



Full wwPDB EM Validation Report ⓘ

Sep 13, 2025 – 07:50 am BST

PDB ID : 9HPC / pdb_00009hpc
EMDB ID : EMD-52325
Title : The TMD and the LBD region of the AMPAR complex GluA3- TARP gamma2
in the apo state.
Authors : Pokharna, A.; Krieger, J.; Greger, I.
Deposited on : 2024-12-12
Resolution : 2.59 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.dev126
MolProbity : 4-5-2 with Phenix2.0rc1
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) : 2.45.1

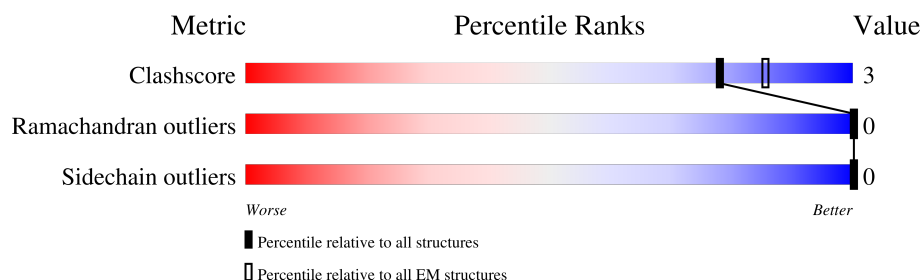
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

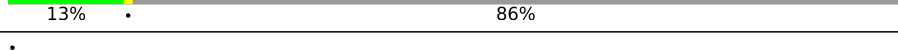
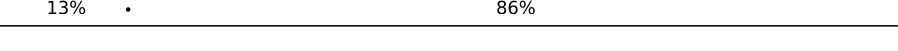
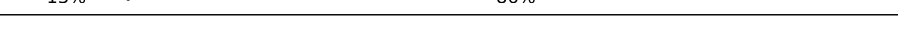
The reported resolution of this entry is 2.59 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	1179	 32% 65%
1	B	1179	 32% 65%
1	C	1179	 33% 65%
1	D	1179	 32% 65%
1	W	1179	 13% 86%
1	X	1179	 13% 86%
1	Y	1179	 13% 86%
1	Z	1179	 13% 86%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 35941 atoms, of which 17989 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 Isoform Flip of Glutamate receptor 3, Voltage-dependent calcium channel gamma-2 subunit.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	410	Total	C	H	N	O	S	0	0
			6430	2084	3226	517	584	19		
1	B	410	Total	C	H	N	O	S	0	0
			6407	2078	3213	518	579	19		
1	C	409	Total	C	H	N	O	S	0	0
			6332	2061	3168	515	569	19		
1	D	409	Total	C	H	N	O	S	0	0
			6369	2068	3191	515	576	19		
1	W	168	Total	C	H	N	O	S	0	0
			2618	865	1307	216	220	10		
1	X	167	Total	C	H	N	O	S	0	0
			2595	860	1293	215	217	10		
1	Y	167	Total	C	H	N	O	S	0	0
			2609	862	1303	215	219	10		
1	Z	167	Total	C	H	N	O	S	0	0
			2581	852	1288	215	217	9		

There are 128 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	GLY	-	expression tag	UNP P19492
A	-6	ASP	-	expression tag	UNP P19492
A	-5	TYR	-	expression tag	UNP P19492
A	-4	LYS	-	expression tag	UNP P19492
A	-3	ASP	-	expression tag	UNP P19492
A	-2	ASP	-	expression tag	UNP P19492
A	-1	ASP	-	expression tag	UNP P19492
A	0	ASP	-	expression tag	UNP P19492
A	1	LYS	-	expression tag	UNP P19492
A	439	GLY	ARG	engineered mutation	UNP P19492
A	844	GLY	-	linker	UNP P19492
A	845	GLY	-	linker	UNP P19492
A	846	SER	-	linker	UNP P19492

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Chain	Residue	Modelled	Actual	Comment	Reference
A	847	GLY	-	linker	UNP P19492
A	848	SER	-	linker	UNP P19492
A	849	GLY	-	linker	UNP P19492
B	-7	GLY	-	expression tag	UNP P19492
B	-6	ASP	-	expression tag	UNP P19492
B	-5	TYR	-	expression tag	UNP P19492
B	-4	LYS	-	expression tag	UNP P19492
B	-3	ASP	-	expression tag	UNP P19492
B	-2	ASP	-	expression tag	UNP P19492
B	-1	ASP	-	expression tag	UNP P19492
B	0	ASP	-	expression tag	UNP P19492
B	1	LYS	-	expression tag	UNP P19492
B	439	GLY	ARG	engineered mutation	UNP P19492
B	844	GLY	-	linker	UNP P19492
B	845	GLY	-	linker	UNP P19492
B	846	SER	-	linker	UNP P19492
B	847	GLY	-	linker	UNP P19492
B	848	SER	-	linker	UNP P19492
B	849	GLY	-	linker	UNP P19492
C	-7	GLY	-	expression tag	UNP P19492
C	-6	ASP	-	expression tag	UNP P19492
C	-5	TYR	-	expression tag	UNP P19492
C	-4	LYS	-	expression tag	UNP P19492
C	-3	ASP	-	expression tag	UNP P19492
C	-2	ASP	-	expression tag	UNP P19492
C	-1	ASP	-	expression tag	UNP P19492
C	0	ASP	-	expression tag	UNP P19492
C	1	LYS	-	expression tag	UNP P19492
C	439	GLY	ARG	engineered mutation	UNP P19492
C	844	GLY	-	linker	UNP P19492
C	845	GLY	-	linker	UNP P19492
C	846	SER	-	linker	UNP P19492
C	847	GLY	-	linker	UNP P19492
C	848	SER	-	linker	UNP P19492
C	849	GLY	-	linker	UNP P19492
D	-7	GLY	-	expression tag	UNP P19492
D	-6	ASP	-	expression tag	UNP P19492
D	-5	TYR	-	expression tag	UNP P19492
D	-4	LYS	-	expression tag	UNP P19492
D	-3	ASP	-	expression tag	UNP P19492
D	-2	ASP	-	expression tag	UNP P19492
D	-1	ASP	-	expression tag	UNP P19492

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Chain	Residue	Modelled	Actual	Comment	Reference
D	0	ASP	-	expression tag	UNP P19492
D	1	LYS	-	expression tag	UNP P19492
D	439	GLY	ARG	engineered mutation	UNP P19492
D	844	GLY	-	linker	UNP P19492
D	845	GLY	-	linker	UNP P19492
D	846	SER	-	linker	UNP P19492
D	847	GLY	-	linker	UNP P19492
D	848	SER	-	linker	UNP P19492
D	849	GLY	-	linker	UNP P19492
W	-855	GLY	-	expression tag	UNP P19492
W	-854	ASP	-	expression tag	UNP P19492
W	-853	TYR	-	expression tag	UNP P19492
W	-852	LYS	-	expression tag	UNP P19492
W	-851	ASP	-	expression tag	UNP P19492
W	-850	ASP	-	expression tag	UNP P19492
W	-849	ASP	-	expression tag	UNP P19492
W	-848	ASP	-	expression tag	UNP P19492
W	-847	LYS	-	expression tag	UNP P19492
W	-409	GLY	ARG	engineered mutation	UNP P19492
W	-4	GLY	-	linker	UNP P19492
W	-3	GLY	-	linker	UNP P19492
W	-2	SER	-	linker	UNP P19492
W	-1	GLY	-	linker	UNP P19492
W	0	SER	-	linker	UNP P19492
W	1	GLY	-	linker	UNP P19492
X	-855	GLY	-	expression tag	UNP P19492
X	-854	ASP	-	expression tag	UNP P19492
X	-853	TYR	-	expression tag	UNP P19492
X	-852	LYS	-	expression tag	UNP P19492
X	-851	ASP	-	expression tag	UNP P19492
X	-850	ASP	-	expression tag	UNP P19492
X	-849	ASP	-	expression tag	UNP P19492
X	-848	ASP	-	expression tag	UNP P19492
X	-847	LYS	-	expression tag	UNP P19492
X	-409	GLY	ARG	engineered mutation	UNP P19492
X	-4	GLY	-	linker	UNP P19492
X	-3	GLY	-	linker	UNP P19492
X	-2	SER	-	linker	UNP P19492
X	-1	GLY	-	linker	UNP P19492
X	0	SER	-	linker	UNP P19492
X	1	GLY	-	linker	UNP P19492
Y	-855	GLY	-	expression tag	UNP P19492

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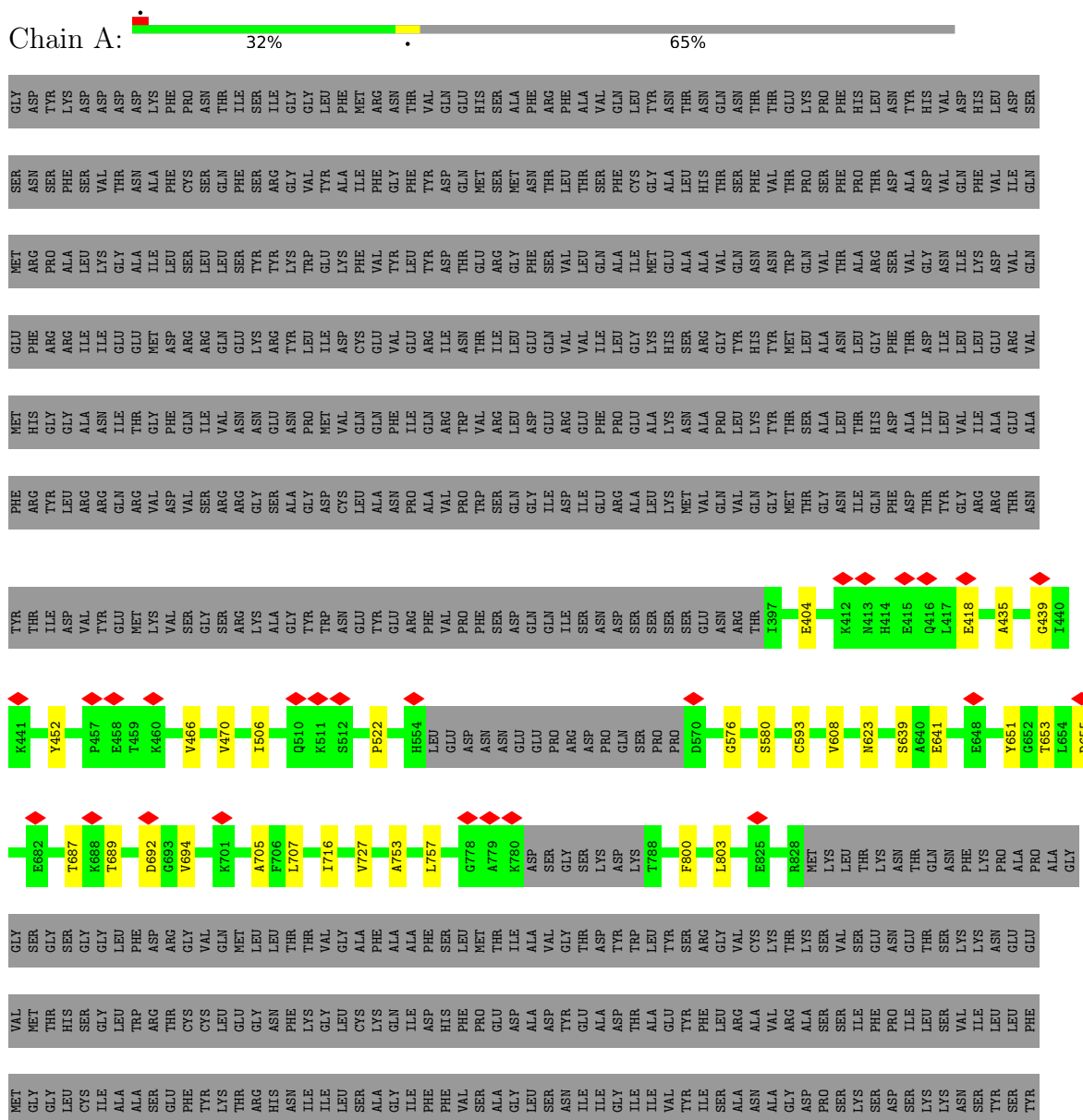
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Chain	Residue	Modelled	Actual	Comment	Reference
Y	-854	ASP	-	expression tag	UNP P19492
Y	-853	TYR	-	expression tag	UNP P19492
Y	-852	LYS	-	expression tag	UNP P19492
Y	-851	ASP	-	expression tag	UNP P19492
Y	-850	ASP	-	expression tag	UNP P19492
Y	-849	ASP	-	expression tag	UNP P19492
Y	-848	ASP	-	expression tag	UNP P19492
Y	-847	LYS	-	expression tag	UNP P19492
Y	-409	GLY	ARG	engineered mutation	UNP P19492
Y	-4	GLY	-	linker	UNP P19492
Y	-3	GLY	-	linker	UNP P19492
Y	-2	SER	-	linker	UNP P19492
Y	-1	GLY	-	linker	UNP P19492
Y	0	SER	-	linker	UNP P19492
Y	1	GLY	-	linker	UNP P19492
Z	-855	GLY	-	expression tag	UNP P19492
Z	-854	ASP	-	expression tag	UNP P19492
Z	-853	TYR	-	expression tag	UNP P19492
Z	-852	LYS	-	expression tag	UNP P19492
Z	-851	ASP	-	expression tag	UNP P19492
Z	-850	ASP	-	expression tag	UNP P19492
Z	-849	ASP	-	expression tag	UNP P19492
Z	-848	ASP	-	expression tag	UNP P19492
Z	-847	LYS	-	expression tag	UNP P19492
Z	-409	GLY	ARG	engineered mutation	UNP P19492
Z	-4	GLY	-	linker	UNP P19492
Z	-3	GLY	-	linker	UNP P19492
Z	-2	SER	-	linker	UNP P19492
Z	-1	GLY	-	linker	UNP P19492
Z	0	SER	-	linker	UNP P19492
Z	1	GLY	-	linker	UNP P19492

3 Residue-property plots

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

- Molecule 1: Isoform Flip of Glutamate receptor 3, Voltage-dependent calcium channel gamma-2 subunit



LEU
GLN
VAL
HIS
ASN
CYS
ILE
GLN
LYS
ASP
SER
LYS
ASP
SER
LEU
HIS
ALA
ASN
THR
ALA
ASN
ARG
ARG
THR
THR
PRO
VAL

- Molecule 1: Isoform Flip of Glutamate receptor 3, Voltage-dependent calcium channel gamma-2 subunit



PHE ARG TYR LEU ARG ARG GLN ARG ARG VAL ASP VAL SER ARG GLY ASP CYS LEU ALA ASN PRO ALA VAL PRO TRP SER GLN GLY ILE ASP ILE ARG ALA LEU MET VAL GLN VAL GLN GLY MET THR GLY ASN ILE GLN PHE ASP THR TYR GLY ARG ARG THR ASN

Accession	Protein	Length	Score	Significance
G439		1440	1440	Significant
D456		1457	1457	Significant
P457		1458	1458	Significant
T459		1460	1460	Significant
K460		1461	1461	Significant
V466		1470	1470	Significant
V470		1476	1476	Significant
I491		1506	1506	Significant
D521		1522	1522	Significant
P522		1554	1554	Significant
H554	LEU GLU ASP ASN ASN GLU GLU GLU ARG ASP PRO GLN SER PRO PRO PRO	1570	1570	Significant
C593		1604	1604	Significant
I604		1608	1608	Significant
N623		1623	1623	Significant
D655		1655	1655	Significant
S656		1656	1656	Significant
G657		1669	1669	Significant
A669		1680	1680	Significant
S680		1681	1681	Significant
F682		1683	1683	Significant

SER	PHE	ILE	ILE	ALA	GLU	MET	VAL	GLY	VAL	LEU	ALA	VAL	HIS	MET	PHE	ILE	ASP	HIS	ARG	LYS	GLN	LEU	ARG	ALA	THR	THR	TYR	LEU	GLN	ALA	SER	ILE	THR	ARG	ILE	PRO	TYR	SER	ARG	TYR	TYR	ARG	ARG	GLN	TYR	ARG	SER	SER	SER	ARG	SER	THR	GLU
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PRO	SER	HIS	ARG	SER	ASP	ALA	SER	PRO	VAL	GLY	VAL	LYS	GLY	PHE	ASN	THR	THR	LEU	PRO	SER	THR	THR	GLU	ILE	SER	SER	TYR	THR	LEU	LEU	ARG	ASP	PRO	LEU	LYS	ALA	ALA	THR	THR	PRO	PRO	THR	THR	ALA	THR	TYR	ASN	SER	SER	PHE	LEU	LEU	GLN	VAL	HIS	ASN	LYS	ILE	CYS	GLN	YS
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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	1774241	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	65.736	Depositor
Minimum map value	-46.676	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	10	Depositor
Map size (Å)	422.912, 422.912, 422.912	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.826, 0.826, 0.826	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	0.16	0/3279	0.26	0/4431
1	B	0.17	0/3269	0.26	0/4419
1	C	0.16	0/3239	0.25	0/4382
1	D	0.16	0/3252	0.25	0/4397
1	W	0.15	0/1341	0.22	0/1808
1	X	0.17	0/1332	0.25	0/1796
1	Y	0.17	0/1336	0.23	0/1801
1	Z	0.16	0/1322	0.23	0/1784
All	All	0.16	0/18370	0.25	0/24818

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3204	3226	3223	18	0
1	B	3194	3213	3209	19	0
1	C	3164	3168	3166	18	0
1	D	3178	3191	3188	20	0
1	W	1311	1307	1318	8	0
1	X	1302	1293	1309	7	0
1	Y	1306	1303	1313	8	0
1	Z	1293	1288	1298	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	17952	17989	18024	96	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (96) 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:D:404:GLU:OE1	1:D:452:TYR:OH	1.96	0.83
1:B:689:THR:OG1	1:B:692:ASP:OD2	2.01	0.78
1:C:401:THR:HG21	1:C:408:VAL:HG21	1.72	0.71
1:D:401:THR:HG21	1:D:408:VAL:HG21	1.70	0.71
1:Y:10:MET:SD	1:Y:200:MET:HE1	2.32	0.70
1:Z:82:HIS:O	1:Z:99:ARG:NH2	2.26	0.69
1:Y:10:MET:O	1:Y:14:THR:HG23	1.97	0.65
1:Z:31:ASP:OD2	1:Z:65:ARG:NH2	2.30	0.65
1:A:418:GLU:N	1:A:418:GLU:OE1	2.30	0.64
1:X:30:THR:OG1	1:X:179:SER:OG	2.09	0.62
1:D:655:ASP:OD1	1:D:656:SER:N	2.34	0.60
1:C:456:ASP:OD2	1:C:459:THR:HG22	2.02	0.59
1:D:498:MET:HE3	1:D:711:THR:HG21	1.84	0.59
1:B:466:VAL:O	1:B:470:VAL:HG23	2.01	0.59
1:B:655:ASP:OD1	1:B:656:SER:N	2.35	0.59
1:A:404:GLU:OE1	1:A:452:TYR:OH	2.21	0.58
1:X:14:THR:HG22	1:X:122:ILE:HG21	1.86	0.57
1:D:653:THR:HG23	1:D:678:MET:HE1	1.86	0.57
1:C:401:THR:HG22	1:C:402:ILE:H	1.70	0.56
1:C:522:PRO:O	1:C:623:ASN:ND2	2.35	0.56
1:C:456:ASP:O	1:C:460:LYS:N	2.39	0.56
1:D:653:THR:HG22	1:D:707:LEU:HB2	1.87	0.55
1:W:30:THR:OG1	1:W:179:SER:OG	2.15	0.55
1:Z:72:ASN:OD1	1:Z:73:PHE:N	2.38	0.55
1:B:522:PRO:O	1:B:623:ASN:ND2	2.35	0.55
1:A:576:GLY:O	1:A:580:SER:OG	2.18	0.53
1:B:457:PRO:O	1:B:460:LYS:NZ	2.40	0.53
1:A:522:PRO:O	1:A:623:ASN:ND2	2.41	0.53
1:B:401:THR:HG21	1:B:408:VAL:HG21	1.90	0.53
1:Y:14:THR:HG22	1:Y:122:ILE:HG21	1.89	0.52
1:C:806:GLY:HA3	1:D:608:VAL:HG11	1.92	0.52
1:Y:13:THR:HG22	1:Y:122:ILE:CD1	2.40	0.52
1:Y:30:THR:OG1	1:Y:179:SER:OG	2.19	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:608:VAL:HG11	1:D:806:GLY:HA3	1.91	0.51
1:D:401:THR:CG2	1:D:408:VAL:HG21	2.37	0.51
1:D:522:PRO:O	1:D:623:ASN:ND2	2.40	0.50
1:D:640:ALA:HB1	1:D:674:MET:HE1	1.93	0.50
1:C:574:GLU:O	1:C:579:ASN:ND2	2.44	0.50
1:B:435:ALA:O	1:B:439:GLY:N	2.45	0.49
1:C:485:LEU:HD22	1:D:756:LYS:HG2	1.95	0.49
1:D:401:THR:HG22	1:D:402:ILE:N	2.28	0.48
1:W:30:THR:HG21	1:W:178:TRP:CH2	2.47	0.48
1:A:593:CYS:SG	1:B:593:CYS:O	2.71	0.48
1:D:401:THR:HG21	1:D:408:VAL:CG2	2.40	0.48
1:X:37:ARG:NH2	1:X:56:GLU:O	2.47	0.47
1:A:653:THR:HG22	1:A:707:LEU:HB2	1.96	0.47
1:W:26:ILE:O	1:W:30:THR:HG23	2.15	0.47
1:B:401:THR:HG22	1:B:402:ILE:H	1.80	0.47
1:A:689:THR:HG23	1:A:692:ASP:H	1.80	0.47
1:W:132:HIS:CD2	1:W:208:LEU:HD11	2.50	0.47
1:A:655:ASP:N	1:A:687:THR:O	2.49	0.46
1:B:401:THR:HG22	1:B:402:ILE:N	2.31	0.46
1:C:604:ILE:O	1:C:608:VAL:HG23	2.16	0.46
1:C:505:MET:HE1	1:C:694:VAL:HG22	1.98	0.46
1:Y:13:THR:HG22	1:Y:122:ILE:HD11	1.96	0.46
1:A:694:VAL:HG21	1:A:716:ILE:HD13	1.98	0.45
1:C:647:THR:O	1:C:647:THR:HG22	2.15	0.45
1:B:476:ILE:HD12	1:B:750:VAL:HG21	1.97	0.45
1:A:435:ALA:O	1:A:439:GLY:N	2.43	0.45
1:A:466:VAL:O	1:A:470:VAL:HG23	2.16	0.45
1:C:429:ASP:OD2	1:C:770:TRP:NE1	2.42	0.45
1:A:639:SER:OG	1:A:641:GLU:OE1	2.25	0.45
1:A:753:ALA:O	1:A:757:LEU:HD13	2.17	0.45
1:D:403:LEU:HD23	1:D:446:ILE:HG21	1.98	0.45
1:C:401:THR:CG2	1:C:408:VAL:HG21	2.43	0.45
1:D:718:GLN:O	1:D:719:ARG:NH1	2.48	0.45
1:C:401:THR:HG22	1:C:402:ILE:N	2.31	0.44
1:D:825:GLU:OE1	1:D:828:ARG:NH2	2.50	0.44
1:W:132:HIS:NE2	1:W:208:LEU:HD11	2.33	0.43
1:X:57:VAL:HG11	1:X:70:GLU:O	2.19	0.43
1:B:521:ASP:N	1:B:522:PRO:CD	2.81	0.43
1:D:588:PHE:O	1:D:617:ILE:HD11	2.19	0.43
1:Z:204:ARG:O	1:Z:208:LEU:HD13	2.19	0.42
1:C:641:GLU:OE1	1:C:641:GLU:N	2.48	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:401:THR:CG2	1:B:408:VAL:HG21	2.48	0.42
1:C:690:THR:O	1:C:694:VAL:HG23	2.19	0.42
1:A:506:ILE:HD11	1:A:727:VAL:HG11	2.00	0.42
1:D:435:ALA:O	1:D:439:GLY:N	2.50	0.42
1:W:10:MET:SD	1:W:200:MET:HE3	2.60	0.42
1:X:57:VAL:O	1:X:59:THR:HG23	2.20	0.42
1:A:803:LEU:HA	1:B:608:VAL:CG1	2.50	0.42
1:C:576:GLY:O	1:C:580:SER:OG	2.32	0.42
1:B:506:ILE:HD11	1:B:727:VAL:HG11	2.01	0.41
1:B:748:THR:HB	1:B:749:PRO:HD3	2.02	0.41
1:X:30:THR:HG21	1:X:178:TRP:CH2	2.56	0.41
1:C:497:PHE:C	1:C:497:PHE:CD1	2.99	0.41
1:Z:27:ALA:O	1:Z:33:TRP:NE1	2.43	0.41
1:A:651:TYR:HA	1:A:705:ALA:O	2.21	0.41
1:B:491:ILE:HD12	1:B:739:ALA:HB1	2.03	0.41
1:A:800:PHE:HB3	1:W:154:ILE:HD13	2.03	0.40
1:B:804:VAL:HG11	1:X:151:ILE:HD11	2.03	0.40
1:Y:30:THR:HG21	1:Y:178:TRP:CH2	2.56	0.40
1:Y:14:THR:HG22	1:Y:122:ILE:CG2	2.50	0.40
1:D:796:VAL:O	1:D:799:VAL:HG12	2.21	0.40
1:W:57:VAL:O	1:W:59:THR:HG23	2.21	0.40
1:B:604:ILE:O	1:B:608:VAL:HG23	2.22	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	404/1179 (34%)	396 (98%)	8 (2%)	0	100	100
1	B	404/1179 (34%)	399 (99%)	5 (1%)	0	100	100
1	C	403/1179 (34%)	397 (98%)	6 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	403/1179 (34%)	398 (99%)	5 (1%)	0	100	100
1	W	160/1179 (14%)	158 (99%)	2 (1%)	0	100	100
1	X	159/1179 (14%)	158 (99%)	1 (1%)	0	100	100
1	Y	159/1179 (14%)	158 (99%)	1 (1%)	0	100	100
1	Z	159/1179 (14%)	158 (99%)	1 (1%)	0	100	100
All	All	2251/9432 (24%)	2222 (99%)	29 (1%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	343/1012 (34%)	343 (100%)	0	100	100
1	B	340/1012 (34%)	340 (100%)	0	100	100
1	C	333/1012 (33%)	333 (100%)	0	100	100
1	D	337/1012 (33%)	337 (100%)	0	100	100
1	W	135/1012 (13%)	135 (100%)	0	100	100
1	X	134/1012 (13%)	134 (100%)	0	100	100
1	Y	135/1012 (13%)	135 (100%)	0	100	100
1	Z	132/1012 (13%)	132 (100%)	0	100	100
All	All	1889/8096 (23%)	1889 (100%)	0	100	100

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

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	414	HIS
1	A	554	HIS
1	W	207	GLN

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Mol	Chain	Res	Type
1	X	199	HIS
1	X	205	HIS
1	Y	9	GLN
1	Z	60	HIS
1	Z	205	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 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.

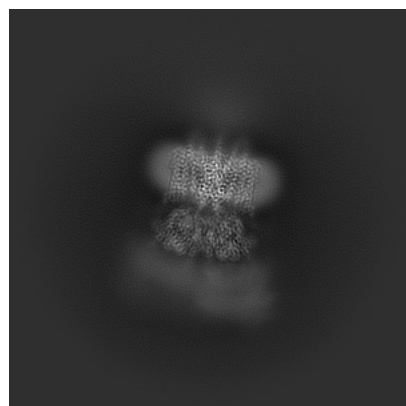
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-52325. These allow visual inspection of the internal detail of the map and identification of artifacts.

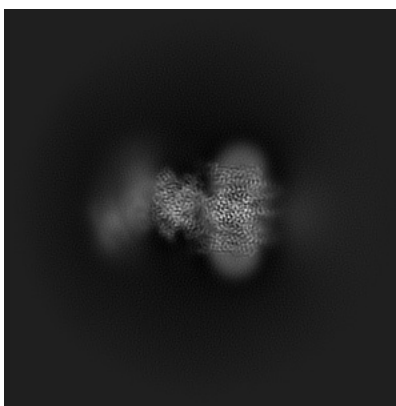
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

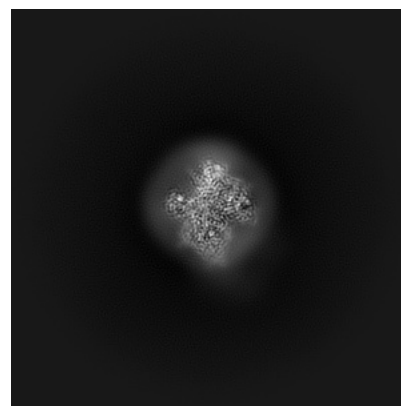
6.1.1 Primary map



X

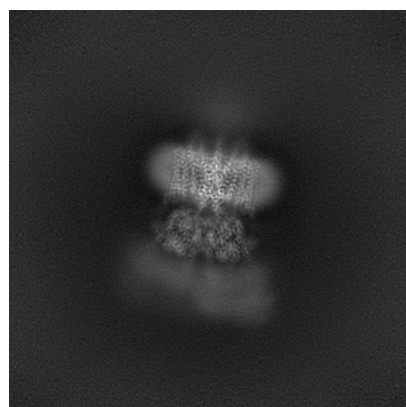


Y

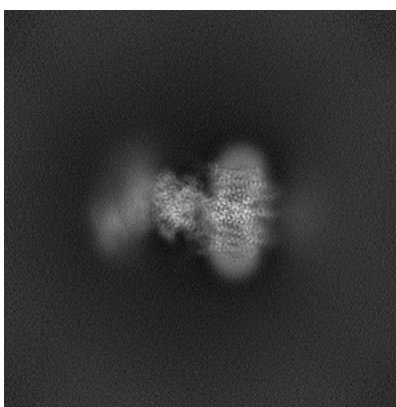


Z

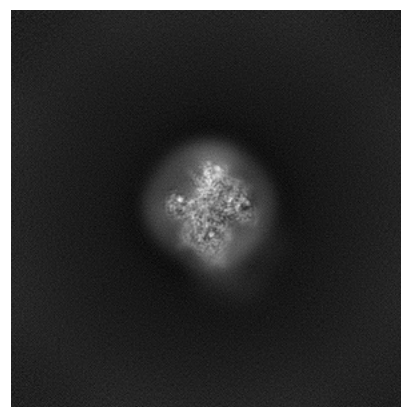
6.1.2 Raw map



X



Y

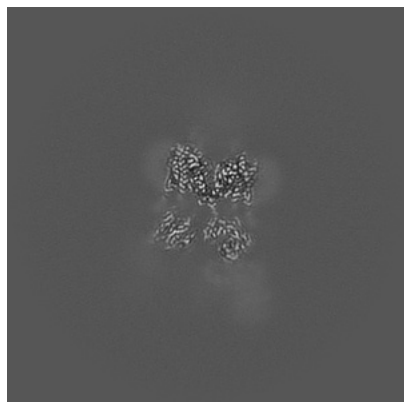


Z

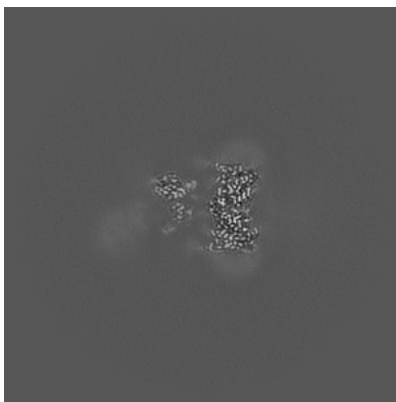
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

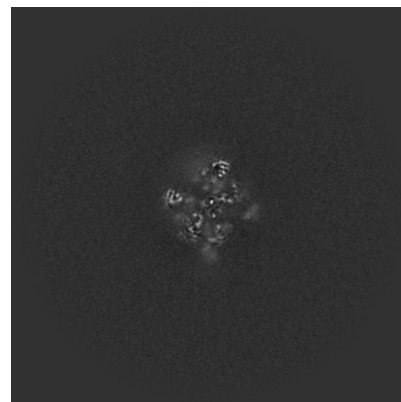
6.2.1 Primary map



X Index: 256

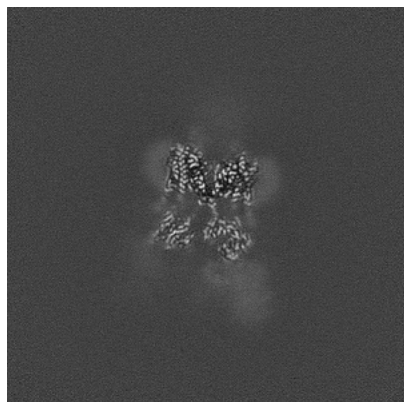


Y Index: 256

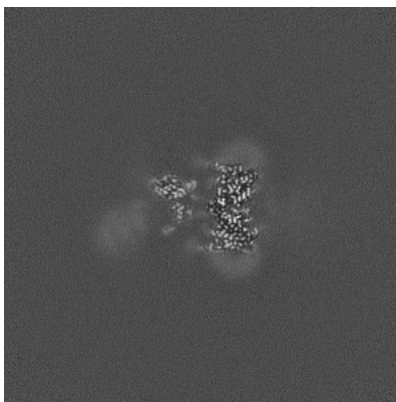


Z Index: 256

6.2.2 Raw map



X Index: 256



Y Index: 256

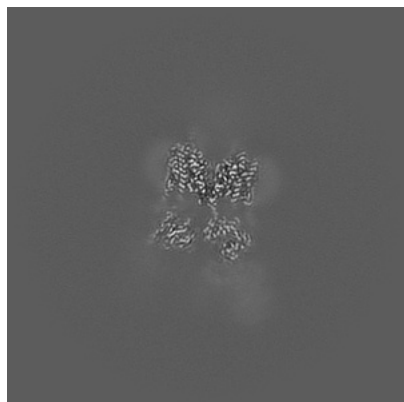


Z Index: 256

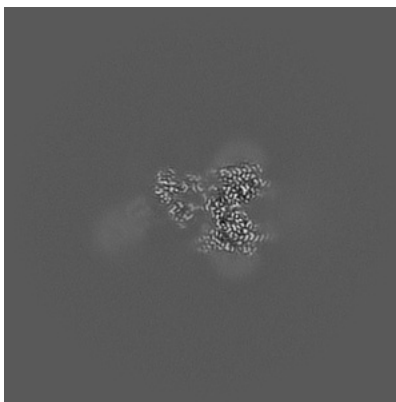
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

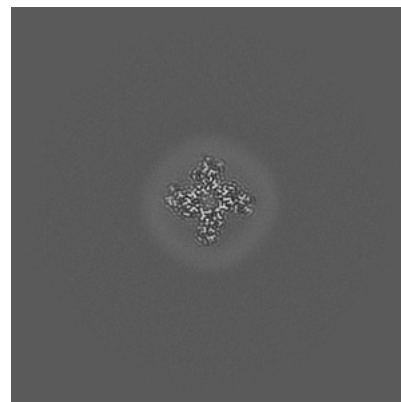
6.3.1 Primary map



X Index: 255

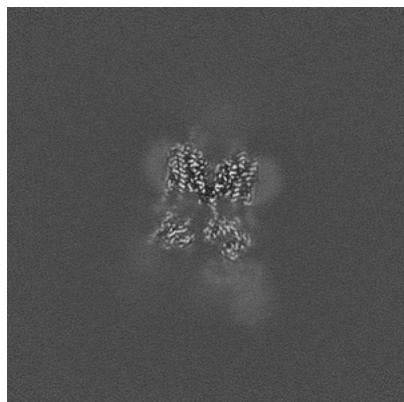


Y Index: 266

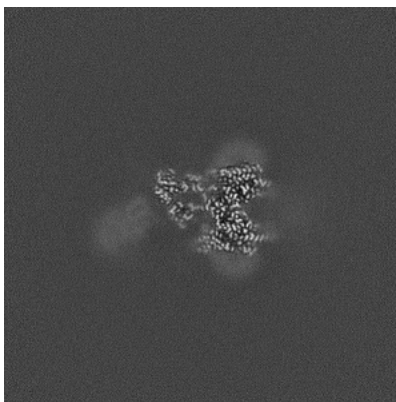


Z Index: 307

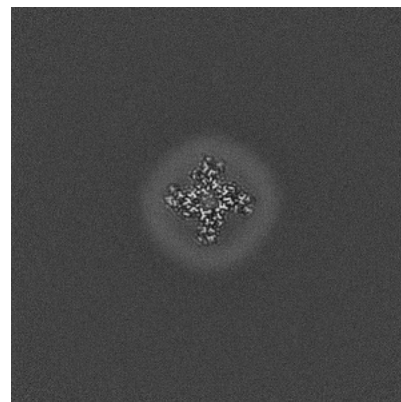
6.3.2 Raw map



X Index: 255



Y Index: 266

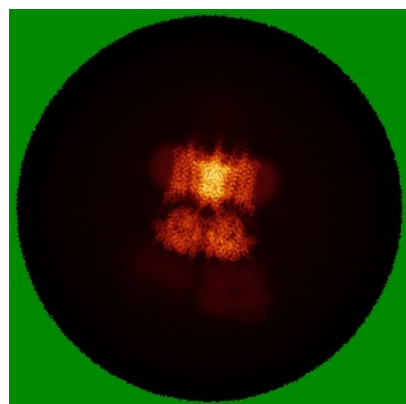


Z Index: 307

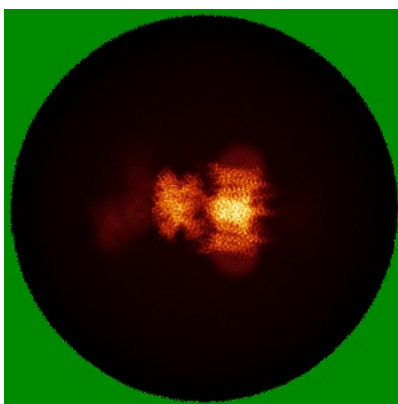
The images above show the largest variance slices of the map in three orthogonal directions.

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

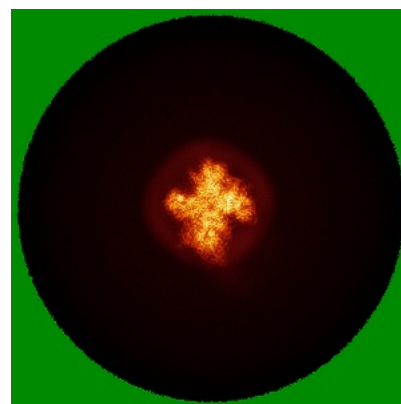
6.4.1 Primary map



X

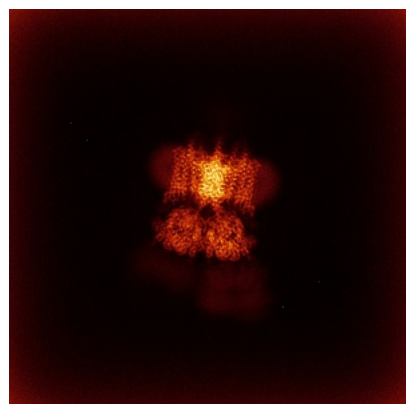


Y

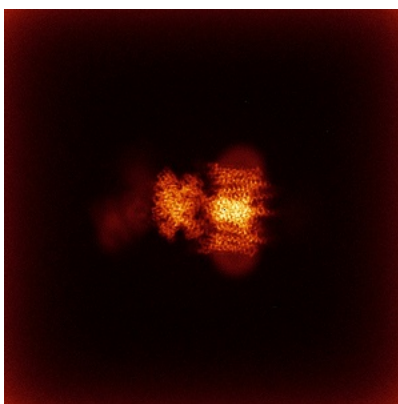


Z

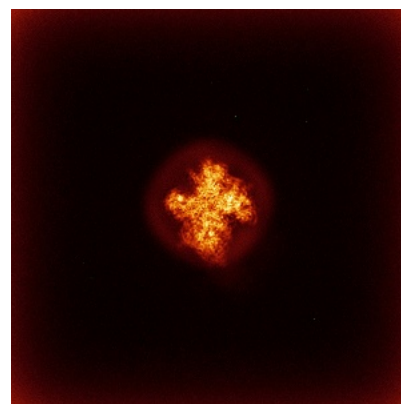
6.4.2 Raw map



X



Y

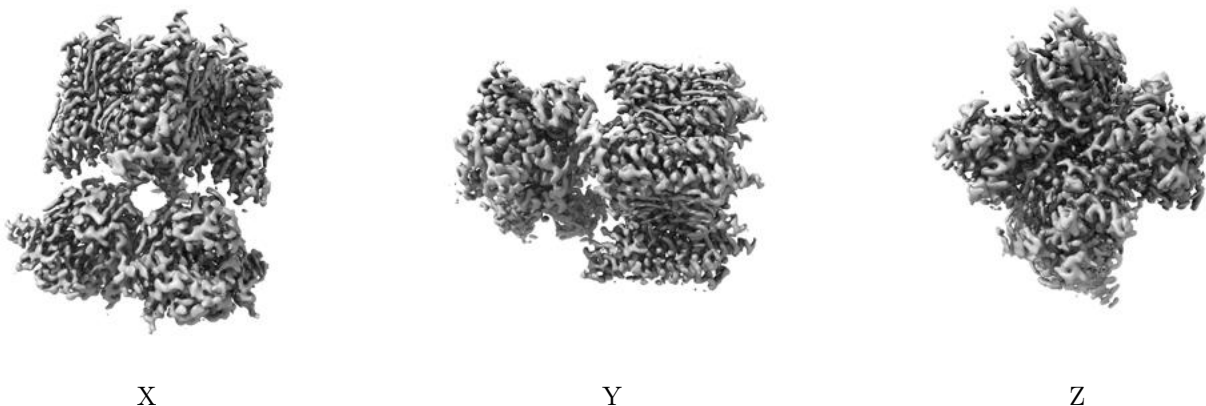


Z

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.

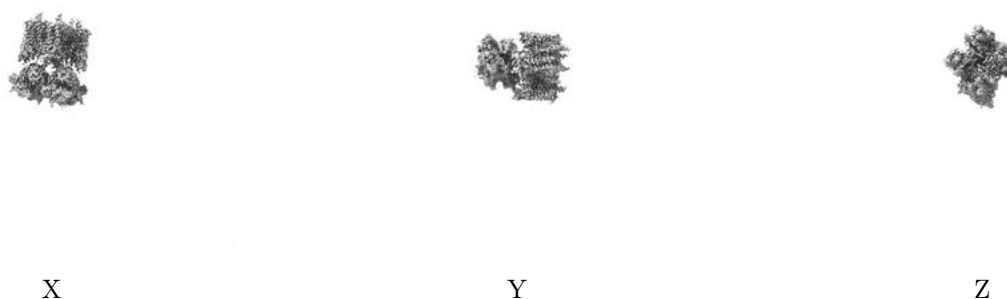
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 10.0. 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.

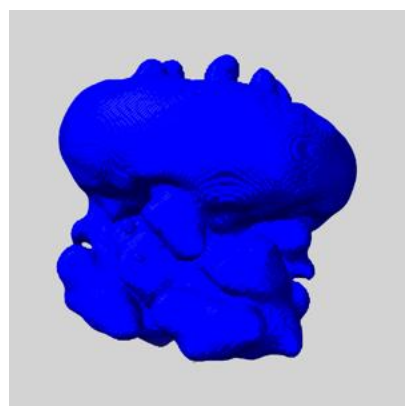
6.6 Mask visualisation [i](#)

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

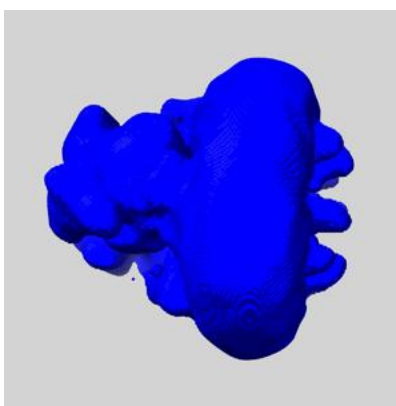
A mask typically either:

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

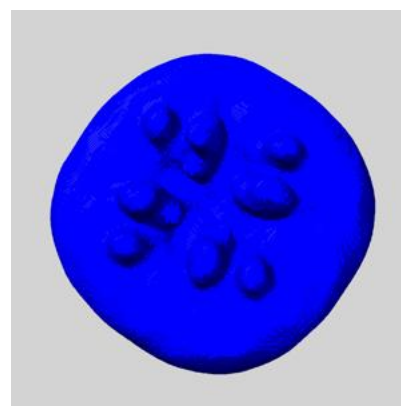
6.6.1 emd_52325_msk_1.map [i](#)



X



Y

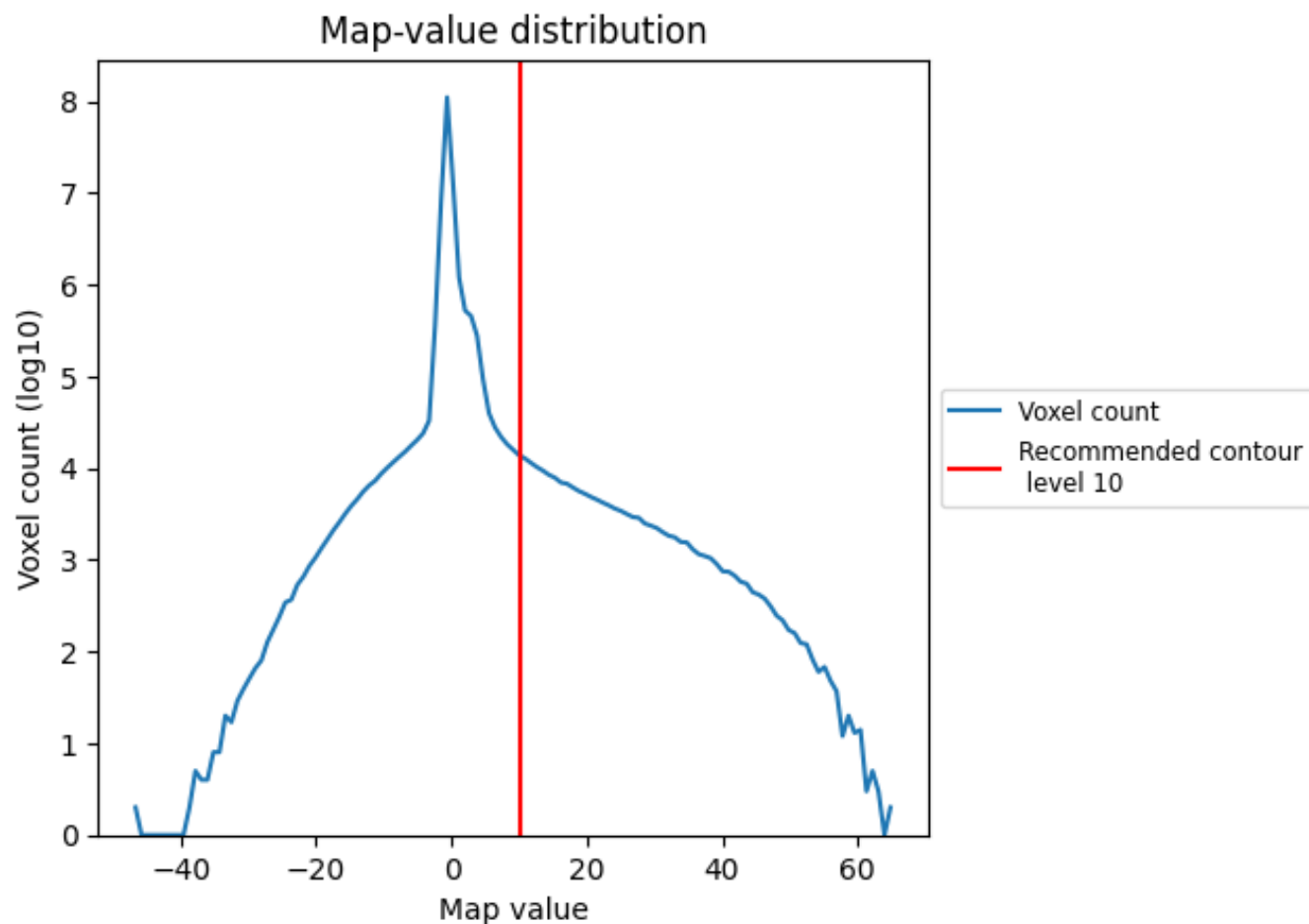


Z

7 Map analysis [i](#)

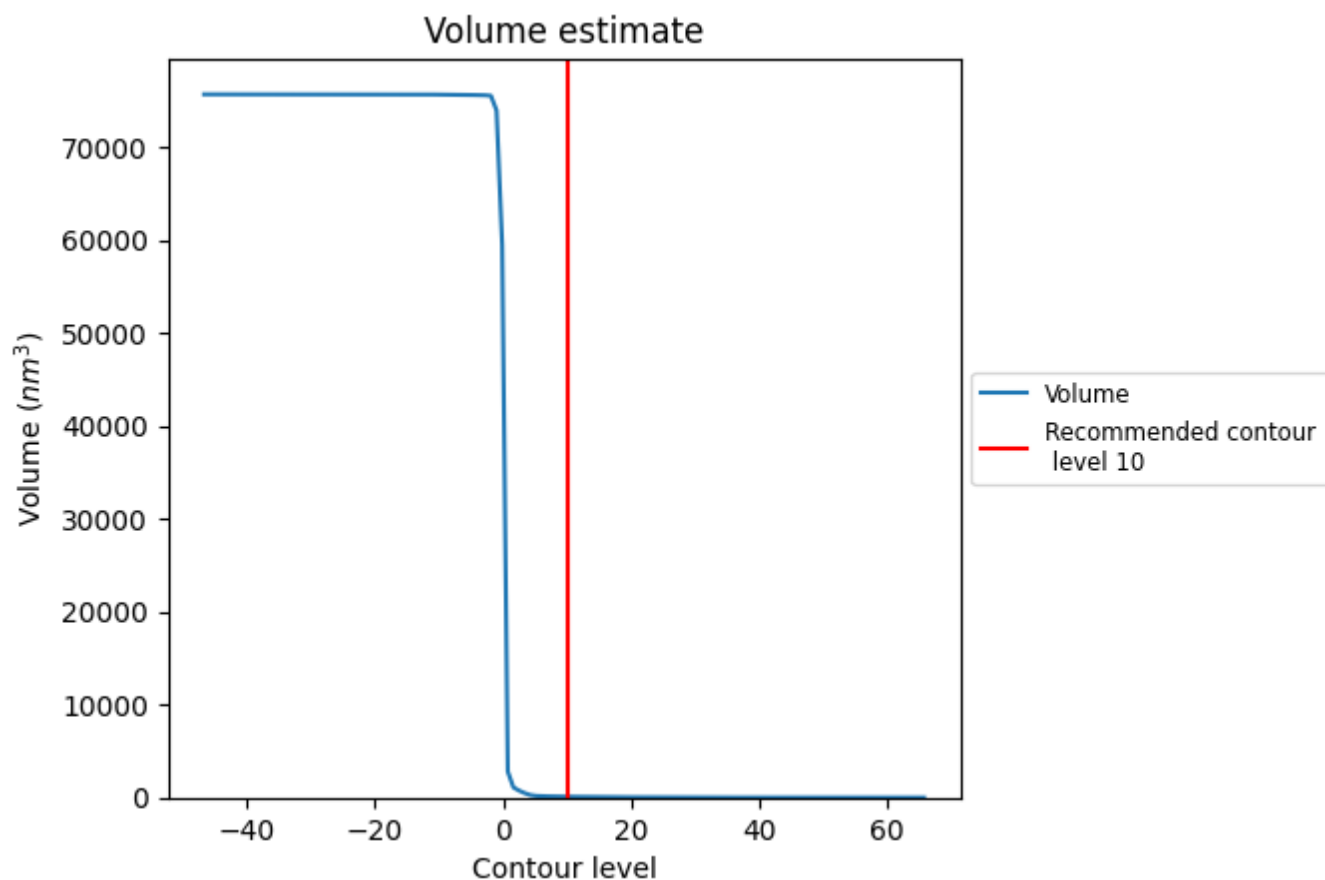
This section contains the results of statistical analysis of the map.

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.

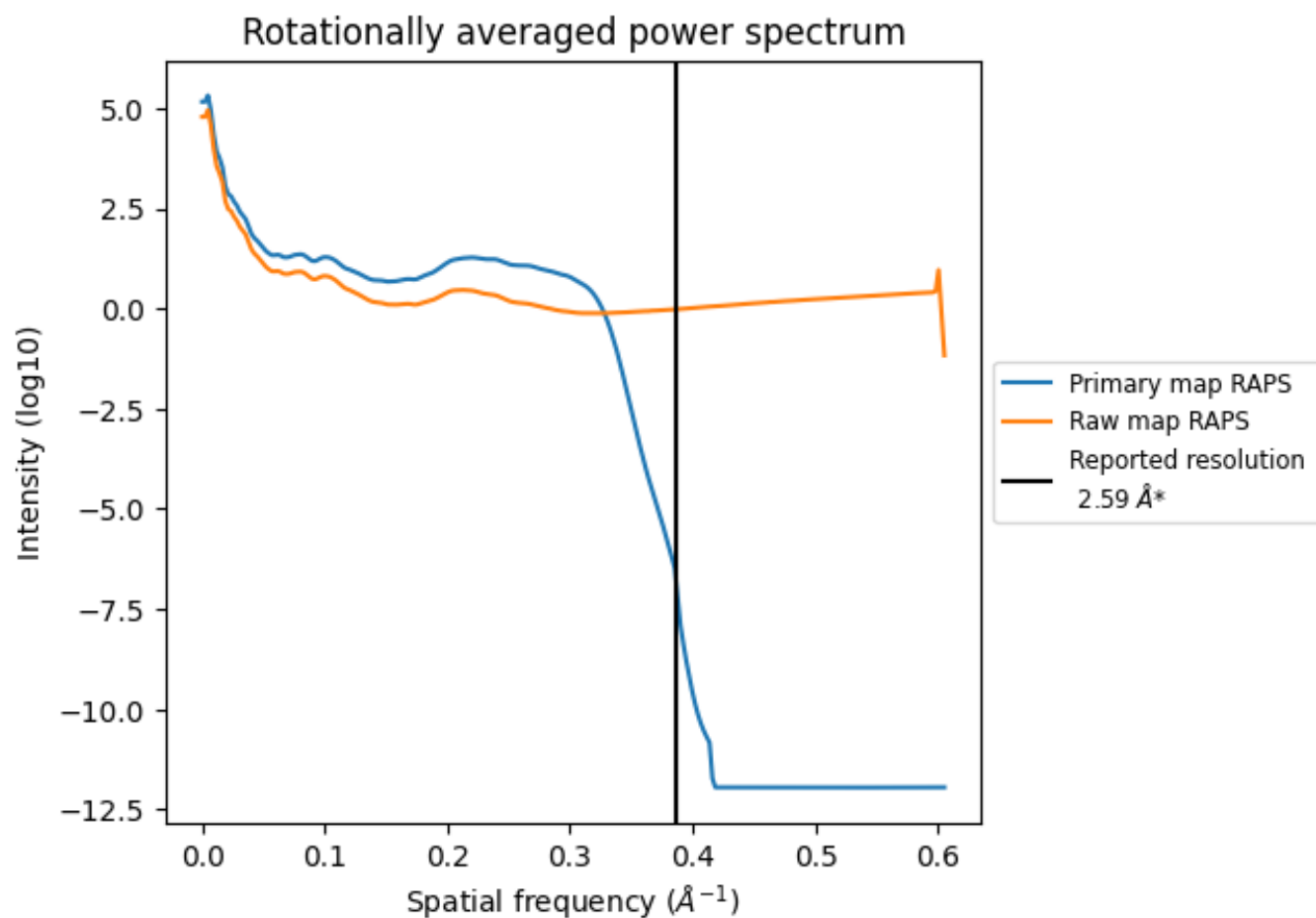
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 93 nm³; this corresponds to an approximate mass of 84 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ

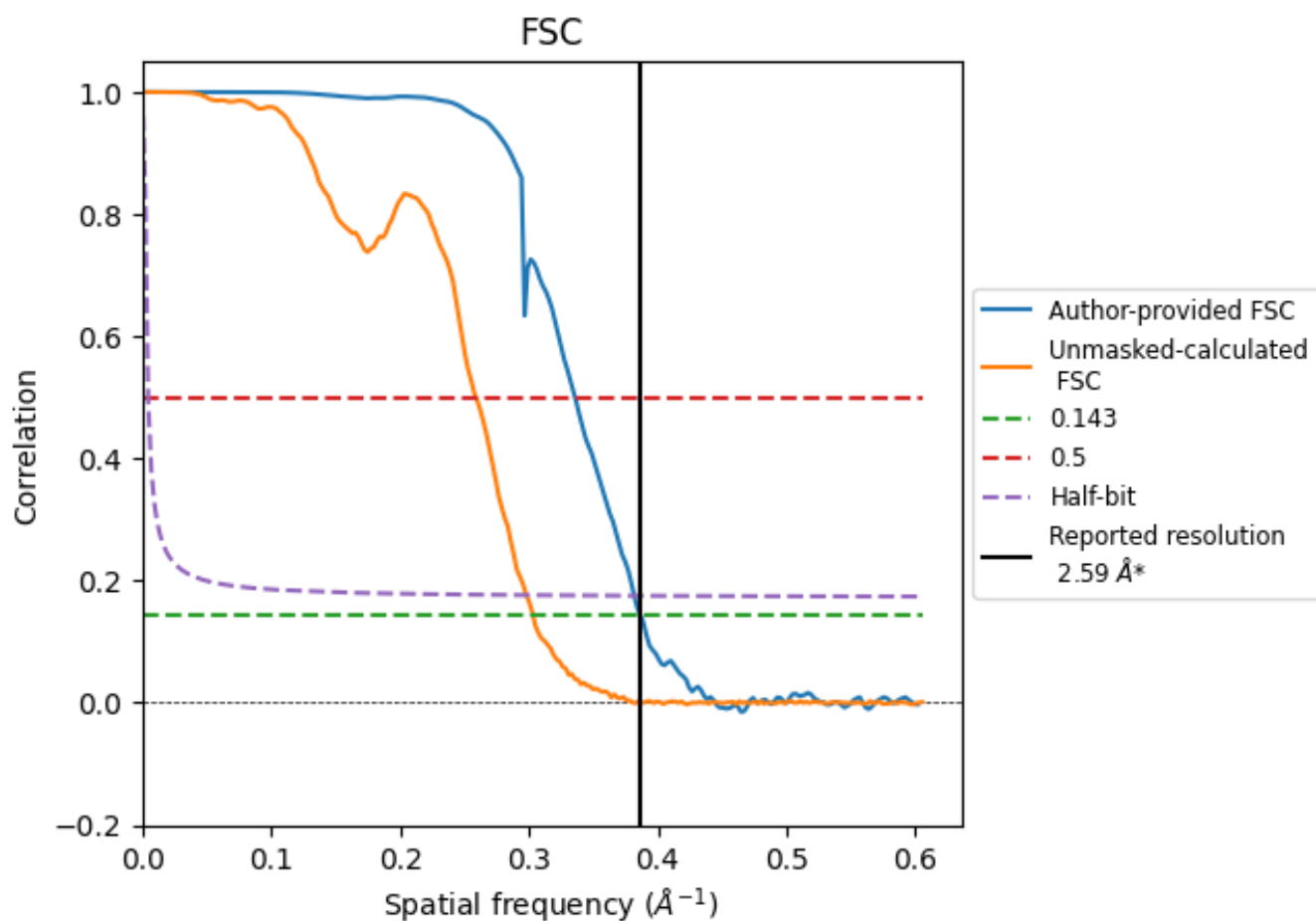


*Reported resolution corresponds to spatial frequency of 0.386 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.386 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

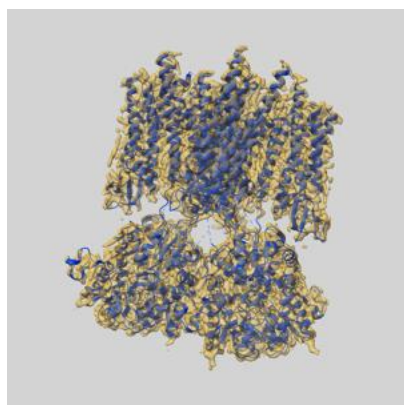
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.59	-	-
Author-provided FSC curve	2.59	2.98	2.62
Unmasked-calculated*	3.30	3.86	3.35

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.30 differs from the reported value 2.59 by more than 10 %

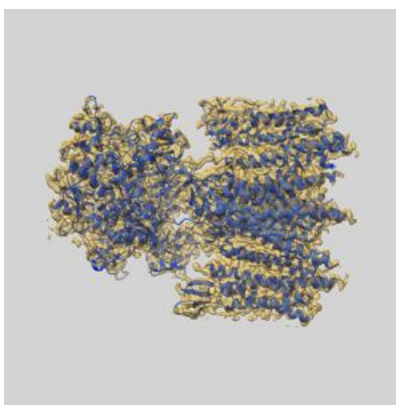
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-52325 and PDB model 9HPC. Per-residue inclusion information can be found in section [3](#) on page [7](#).

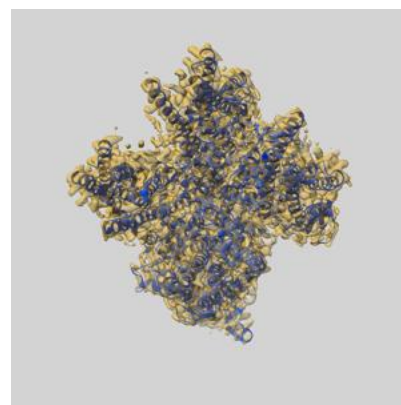
9.1 Map-model overlay [i](#)



X



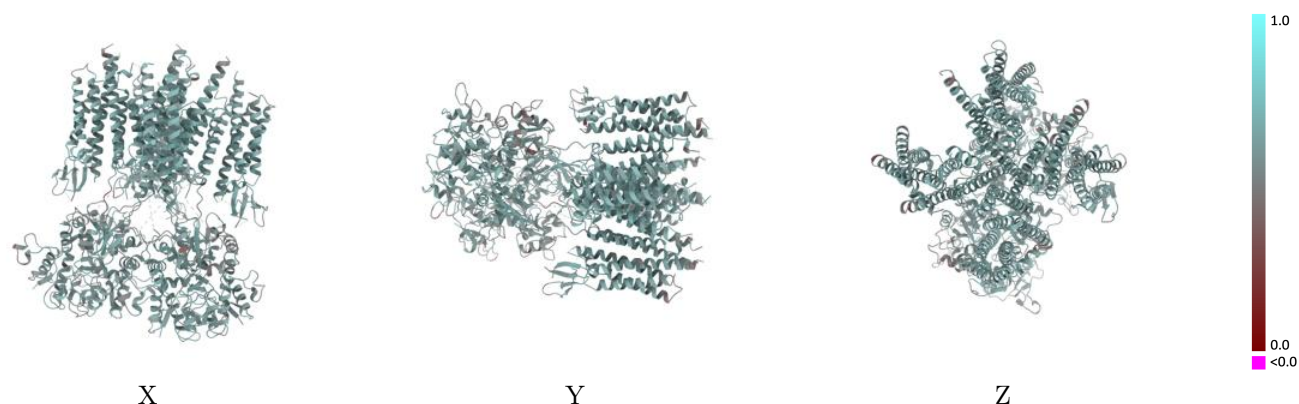
Y



Z

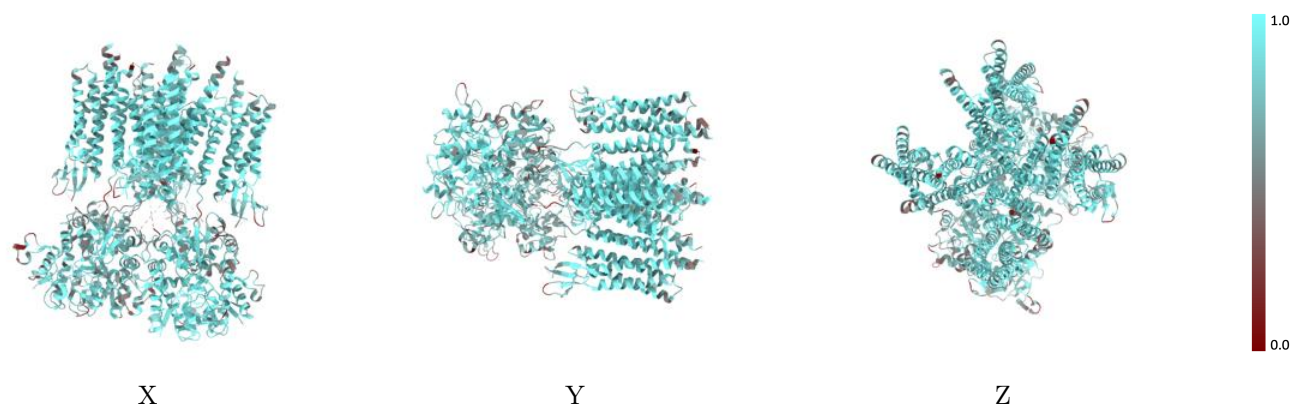
The images above show the 3D surface view of the map at the recommended contour level 10.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



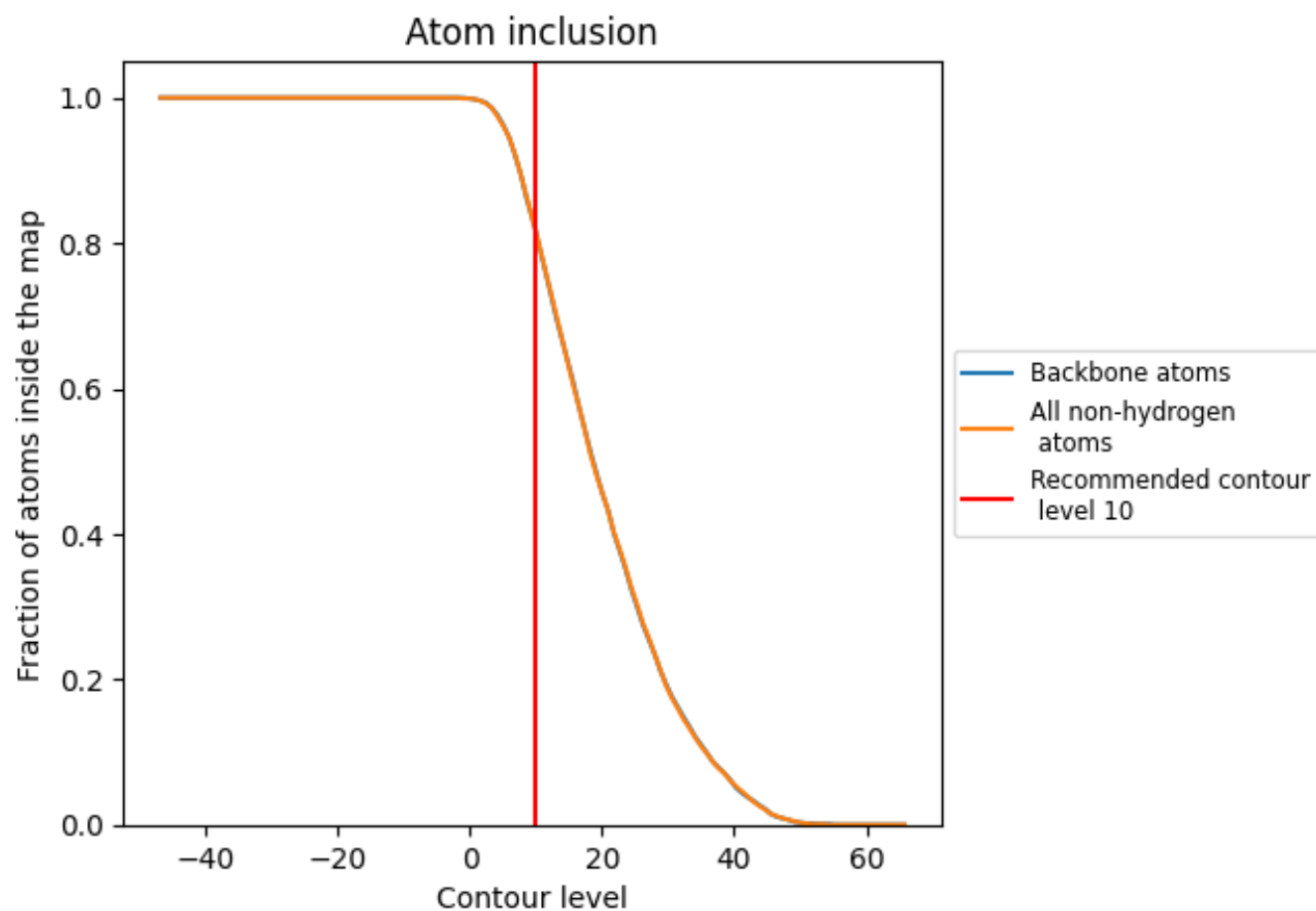
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (10).

9.4 Atom inclusion [i](#)



At the recommended contour level, 82% of all backbone atoms, 82% 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 (10) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8170	0.5870
A	0.8000	0.5820
B	0.7960	0.5790
C	0.8470	0.5930
D	0.8310	0.5840
W	0.8260	0.5980
X	0.8340	0.5890
Y	0.8400	0.5970
Z	0.8390	0.5900

1.0

0.0

<0.0