Full wwPDB EM Validation Report ⓘ

Aug 24, 2026 – 12:31 PM JST

PDB ID	:	9WJS / pdb_00009wjs
EMDB ID	:	EMD-66028
Title	:	Tti1-Telo2 complex
Authors	:	Qin, Y.; Wang, P.; Xu, G.
Deposited on	:	2025-08-31
Resolution	:	3.83 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

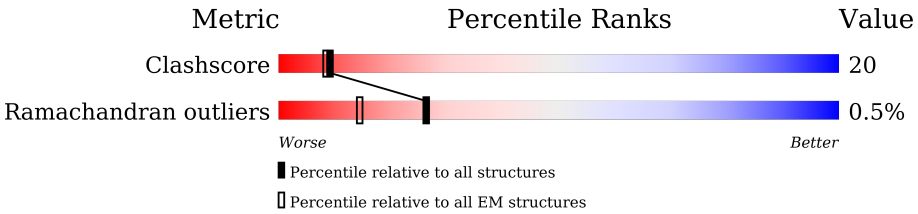
EMDB validation analysis	:	0.0.1.dev133
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

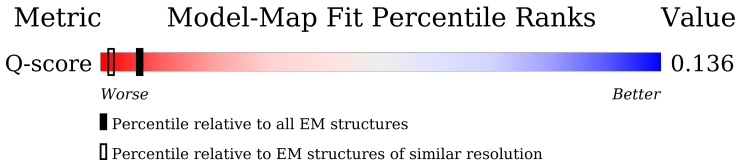
1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.83 Å.

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





Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Q-score	-	25397	9087 (3.33 - 4.33)

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	733	31% 77% 20% .
2	C	437	37% 75% 21% .

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 5793 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 Tti1.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
1	A	733	3635	2168	733	734	0	0

- Molecule 2 is a protein called Telomere length regulation protein TEL2 homolog.

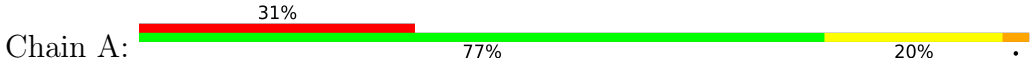
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	C	437	2158	1284	437	437	0	0

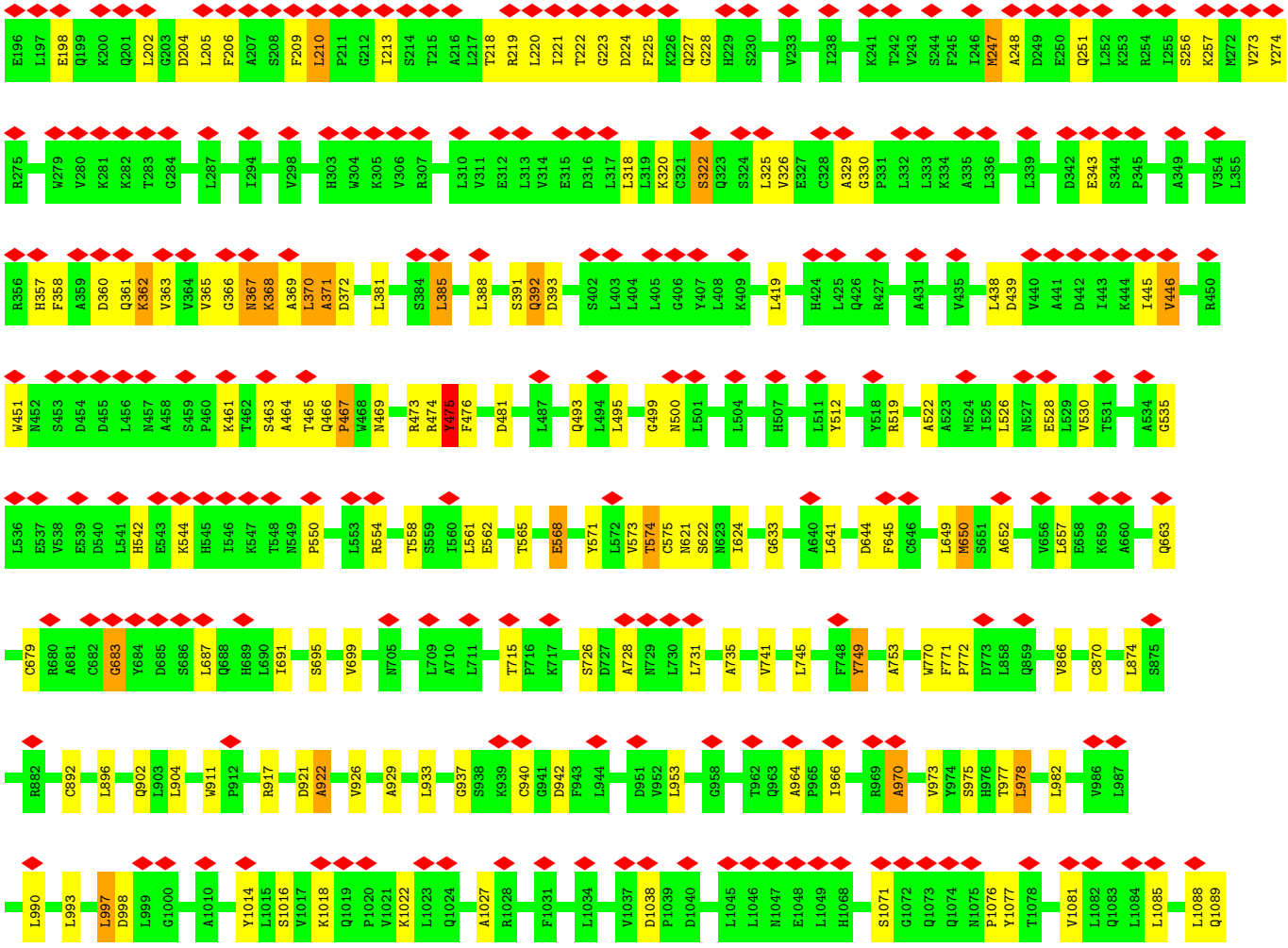
3 Residue-property plots (i)

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: Tti1

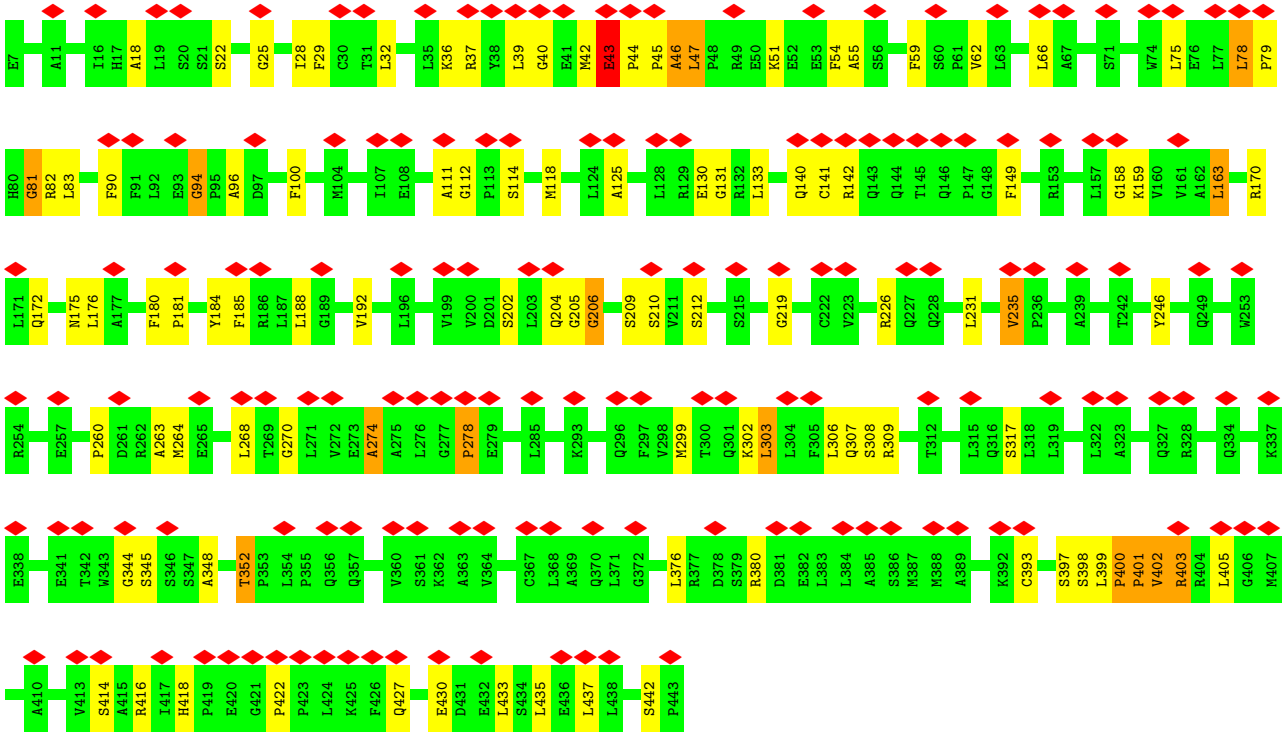
Chain A:





- Molecule 2: Telomere length regulation protein TEL2 homolog

Chain C:


E7 A11 I16 H17 A18 L19 S20 S21 S22 G25 I28 F29 C30 T31 L32 L35 K36 R37 Y38 L39 G40 E41 M42 E43 P44 P45 A46 L47 P48 R49 E50 K51 E52 E53 F54 A55 S56 F59 S60 P61 V62 L63 L66 A67 S71 W74 L75 E76 L77 L78 P79
H80 G81 R82 L83 F90 F91 L92 E93 G94 P95 A96 D97 F100 M104 I107 E108 A111 G112 P113 S114 M118 L124 A125 L128 R129 E130 G131 R132 L133 Q140 C141 R142 Q143 Q144 T145 Q146 P147 G148 F149 R153 L157 G158 K159 V160 V161 A162 L163 R170
L171 Q172 N175 L176 A177 F180 P181 Y184 F185 R186 L187 L188 G189 V192 L196 V199 V200 D201 S202 L203 Q204 G205 G206 S209 S210 V211 S212 S215 G219 C222 Y223 R226 Q227 Q228 L231 V235 P236 A239 T242 Y246 Q249 W253
R254 E257 P260 D261 R262 A263 M264 E265 L268 T269 G270 L271 V272 E273 A274 A275 L276 G277 P278 E279 L285 K293 Q296 F297 V298 M299 T300 Q301 K302 L303 L304 F305 L306 Q307 S308 R309 T312 L315 Q316 S317 L318 L319 L322 A323 Q327 R328 Q334 K337
E338 E341 T342 W343 G344 S345 S346 S347 A348 T352 P353 L354 P355 Q356 Q357 V360 S361 K362 A363 V364 C367 L368 A369 Q370 L371 G372 L376 R377 D378 S379 R380 D381 E382 L383 L384 A385 S386 M387 M388 A389 K392 C393 S397 S398 L399 P400 P401 V402 R403 R404 L405 G406 M407
A410 V413 S414 A415 R416 I417 H418 P419 E420 G421 P422 P423 L424 K425 F426 Q427 E430 D431 E432 L433 S434 L435 E436 L437 L438 S442 P443

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	287635	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 ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	5.544	Depositor
Minimum map value	-6.349	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.025	Depositor
Recommended contour level	0.16	Depositor
Map size (Å)	428.00003, 428.00003, 428.00003	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.07, 1.07, 1.07	Depositor

5 Model quality

5.1 Standard geometry

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	1.01	1/3630 (0.0%)	1.51	77/5054 (1.5%)
2	C	1.07	9/2156 (0.4%)	1.52	49/2999 (1.6%)
All	All	1.03	10/5786 (0.2%)	1.51	126/8053 (1.6%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	C	0	2

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	435	LEU	C-N	-7.69	1.23	1.33
2	C	414	SER	C-N	-7.20	1.24	1.34
1	A	371	ALA	CA-C	-6.56	1.47	1.53
2	C	402	VAL	C-N	-6.26	1.25	1.33
2	C	437	LEU	C-N	-5.87	1.25	1.34
2	C	416	ARG	C-N	-5.50	1.26	1.33
2	C	427	GLN	C-N	-5.37	1.26	1.33
2	C	401	PRO	C-N	-5.29	1.27	1.33
2	C	433	LEU	C-N	-5.28	1.27	1.33
2	C	430	GLU	C-N	-5.03	1.26	1.33

All (126) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	370	LEU	N-CA-C	-13.55	96.51	111.28
2	C	43	GLU	CA-C-N	12.71	133.47	120.38
2	C	43	GLU	C-N-CA	12.71	133.47	120.38
1	A	225	PHE	N-CA-C	-11.53	98.71	111.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	206	GLY	N-CA-C	-10.10	101.93	115.36
2	C	344	GLY	N-CA-C	9.88	124.58	112.73
1	A	368	LYS	N-CA-C	-9.56	100.86	111.28
2	C	309	ARG	N-CA-C	9.20	121.30	111.28
1	A	942	ASP	N-CA-C	8.83	120.91	111.28
1	A	683	GLY	N-CA-C	-8.49	104.07	115.36
1	A	362	LYS	N-CA-C	-8.33	100.50	111.74
1	A	475	TYR	N-CA-C	8.31	128.50	110.80
1	A	371	ALA	CB-CA-C	-8.30	107.00	116.54
1	A	970	ALA	N-CA-C	7.94	121.74	110.23
1	A	568	GLU	N-CA-C	-7.82	102.75	111.28
1	A	385	LEU	CA-C-N	-7.77	110.43	119.05
1	A	385	LEU	C-N-CA	-7.77	110.43	119.05
1	A	499	GLY	N-CA-C	7.74	122.07	111.54
1	A	393	ASP	N-CA-C	-7.60	99.78	110.50
2	C	163	LEU	CA-C-N	-7.58	110.64	119.05
2	C	163	LEU	C-N-CA	-7.58	110.64	119.05
2	C	246	TYR	N-CA-C	-7.55	103.05	111.28
2	C	302	LYS	N-CA-C	-7.47	103.14	111.28
2	C	40	GLY	N-CA-C	-7.45	98.07	110.80
1	A	749	TYR	N-CA-C	7.31	119.24	111.28
1	A	663	GLN	N-CA-C	7.27	119.21	111.28
2	C	149	PHE	N-CA-C	-7.26	99.70	110.23
1	A	227	GLN	N-CA-C	-7.22	103.41	111.28
1	A	687	LEU	N-CA-C	-7.01	103.64	111.28
1	A	221	ILE	N-CA-C	-7.01	103.47	110.62
1	A	978	LEU	N-CA-C	6.99	118.90	111.28
2	C	131	GLY	N-CA-C	-6.98	105.60	115.30
1	A	210	LEU	CA-C-N	-6.94	111.34	119.05
1	A	210	LEU	C-N-CA	-6.94	111.34	119.05
2	C	36	LYS	N-CA-C	-6.84	103.82	111.28
1	A	998	ASP	N-CA-C	-6.80	102.56	111.74
1	A	535	GLY	N-CA-C	-6.73	105.95	115.30
2	C	307	GLN	N-CA-C	6.60	119.66	108.90
1	A	911	TRP	CA-C-N	-6.59	111.74	119.05
1	A	911	TRP	C-N-CA	-6.59	111.74	119.05
1	A	322	SER	N-CA-C	6.56	118.43	111.28
1	A	771	PHE	CA-C-N	-6.52	113.04	119.76
1	A	771	PHE	C-N-CA	-6.52	113.04	119.76
1	A	622	SER	N-CA-C	-6.48	104.22	111.28
1	A	990	LEU	N-CA-C	6.47	118.33	111.28
1	A	330	GLY	N-CA-C	-6.46	107.02	115.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	278	PRO	N-CA-C	-6.41	104.63	113.53
2	C	352	THR	N-CA-C	6.41	117.78	109.64
1	A	904	LEU	CA-C-N	-6.36	111.99	119.05
1	A	904	LEU	C-N-CA	-6.36	111.99	119.05
1	A	392	GLN	N-CA-C	6.32	119.41	110.50
2	C	306	LEU	N-CA-C	6.30	118.15	111.28
2	C	235	VAL	CA-C-N	-6.29	112.07	119.05
2	C	235	VAL	C-N-CA	-6.29	112.07	119.05
1	A	247	MET	N-CA-C	6.28	118.13	111.28
2	C	403	ARG	O-C-N	6.27	128.86	122.09
2	C	235	VAL	CB-CA-C	-6.26	107.72	114.35
1	A	574	THR	N-CA-C	-6.21	104.51	111.28
2	C	226	ARG	N-CA-C	-6.21	105.47	113.16
2	C	94	GLY	CA-C-N	-6.18	113.39	119.76
2	C	94	GLY	C-N-CA	-6.18	113.39	119.76
1	A	1022	LYS	N-CA-C	-6.15	104.57	111.28
1	A	475	TYR	CA-C-N	-6.14	114.53	123.00
1	A	475	TYR	C-N-CA	-6.14	114.53	123.00
1	A	1038	ASP	CA-C-N	-6.10	112.28	119.05
1	A	1038	ASP	C-N-CA	-6.10	112.28	119.05
1	A	1076	PRO	N-CA-C	-6.03	105.15	113.53
1	A	953	LEU	CA-C-N	-6.02	112.36	119.05
1	A	953	LEU	C-N-CA	-6.02	112.36	119.05
2	C	418	HIS	CA-C-N	-6.00	112.83	119.19
2	C	418	HIS	C-N-CA	-6.00	112.83	119.19
1	A	343	GLU	N-CA-C	5.97	117.79	111.28
1	A	902	GLN	N-CA-C	-5.92	104.83	111.28
2	C	212	SER	N-CA-C	5.89	117.70	111.28
1	A	481	ASP	N-CA-C	5.87	118.76	109.96
1	A	228	GLY	N-CA-C	5.85	122.77	112.83
1	A	922	ALA	CA-C-N	-5.81	112.60	119.05
1	A	922	ALA	C-N-CA	-5.81	112.60	119.05
1	A	975	SER	N-CA-C	-5.81	104.95	111.28
2	C	418	HIS	O-C-N	5.71	126.50	121.37
2	C	175	ASN	N-CA-C	5.66	118.43	110.23
2	C	274	ALA	N-CA-C	5.65	117.44	111.28
1	A	715	THR	CA-C-N	-5.63	112.80	119.05
1	A	715	THR	C-N-CA	-5.63	112.80	119.05
1	A	650	MET	N-CA-C	-5.62	105.15	111.28
1	A	365	VAL	N-CA-C	-5.60	104.91	110.62
1	A	500	ASN	N-CA-C	-5.56	102.17	110.23
1	A	964	ALA	CA-C-N	-5.55	112.89	119.05

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	964	ALA	C-N-CA	-5.55	112.89	119.05
2	C	205	GLY	N-CA-C	-5.54	106.08	112.73
1	A	1018	LYS	N-CA-C	-5.52	105.26	111.28
1	A	495	LEU	N-CA-C	-5.48	105.31	111.28
2	C	78	LEU	CA-C-N	-5.48	114.12	119.76
2	C	78	LEU	C-N-CA	-5.48	114.12	119.76
2	C	303	LEU	N-CA-C	-5.47	105.31	111.28
2	C	46	ALA	N-CA-C	-5.46	103.32	110.53
2	C	400	PRO	CA-C-N	-5.40	113.34	119.28
2	C	400	PRO	C-N-CA	-5.40	113.34	119.28
1	A	220	LEU	N-CA-C	-5.40	105.40	111.28
1	A	997	LEU	N-CA-C	5.36	117.12	111.28
2	C	422	PRO	O-C-N	5.32	127.74	121.46
2	C	47	LEU	N-CA-C	-5.27	102.94	109.64
2	C	172	GLN	CB-CA-C	-5.27	110.51	116.63
1	A	772	PRO	N-CA-C	-5.25	102.95	111.14
1	A	633	GLY	N-CA-C	-5.25	106.43	112.73
1	A	726	SER	N-CA-C	5.25	117.84	110.23
2	C	204	GLN	N-CA-C	-5.24	105.57	111.28
1	A	644	ASP	N-CA-C	-5.23	105.58	111.28
2	C	130	GLU	N-CA-C	-5.20	105.61	111.28
2	C	274	ALA	CA-C-N	-5.20	115.77	123.05
2	C	274	ALA	C-N-CA	-5.20	115.77	123.05
1	A	641	LEU	N-CA-C	5.19	116.93	111.28
1	A	922	ALA	N-CA-C	-5.19	102.92	110.08
1	A	419	LEU	N-CA-C	-5.14	105.67	111.28
1	A	224	ASP	N-CA-C	5.12	117.29	110.53
1	A	874	LEU	N-CA-C	-5.12	105.69	111.28
2	C	158	GLY	N-CA-C	-5.10	106.61	112.73
2	C	140	GLN	N-CA-C	-5.07	105.75	111.28
1	A	391	SER	N-CA-C	5.07	116.88	111.36
2	C	125	ALA	N-CA-C	-5.05	105.78	111.28
1	A	1071	SER	N-CA-C	-5.04	105.79	111.28
1	A	940	CYS	N-CA-C	5.03	116.77	111.28
2	C	81	GLY	N-CA-C	-5.03	104.71	113.76
1	A	360	ASP	N-CA-C	-5.01	105.82	111.28
1	A	657	LEU	N-CA-C	-5.00	105.83	111.28
2	C	308	SER	N-CA-C	-5.00	105.83	111.28

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	C	43	GLU	Peptide
2	C	442	SER	Mainchain

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	3635	0	1621	96	0
2	C	2158	0	987	77	0
All	All	5793	0	2608	172	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 20.

All (172) 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)
1:A:256:SER:CB	1:A:274:TYR:CB	2.02	1.37
2:C:141:CYS:O	2:C:210:SER:CB	1.75	1.34
2:C:399:LEU:CB	2:C:401:PRO:O	1.85	1.24
1:A:574:THR:CB	1:A:621:ASN:O	1.71	1.20
2:C:299:MET:O	2:C:303:LEU:CB	1.92	1.18
2:C:78:LEU:CB	2:C:83:LEU:N	2.06	1.17
2:C:78:LEU:CB	2:C:83:LEU:H	1.56	1.16
2:C:398:SER:O	2:C:403:ARG:CB	1.69	1.14
2:C:55:ALA:HA	2:C:59:PHE:CB	1.78	1.13
1:A:366:GLY:O	1:A:368:LYS:N	1.84	1.10
1:A:461:LYS:HA	1:A:466:GLN:HA	1.36	1.07
2:C:39:LEU:O	2:C:55:ALA:HB2	1.55	1.06
1:A:247:MET:CB	1:A:320:LYS:CB	2.35	1.05
2:C:399:LEU:HA	2:C:401:PRO:C	1.79	1.03
1:A:366:GLY:C	1:A:368:LYS:H	1.62	1.02
1:A:438:LEU:HA	1:A:476:PHE:HA	1.44	0.97
2:C:399:LEU:CA	2:C:401:PRO:C	2.35	0.96
1:A:461:LYS:HA	1:A:466:GLN:CA	1.98	0.94
1:A:573:VAL:CB	1:A:621:ASN:N	2.32	0.93
2:C:25:GLY:HA3	2:C:78:LEU:HA	1.53	0.90

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:399:LEU:CA	2:C:401:PRO:O	2.20	0.89
1:A:649:LEU:HA	1:A:652:ALA:HB3	1.57	0.87
2:C:55:ALA:CA	2:C:59:PHE:CB	2.54	0.85
2:C:55:ALA:O	2:C:59:PHE:CB	2.25	0.83
2:C:39:LEU:HA	2:C:55:ALA:HB2	1.59	0.83
2:C:399:LEU:CB	2:C:401:PRO:C	2.50	0.83
2:C:39:LEU:C	2:C:55:ALA:HB2	2.04	0.82
1:A:749:TYR:O	1:A:753:ALA:N	2.13	0.81
1:A:439:ASP:N	1:A:475:TYR:O	2.14	0.80
2:C:39:LEU:CA	2:C:55:ALA:HB2	2.10	0.80
2:C:399:LEU:O	2:C:402:VAL:O	1.84	0.80
2:C:112:GLY:HA2	2:C:170:ARG:O	1.81	0.80
1:A:728:ALA:HB1	1:A:770:TRP:HA	1.63	0.79
1:A:461:LYS:CA	1:A:466:GLN:HA	2.15	0.77
2:C:39:LEU:O	2:C:55:ALA:CB	2.32	0.77
1:A:438:LEU:CA	1:A:476:PHE:HA	2.15	0.76
2:C:142:ARG:HA	2:C:209:SER:HA	1.67	0.76
2:C:398:SER:N	2:C:402:VAL:CB	2.48	0.76
1:A:368:LYS:O	1:A:371:ALA:HB2	1.86	0.74
2:C:79:PRO:O	2:C:82:ARG:CB	2.37	0.72
2:C:399:LEU:CB	2:C:405:LEU:H	2.02	0.72
2:C:25:GLY:HA3	2:C:78:LEU:CA	2.19	0.71
2:C:399:LEU:CB	2:C:405:LEU:CB	2.71	0.69
2:C:399:LEU:HA	2:C:401:PRO:O	1.88	0.67
1:A:219:ARG:HA	1:A:222:THR:CB	2.26	0.66
1:A:438:LEU:HA	1:A:476:PHE:CA	2.24	0.65
1:A:366:GLY:C	1:A:368:LYS:N	2.31	0.65
1:A:1016:SER:HA	1:A:1077:TYR:HA	1.80	0.64
1:A:473:ARG:C	1:A:475:TYR:H	2.05	0.64
1:A:728:ALA:CB	1:A:770:TRP:HA	2.29	0.63
1:A:568:GLU:O	1:A:571:TYR:O	2.17	0.62
1:A:466:GLN:O	1:A:467:PRO:C	2.42	0.62
2:C:39:LEU:HA	2:C:55:ALA:CB	2.29	0.61
1:A:369:ALA:O	1:A:370:LEU:C	2.43	0.61
2:C:55:ALA:C	2:C:59:PHE:CB	2.73	0.60
2:C:37:ARG:HA	2:C:42:MET:N	2.16	0.60
1:A:645:PHE:O	1:A:649:LEU:N	2.34	0.60
1:A:731:LEU:O	1:A:735:ALA:N	2.33	0.59
2:C:37:ARG:HA	2:C:42:MET:H	1.66	0.59
2:C:398:SER:CA	2:C:402:VAL:CB	2.81	0.59
2:C:399:LEU:C	2:C:405:LEU:N	2.60	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:181:PRO:O	2:C:185:PHE:N	2.33	0.58
1:A:363:VAL:O	1:A:367:ASN:N	2.37	0.57
1:A:206:PHE:O	1:A:210:LEU:N	2.35	0.57
1:A:512:TYR:HA	1:A:519:ARG:HA	1.87	0.56
1:A:461:LYS:HA	1:A:466:GLN:CB	2.35	0.56
1:A:691:ILE:O	1:A:695:SER:N	2.39	0.56
1:A:325:LEU:O	1:A:329:ALA:N	2.39	0.56
2:C:141:CYS:O	2:C:210:SER:CA	2.53	0.56
1:A:466:GLN:O	1:A:469:ASN:N	2.39	0.56
2:C:398:SER:H	2:C:402:VAL:CB	2.19	0.55
1:A:202:LEU:O	1:A:206:PHE:N	2.37	0.55
1:A:445:ILE:O	1:A:446:VAL:C	2.50	0.55
1:A:573:VAL:C	1:A:621:ASN:N	2.66	0.54
1:A:219:ARG:O	1:A:223:GLY:N	2.40	0.54
1:A:473:ARG:O	1:A:475:TYR:N	2.40	0.54
2:C:219:GLY:HA2	2:C:263:ALA:HB1	1.87	0.54
1:A:469:ASN:O	1:A:473:ARG:N	2.35	0.54
2:C:78:LEU:CB	2:C:83:LEU:CA	2.86	0.54
1:A:198:GLU:O	1:A:202:LEU:N	2.39	0.53
1:A:542:HIS:O	1:A:544:LYS:N	2.38	0.53
2:C:260:PRO:O	2:C:264:MET:N	2.40	0.53
1:A:318:LEU:O	1:A:322:SER:N	2.42	0.53
1:A:388:LEU:O	1:A:392:GLN:N	2.34	0.53
1:A:966:ILE:O	1:A:970:ALA:N	2.42	0.53
2:C:114:SER:O	2:C:118:MET:N	2.36	0.52
2:C:184:TYR:O	2:C:188:LEU:N	2.40	0.52
2:C:176:LEU:O	2:C:180:PHE:N	2.38	0.52
1:A:204:ASP:HA	1:A:273:VAL:O	2.09	0.51
2:C:376:LEU:O	2:C:380:ARG:N	2.43	0.51
1:A:1081:VAL:O	1:A:1085:LEU:N	2.42	0.51
1:A:512:TYR:HA	1:A:519:ARG:CA	2.41	0.51
1:A:741:VAL:O	1:A:745:LEU:N	2.39	0.51
2:C:202:SER:O	2:C:206:GLY:N	2.42	0.51
2:C:398:SER:CB	2:C:402:VAL:CB	2.89	0.51
1:A:473:ARG:C	1:A:475:TYR:N	2.69	0.50
1:A:917:ARG:O	1:A:921:ASP:N	2.45	0.50
1:A:561:LEU:O	1:A:565:THR:N	2.43	0.50
1:A:745:LEU:O	1:A:749:TYR:N	2.44	0.50
1:A:649:LEU:HA	1:A:652:ALA:CB	2.37	0.49
2:C:231:LEU:O	2:C:235:VAL:N	2.42	0.49
1:A:993:LEU:O	1:A:997:LEU:N	2.43	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:43:GLU:HA	2:C:45:PRO:N	2.27	0.49
1:A:372:ASP:CB	2:C:345:SER:CB	2.91	0.49
1:A:679:CYS:O	1:A:683:GLY:N	2.43	0.49
2:C:54:PHE:O	2:C:59:PHE:N	2.42	0.48
1:A:575:CYS:CB	1:A:621:ASN:CB	0.49	0.48
2:C:96:ALA:HB1	2:C:133:LEU:HA	1.95	0.48
2:C:111:ALA:O	2:C:170:ARG:HA	2.14	0.48
1:A:322:SER:O	1:A:326:VAL:N	2.46	0.48
1:A:933:LEU:O	1:A:937:GLY:N	2.43	0.48
2:C:141:CYS:O	2:C:210:SER:N	2.46	0.48
1:A:209:PHE:O	1:A:213:ILE:N	2.41	0.47
1:A:978:LEU:O	1:A:982:LEU:N	2.41	0.47
1:A:248:ALA:HB3	1:A:251:GLN:CB	2.44	0.47
1:A:922:ALA:O	1:A:926:VAL:N	2.38	0.47
2:C:79:PRO:O	2:C:82:ARG:N	2.48	0.47
2:C:264:MET:O	2:C:268:LEU:N	2.40	0.47
2:C:159:LYS:O	2:C:163:LEU:N	2.41	0.47
2:C:188:LEU:O	2:C:192:VAL:N	2.43	0.47
1:A:522:ALA:O	1:A:526:LEU:N	2.44	0.47
2:C:96:ALA:O	2:C:100:PHE:N	2.44	0.47
1:A:381:LEU:O	1:A:385:LEU:N	2.43	0.46
2:C:78:LEU:CB	2:C:83:LEU:CB	2.92	0.46
1:A:451:TRP:HA	1:A:463:SER:CB	2.45	0.46
2:C:399:LEU:HA	2:C:400:PRO:O	2.16	0.46
1:A:973:VAL:O	1:A:977:THR:N	2.49	0.46
1:A:219:ARG:O	1:A:222:THR:N	2.49	0.45
1:A:358:PHE:O	1:A:362:LYS:N	2.48	0.45
1:A:512:TYR:HA	1:A:519:ARG:CB	2.46	0.45
1:A:1077:TYR:O	1:A:1081:VAL:N	2.47	0.45
1:A:526:LEU:O	1:A:530:VAL:N	2.43	0.45
2:C:42:MET:O	2:C:45:PRO:HA	2.17	0.45
2:C:399:LEU:CB	2:C:405:LEU:N	2.75	0.44
2:C:28:ILE:O	2:C:32:LEU:N	2.47	0.44
1:A:573:VAL:CA	1:A:621:ASN:N	2.79	0.44
1:A:204:ASP:HA	1:A:273:VAL:C	2.43	0.44
1:A:256:SER:O	1:A:257:LYS:C	2.60	0.44
2:C:47:LEU:O	2:C:51:LYS:N	2.40	0.44
1:A:929:ALA:O	1:A:933:LEU:N	2.43	0.44
1:A:542:HIS:C	1:A:544:LYS:H	2.24	0.44
2:C:278:PRO:CB	2:C:317:SER:HA	2.48	0.44
1:A:892:CYS:O	1:A:896:LEU:N	2.50	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:62:VAL:O	2:C:66:LEU:N	2.46	0.43
1:A:464:ALA:O	1:A:465:THR:C	2.61	0.43
2:C:393:CYS:O	2:C:397:SER:N	2.43	0.43
1:A:439:ASP:H	1:A:475:TYR:C	2.21	0.43
1:A:558:THR:O	1:A:562:GLU:N	2.48	0.43
1:A:695:SER:O	1:A:699:VAL:N	2.43	0.43
1:A:493:GLN:HA	1:A:528:GLU:O	2.19	0.42
2:C:25:GLY:O	2:C:29:PHE:N	2.47	0.42
2:C:75:LEU:O	2:C:81:GLY:HA2	2.19	0.42
1:A:550:PRO:O	1:A:554:ARG:N	2.47	0.42
1:A:866:VAL:O	1:A:870:CYS:N	2.47	0.42
1:A:749:TYR:O	1:A:753:ALA:CA	2.67	0.42
2:C:18:ALA:O	2:C:22:SER:N	2.49	0.42
2:C:270:GLY:O	2:C:274:ALA:N	2.49	0.42
2:C:46:ALA:O	2:C:47:LEU:C	2.63	0.41
1:A:205:LEU:O	1:A:209:PHE:N	2.46	0.41
1:A:1088:LEU:O	1:A:1089:GLN:C	2.61	0.41
1:A:574:THR:N	1:A:621:ASN:N	2.69	0.41
2:C:90:PHE:O	2:C:94:GLY:N	2.47	0.41
1:A:573:VAL:HA	1:A:624:ILE:CB	2.50	0.41
1:A:218:THR:O	1:A:222:THR:N	2.50	0.41
1:A:461:LYS:C	1:A:466:GLN:HA	2.46	0.41
2:C:78:LEU:CB	2:C:82:ARG:CB	2.99	0.41
2:C:39:LEU:HA	2:C:55:ALA:CA	2.51	0.41
1:A:357:HIS:O	1:A:361:GLN:N	2.45	0.40
1:A:649:LEU:O	1:A:650:MET:C	2.63	0.40
2:C:399:LEU:C	2:C:405:LEU:H	2.29	0.40
2:C:348:ALA:O	2:C:352:THR:N	2.50	0.40
1:A:1014:TYR:CB	1:A:1027:ALA:HB2	2.52	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	723/733 (99%)	709 (98%)	9 (1%)	5 (1%)	18 53
2	C	433/437 (99%)	431 (100%)	1 (0%)	1 (0%)	43 74
All	All	1156/1170 (99%)	1140 (99%)	10 (1%)	6 (0%)	26 59

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	367	ASN
2	C	44	PRO
1	A	474	ARG
1	A	475	TYR
1	A	446	VAL
1	A	467	PRO

5.3.2 Protein sidechains (i)

There are no protein residues with a non-rotameric sidechain to report in this entry.

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	4
2	C	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	773:ASP	C	858:LEU	N	14.20
1	A	257:LYS	C	272:MET	N	13.52
1	A	1049:LEU	C	1068:HIS	N	7.36
1	C	399:LEU	C	400:PRO	N	6.28
1	A	575:CYS	C	621:ASN	N	3.17

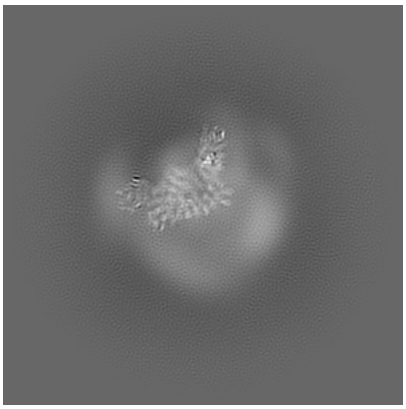
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-66028. These allow visual inspection of the internal detail of the map and identification of artifacts.

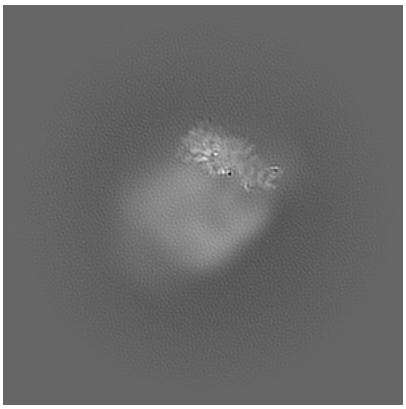
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

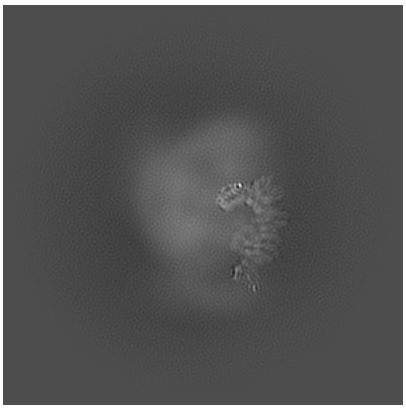
6.1.1 Primary map



X

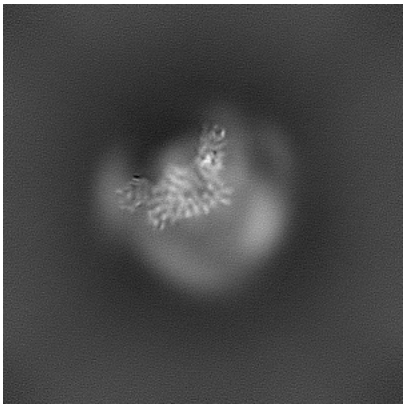


Y

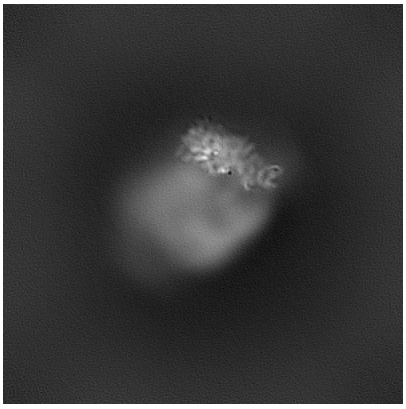


Z

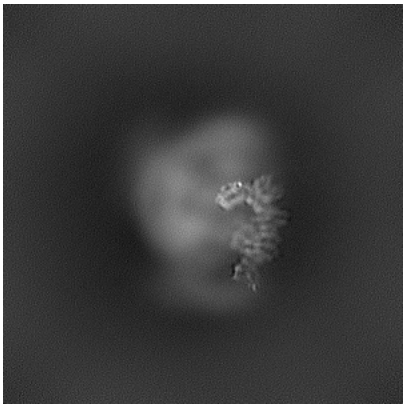
6.1.2 Raw map



X



Y

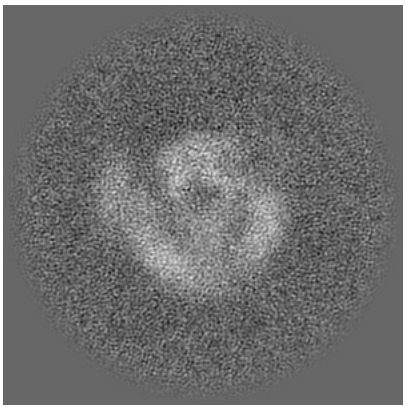


Z

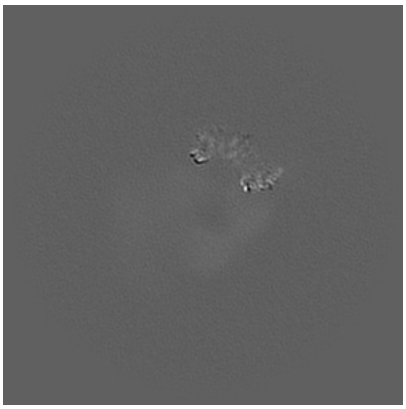
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

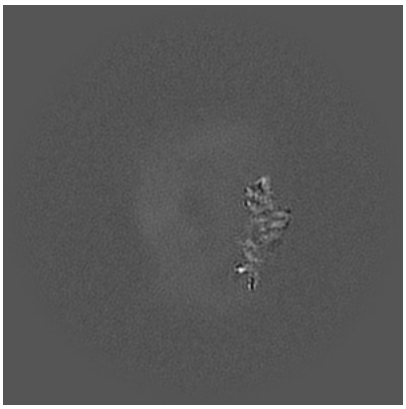
6.2.1 Primary map



X Index: 200

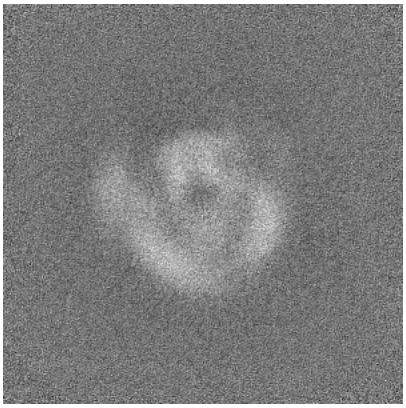


Y Index: 200

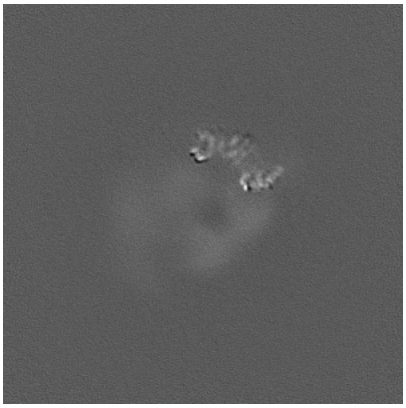


Z Index: 200

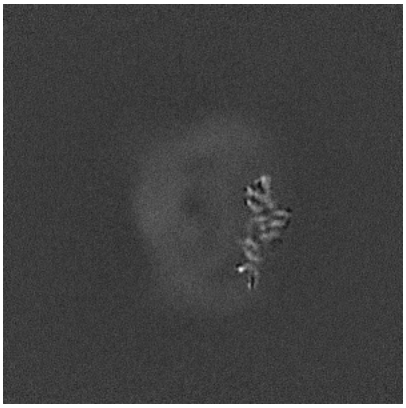
6.2.2 Raw map



X Index: 200



Y Index: 200

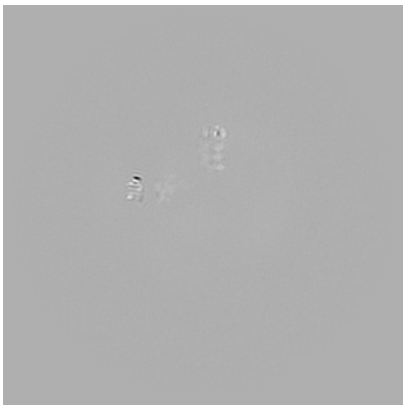


Z Index: 200

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

6.3 Largest variance slices (i)

6.3.1 Primary map

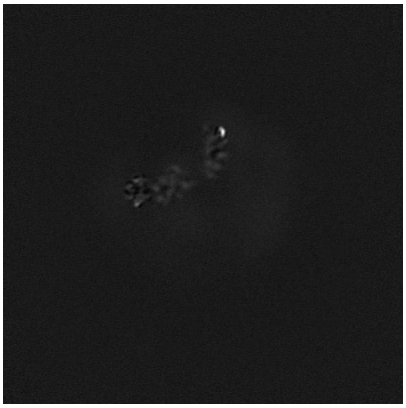


X Index: 231

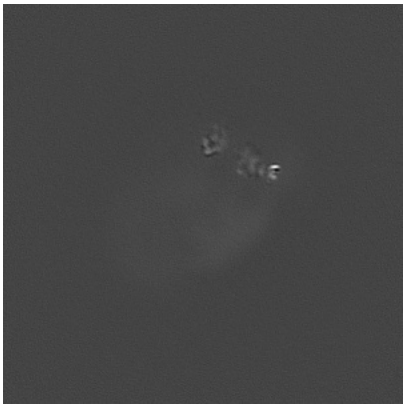
Y Index: 219

Z Index: 226

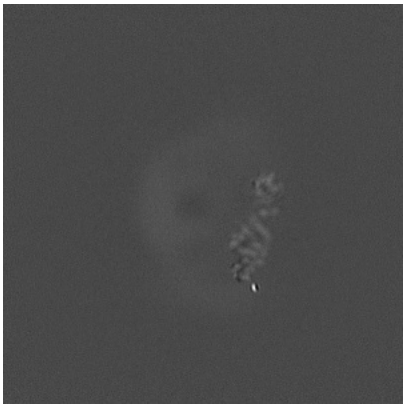
6.3.2 Raw map



X Index: 237



Y Index: 219

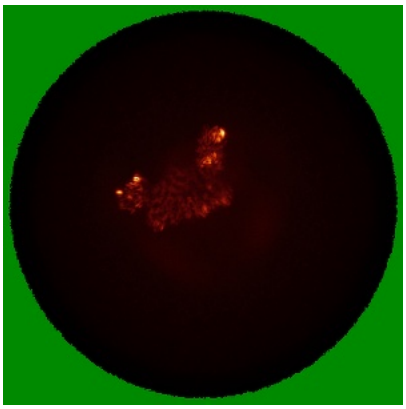


Z Index: 212

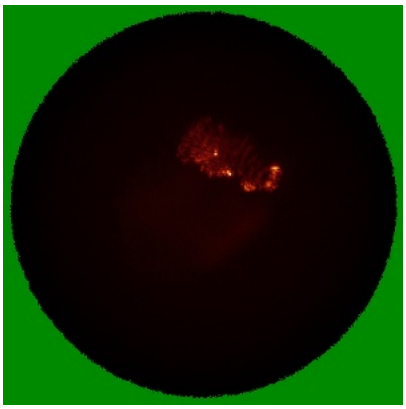
The images above show the largest variance slices of the map in three orthogonal directions.

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

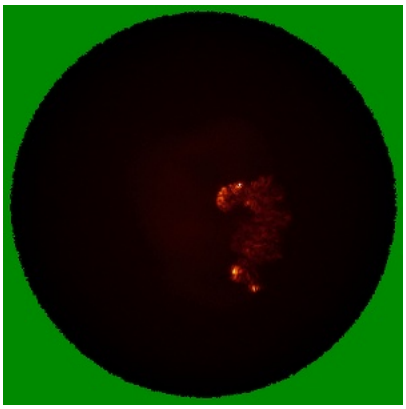
6.4.1 Primary map



X

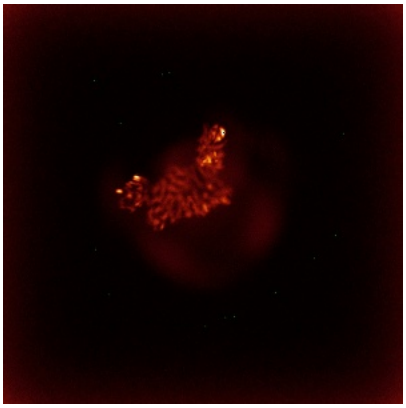


Y

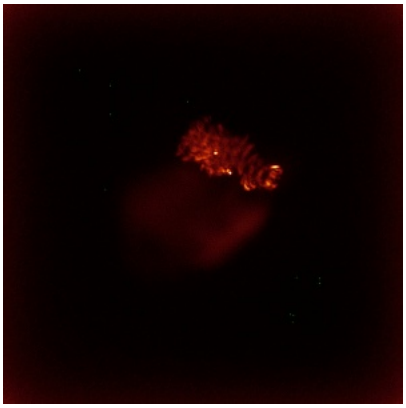


Z

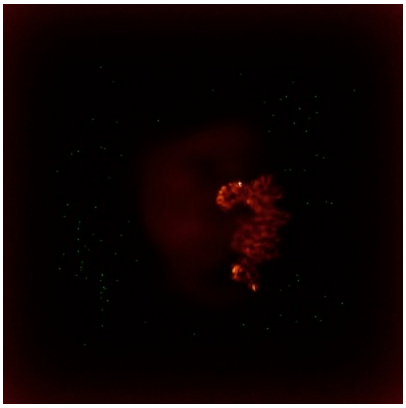
6.4.2 Raw map



X



Y



Z

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

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.16. 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.

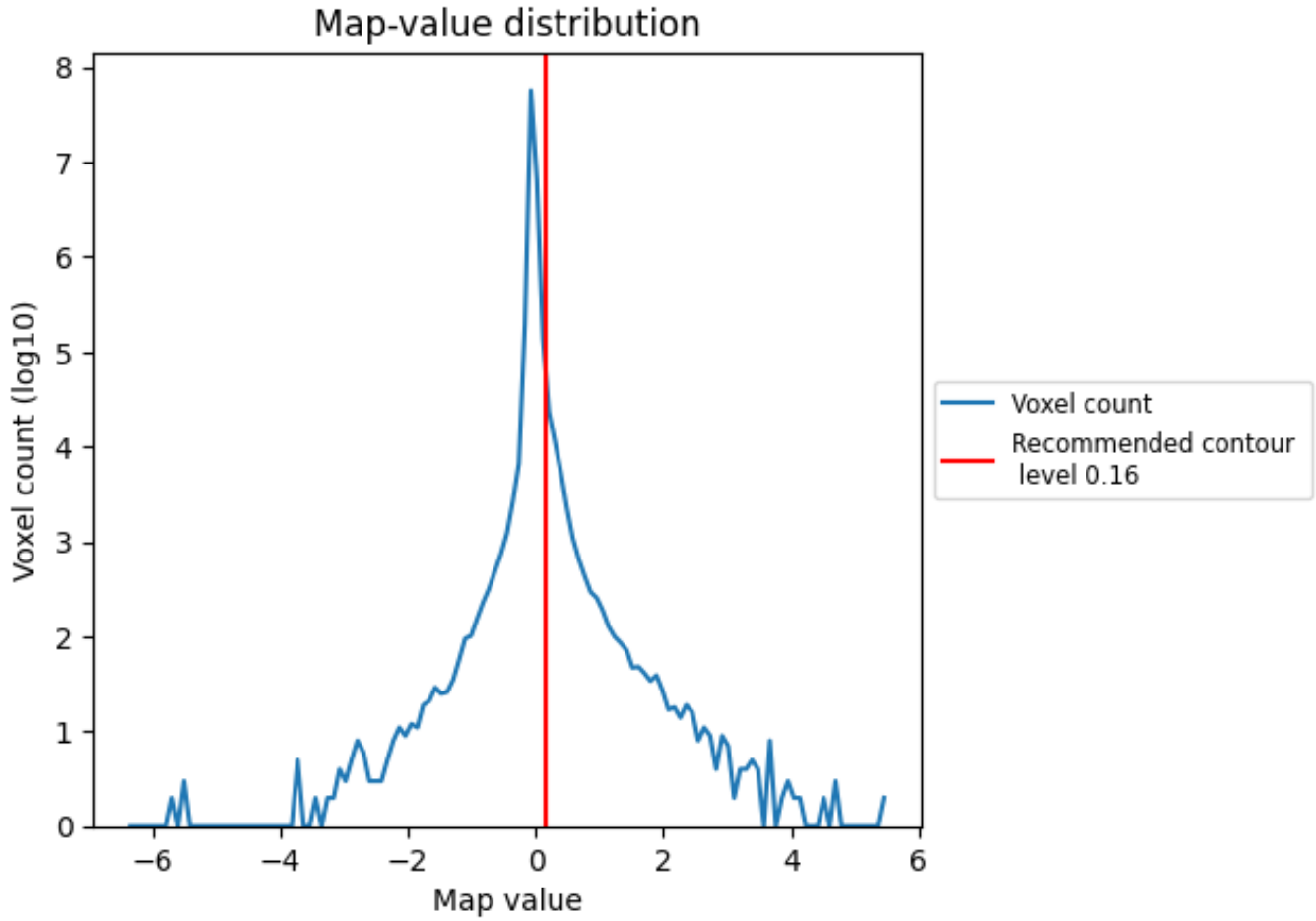
6.6 Mask visualisation (i)

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

7 Map analysis

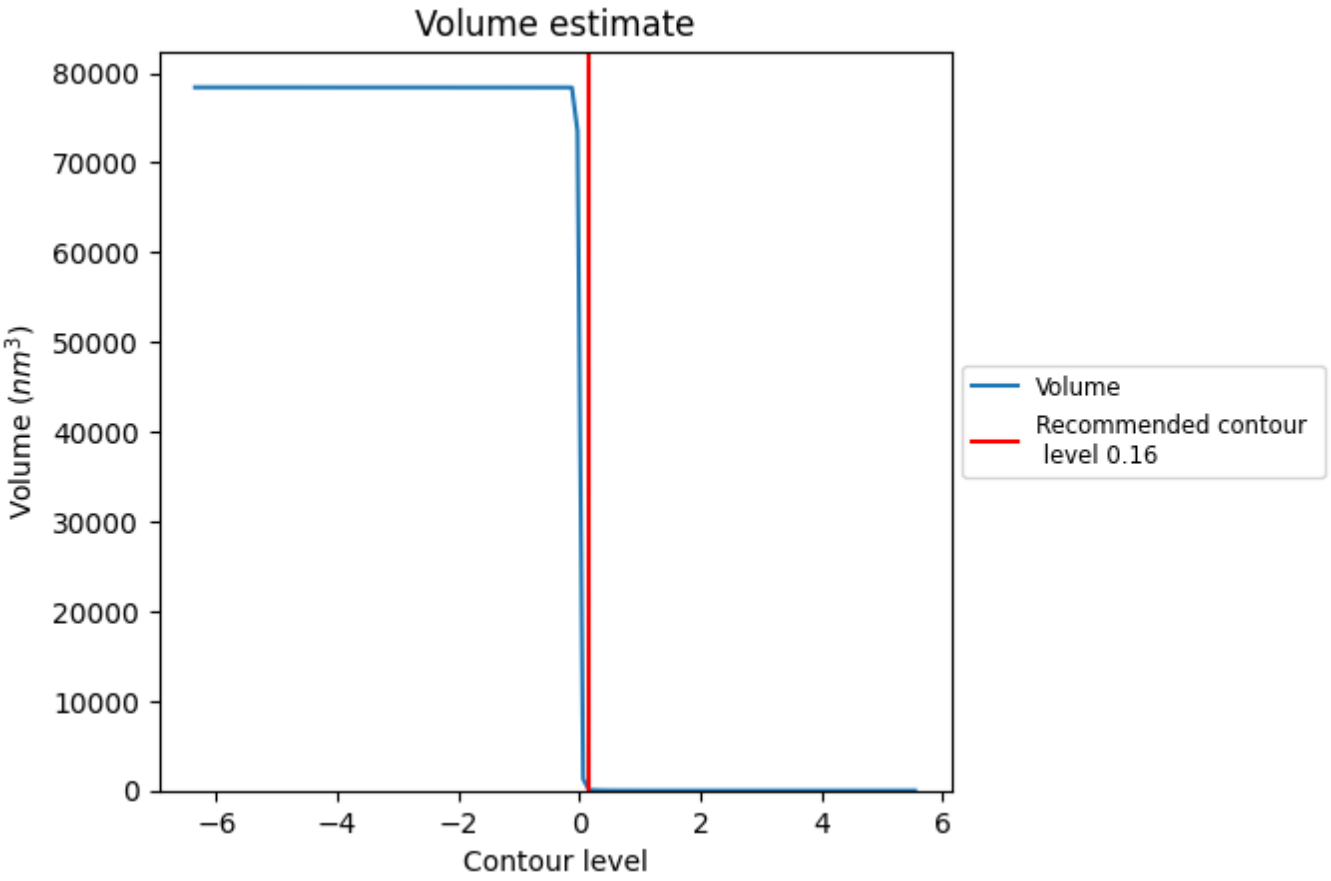
This section contains the results of statistical analysis of the map.

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.

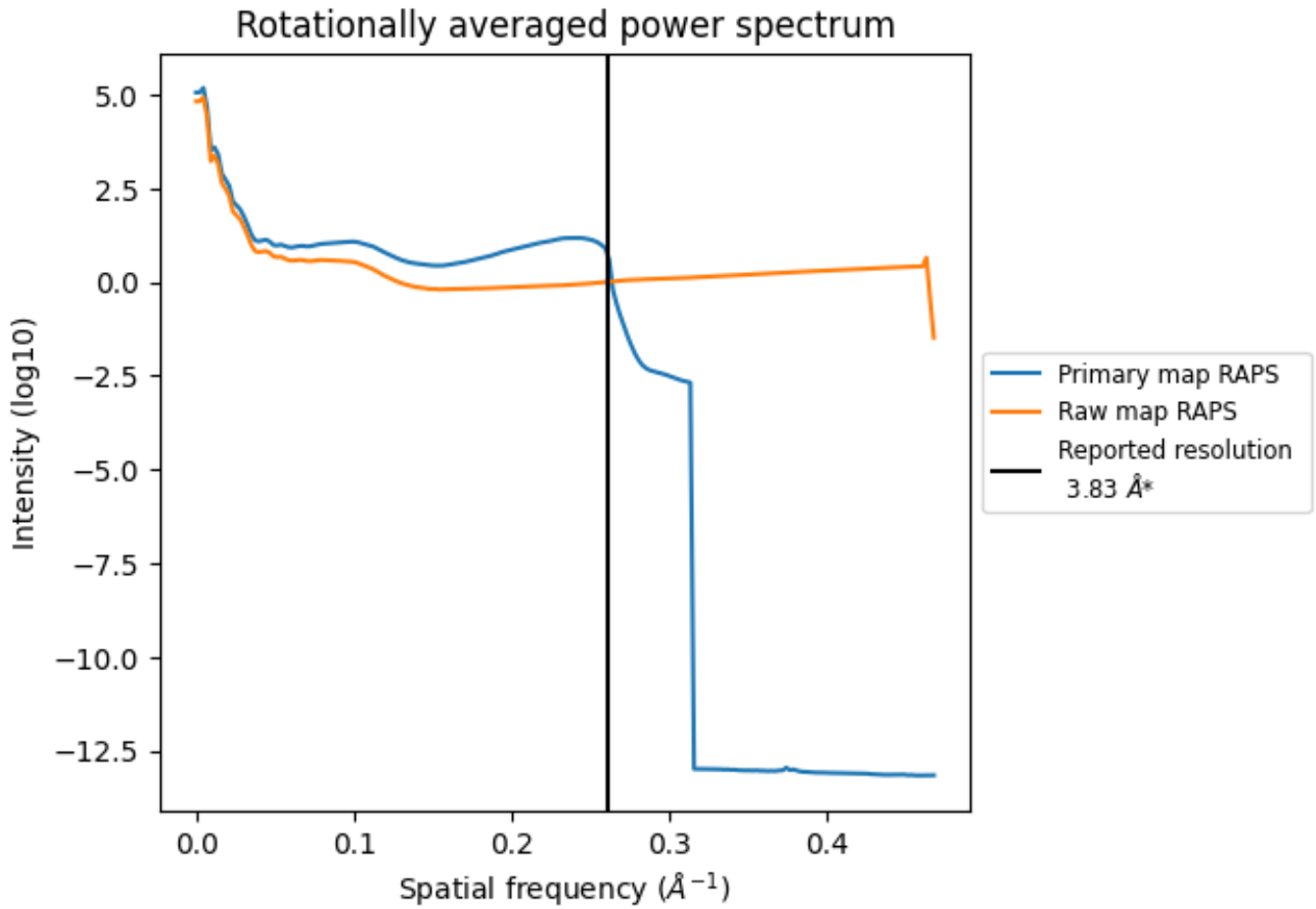
7.2 Volume estimate (i)



The volume at the recommended contour level is 88 nm^3; this corresponds to an approximate mass of 79 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)

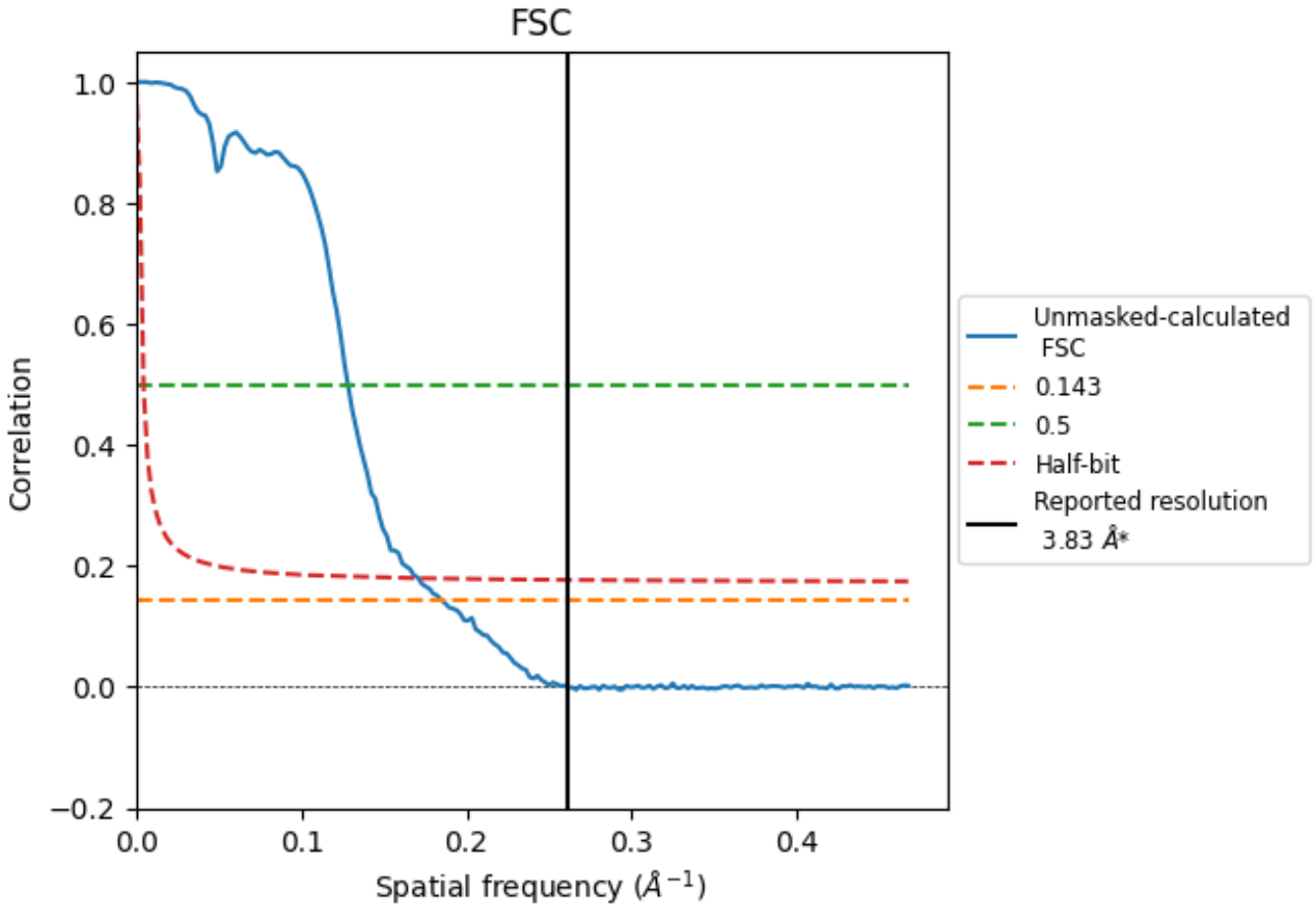


*Reported resolution corresponds to spatial frequency of 0.261 $Å^{-1}$

8 Fourier-Shell correlation

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

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.261 Å^{-1}

8.2 Resolution estimates (i)

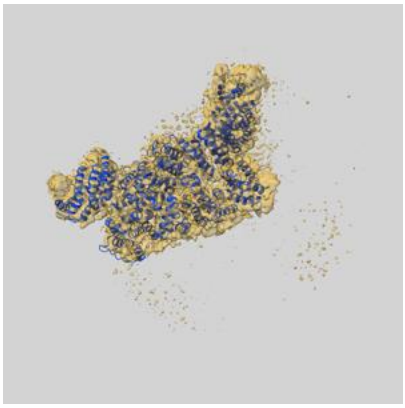
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.83	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	5.40	7.80	5.85

*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 5.40 differs from the reported value 3.83 by more than 10 %

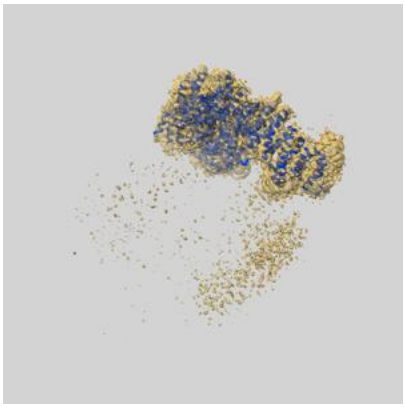
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-66028 and PDB model 9WJS. Per-residue inclusion information can be found in section 3 on page 4.

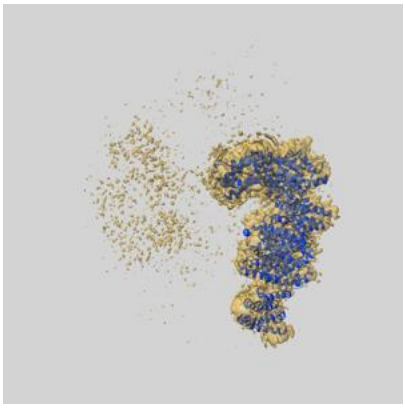
9.1 Map-model overlay



X



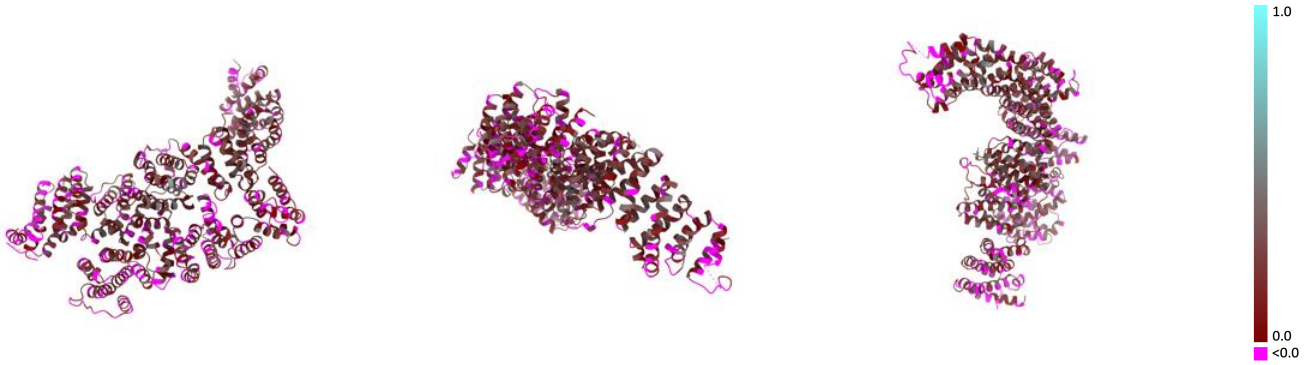
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.16 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

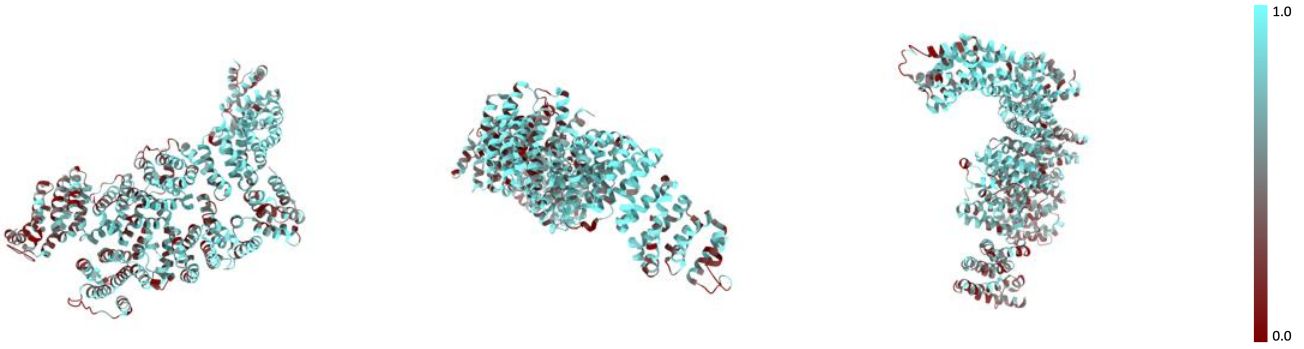
9.2 Q-score mapped to coordinate model (i)



X Y Z

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

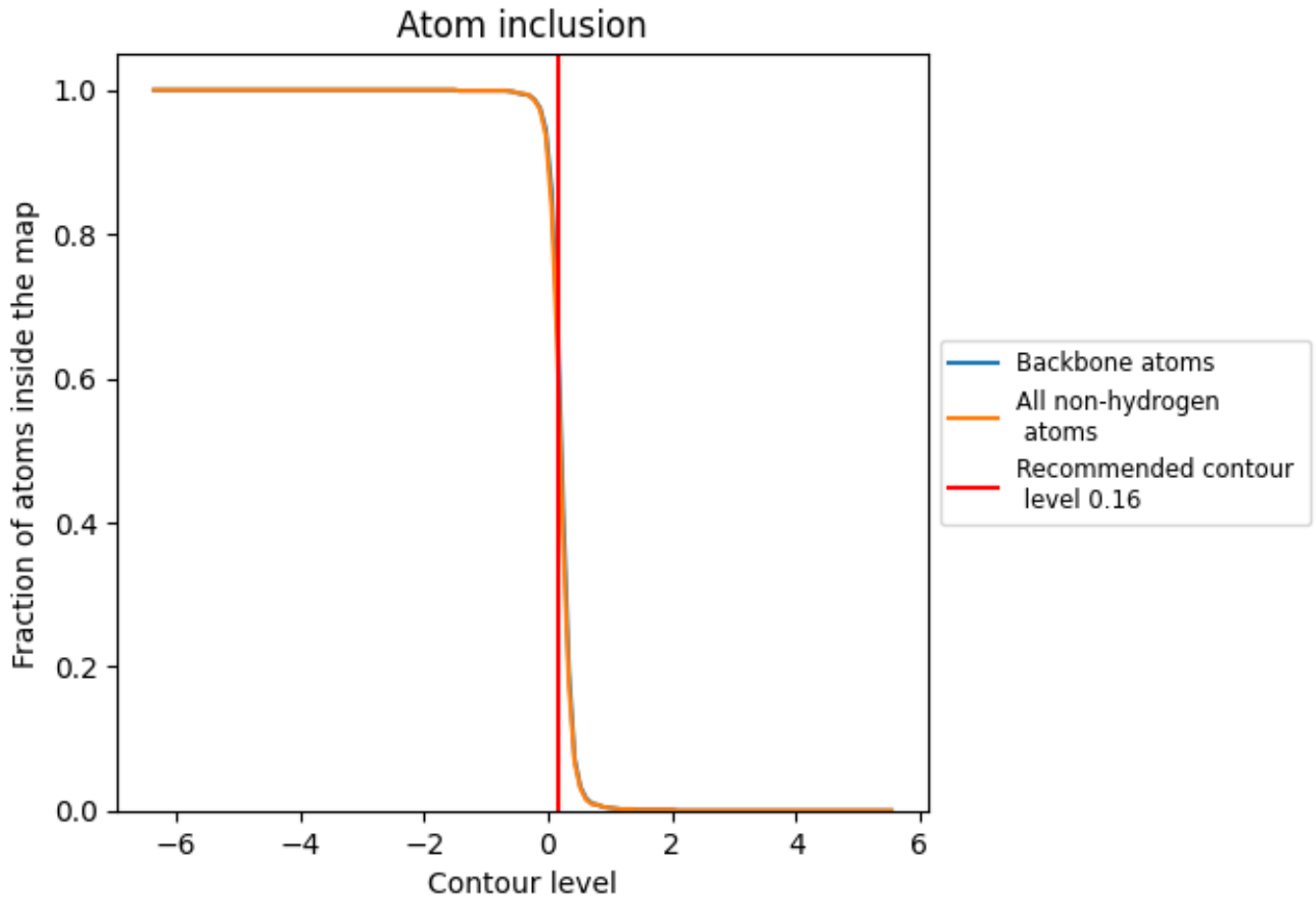
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.16).

9.4 Atom inclusion (i)



At the recommended contour level, 68% of all backbone atoms, 63% 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 (0.16) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6300	0.1360
A	0.6500	0.1520
C	0.5960	0.1080