Full wwPDB EM Validation Report ⓘ

Nov 7, 2023 – 04:10 PM EST

PDB ID	:	8SOJ
EMDB ID	:	EMD-40659
Title	:	Cryo-EM structure of human CST bound to POT1(ESDL)/TPP1 in the absence of telomeric ssDNA
Authors	:	Cai, S.W.
Deposited on	:	2023-04-28
Resolution	:	3.80 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:

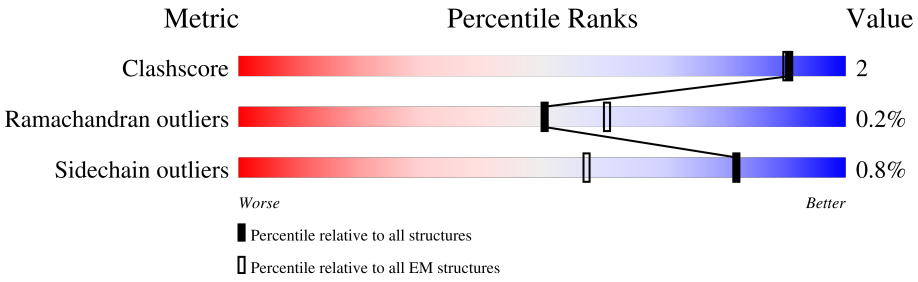
EMDB validation analysis	:	0.0.1.dev70
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 3.80 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	1613	7% 69% · 28%
2	B	1049	8% 39% · 59%
3	C	123	10% 84% 9% · ·
4	D	646	7% 73% · 24%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 34490 atoms, of which 17267 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 CST complex subunit CTC1.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	A	1158	18090	5755	9078	1586	1622	49	0	0

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-395	MET	-	initiating methionine	UNP P0AEY0
A	-394	GLY	-	expression tag	UNP P0AEY0
A	-393	SER	-	expression tag	UNP P0AEY0
A	-392	SER	-	expression tag	UNP P0AEY0
A	-391	HIS	-	expression tag	UNP P0AEY0
A	-390	HIS	-	expression tag	UNP P0AEY0
A	-389	HIS	-	expression tag	UNP P0AEY0
A	-388	HIS	-	expression tag	UNP P0AEY0
A	-387	HIS	-	expression tag	UNP P0AEY0
A	-386	HIS	-	expression tag	UNP P0AEY0
A	-385	SER	-	expression tag	UNP P0AEY0
A	-384	SER	-	expression tag	UNP P0AEY0
A	-383	GLY	-	expression tag	UNP P0AEY0
A	-382	THR	-	expression tag	UNP P0AEY0
A	-15	LYS	-	linker	UNP P0AEY0
A	-14	LEU	-	linker	UNP P0AEY0
A	-13	VAL	-	linker	UNP P0AEY0
A	-12	GLU	-	linker	UNP P0AEY0
A	-11	LYS	-	linker	UNP P0AEY0
A	-10	TYR	-	linker	UNP P0AEY0
A	-9	LEU	-	linker	UNP P0AEY0
A	-8	GLU	-	linker	UNP P0AEY0
A	-7	VAL	-	linker	UNP P0AEY0
A	-6	LEU	-	linker	UNP P0AEY0
A	-5	PHE	-	linker	UNP P0AEY0
A	-4	GLN	-	linker	UNP P0AEY0
A	-3	GLY	-	linker	UNP P0AEY0
A	-2	PRO	-	linker	UNP P0AEY0

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	linker	UNP P0AEY0
A	0	SER	-	linker	UNP P0AEY0

- Molecule 2 is a protein called CST complex subunit STN1.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	B	428	Total	C	H	N	O	S	0	0
			6797	2145	3394	582	657	19		

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-277	MET	-	initiating methionine	UNP B6F2F5
B	-276	TRP	-	expression tag	UNP B6F2F5
B	-275	SER	-	expression tag	UNP B6F2F5
B	-274	HIS	-	expression tag	UNP B6F2F5
B	-273	PRO	-	expression tag	UNP B6F2F5
B	-272	GLN	-	expression tag	UNP B6F2F5
B	-271	PHE	-	expression tag	UNP B6F2F5
B	-270	GLU	-	expression tag	UNP B6F2F5
B	-269	LYS	-	expression tag	UNP B6F2F5
B	-268	GLY	-	expression tag	UNP B6F2F5
B	-267	GLY	-	expression tag	UNP B6F2F5
B	-266	GLY	-	expression tag	UNP B6F2F5
B	-265	SER	-	expression tag	UNP B6F2F5
B	-264	GLY	-	expression tag	UNP B6F2F5
B	-263	GLY	-	expression tag	UNP B6F2F5
B	-262	GLY	-	expression tag	UNP B6F2F5
B	-261	SER	-	expression tag	UNP B6F2F5
B	-260	GLY	-	expression tag	UNP B6F2F5
B	-259	GLY	-	expression tag	UNP B6F2F5
B	-258	SER	-	expression tag	UNP B6F2F5
B	-257	ALA	-	expression tag	UNP B6F2F5
B	-256	TRP	-	expression tag	UNP B6F2F5
B	-255	SER	-	expression tag	UNP B6F2F5
B	-254	HIS	-	expression tag	UNP B6F2F5
B	-253	PRO	-	expression tag	UNP B6F2F5
B	-252	GLN	-	expression tag	UNP B6F2F5
B	-251	PHE	-	expression tag	UNP B6F2F5
B	-250	GLU	-	expression tag	UNP B6F2F5
B	-249	LYS	-	expression tag	UNP B6F2F5
B	-8	GLU	-	linker	UNP B6F2F5

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
B	-7	ASN	-	linker	UNP B6F2F5
B	-6	LEU	-	linker	UNP B6F2F5
B	-5	TYR	-	linker	UNP B6F2F5
B	-4	PHE	-	linker	UNP B6F2F5
B	-3	GLN	-	linker	UNP B6F2F5
B	-2	GLY	-	linker	UNP B6F2F5
B	-1	GLY	-	linker	UNP B6F2F5
B	0	SER	-	linker	UNP B6F2F5
B	398	GLY	-	linker	UNP Q96AP0
B	399	GLY	-	linker	UNP Q96AP0
B	400	SER	-	linker	UNP Q96AP0
B	401	GLY	-	linker	UNP Q96AP0
B	402	GLY	-	linker	UNP Q96AP0
B	403	SER	-	linker	UNP Q96AP0

- Molecule 3 is a protein called CST complex subunit TEN1.

Mol	Chain	Residues	Atoms						AltConf	Trace
3	C	119	Total	C	H	N	O	S	0	0
			1897	595	955	169	171	7		

- Molecule 4 is a protein called Protection of telomeres protein 1.

Mol	Chain	Residues	Atoms						AltConf	Trace
4	D	490	Total	C	H	N	O	S	0	0
			7704	2451	3840	651	740	22		

There are 13 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-7	MET	-	initiating methionine	UNP Q9NUX5
D	-6	HIS	-	expression tag	UNP Q9NUX5
D	-5	HIS	-	expression tag	UNP Q9NUX5
D	-4	HIS	-	expression tag	UNP Q9NUX5
D	-3	HIS	-	expression tag	UNP Q9NUX5
D	-2	HIS	-	expression tag	UNP Q9NUX5
D	-1	HIS	-	expression tag	UNP Q9NUX5
D	0	GLY	-	expression tag	UNP Q9NUX5
D	1	SER	-	expression tag	UNP Q9NUX5
D	320A	GLU	-	insertion	UNP Q9NUX5
D	320B	SER	-	insertion	UNP Q9NUX5
D	320C	ASP	-	insertion	UNP Q9NUX5

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
D	320D	LEU	-	insertion	UNP Q9NUX5

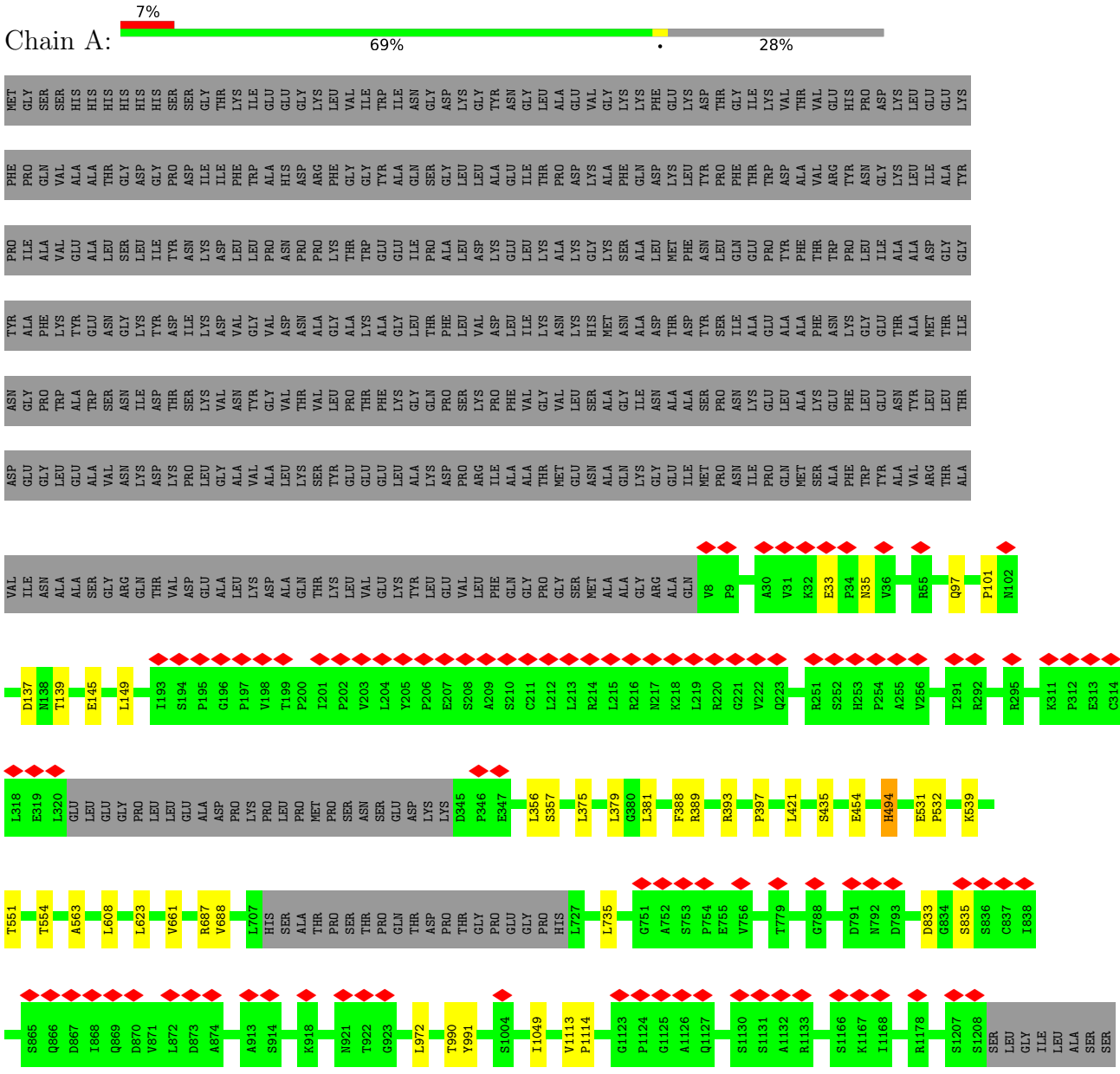
- Molecule 5 is ZINC ION (three-letter code: ZN) (formula: Zn).

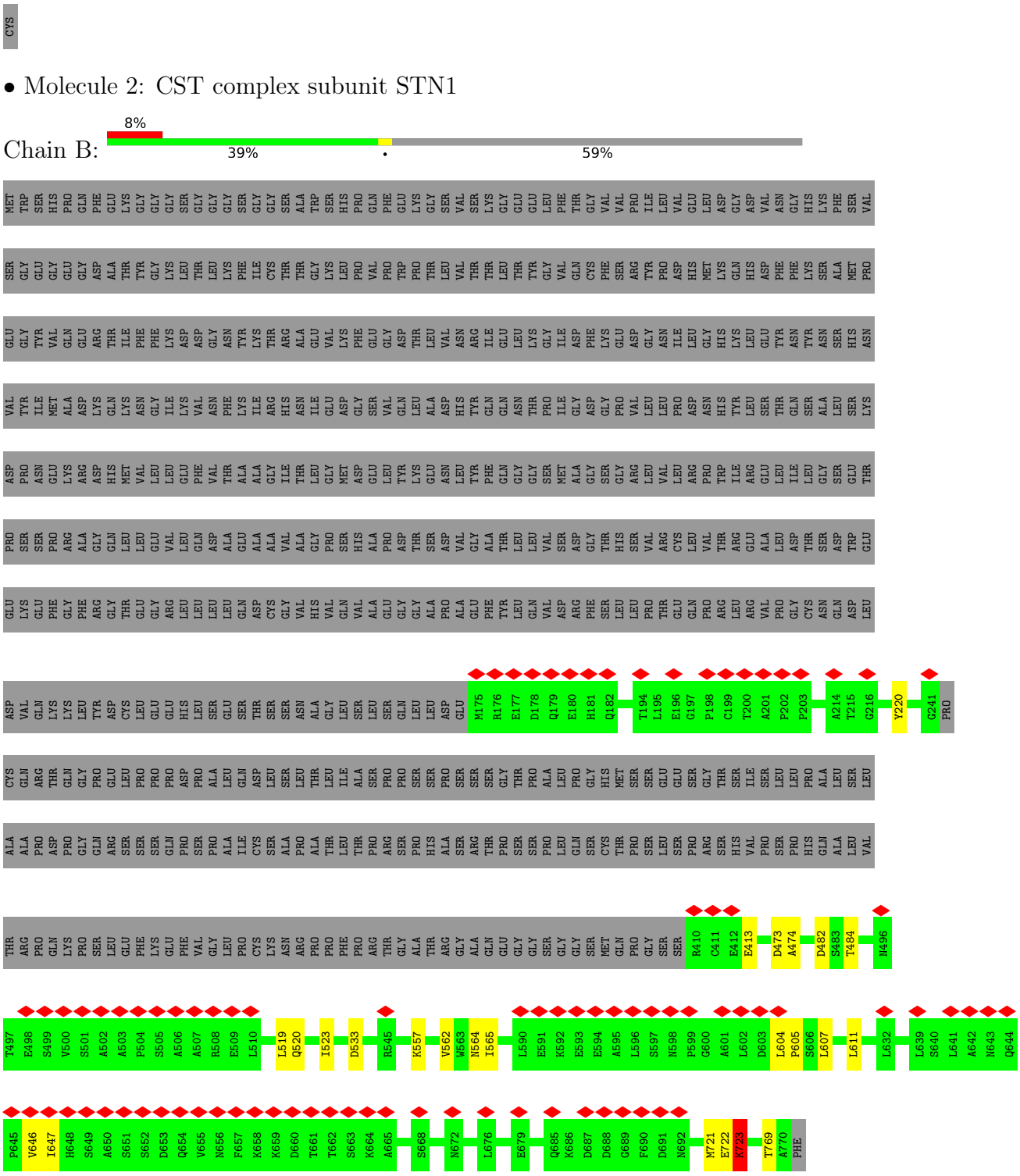
Mol	Chain	Residues	Atoms	AltConf
5	A	1	Total Zn 1 1	0
5	D	1	Total Zn 1 1	0

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.

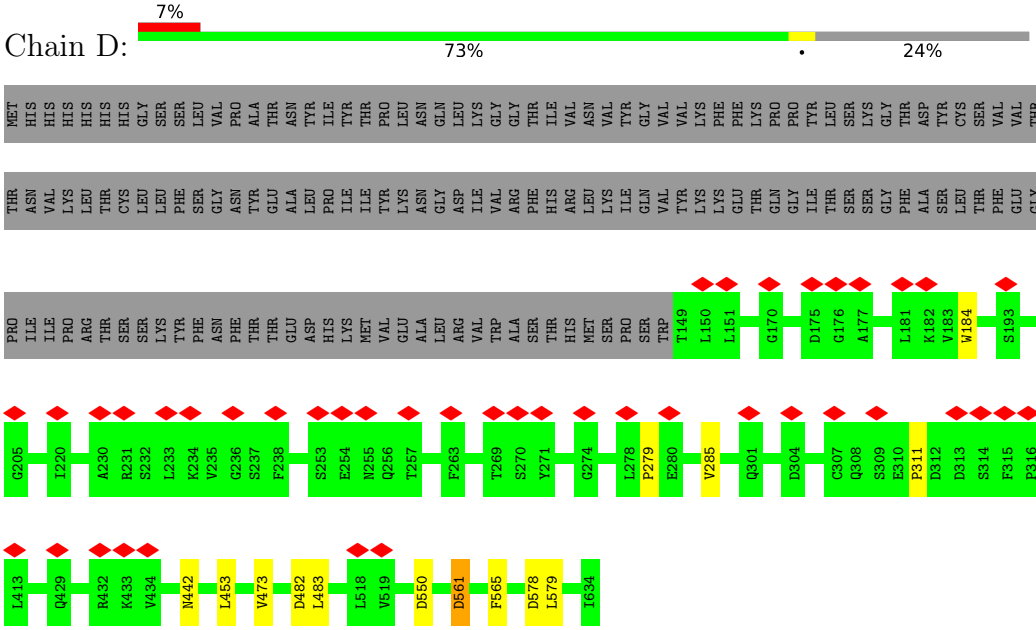
- Molecule 1: CST complex subunit CTC1




CYS
• Molecule 2: CST complex subunit STN1
Chain B:
8%
39%
59%
MET TRP SER HIS PRO GLN PHE GLU LYS GLY GLY GLY GLY SER GLY GLY GLY GLY SER GLY GLY SER ALA TRP SER HIS PRO GLN PHE GLU LYS GLY SER VAL SER LYS GLY GLU GLU LEU PHE THR GLY VAL VAL PRO ILE LEU VAL GLU LEU ASP GLY ASP VAL ASN GLY HIS LYS PHE SER VAL
SER GLY GLU GLY GLU GLN GLY ASP ALA THR TYR GLY LYS LEU THR LEU LYS PHE ILE CYS THR THR GLY LYS LEU PRO VAL PRO TRP PRO THR LEU VAL THR THR LEU THR TYR GLY VAL GLN CYS PHE SER ARG TYR PRO ASP HIS MET LYS GLN HIS ASP PHE PHE LYS SER ALA MET PRO
GLU GLY TYR VAL GLN GLU ARG THR ILE PHE PHE LYS ASP ASP GLY ASN TYR LYS THR ARG ALA GLU VAL LYS PHE GLU GLY ASP THR LEU VAL ASN ARG ILE GLU GLU LEU LYS GLY ILE ASP PHE LYS GLU ASP GLY ASN ILE LEU GLY HIS LYS LEU GLU GLU TYR ASN TYR ASN SER HIS ASN
VAL TYR ILE MET ALA ASP LYS GLN LYS ASN GLY ILE LYS VAL ASN PHE LYS ILE ARG HIS ASN ILE GLU GLU ASP GLY SER VAL GLN LEU LEU ALA ASP HIS TYR GLN GLN ASN THR PRO ILE GLY ASP GLY PRO VAL LEU LEU PRO ASP ASN HIS TYR LEU SER THR GLN SER ALA LEU SER LYS
ASP PRO ASN GLU LYS ARG ASP HIS MET VAL LEU LEU GLU PHE VAL THR ALA ALA GLY ILE THR LEU GLY GLY MET ASP GLU GLU LEU TYR LYS GLU ASN LEU TYR PHE GLN GLN GLY GLY SER MET ALA GLY GLY SER GLY ARG LEU VAL LEU ARG PRO TRP ILE ARG GLU GLU LEU ILE LEU GLY SER GLU THR
PRO SER SER PRO ARG ALA GLY GLN LEU LEU GLU VAL LEU GLN ASP ALA GLU ALA ALA VAL ALA GLY PRO SER HIS ALA PRO ASP THR SER ASP VAL GLY ALA THR LEU LEU VAL SER ASP GLY THR HIS SER VAL ARG CYS LEU VAL THR ARG GLU ALA LEU ASP THR SER ASP TRP GLU
GLU LYS GLU PHE GLY PHE ARG GLY THR GLU GLY GLY ALA PRO ALA GLU PHE TYR LEU GLN VAL ASP ARG PHE SER LEU LEU PRO THR GLU GLN PRO ARG LEU ARG VAL PRO GLY CYS ASN GLN ASP LEU
ASP VAL GLN LYS LEU TYR ASP CYS LEU GLU GLU GLU GLU HIS LEU SER GLU SER THR SER SER GLU SER ASN ALA GLY LEU SER LEU SER GLN LEU LEU LEU ASP GLU M175 R176 E177 D178 Q179 E180 H181 Q182 T194 L195 E196 G197 P198 C199 T200 A201 P202 P203 A214 T215 G216 Y220 G241 PRO
CYS GLN ARG THR GLN GLY PRO GLU LEU PRO PRO PRO PRO ASP PRO ALA LEU GLN ASP LEU SER LEU THR LEU ILE ALA SER PRO PRO SER PRO SER SER GLY THR PRO ALA LEU PRO GLY HIS MET SER SER GLU GLU SER GLY THR SER ILE SER LEU LEU PRO ALA LEU SER LEU
ALA ALA PRO ASP PRO GLY GLN ARG SER SER SER GLN PRO SER PRO ALA ILE CYS SER ALA PRO ALA THR LEU THR PRO ARG SER PRO HIS ALA SER ARG THR PRO SER PRO PRO LEU GLN SER CYS THR PRO SER LEU SER PRO ARG SER HIS VAL PRO SER PRO HIS GLN ALA LEU VAL
THR ARG PRO GLN LYS PRO SER LEU GLU PHE LYS GLU PHE VAL GLY LEU PRO CYS LYS ASN ARG PRO PRO PHE PRO ARG THR GLY ALA THR ARG GLY ALA GLN GLU GLY GLY SER GLY GLY SER MET GLN PRO GLY SER SER R410 C411 E412 E413 D473 A474 D482 S483 T484 N496
T497 E498 S499 V500 S501 A502 A503 P504 S505 A506 A507 R508 E509 L510 L519 Q520 I523 D533 R545 K557 V562 W563 N564 I565 L590 E591 K592 E593 E594 A595 L596 S597 N598 P599 G600 A601 L602 D603 L604 P605 S606 L607 L611 L632 L639 S640 L641 A642 N643 Q644
P645 V646 I647 H648 S649 A650 S651 S652 D653 Q654 V655 N656 F657 K658 K659 D660 T661 T662 S663 K664 A665 S668 M672 L676 E679 Q685 K686 D687 D688 G689 F690 D691 N692 M721 E722 K723 T769 A770 PHE
• Molecule 3: CST complex subunit TEN1
Chain C:
10%
84%
9%
MET M2 G23 L32 C33 L34 Y35 I38 R41 V42 T43 L44 M45 A46 Q47 H48 G49 V55 L56 V57 C58 E63 P64 F65 H66 A67 V75 E78 Q82 Q83 D84 R85 K90 G120 GLY SER GLN

• Molecule 4: Protection of telomeres protein 1

Chain D:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	132356	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 ($e^-/Å^2$)	50.3	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.314	Depositor
Minimum map value	-1.438	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.042	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	302.72, 302.72, 302.72	wwPDB
Map dimensions	352, 352, 352	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.86, 0.86, 0.86	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.25	0/9245	0.52	0/12607
2	B	0.25	0/3466	0.49	0/4691
3	C	0.32	0/960	0.59	0/1299
4	D	0.26	0/3942	0.50	0/5348
All	All	0.26	0/17613	0.51	0/23945

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	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	C	41	ARG	Sidechain

5.2 Too-close contacts

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	9012	9078	9063	20	0
2	B	3403	3394	3390	13	0
3	C	942	955	953	13	0
4	D	3864	3840	3831	10	0
5	A	1	0	0	0	0
5	D	1	0	0	0	0
All	All	17223	17267	17237	56	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 2.

All (56) 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)
2:B:723:LYS:HE3	2:B:769:THR:OG1	1.87	0.74
2:B:533:ASP:OD2	2:B:557:LYS:NZ	2.35	0.58
3:C:35:TYR:HA	3:C:42:VAL:HG23	1.87	0.57
2:B:413:GLU:OE1	2:B:413:GLU:N	2.39	0.53
1:A:389:ARG:NH1	1:A:454:GLU:OE1	2.42	0.53
4:D:482:ASP:OD1	4:D:483:LEU:N	2.42	0.53
2:B:723:LYS:CE	2:B:769:THR:OG1	2.57	0.52
2:B:519:LEU:O	2:B:523:ILE:HD13	2.10	0.52
1:A:97:GLN:NE2	1:A:101:PRO:O	2.40	0.51
2:B:564:ASN:OD1	2:B:565:ILE:N	2.42	0.51
3:C:41:ARG:HA	3:C:41:ARG:HE	1.75	0.51
3:C:41:ARG:NH2	3:C:58:CYS:SG	2.85	0.50
3:C:42:VAL:HG22	3:C:43:THR:H	1.77	0.49
1:A:388:PHE:O	1:A:388:PHE:CG	2.65	0.49
2:B:562:VAL:HG22	2:B:562:VAL:O	2.11	0.49
3:C:57:VAL:HG11	3:C:75:VAL:HG21	1.96	0.48
3:C:56:LEU:HD12	3:C:85:ARG:HD3	1.96	0.47
3:C:78:GLU:O	3:C:90:LYS:N	2.46	0.47
4:D:338:THR:O	4:D:341:GLN:NE2	2.48	0.47
3:C:42:VAL:O	3:C:56:LEU:HD13	2.16	0.46
2:B:473:ASP:OD1	2:B:474:ALA:N	2.47	0.46
4:D:320(B):SER:HA	4:D:321:VAL:HG22	1.98	0.45
2:B:482:ASP:O	2:B:484:THR:N	2.47	0.45
3:C:32:LEU:HA	3:C:44:LEU:HD12	1.98	0.45
1:A:551:THR:O	1:A:554:THR:HG22	2.17	0.45
2:B:722:GLU:O	2:B:723:LYS:C	2.55	0.45
4:D:320(D):LEU:HD23	4:D:321:VAL:N	2.32	0.44
1:A:145:GLU:OE2	1:A:393:ARG:NH2	2.40	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:833:ASP:O	1:A:835:SER:N	2.49	0.44
2:B:646:VAL:HG13	2:B:647:ILE:N	2.32	0.44
1:A:356:LEU:HD12	1:A:357:SER:N	2.31	0.44
1:A:397:PRO:O	1:A:435:SER:OG	2.28	0.44
4:D:324:TYR:CZ	4:D:550:ASP:HA	2.53	0.44
3:C:32:LEU:HD11	3:C:42:VAL:HG21	1.98	0.44
3:C:35:TYR:CE2	3:C:65:PHE:CZ	3.06	0.44
1:A:494:HIS:O	1:A:494:HIS:ND1	2.47	0.44
1:A:563:ALA:HB2	1:A:661:VAL:HG11	1.99	0.43
1:A:531:GLU:HB2	1:A:532:PRO:HD3	2.01	0.43
4:D:453:LEU:O	4:D:473:VAL:HA	2.19	0.43
1:A:137:ASP:OD1	1:A:139:THR:N	2.44	0.43
1:A:608:LEU:HD21	1:A:623:LEU:CD1	2.49	0.42
2:B:604:LEU:HB2	2:B:605:PRO:HD3	2.01	0.42
1:A:972:LEU:HD22	1:A:990:THR:HG23	2.02	0.42
4:D:442:ASN:O	4:D:442:ASN:ND2	2.52	0.42
1:A:375:LEU:HD21	1:A:381:LEU:HD22	2.02	0.41
3:C:41:ARG:HG3	3:C:85:ARG:NH1	2.35	0.41
3:C:34:LEU:HD11	3:C:42:VAL:HA	2.01	0.41
1:A:33:GLU:O	1:A:35:ASN:N	2.54	0.41
4:D:279:PRO:O	4:D:285:VAL:HG21	2.20	0.41
4:D:561:ASP:OD2	4:D:565:PHE:N	2.44	0.41
2:B:607:LEU:O	2:B:611:LEU:HD23	2.20	0.41
1:A:379:LEU:HD13	1:A:421:LEU:HD11	2.02	0.41
1:A:1113:VAL:HB	1:A:1114:PRO:CD	2.51	0.41
1:A:1049:ILE:H	1:A:1049:ILE:HD12	1.86	0.40
4:D:578:ASP:OD1	4:D:579:LEU:N	2.53	0.40
1:A:356:LEU:HD12	1:A:356:LEU:C	2.41	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	1152/1613 (71%)	1100 (96%)	52 (4%)	0	100 100
2	B	424/1049 (40%)	406 (96%)	17 (4%)	1 (0%)	47 79
3	C	117/123 (95%)	106 (91%)	8 (7%)	3 (3%)	5 36
4	D	488/646 (76%)	454 (93%)	33 (7%)	1 (0%)	47 79
All	All	2181/3431 (64%)	2066 (95%)	110 (5%)	5 (0%)	50 79

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	42	VAL
2	B	723	LYS
3	C	32	LEU
4	D	311	PRO
3	C	55	VAL

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	1005/1383 (73%)	998 (99%)	7 (1%)	84 91
2	B	382/907 (42%)	378 (99%)	4 (1%)	76 86
3	C	104/107 (97%)	102 (98%)	2 (2%)	57 76
4	D	441/587 (75%)	438 (99%)	3 (1%)	84 91
All	All	1932/2984 (65%)	1916 (99%)	16 (1%)	82 89

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	149	LEU
1	A	494	HIS
1	A	539	LYS
1	A	687	ARG
1	A	688	VAL
1	A	735	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	991	TYR
2	B	220	TYR
2	B	520	GLN
2	B	721	MET
2	B	723	LYS
3	C	35	TYR
3	C	44	LEU
4	D	184	TRP
4	D	320(D)	LEU
4	D	561	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	84	HIS

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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.

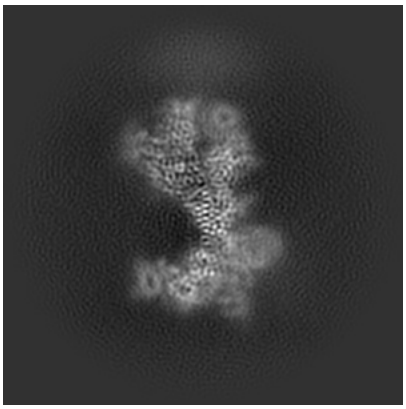
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-40659. These allow visual inspection of the internal detail of the map and identification of artifacts.

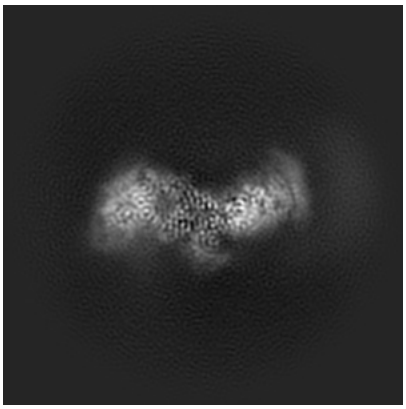
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

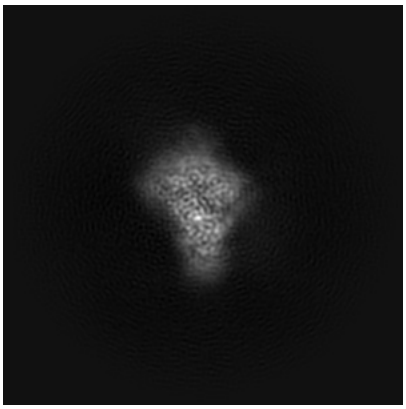
6.1.1 Primary map



X

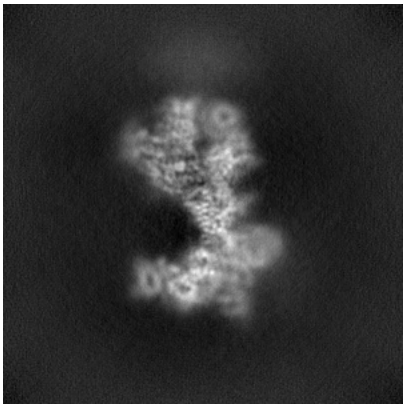


Y

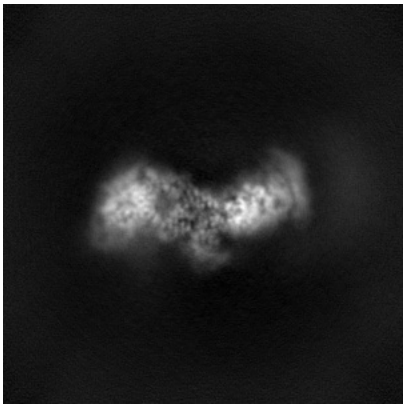


Z

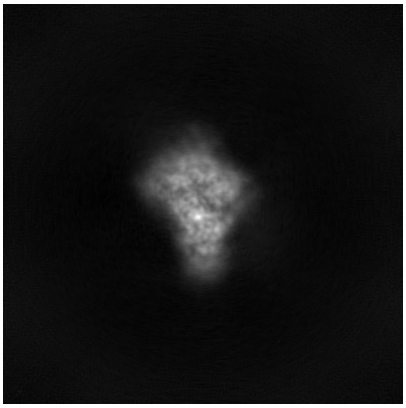
6.1.2 Raw map



X



Y

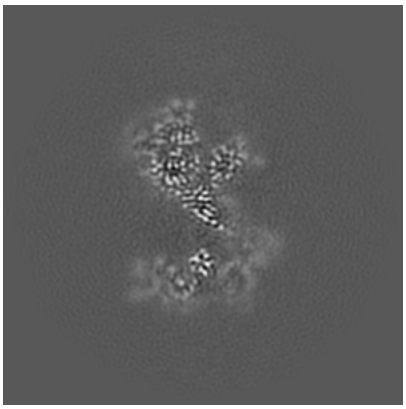


Z

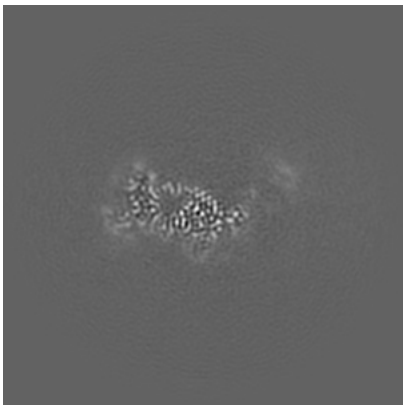
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

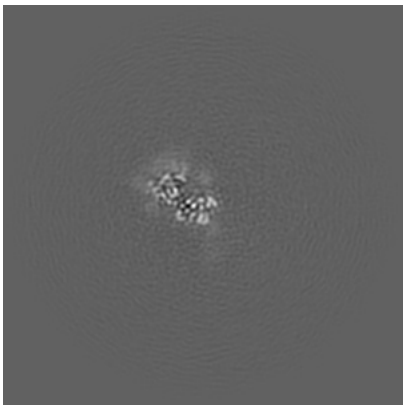
6.2.1 Primary map



X Index: 176

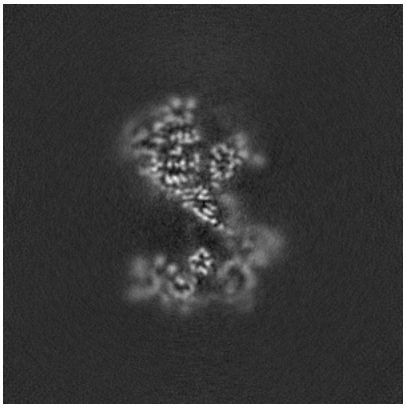


Y Index: 176

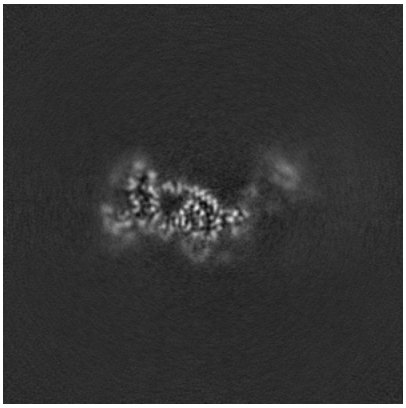


Z Index: 176

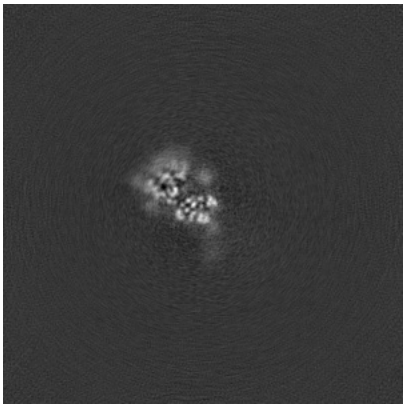
6.2.2 Raw map



X Index: 176



Y Index: 176

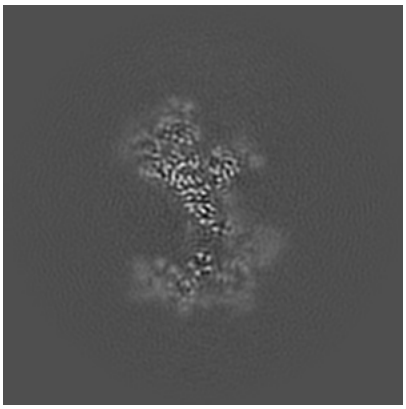


Z Index: 176

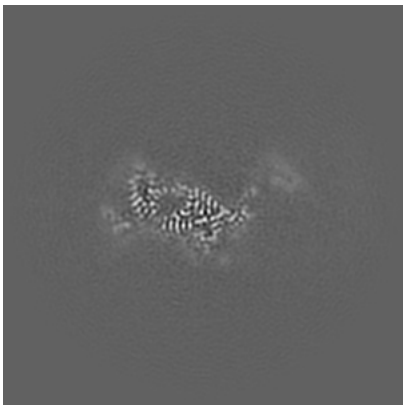
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

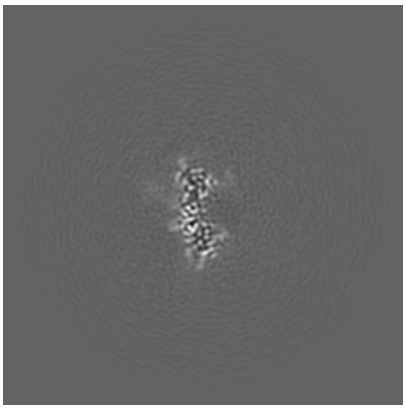
6.3.1 Primary map



X Index: 173

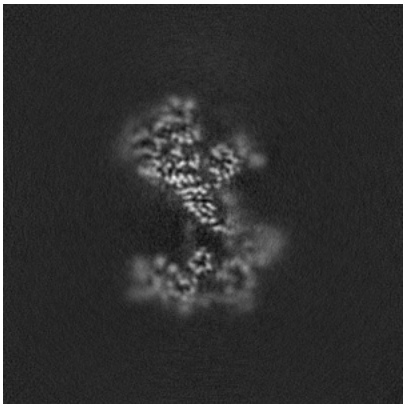


Y Index: 178

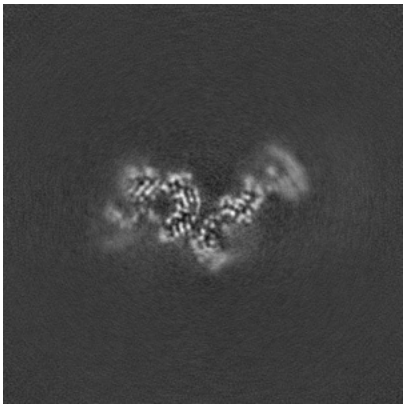


Z Index: 206

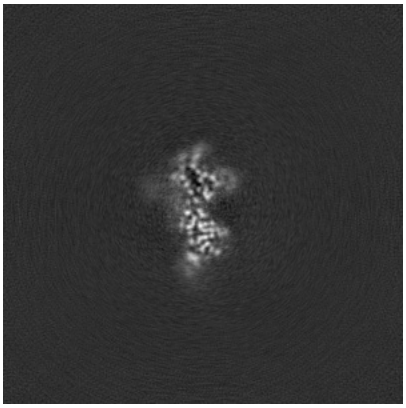
6.3.2 Raw map



X Index: 174



Y Index: 186

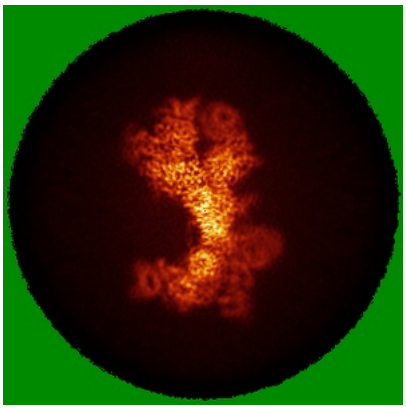


Z Index: 210

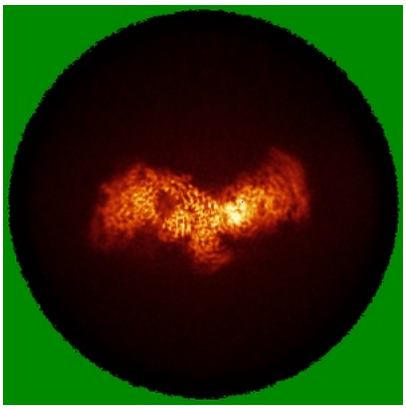
The images above show the largest variance slices of the map in three orthogonal directions.

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

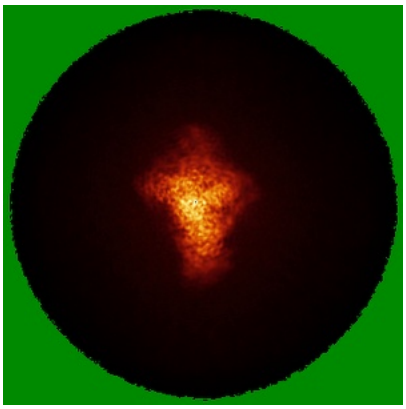
6.4.1 Primary map



X

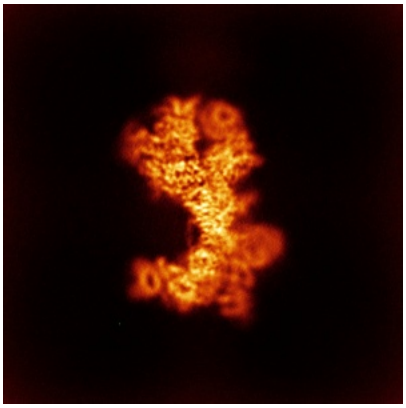


Y

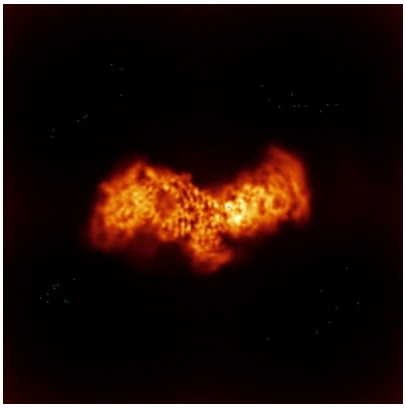


Z

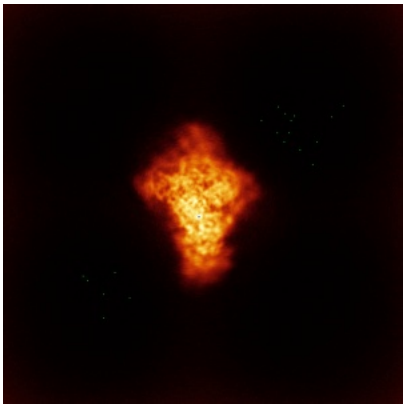
6.4.2 Raw map



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 0.2. 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.

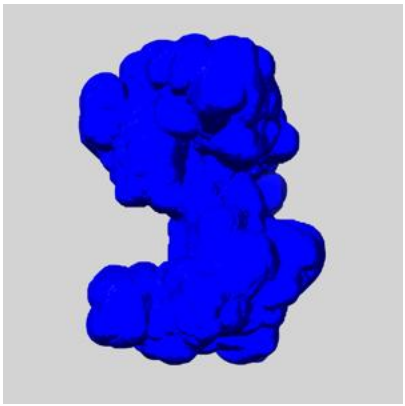
6.6 Mask visualisation (i)

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

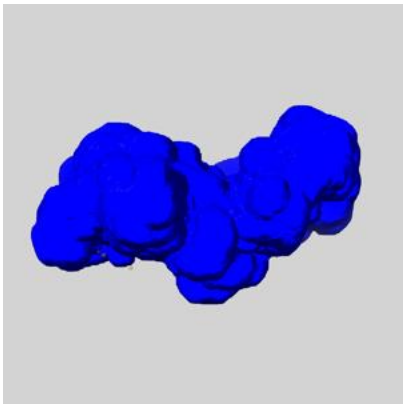
A mask typically either:

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

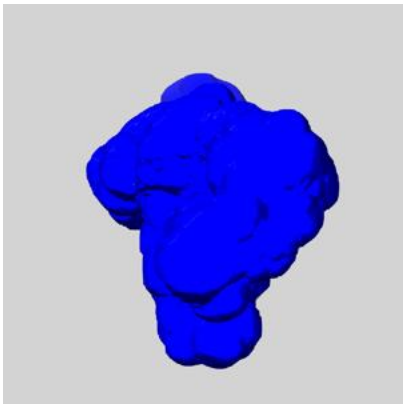
6.6.1 emd_40659_msk_1.map (i)



X



Y

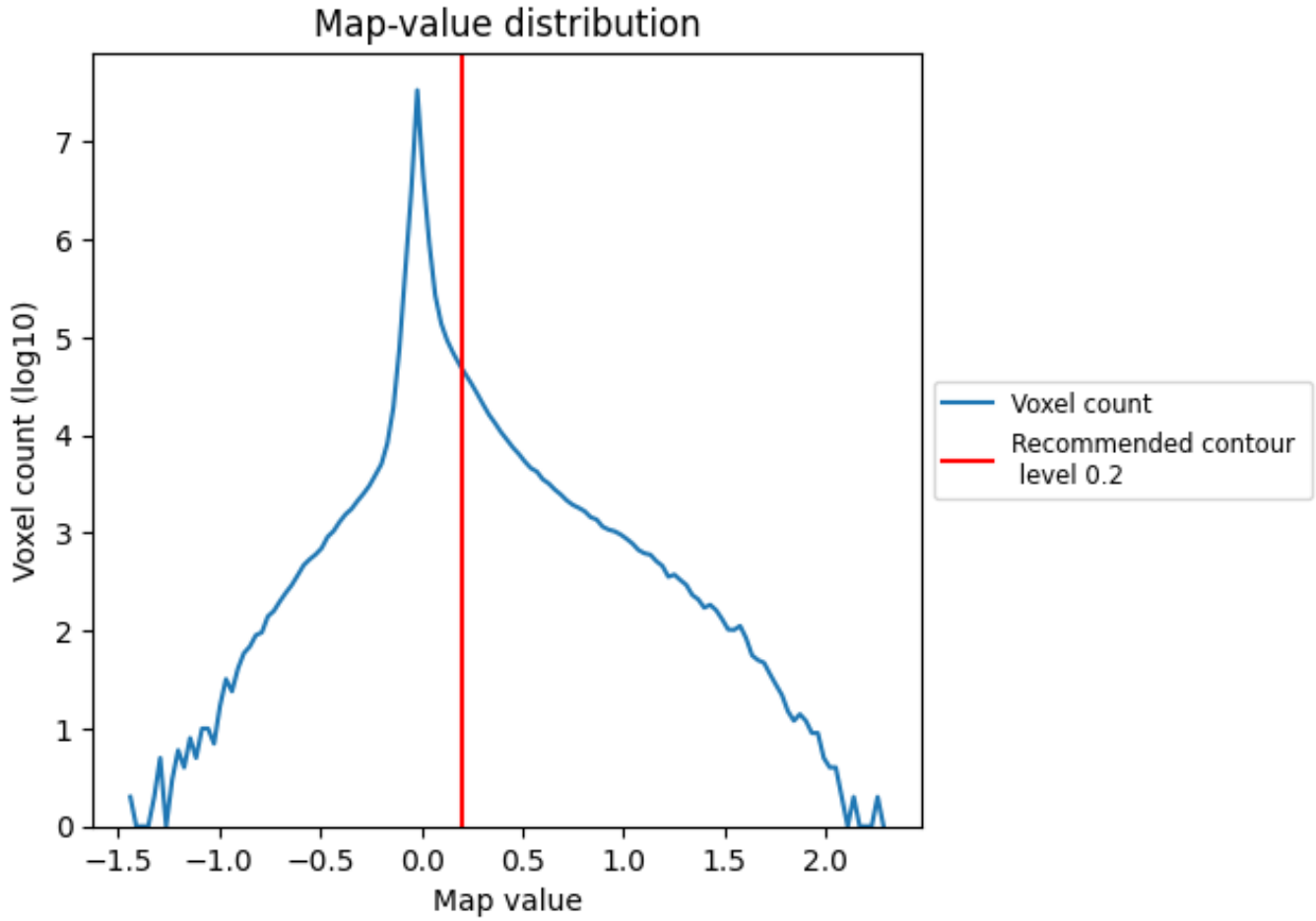


Z

7 Map analysis

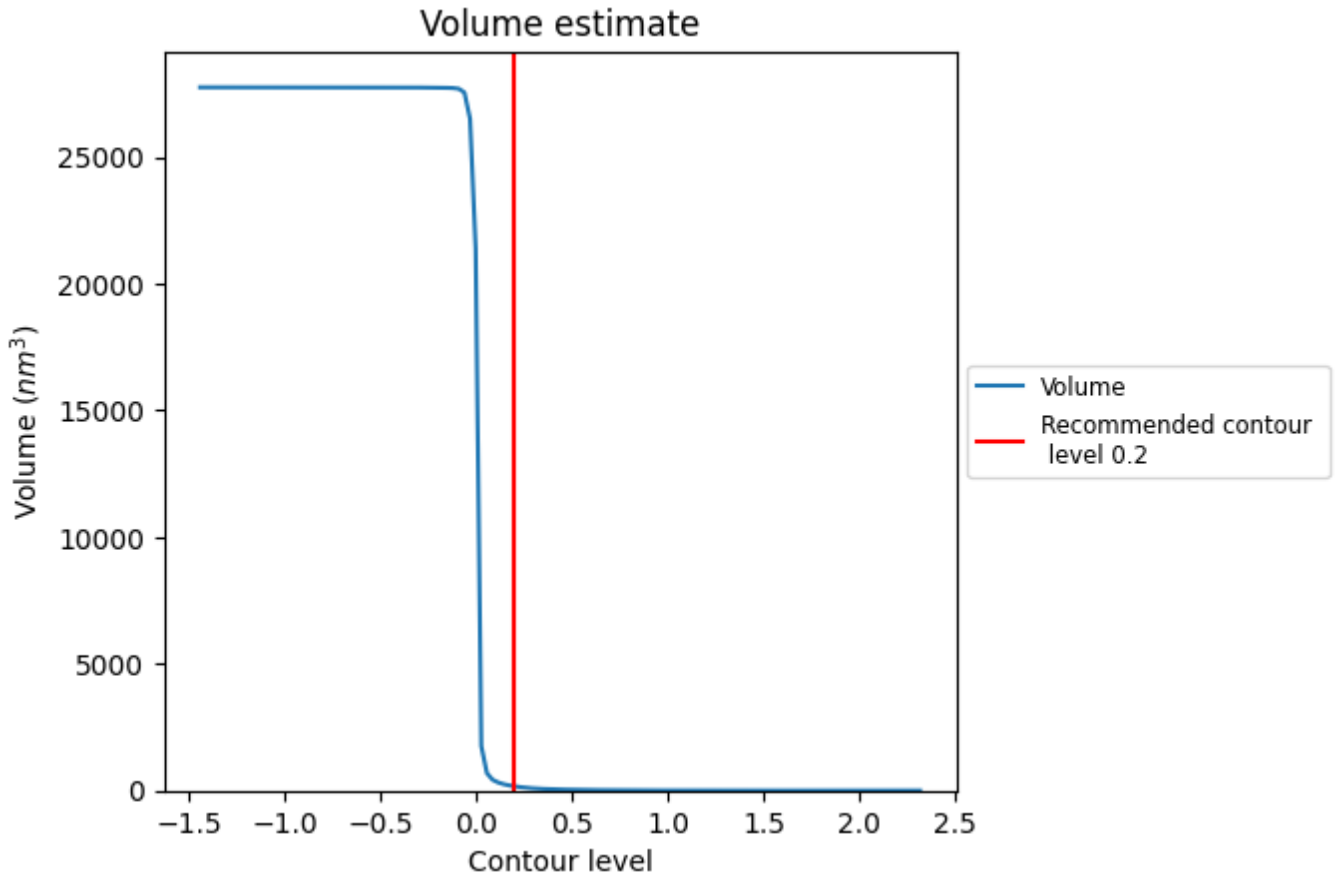
This section contains the results of statistical analysis of the map.

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.

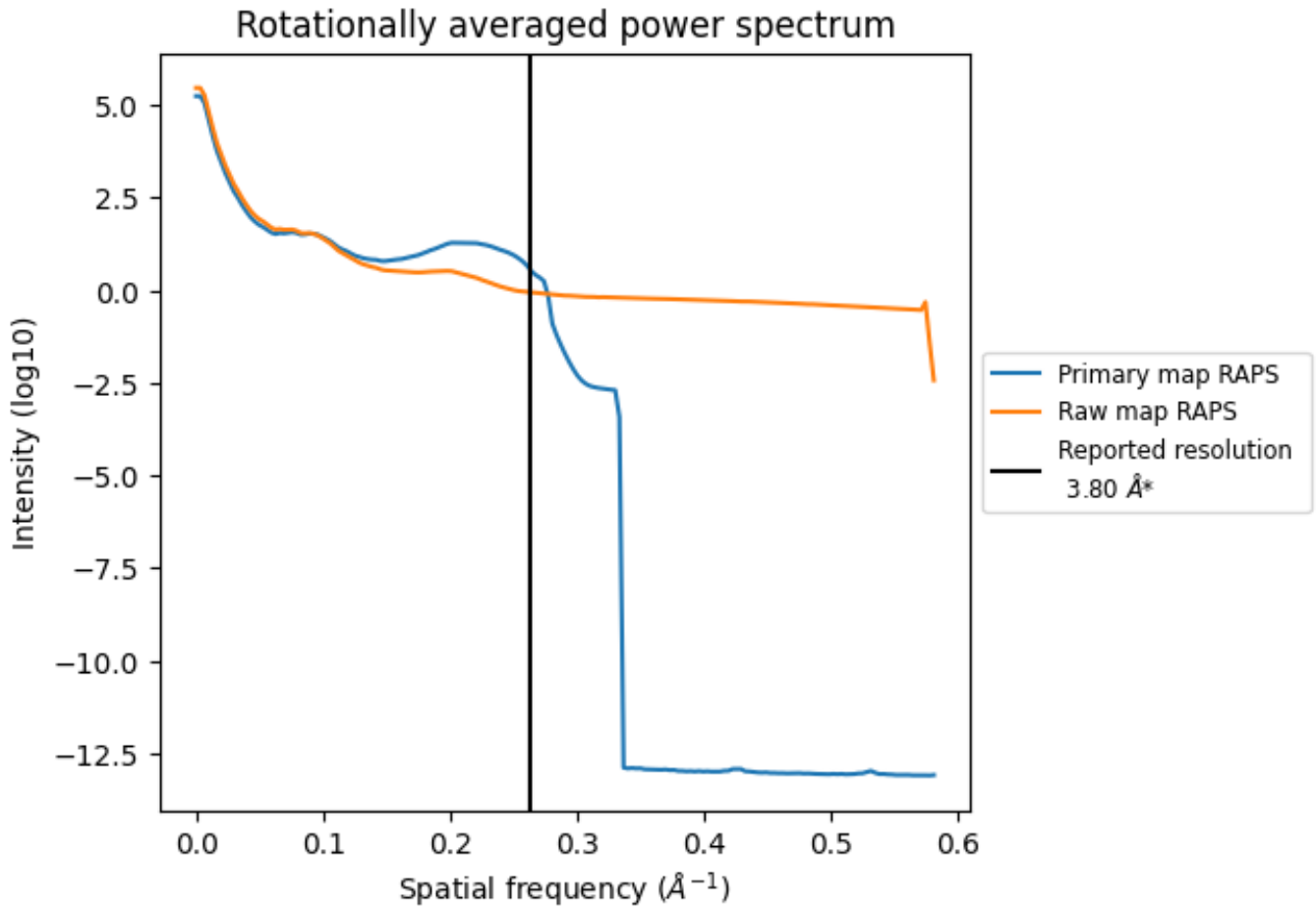
7.2 Volume estimate



The volume at the recommended contour level is 168 nm^3; this corresponds to an approximate mass of 152 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)

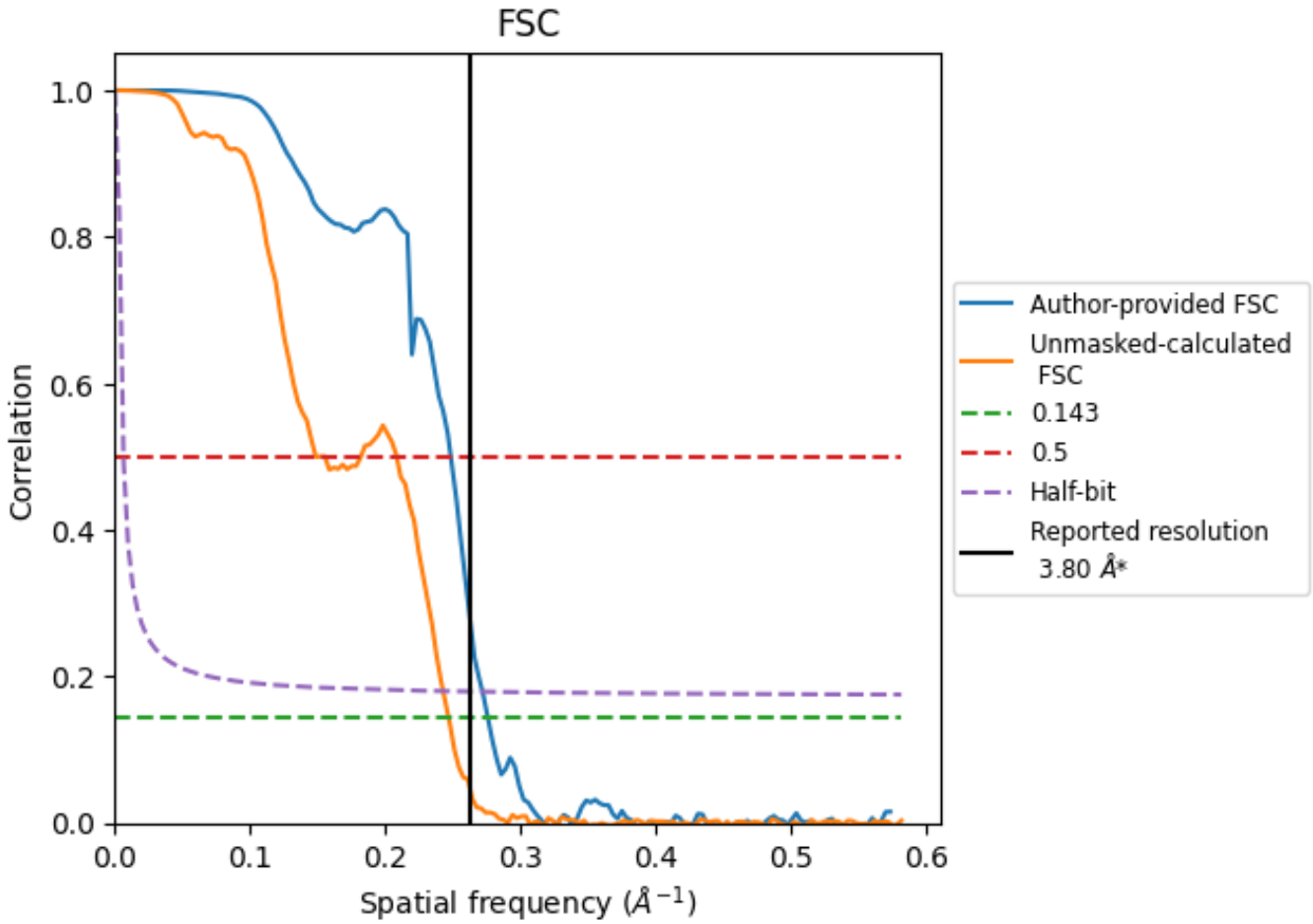


*Reported resolution corresponds to spatial frequency of 0.263 Å^{-1}

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 0.263 Å^{-1}

8.2 Resolution estimates (i)

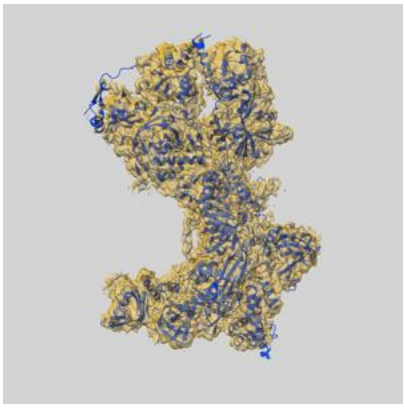
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.80	-	-
Author-provided FSC curve	3.63	4.03	3.68
Unmasked-calculated*	4.05	6.73	4.12

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

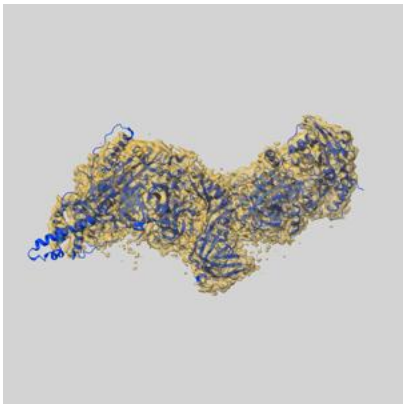
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-40659 and PDB model 8SOJ. Per-residue inclusion information can be found in section 3 on page 7.

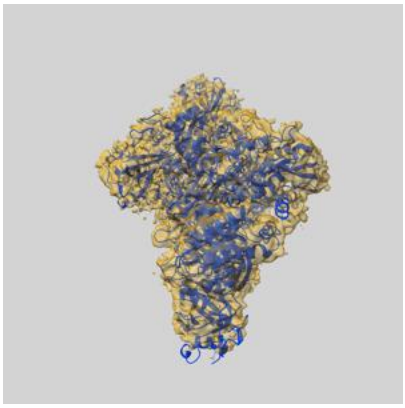
9.1 Map-model overlay



X



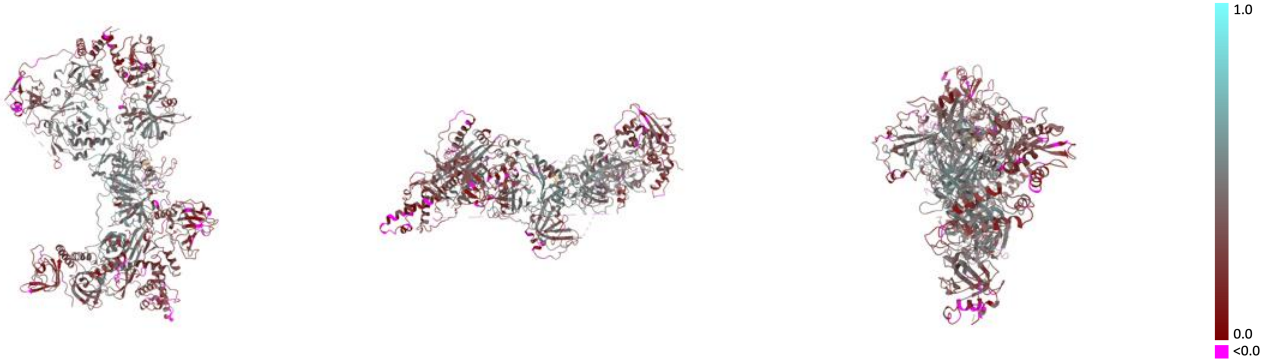
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.2 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.

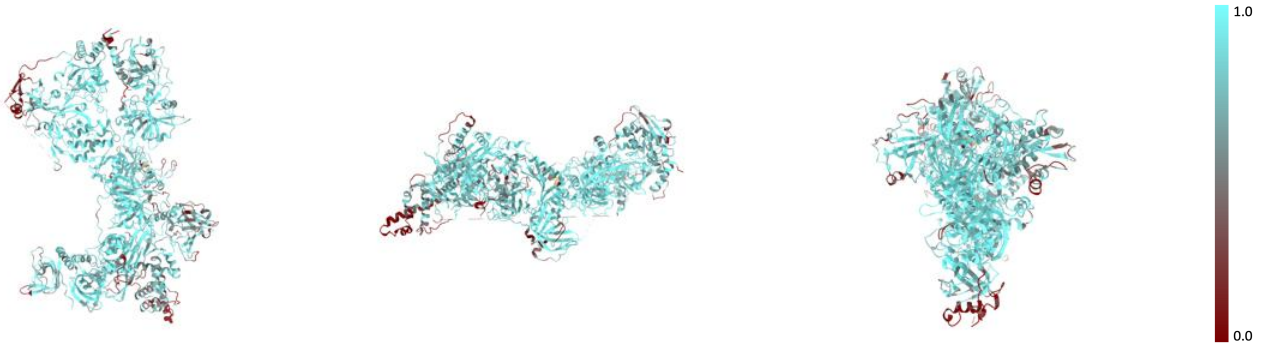
9.2 Q-score mapped to coordinate model



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.

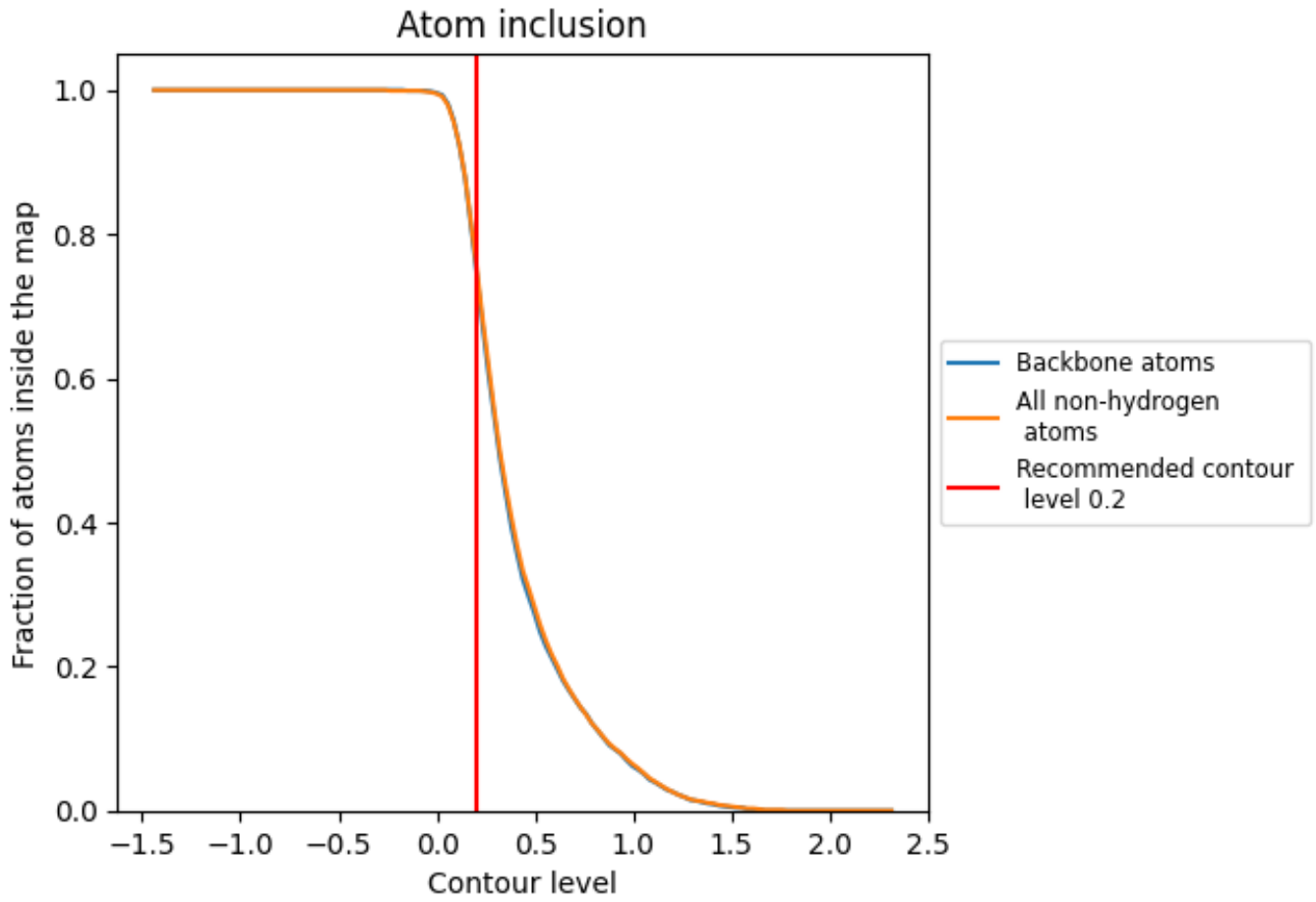
9.3 Atom inclusion mapped to coordinate model



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 (0.2).

9.4 Atom inclusion (i)



At the recommended contour level, 75% of all backbone atoms, 76% 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 (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7600	0.3400
A	0.8170	0.3940
B	0.6550	0.2660
C	0.7200	0.2070
D	0.7440	0.3100