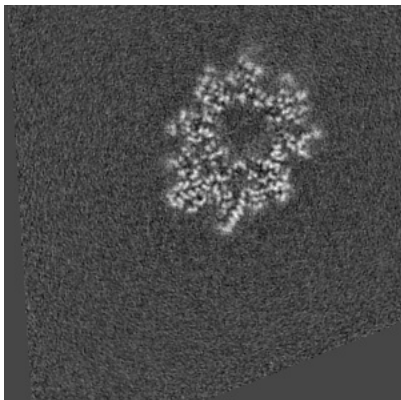


Y Index: 172

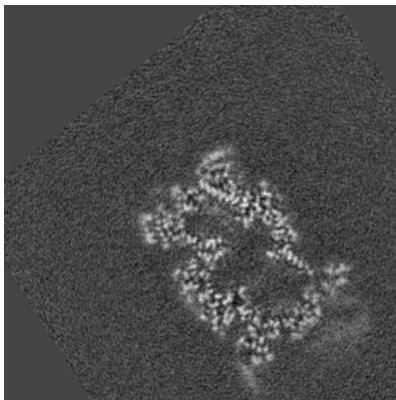


Z Index: 179

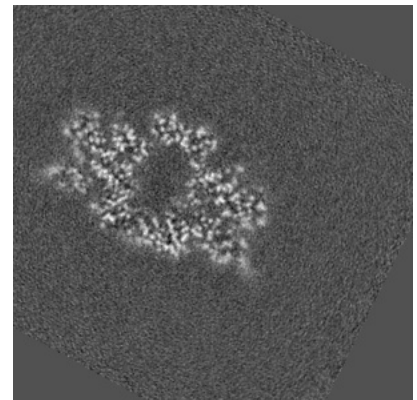
### 6.3.2 Raw map



X Index: 88



Y Index: 172

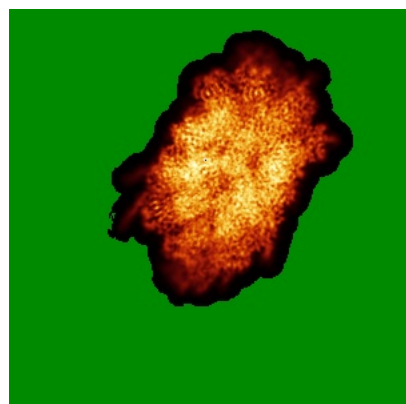


Z Index: 179

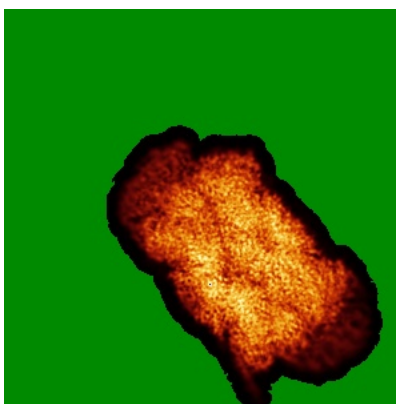
The images above show the largest variance slices of the map in three orthogonal directions.

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

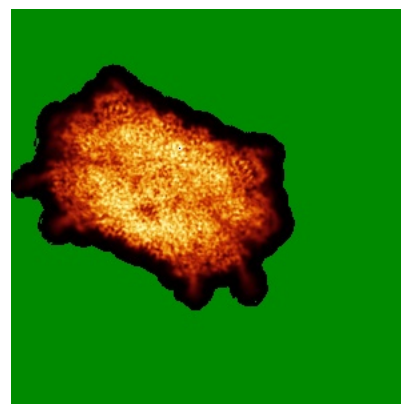
### 6.4.1 Primary map



X

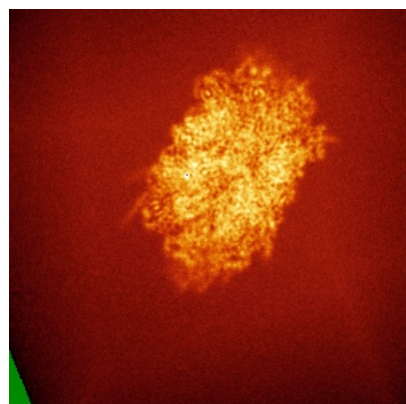


Y

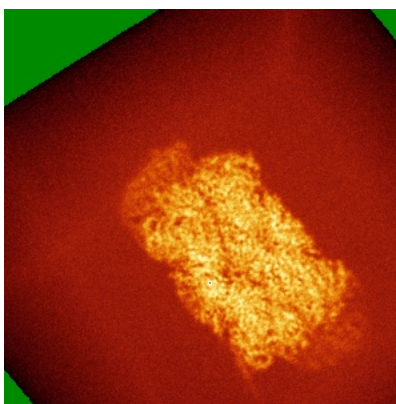


Z

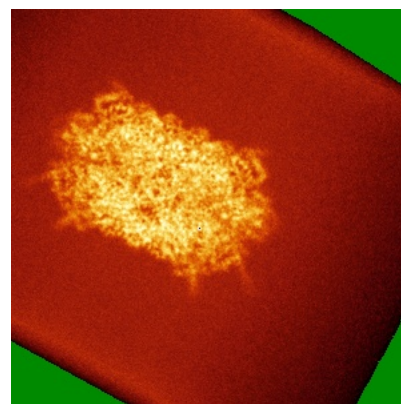
### 6.4.2 Raw map



X



Y



Z

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

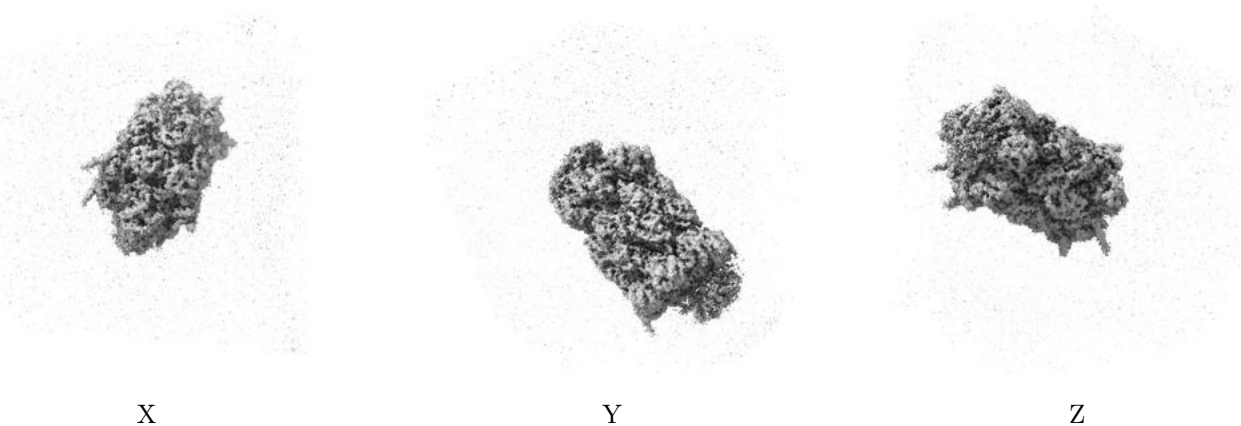
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.237. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



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

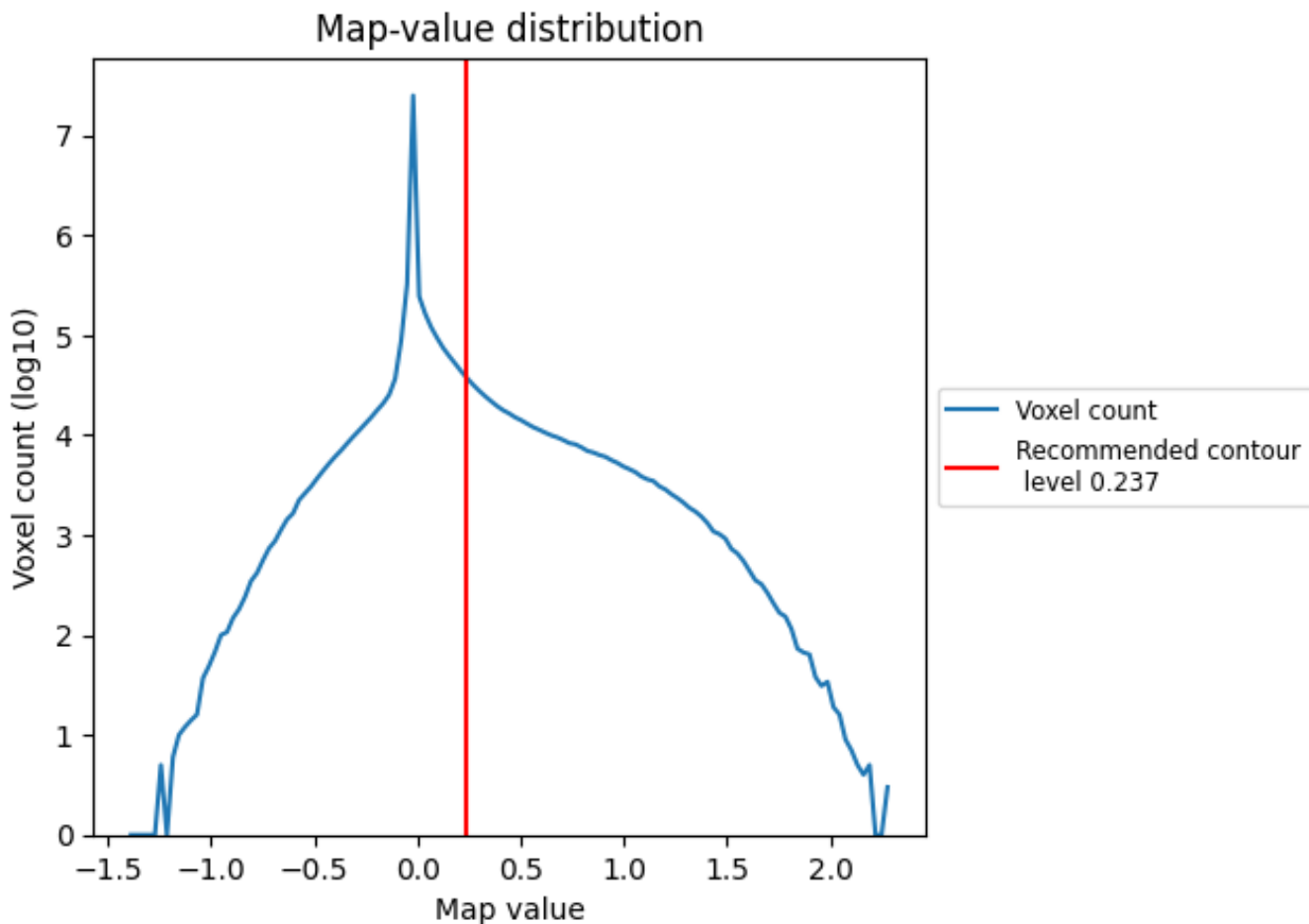
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

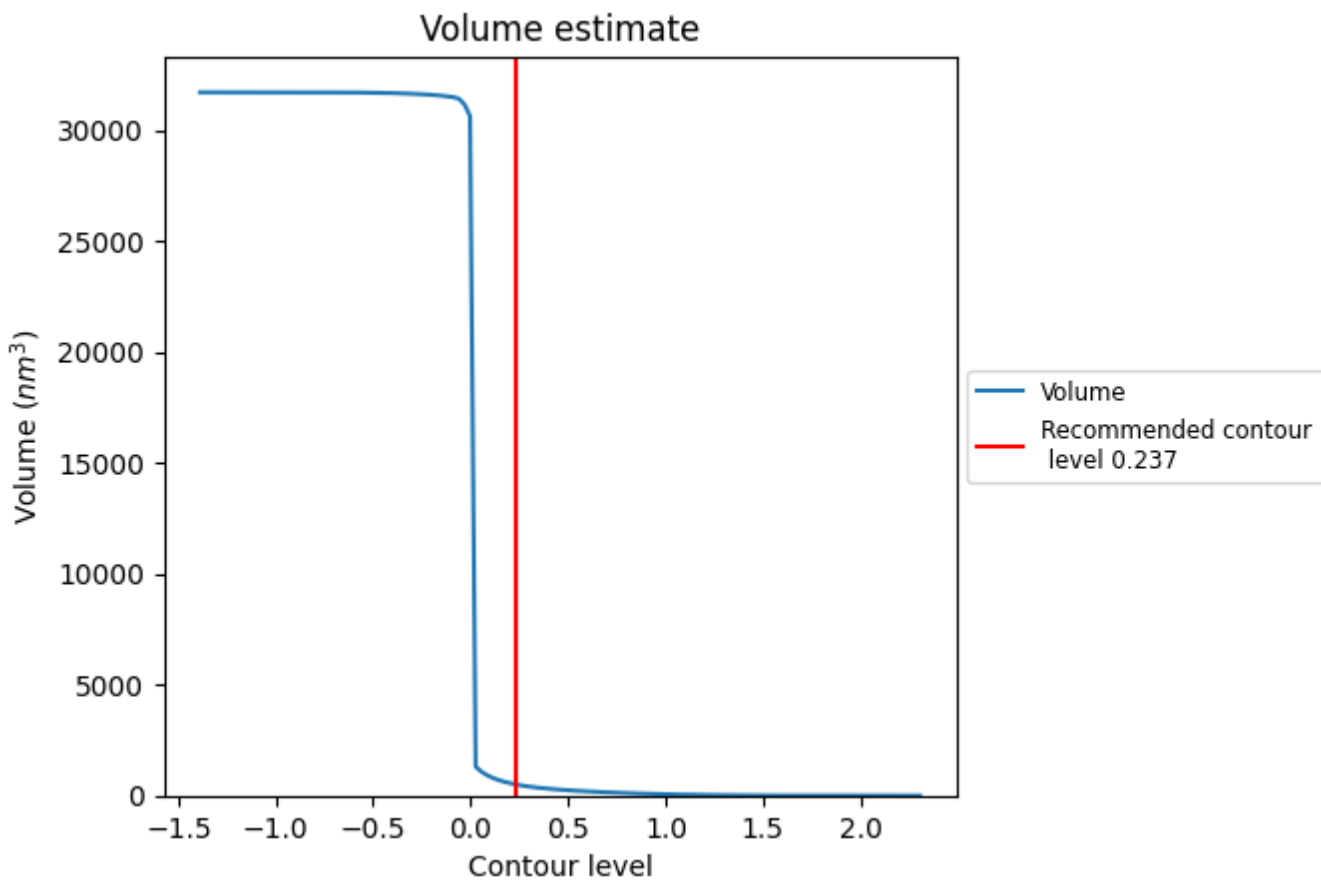
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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

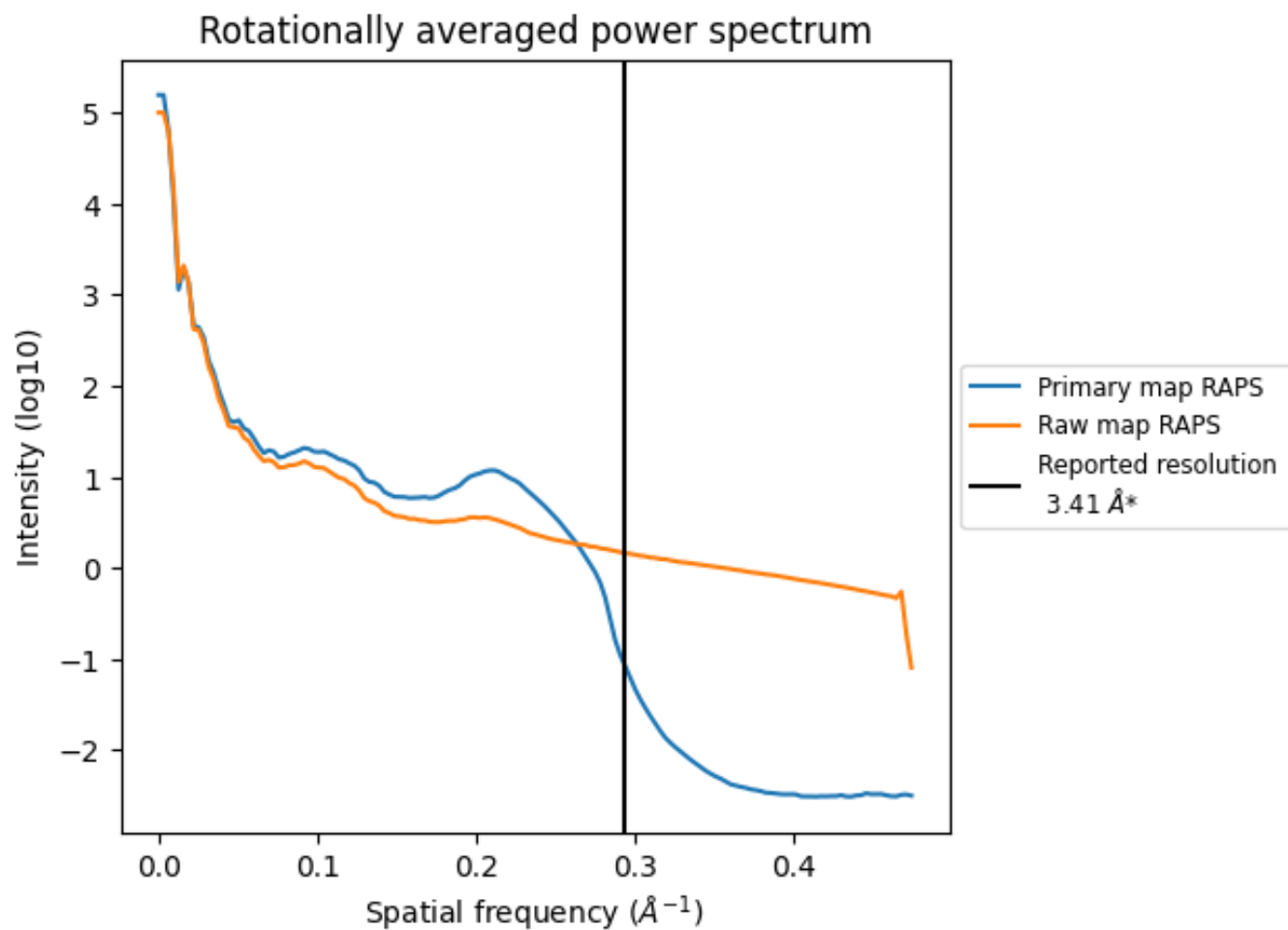
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 494 nm<sup>3</sup>; this corresponds to an approximate mass of 446 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

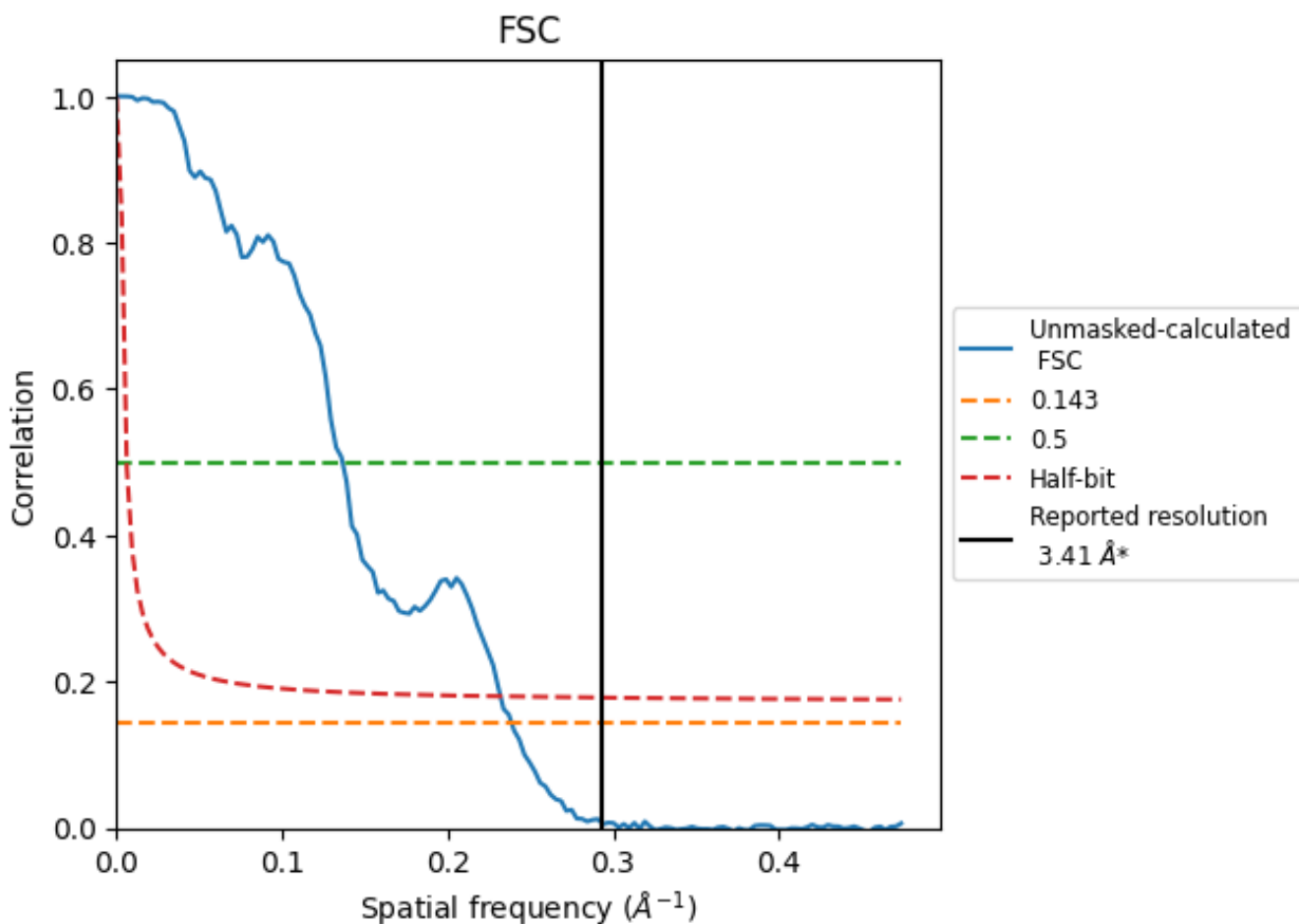


\*Reported resolution corresponds to spatial frequency of 0.293 Å<sup>-1</sup>

## 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 0.293 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.41	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.19	7.33	4.31

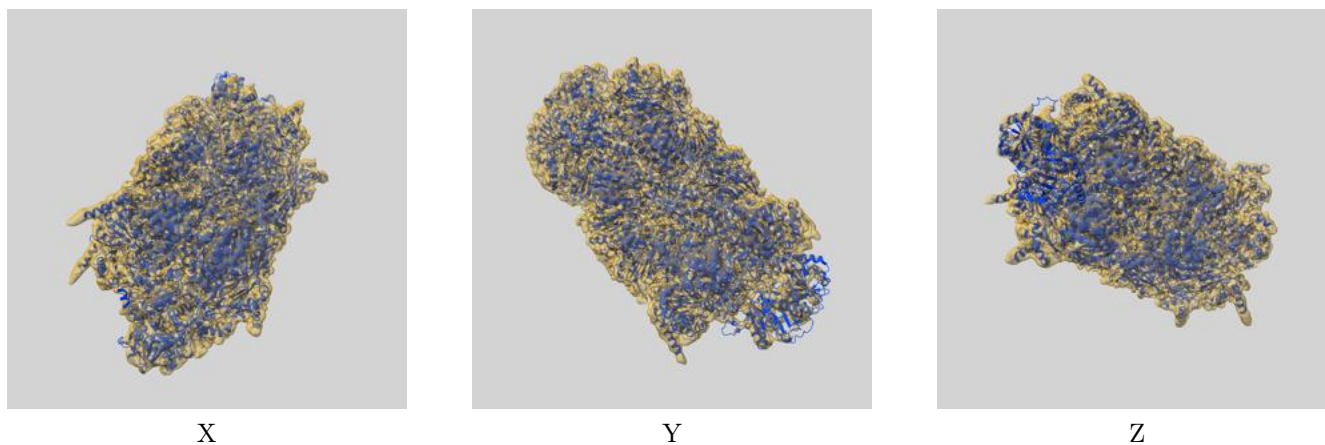
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.19 differs from the reported value 3.41 by more than 10 %



## 9 Map-model fit [i](#)

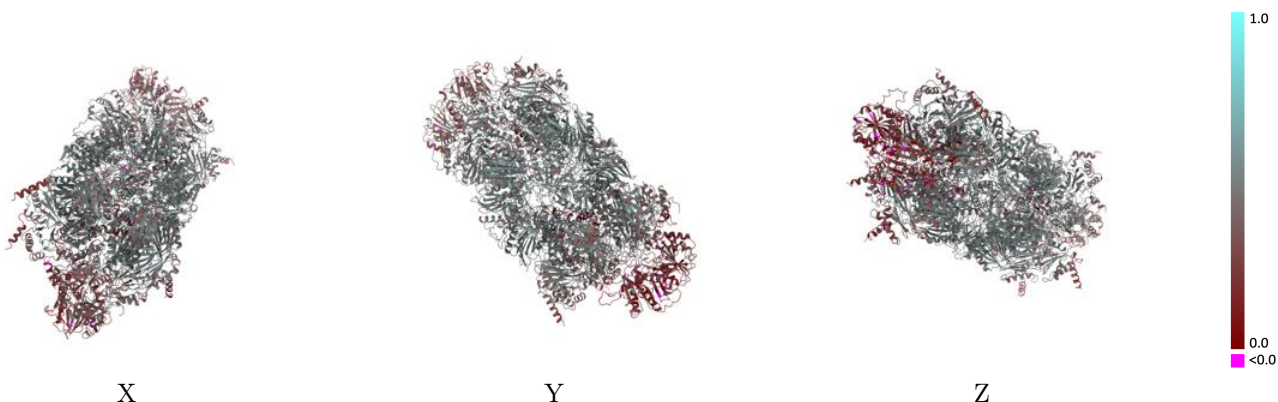
This section contains information regarding the fit between EMDB map EMD-39333 and PDB model 8YIY. Per-residue inclusion information can be found in section 3 on page 8.

### 9.1 Map-model overlay [i](#)



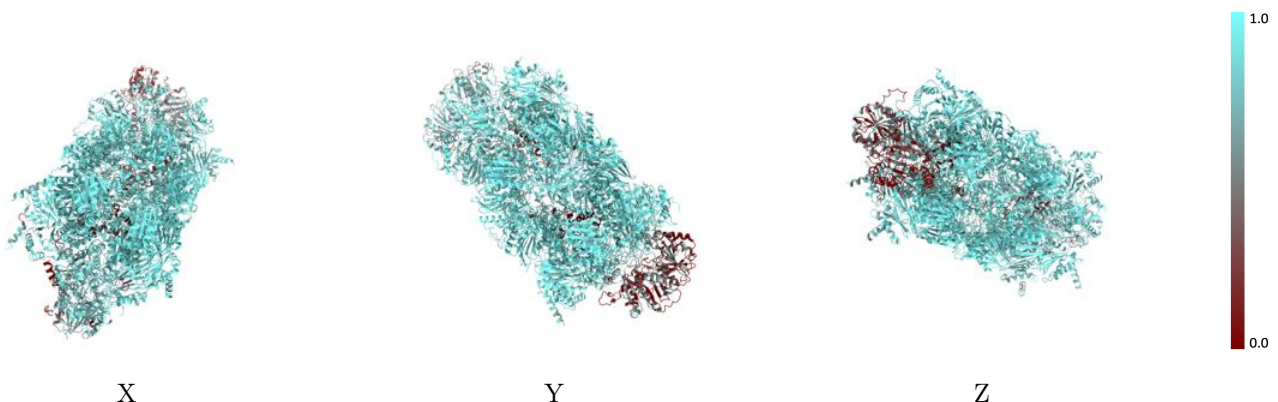
The images above show the 3D surface view of the map at the recommended contour level 0.237 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



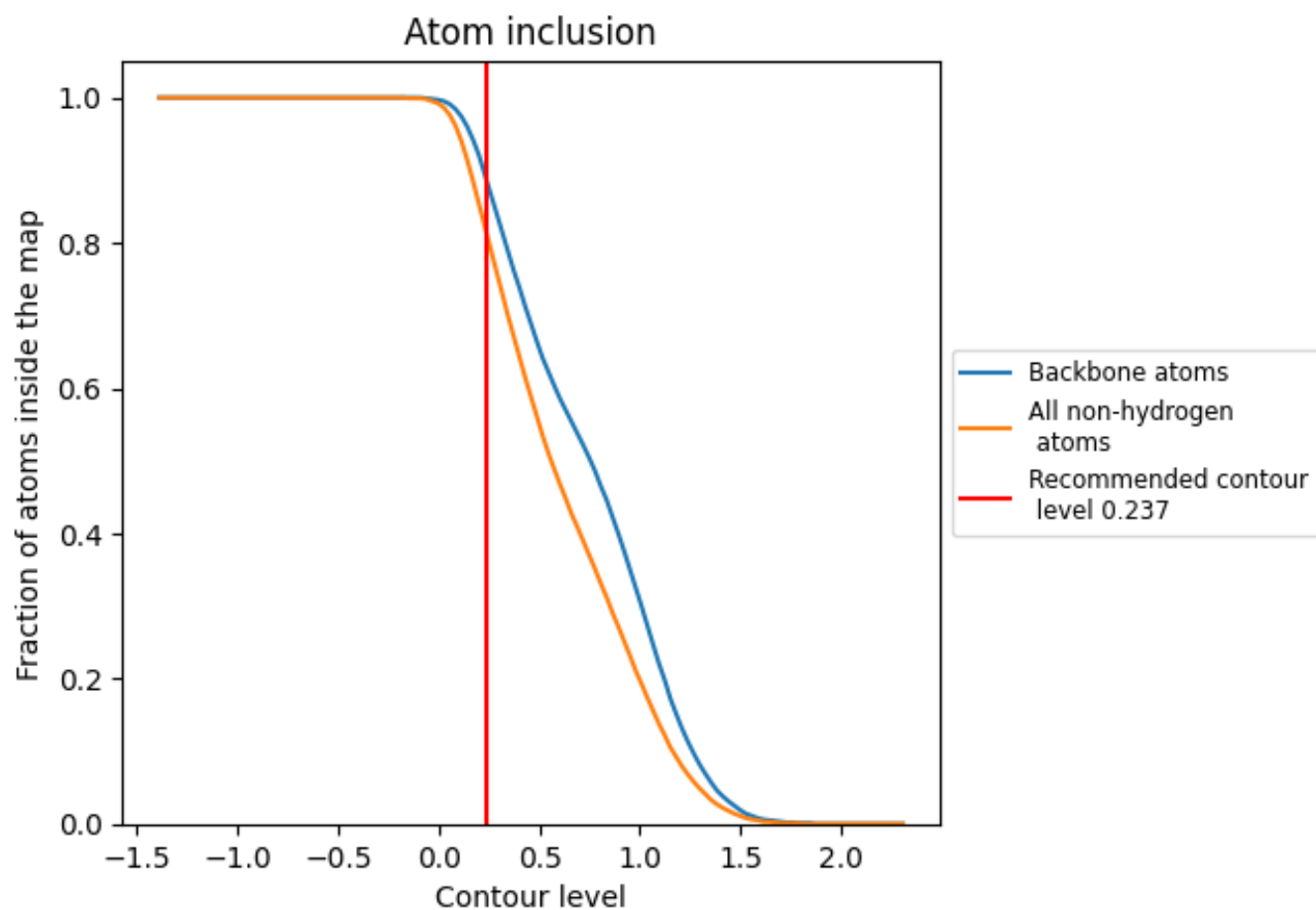
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.237).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 81% 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 (0.237) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8130	 0.4310
A	 0.8940	 0.4540
B	 0.8830	 0.4470
C	 0.8470	 0.3920
D	 0.8430	 0.4320
E	 0.9070	 0.4530
F	 0.9030	 0.4590
G	 0.8990	 0.4510
H	 0.8080	 0.4380
I	 0.9310	 0.5010
J	 0.9150	 0.4960
K	 0.8600	 0.4690
L	 0.9270	 0.4990
M	 0.9230	 0.5000
N	 0.9300	 0.5000
O	 0.9070	 0.4630
P	 0.8820	 0.4390
Q	 0.8760	 0.4260
R	 0.8700	 0.4490
S	 0.9200	 0.4810
T	 0.9160	 0.4710
U	 0.9060	 0.4590
V	 0.8320	 0.4610
W	 0.9480	 0.5190
X	 0.9370	 0.5180
Y	 0.8970	 0.5000
Z	 0.9390	 0.5110
a	 0.9400	 0.5130
b	 0.9410	 0.5150
c	 0.2230	 0.1990
d	 0.3340	 0.2170
e	 0.1530	 0.2070
f	 0.5760	 0.2870
g	 0.6960	 0.3170
h	 0.3220	 0.2580

