Full wwPDB EM Validation Report ⓘ

Mar 23, 2025 – 12:33 AM JST

PDB ID	:	9KC9
EMDB ID	:	EMD-62246
Title	:	Cryo-EM structure of docked mouse bestrophin-1 in a partial open state
Authors	:	Lim, H.H.; Kim, K.W.; Ko, A.
Deposited on	:	2024-11-01
Resolution	:	3.10 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:

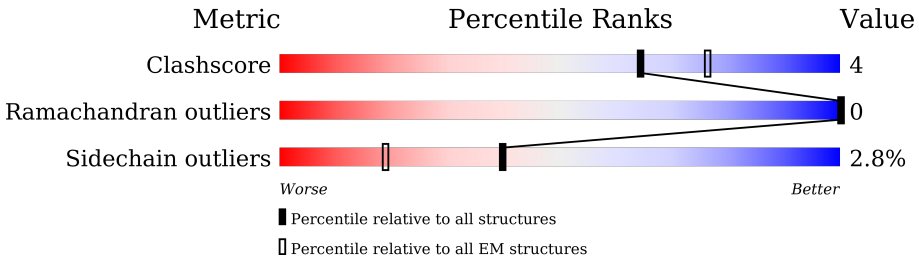
EMDB validation analysis	:	0.0.1.dev117
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.4

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 3.10 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 <=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	689	47% 6% 47%
1	B	689	47% 6% 47%
1	C	689	47% 6% 47%
1	D	689	46% 6% 47%
1	E	689	46% 7% 47%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 15005 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 Bestrophin-1,Soluble cytochrome b562.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	365	Total 2998	C 1968	N 496	O 518	S 16	0	0
1	E	365	Total 2998	C 1968	N 496	O 518	S 16	0	0
1	B	365	Total 2998	C 1968	N 496	O 518	S 16	0	0
1	C	365	Total 2998	C 1968	N 496	O 518	S 16	0	0
1	D	365	Total 2998	C 1968	N 496	O 518	S 16	0	0

There are 175 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	552	THR	-	linker	UNP O88870
A	553	GLY	-	linker	UNP O88870
A	554	LEU	-	linker	UNP O88870
A	555	GLU	-	linker	UNP O88870
A	556	VAL	-	linker	UNP O88870
A	557	LEU	-	linker	UNP O88870
A	558	PHE	-	linker	UNP O88870
A	559	GLN	-	linker	UNP O88870
A	560	GLY	-	linker	UNP O88870
A	561	PRO	-	linker	UNP O88870
A	568	TRP	MET	engineered mutation	UNP P0ABE7
A	663	ILE	HIS	engineered mutation	UNP P0ABE7
A	667	LEU	ARG	engineered mutation	UNP P0ABE7
A	668	ASP	-	expression tag	UNP P0ABE7
A	669	TYR	-	expression tag	UNP P0ABE7
A	670	LYS	-	expression tag	UNP P0ABE7
A	671	ASP	-	expression tag	UNP P0ABE7
A	672	HIS	-	expression tag	UNP P0ABE7
A	673	ASP	-	expression tag	UNP P0ABE7
A	674	GLY	-	expression tag	UNP P0ABE7

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Chain	Residue	Modelled	Actual	Comment	Reference
A	675	ASP	-	expression tag	UNP P0ABE7
A	676	TYR	-	expression tag	UNP P0ABE7
A	677	LYS	-	expression tag	UNP P0ABE7
A	678	ASP	-	expression tag	UNP P0ABE7
A	679	HIS	-	expression tag	UNP P0ABE7
A	680	ASP	-	expression tag	UNP P0ABE7
A	681	ILE	-	expression tag	UNP P0ABE7
A	682	ASP	-	expression tag	UNP P0ABE7
A	683	TYR	-	expression tag	UNP P0ABE7
A	684	LYS	-	expression tag	UNP P0ABE7
A	685	ASP	-	expression tag	UNP P0ABE7
A	686	ASP	-	expression tag	UNP P0ABE7
A	687	ASP	-	expression tag	UNP P0ABE7
A	688	ASP	-	expression tag	UNP P0ABE7
A	689	LYS	-	expression tag	UNP P0ABE7
E	552	THR	-	linker	UNP O88870
E	553	GLY	-	linker	UNP O88870
E	554	LEU	-	linker	UNP O88870
E	555	GLU	-	linker	UNP O88870
E	556	VAL	-	linker	UNP O88870
E	557	LEU	-	linker	UNP O88870
E	558	PHE	-	linker	UNP O88870
E	559	GLN	-	linker	UNP O88870
E	560	GLY	-	linker	UNP O88870
E	561	PRO	-	linker	UNP O88870
E	568	TRP	MET	engineered mutation	UNP P0ABE7
E	663	ILE	HIS	engineered mutation	UNP P0ABE7
E	667	LEU	ARG	engineered mutation	UNP P0ABE7
E	668	ASP	-	expression tag	UNP P0ABE7
E	669	TYR	-	expression tag	UNP P0ABE7
E	670	LYS	-	expression tag	UNP P0ABE7
E	671	ASP	-	expression tag	UNP P0ABE7
E	672	HIS	-	expression tag	UNP P0ABE7
E	673	ASP	-	expression tag	UNP P0ABE7
E	674	GLY	-	expression tag	UNP P0ABE7
E	675	ASP	-	expression tag	UNP P0ABE7
E	676	TYR	-	expression tag	UNP P0ABE7
E	677	LYS	-	expression tag	UNP P0ABE7
E	678	ASP	-	expression tag	UNP P0ABE7
E	679	HIS	-	expression tag	UNP P0ABE7
E	680	ASP	-	expression tag	UNP P0ABE7
E	681	ILE	-	expression tag	UNP P0ABE7

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Chain	Residue	Modelled	Actual	Comment	Reference
E	682	ASP	-	expression tag	UNP P0ABE7
E	683	TYR	-	expression tag	UNP P0ABE7
E	684	LYS	-	expression tag	UNP P0ABE7
E	685	ASP	-	expression tag	UNP P0ABE7
E	686	ASP	-	expression tag	UNP P0ABE7
E	687	ASP	-	expression tag	UNP P0ABE7
E	688	ASP	-	expression tag	UNP P0ABE7
E	689	LYS	-	expression tag	UNP P0ABE7
B	552	THR	-	linker	UNP O88870
B	553	GLY	-	linker	UNP O88870
B	554	LEU	-	linker	UNP O88870
B	555	GLU	-	linker	UNP O88870
B	556	VAL	-	linker	UNP O88870
B	557	LEU	-	linker	UNP O88870
B	558	PHE	-	linker	UNP O88870
B	559	GLN	-	linker	UNP O88870
B	560	GLY	-	linker	UNP O88870
B	561	PRO	-	linker	UNP O88870
B	568	TRP	MET	engineered mutation	UNP P0ABE7
B	663	ILE	HIS	engineered mutation	UNP P0ABE7
B	667	LEU	ARG	engineered mutation	UNP P0ABE7
B	668	ASP	-	expression tag	UNP P0ABE7
B	669	TYR	-	expression tag	UNP P0ABE7
B	670	LYS	-	expression tag	UNP P0ABE7
B	671	ASP	-	expression tag	UNP P0ABE7
B	672	HIS	-	expression tag	UNP P0ABE7
B	673	ASP	-	expression tag	UNP P0ABE7
B	674	GLY	-	expression tag	UNP P0ABE7
B	675	ASP	-	expression tag	UNP P0ABE7
B	676	TYR	-	expression tag	UNP P0ABE7
B	677	LYS	-	expression tag	UNP P0ABE7
B	678	ASP	-	expression tag	UNP P0ABE7
B	679	HIS	-	expression tag	UNP P0ABE7
B	680	ASP	-	expression tag	UNP P0ABE7
B	681	ILE	-	expression tag	UNP P0ABE7
B	682	ASP	-	expression tag	UNP P0ABE7
B	683	TYR	-	expression tag	UNP P0ABE7
B	684	LYS	-	expression tag	UNP P0ABE7
B	685	ASP	-	expression tag	UNP P0ABE7
B	686	ASP	-	expression tag	UNP P0ABE7
B	687	ASP	-	expression tag	UNP P0ABE7
B	688	ASP	-	expression tag	UNP P0ABE7

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Chain	Residue	Modelled	Actual	Comment	Reference
B	689	LYS	-	expression tag	UNP P0ABE7
C	552	THR	-	linker	UNP O88870
C	553	GLY	-	linker	UNP O88870
C	554	LEU	-	linker	UNP O88870
C	555	GLU	-	linker	UNP O88870
C	556	VAL	-	linker	UNP O88870
C	557	LEU	-	linker	UNP O88870
C	558	PHE	-	linker	UNP O88870
C	559	GLN	-	linker	UNP O88870
C	560	GLY	-	linker	UNP O88870
C	561	PRO	-	linker	UNP O88870
C	568	TRP	MET	engineered mutation	UNP P0ABE7
C	663	ILE	HIS	engineered mutation	UNP P0ABE7
C	667	LEU	ARG	engineered mutation	UNP P0ABE7
C	668	ASP	-	expression tag	UNP P0ABE7
C	669	TYR	-	expression tag	UNP P0ABE7
C	670	LYS	-	expression tag	UNP P0ABE7
C	671	ASP	-	expression tag	UNP P0ABE7
C	672	HIS	-	expression tag	UNP P0ABE7
C	673	ASP	-	expression tag	UNP P0ABE7
C	674	GLY	-	expression tag	UNP P0ABE7
C	675	ASP	-	expression tag	UNP P0ABE7
C	676	TYR	-	expression tag	UNP P0ABE7
C	677	LYS	-	expression tag	UNP P0ABE7
C	678	ASP	-	expression tag	UNP P0ABE7
C	679	HIS	-	expression tag	UNP P0ABE7
C	680	ASP	-	expression tag	UNP P0ABE7
C	681	ILE	-	expression tag	UNP P0ABE7
C	682	ASP	-	expression tag	UNP P0ABE7
C	683	TYR	-	expression tag	UNP P0ABE7
C	684	LYS	-	expression tag	UNP P0ABE7
C	685	ASP	-	expression tag	UNP P0ABE7
C	686	ASP	-	expression tag	UNP P0ABE7
C	687	ASP	-	expression tag	UNP P0ABE7
C	688	ASP	-	expression tag	UNP P0ABE7
C	689	LYS	-	expression tag	UNP P0ABE7
D	552	THR	-	linker	UNP O88870
D	553	GLY	-	linker	UNP O88870
D	554	LEU	-	linker	UNP O88870
D	555	GLU	-	linker	UNP O88870
D	556	VAL	-	linker	UNP O88870
D	557	LEU	-	linker	UNP O88870

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Chain	Residue	Modelled	Actual	Comment	Reference
D	558	PHE	-	linker	UNP O88870
D	559	GLN	-	linker	UNP O88870
D	560	GLY	-	linker	UNP O88870
D	561	PRO	-	linker	UNP O88870
D	568	TRP	MET	engineered mutation	UNP P0ABE7
D	663	ILE	HIS	engineered mutation	UNP P0ABE7
D	667	LEU	ARG	engineered mutation	UNP P0ABE7
D	668	ASP	-	expression tag	UNP P0ABE7
D	669	TYR	-	expression tag	UNP P0ABE7
D	670	LYS	-	expression tag	UNP P0ABE7
D	671	ASP	-	expression tag	UNP P0ABE7
D	672	HIS	-	expression tag	UNP P0ABE7
D	673	ASP	-	expression tag	UNP P0ABE7
D	674	GLY	-	expression tag	UNP P0ABE7
D	675	ASP	-	expression tag	UNP P0ABE7
D	676	TYR	-	expression tag	UNP P0ABE7
D	677	LYS	-	expression tag	UNP P0ABE7
D	678	ASP	-	expression tag	UNP P0ABE7
D	679	HIS	-	expression tag	UNP P0ABE7
D	680	ASP	-	expression tag	UNP P0ABE7
D	681	ILE	-	expression tag	UNP P0ABE7
D	682	ASP	-	expression tag	UNP P0ABE7
D	683	TYR	-	expression tag	UNP P0ABE7
D	684	LYS	-	expression tag	UNP P0ABE7
D	685	ASP	-	expression tag	UNP P0ABE7
D	686	ASP	-	expression tag	UNP P0ABE7
D	687	ASP	-	expression tag	UNP P0ABE7
D	688	ASP	-	expression tag	UNP P0ABE7
D	689	LYS	-	expression tag	UNP P0ABE7

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms	AltConf
2	A	1	Total Ca 1 1	0
2	E	1	Total Ca 1 1	0
2	B	1	Total Ca 1 1	0
2	C	1	Total Ca 1 1	0

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Mol	Chain	Residues	Atoms	AltConf
2	D	1	Total Ca 1 1	0

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

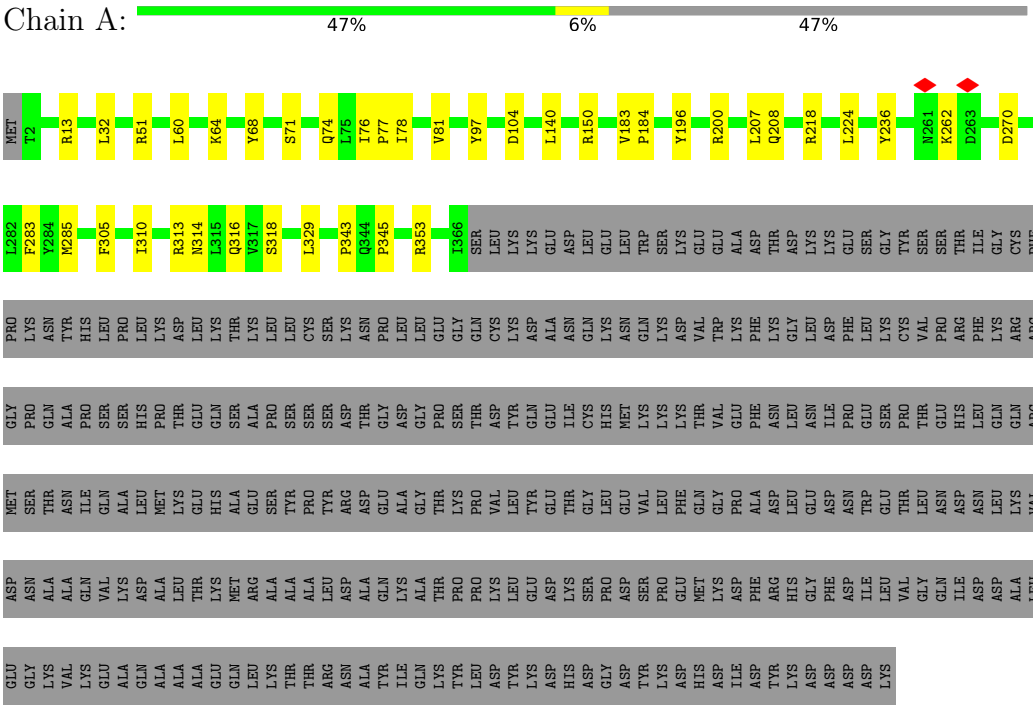
Mol	Chain	Residues	Atoms	AltConf
3	A	2	Total Cl 2 2	0
3	E	2	Total Cl 2 2	0
3	B	2	Total Cl 2 2	0
3	C	2	Total Cl 2 2	0
3	D	2	Total Cl 2 2	0

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.

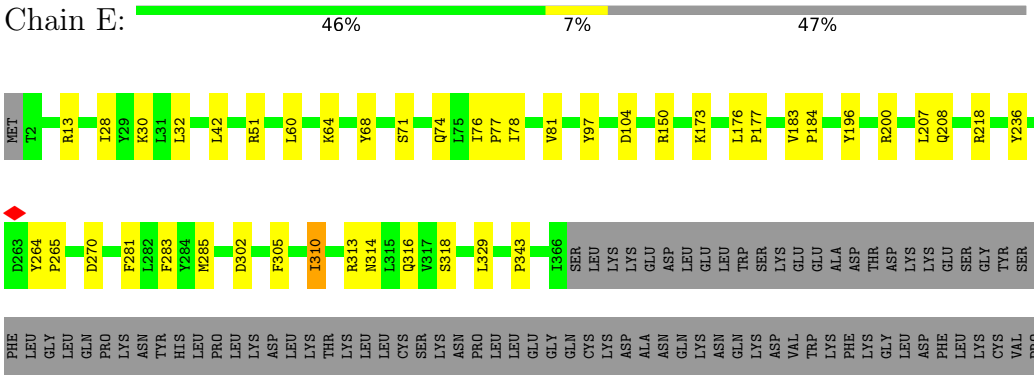
• Molecule 1: Bestrophin-1,Soluble cytochrome b562

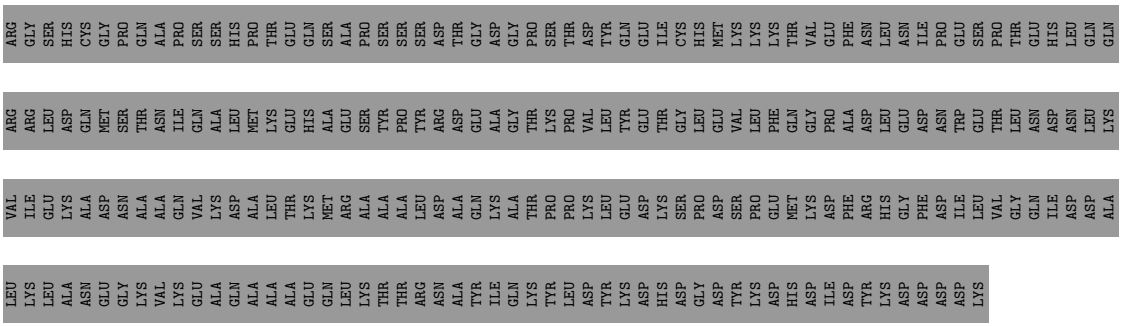
Chain A:



• Molecule 1: Bestrophin-1,Soluble cytochrome b562

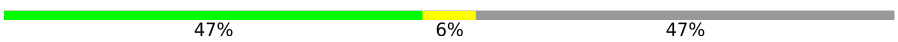
Chain E:

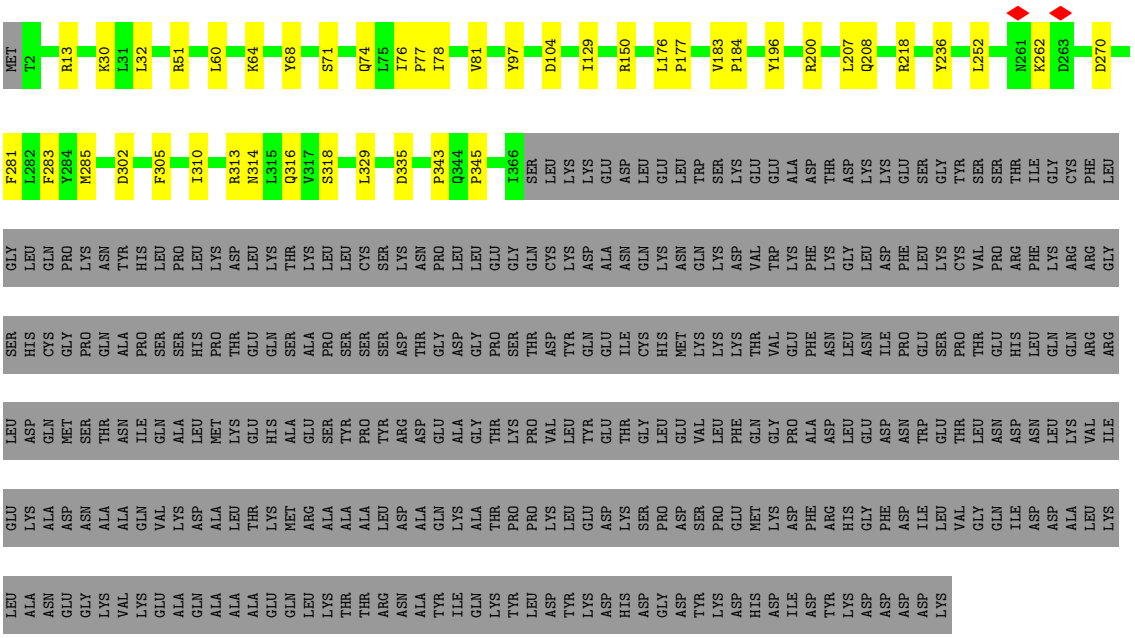




• Molecule 1: Bestrophin-1,Soluble cytochrome b562

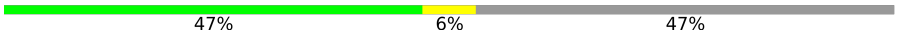
Chain B:

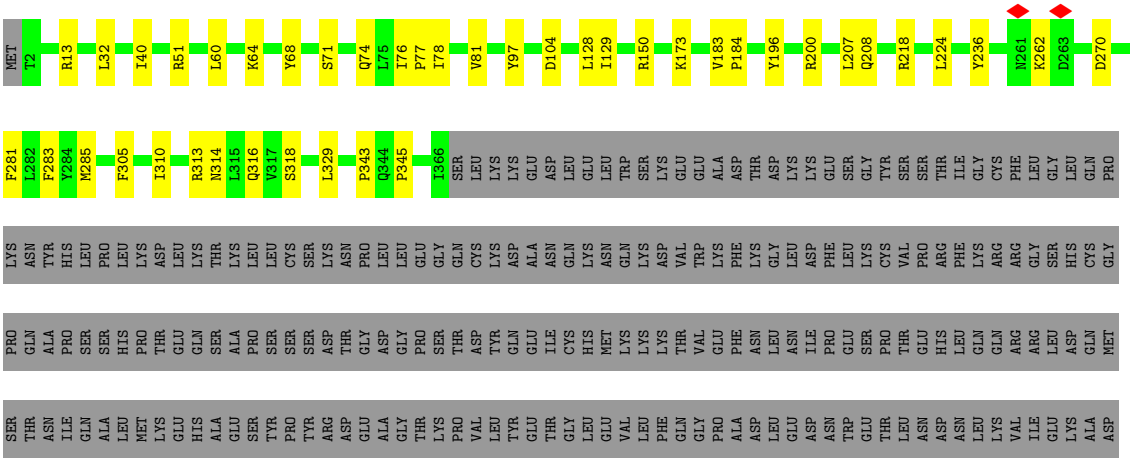


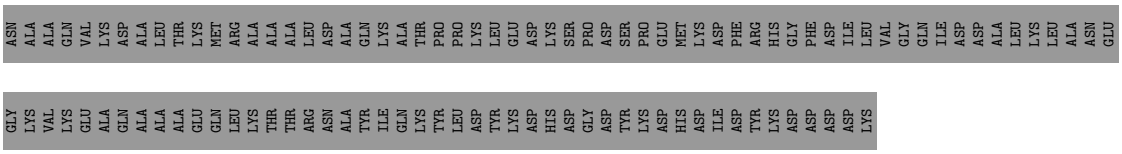


• Molecule 1: Bestrophin-1,Soluble cytochrome b562

Chain C:

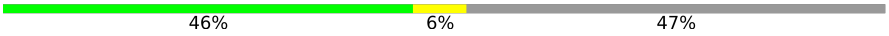


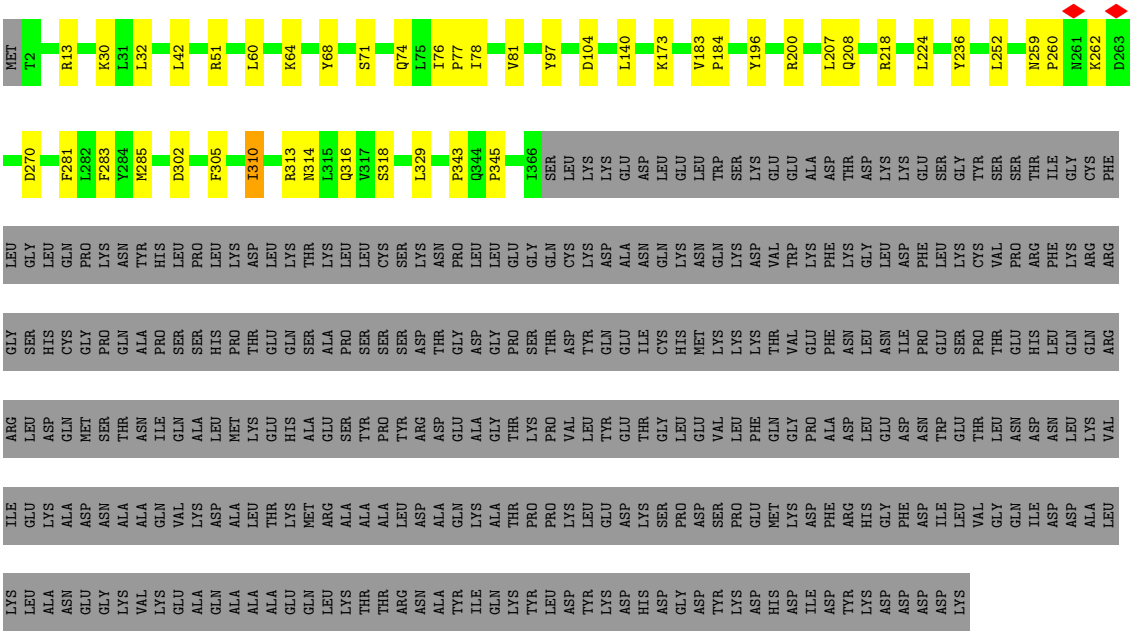




• Molecule 1: Bestrophin-1,Soluble cytochrome b562

Chain D:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	97720	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/Å^2$)	40	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2750	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	8.376	Depositor
Minimum map value	-4.970	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.246	Depositor
Recommended contour level	0.5	Depositor
Map size (Å)	261.0, 261.0, 261.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.87, 0.87, 0.87	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.27	0/3086	0.48	0/4202
1	B	0.27	0/3086	0.48	0/4202
1	C	0.27	0/3086	0.48	0/4202
1	D	0.27	0/3086	0.48	0/4202
1	E	0.27	0/3086	0.48	0/4202
All	All	0.27	0/15430	0.48	0/21010

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

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	2998	0	2979	26	0
1	B	2998	0	2979	27	0
1	C	2998	0	2979	27	0
1	D	2998	0	2979	28	0
1	E	2998	0	2979	28	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	1	0	0	0	0
2	E	1	0	0	0	0
3	A	2	0	0	2	0
3	B	2	0	0	2	0
3	C	2	0	0	2	0
3	D	2	0	0	2	0
3	E	2	0	0	2	0
All	All	15005	0	14895	117	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 4.

All (117) 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:C:76:ILE:O	1:C:78:ILE:N	2.24	0.71
1:B:76:ILE:O	1:B:78:ILE:N	2.24	0.70
1:E:218:ARG:NH1	3:E:703:CL:CL	2.62	0.70
1:B:68:TYR:OH	3:B:702:CL:CL	2.47	0.70
1:C:68:TYR:OH	3:C:702:CL:CL	2.47	0.70
1:D:218:ARG:NH1	3:D:703:CL:CL	2.62	0.70
1:C:218:ARG:NH1	3:C:703:CL:CL	2.62	0.69
1:A:218:ARG:NH1	3:A:703:CL:CL	2.62	0.69
1:B:218:ARG:NH1	3:B:703:CL:CL	2.62	0.69
1:A:68:TYR:OH	3:A:702:CL:CL	2.47	0.68
1:E:68:TYR:OH	3:E:702:CL:CL	2.47	0.68
1:D:68:TYR:OH	3:D:702:CL:CL	2.47	0.67
1:E:76:ILE:O	1:E:78:ILE:N	2.24	0.67
1:A:76:ILE:O	1:A:78:ILE:N	2.24	0.66
1:B:51:ARG:NH2	1:B:270:ASP:OD2	2.29	0.66
1:D:76:ILE:O	1:D:78:ILE:N	2.24	0.66
1:A:51:ARG:NH2	1:A:270:ASP:OD2	2.29	0.65
1:C:51:ARG:NH2	1:C:270:ASP:OD2	2.29	0.65
1:D:51:ARG:NH2	1:D:270:ASP:OD2	2.29	0.65
1:E:51:ARG:NH2	1:E:270:ASP:OD2	2.29	0.64
1:A:316:GLN:HG2	1:B:343:PRO:HD2	1.81	0.63
1:E:343:PRO:HD2	1:D:316:GLN:HG2	1.82	0.62
1:A:343:PRO:HD2	1:E:316:GLN:HG2	1.81	0.61
1:B:316:GLN:HG2	1:C:343:PRO:HD2	1.81	0.61
1:C:316:GLN:HG2	1:D:343:PRO:HD2	1.82	0.60
1:A:218:ARG:NH2	1:B:104:ASP:OD2	2.36	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:218:ARG:NH2	1:D:104:ASP:OD2	2.36	0.58
1:E:104:ASP:OD2	1:D:218:ARG:NH2	2.36	0.58
1:B:218:ARG:NH2	1:C:104:ASP:OD2	2.36	0.58
1:A:104:ASP:OD2	1:E:218:ARG:NH2	2.36	0.58
1:A:314:ASN:O	1:A:318:SER:OG	2.26	0.52
1:A:281:PHE:O	1:A:285:MET:HB2	2.11	0.51
1:C:281:PHE:O	1:C:285:MET:HB2	2.11	0.51
1:E:281:PHE:O	1:E:285:MET:HB2	2.11	0.51
1:D:281:PHE:O	1:D:285:MET:HB2	2.11	0.50
1:B:281:PHE:O	1:B:285:MET:HB2	2.11	0.50
1:E:32:LEU:HD21	1:E:285:MET:HB3	1.94	0.49
1:B:32:LEU:HD21	1:B:285:MET:HB3	1.94	0.49
1:C:314:ASN:O	1:C:318:SER:OG	2.26	0.49
1:C:32:LEU:HD21	1:C:285:MET:HB3	1.94	0.49
1:A:32:LEU:HD21	1:A:285:MET:HB3	1.94	0.49
1:D:32:LEU:HD21	1:D:285:MET:HB3	1.94	0.48
1:E:314:ASN:O	1:E:318:SER:OG	2.26	0.48
1:C:196:TYR:HB2	1:C:207:LEU:HD13	1.96	0.48
1:B:196:TYR:HB2	1:B:207:LEU:HD13	1.96	0.48
1:B:77:PRO:O	1:B:81:VAL:HG22	2.15	0.47
1:D:77:PRO:O	1:D:81:VAL:HG22	2.15	0.47
1:A:77:PRO:O	1:A:81:VAL:HG22	2.15	0.47
1:E:196:TYR:HB2	1:E:207:LEU:HD13	1.96	0.47
1:D:196:TYR:HB2	1:D:207:LEU:HD13	1.96	0.47
1:A:196:TYR:HB2	1:A:207:LEU:HD13	1.96	0.47
1:E:77:PRO:O	1:E:81:VAL:HG22	2.15	0.47
1:B:97:TYR:HB2	1:B:305:PHE:CZ	2.50	0.46
1:C:77:PRO:O	1:C:81:VAL:HG22	2.15	0.46
1:E:97:TYR:HB2	1:E:305:PHE:CZ	2.50	0.46
1:D:30:LYS:NZ	1:D:302:ASP:OD2	2.35	0.46
1:A:97:TYR:HB2	1:A:305:PHE:CZ	2.50	0.46
1:D:97:TYR:HB2	1:D:305:PHE:CZ	2.50	0.45
1:C:97:TYR:HB2	1:C:305:PHE:CZ	2.50	0.45
1:B:314:ASN:O	1:B:318:SER:OG	2.26	0.45
1:D:314:ASN:O	1:D:318:SER:OG	2.26	0.44
1:B:76:ILE:O	1:B:78:ILE:HG22	2.18	0.43
1:B:30:LYS:NZ	1:B:302:ASP:OD2	2.35	0.43
1:C:76:ILE:O	1:C:78:ILE:HG22	2.18	0.43
1:C:224:LEU:HD23	1:C:224:LEU:HA	1.92	0.43
1:E:176:LEU:HA	1:E:177:PRO:HD3	1.89	0.43
1:E:60:LEU:O	1:E:64:LYS:HG3	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:224:LEU:HD23	1:D:224:LEU:HA	1.92	0.43
1:E:76:ILE:O	1:E:78:ILE:HG22	2.18	0.42
1:D:60:LEU:O	1:D:64:LYS:HG3	2.19	0.42
1:E:264:TYR:HA	1:E:265:PRO:HD3	1.92	0.42
1:B:60:LEU:O	1:B:64:LYS:HG3	2.19	0.42
1:C:60:LEU:O	1:C:64:LYS:HG3	2.19	0.42
1:D:173:LYS:HB2	1:D:173:LYS:HE2	1.86	0.42
1:D:76:ILE:O	1:D:78:ILE:HG22	2.18	0.42
1:D:310:ILE:H	1:D:310:ILE:HG12	1.65	0.42
1:C:183:VAL:N	1:C:184:PRO:HD2	2.35	0.42
1:A:76:ILE:O	1:A:78:ILE:HG22	2.18	0.42
1:E:173:LYS:HB2	1:E:173:LYS:HE2	1.86	0.42
1:C:40:ILE:HD13	1:C:40:ILE:HA	1.92	0.42
1:C:128:LEU:HD23	1:C:128:LEU:HA	1.90	0.42
1:A:60:LEU:O	1:A:64:LYS:HG3	2.19	0.42
1:C:129:ILE:HD12	1:C:129:ILE:HA	1.90	0.42
1:A:353:ARG:H	1:A:353:ARG:HG2	1.60	0.42
1:E:310:ILE:H	1:E:310:ILE:HG12	1.66	0.41
1:B:183:VAL:N	1:B:184:PRO:HD2	2.35	0.41
1:D:140:LEU:HD23	1:D:140:LEU:HA	1.92	0.41
1:D:183:VAL:N	1:D:184:PRO:HD2	2.35	0.41
1:E:183:VAL:N	1:E:184:PRO:HD2	2.35	0.41
1:D:259:ASN:HA	1:D:260:PRO:HD3	1.95	0.41
1:D:13:ARG:HH11	1:D:13:ARG:HG3	1.86	0.41
1:A:13:ARG:HG3	1:A:13:ARG:HH11	1.86	0.41
1:E:28:ILE:H	1:E:28:ILE:HG12	1.71	0.41
1:B:129:ILE:HD12	1:B:129:ILE:HA	1.90	0.41
1:B:335:ASP:OD1	1:B:335:ASP:N	2.48	0.41
1:C:173:LYS:HB2	1:C:173:LYS:HE2	1.86	0.41
1:A:140:LEU:HD23	1:A:140:LEU:HA	1.92	0.41
1:A:150:ARG:NH2	1:B:345:PRO:HB2	2.36	0.41
1:A:345:PRO:HB2	1:E:150:ARG:NH2	2.36	0.41
1:E:13:ARG:HG3	1:E:13:ARG:HH11	1.86	0.41
1:B:13:ARG:HH11	1:B:13:ARG:HG3	1.86	0.41
1:B:176:LEU:HA	1:B:177:PRO:HD3	1.89	0.41
1:A:77:PRO:HG2	1:B:283:PHE:CE2	2.56	0.41
1:A:183:VAL:N	1:A:184:PRO:HD2	2.35	0.41
1:E:42:LEU:HB3	1:E:252:LEU:HD21	2.03	0.41
1:A:283:PHE:CE2	1:E:77:PRO:HG2	2.56	0.40
1:E:30:LYS:NZ	1:E:302:ASP:OD2	2.35	0.40
1:C:77:PRO:HG2	1:D:283:PHE:CE2	2.56	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:150:ARG:NH2	1:C:345:PRO:HB2	2.36	0.40
1:E:283:PHE:CE2	1:D:77:PRO:HG2	2.57	0.40
1:D:42:LEU:HB3	1:D:252:LEU:HD21	2.03	0.40
1:B:252:LEU:HD12	1:B:252:LEU:HA	1.97	0.40
1:C:150:ARG:NH2	1:D:345:PRO:HB2	2.36	0.40
1:A:224:LEU:HD23	1:A:224:LEU:HA	1.92	0.40
1:A:274:PRO:HB2	1:A:277:THR:HB	2.04	0.40
1:B:77:PRO:HG2	1:C:283:PHE:CE2	2.56	0.40
1:C:13:ARG:HH11	1:C:13:ARG:HG3	1.86	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	363/689 (53%)	349 (96%)	14 (4%)	0	100	100
1	B	363/689 (53%)	350 (96%)	13 (4%)	0	100	100
1	C	363/689 (53%)	349 (96%)	14 (4%)	0	100	100
1	D	363/689 (53%)	349 (96%)	14 (4%)	0	100	100
1	E	363/689 (53%)	350 (96%)	13 (4%)	0	100	100
All	All	1815/3445 (53%)	1747 (96%)	68 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	327/613 (53%)	318 (97%)	9 (3%)	38	66
1	B	327/613 (53%)	318 (97%)	9 (3%)	38	66
1	C	327/613 (53%)	318 (97%)	9 (3%)	38	66
1	D	327/613 (53%)	318 (97%)	9 (3%)	38	66
1	E	327/613 (53%)	318 (97%)	9 (3%)	38	66
All	All	1635/3065 (53%)	1590 (97%)	45 (3%)	40	66

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	71	SER
1	A	74	GLN
1	A	200	ARG
1	A	208	GLN
1	A	236	TYR
1	A	262	LYS
1	A	310	ILE
1	A	313	ARG
1	A	329	LEU
1	E	71	SER
1	E	74	GLN
1	E	200	ARG
1	E	208	GLN
1	E	236	TYR
1	E	262	LYS
1	E	310	ILE
1	E	313	ARG
1	E	329	LEU
1	B	71	SER
1	B	74	GLN
1	B	200	ARG
1	B	208	GLN
1	B	236	TYR
1	B	262	LYS
1	B	310	ILE
1	B	313	ARG
1	B	329	LEU
1	C	71	SER

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Mol	Chain	Res	Type
1	C	74	GLN
1	C	200	ARG
1	C	208	GLN
1	C	236	TYR
1	C	262	LYS
1	C	310	ILE
1	C	313	ARG
1	C	329	LEU
1	D	71	SER
1	D	74	GLN
1	D	200	ARG
1	D	208	GLN
1	D	236	TYR
1	D	262	LYS
1	D	310	ILE
1	D	313	ARG
1	D	329	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 15 ligands modelled in this entry, 15 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.

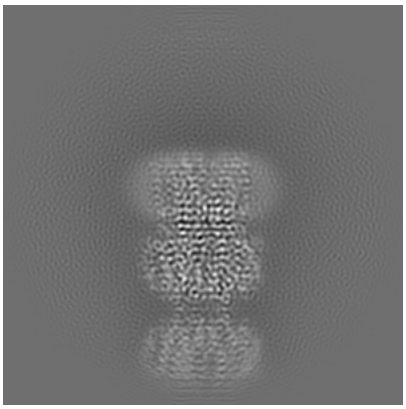
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-62246. These allow visual inspection of the internal detail of the map and identification of artifacts.

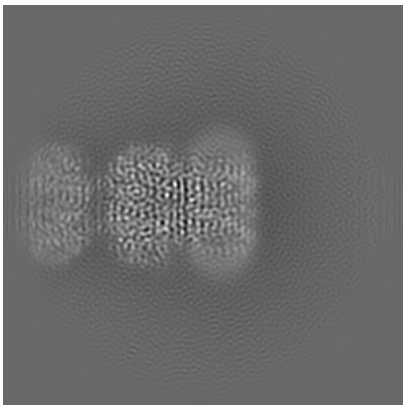
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

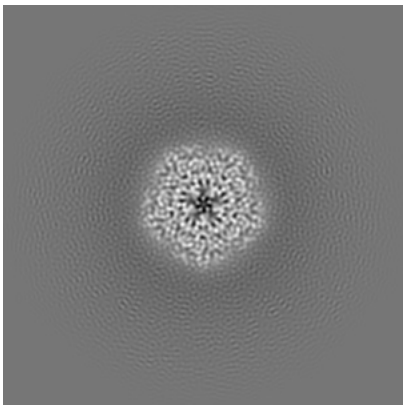
6.1.1 Primary map



X

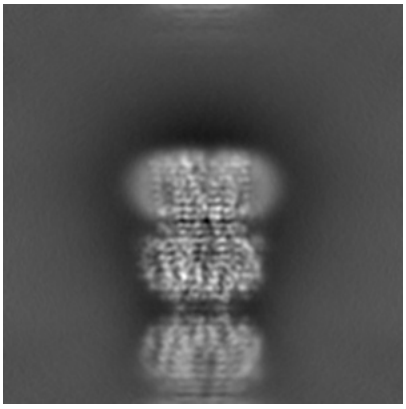


Y

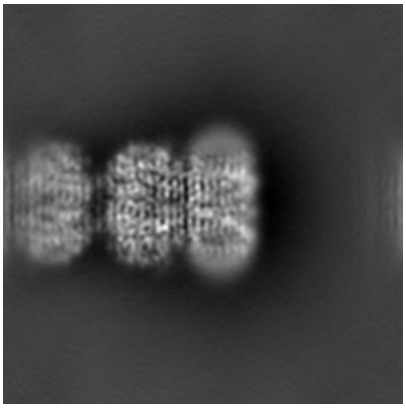


Z

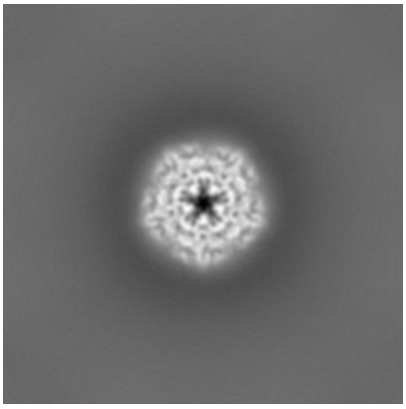
6.1.2 Raw map



X



Y

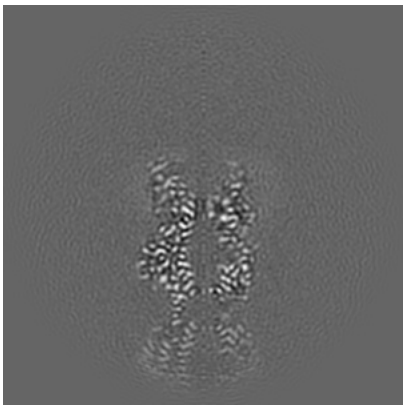


Z

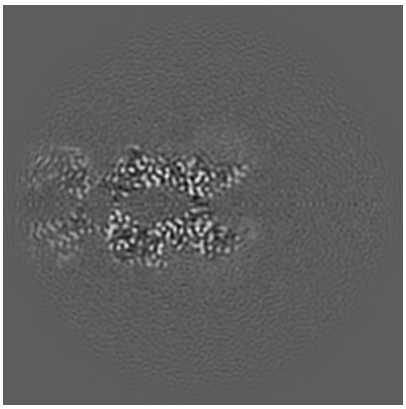
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

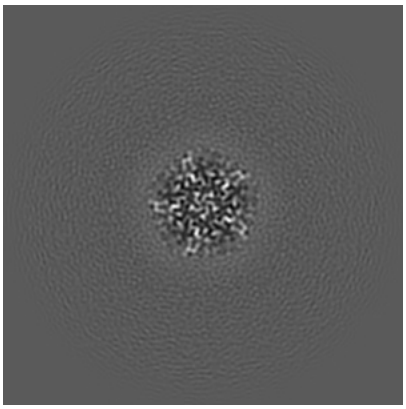
6.2.1 Primary map



X Index: 150

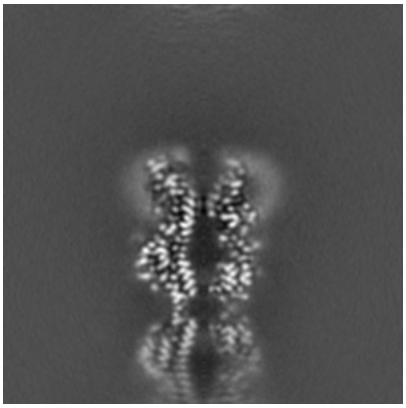


Y Index: 150

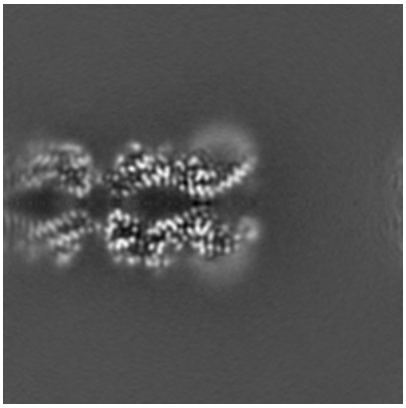


Z Index: 150

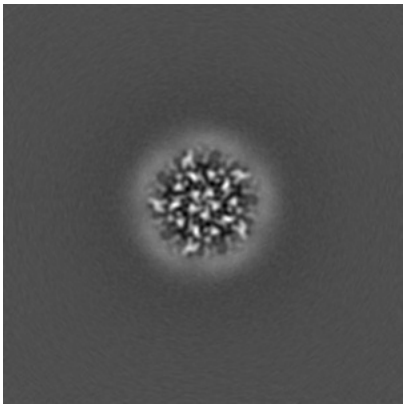
6.2.2 Raw map



X Index: 150



Y Index: 150

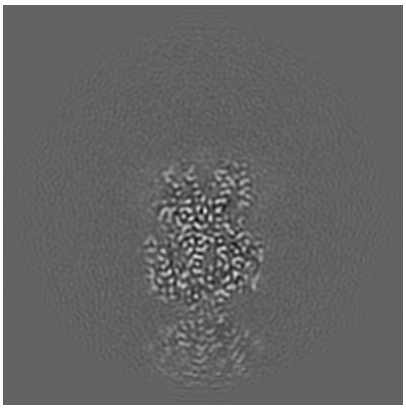


Z Index: 150

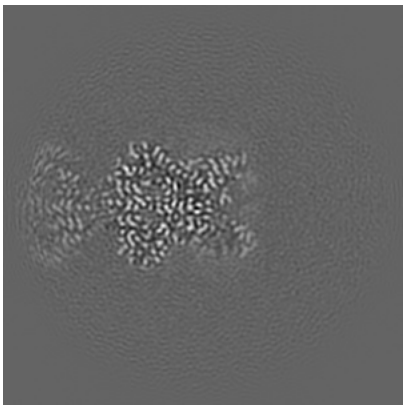
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

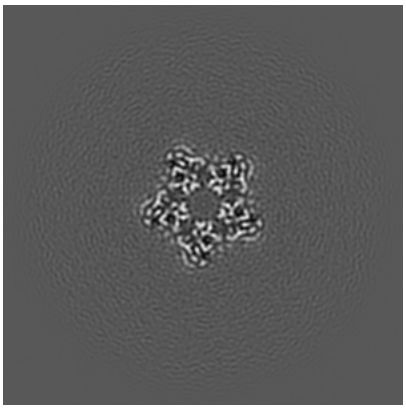
6.3.1 Primary map



X Index: 135

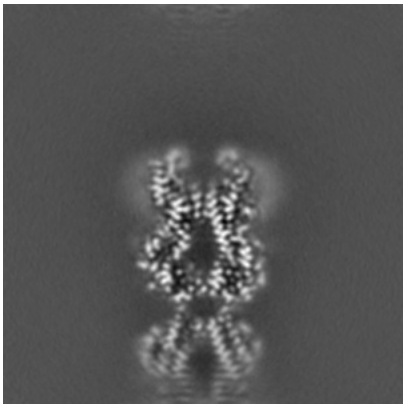


Y Index: 136

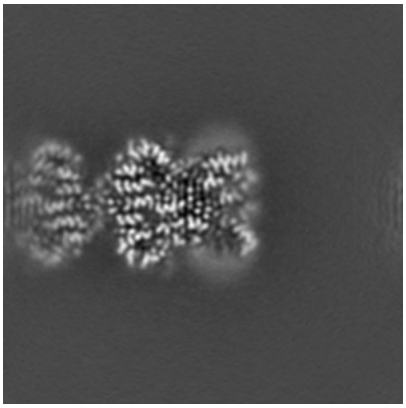


Z Index: 116

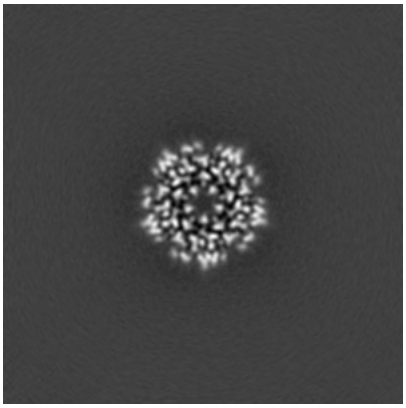
6.3.2 Raw map



X Index: 144



Y Index: 135

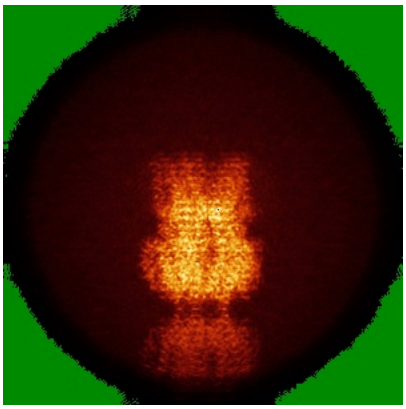


Z Index: 96

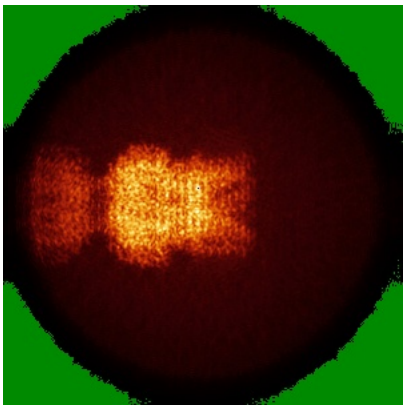
The images above show the largest variance slices of the map in three orthogonal directions.

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

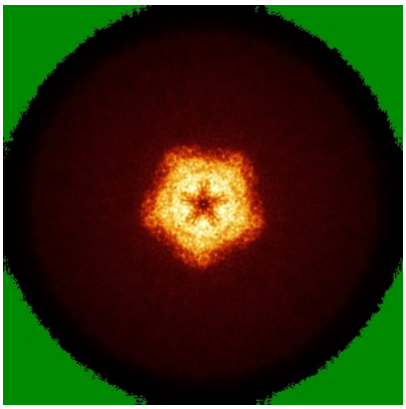
6.4.1 Primary map



X

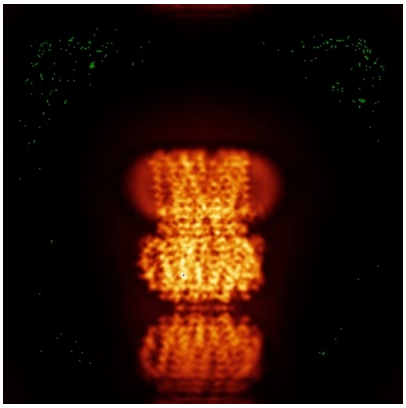


Y

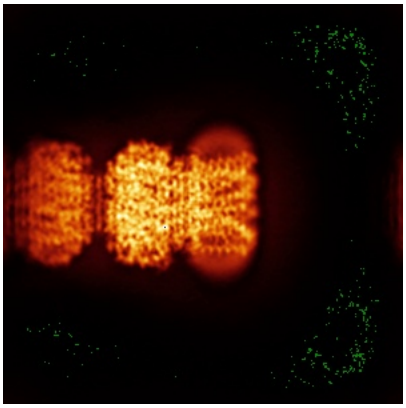


Z

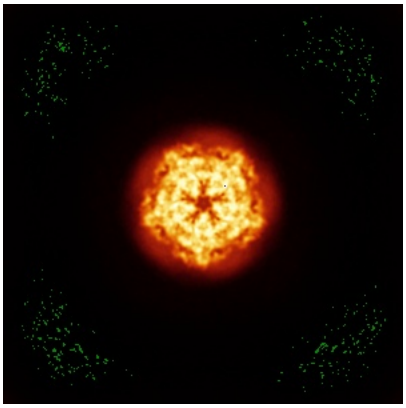
6.4.2 Raw map



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.

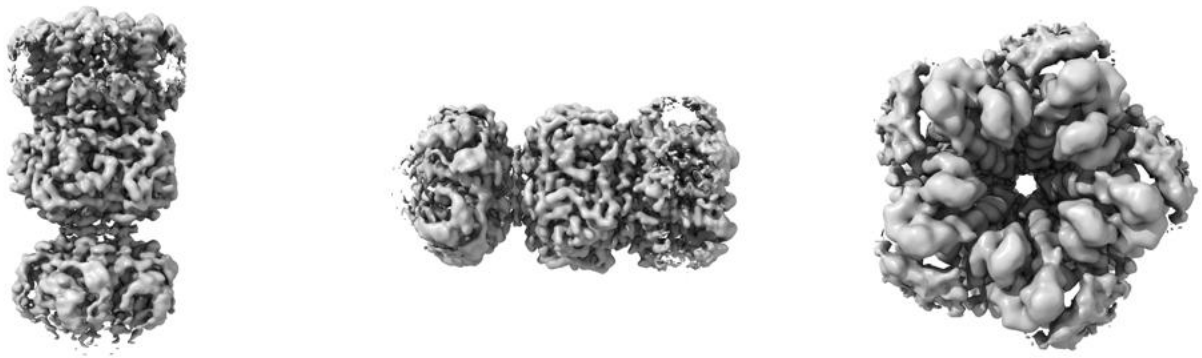
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.5. 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.

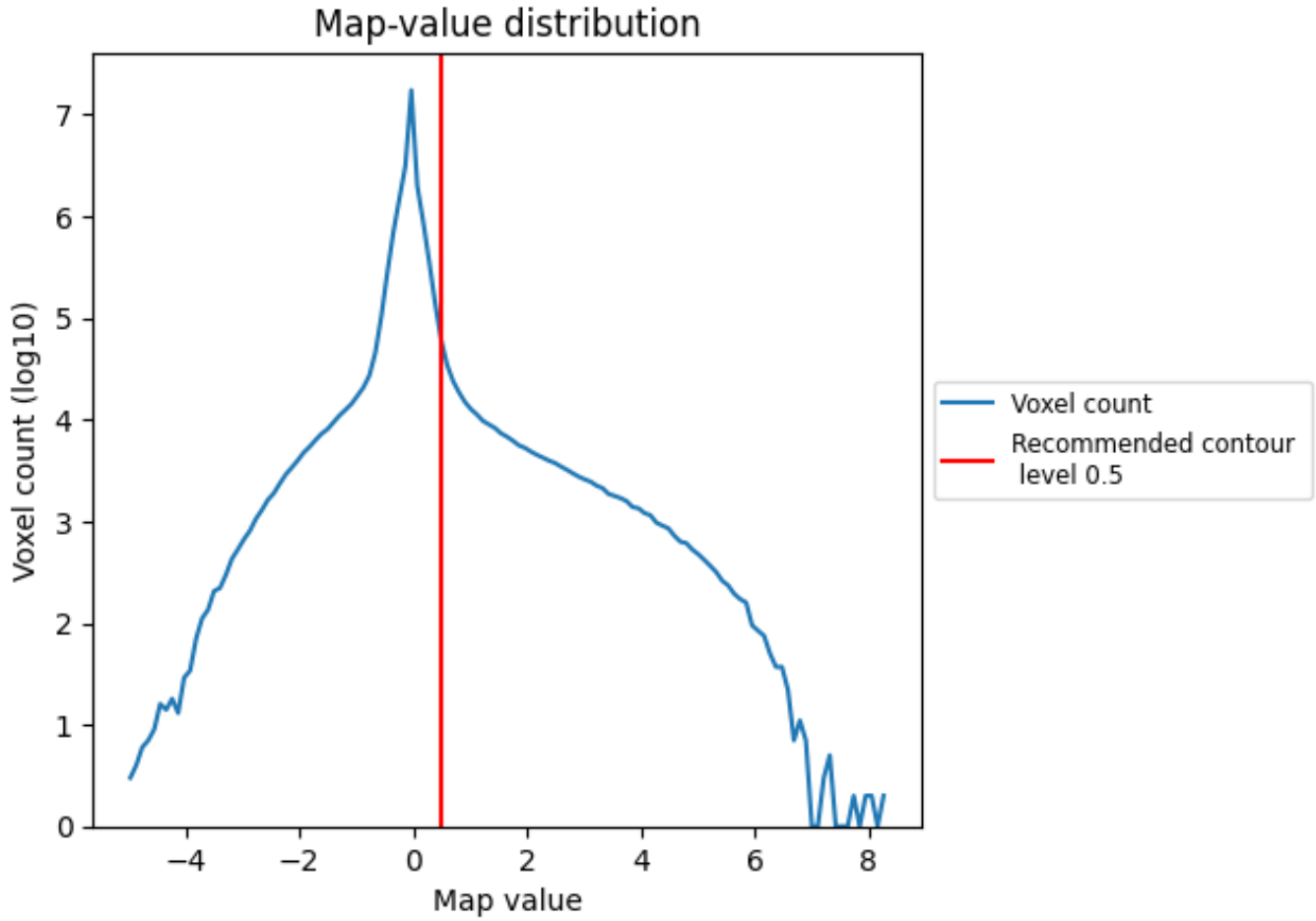
6.6 Mask visualisation (i)

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

7 Map analysis

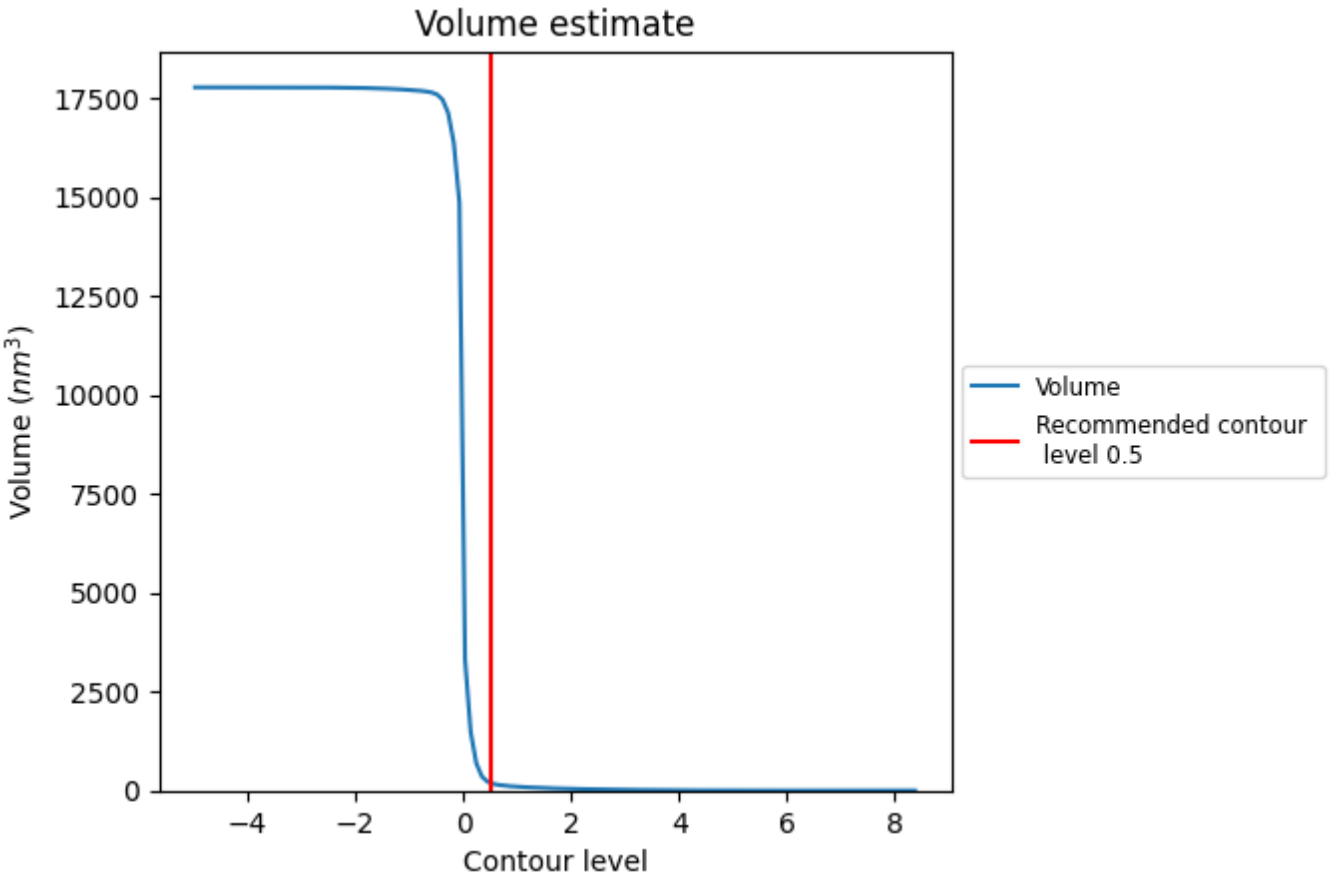
This section contains the results of statistical analysis of the map.

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.

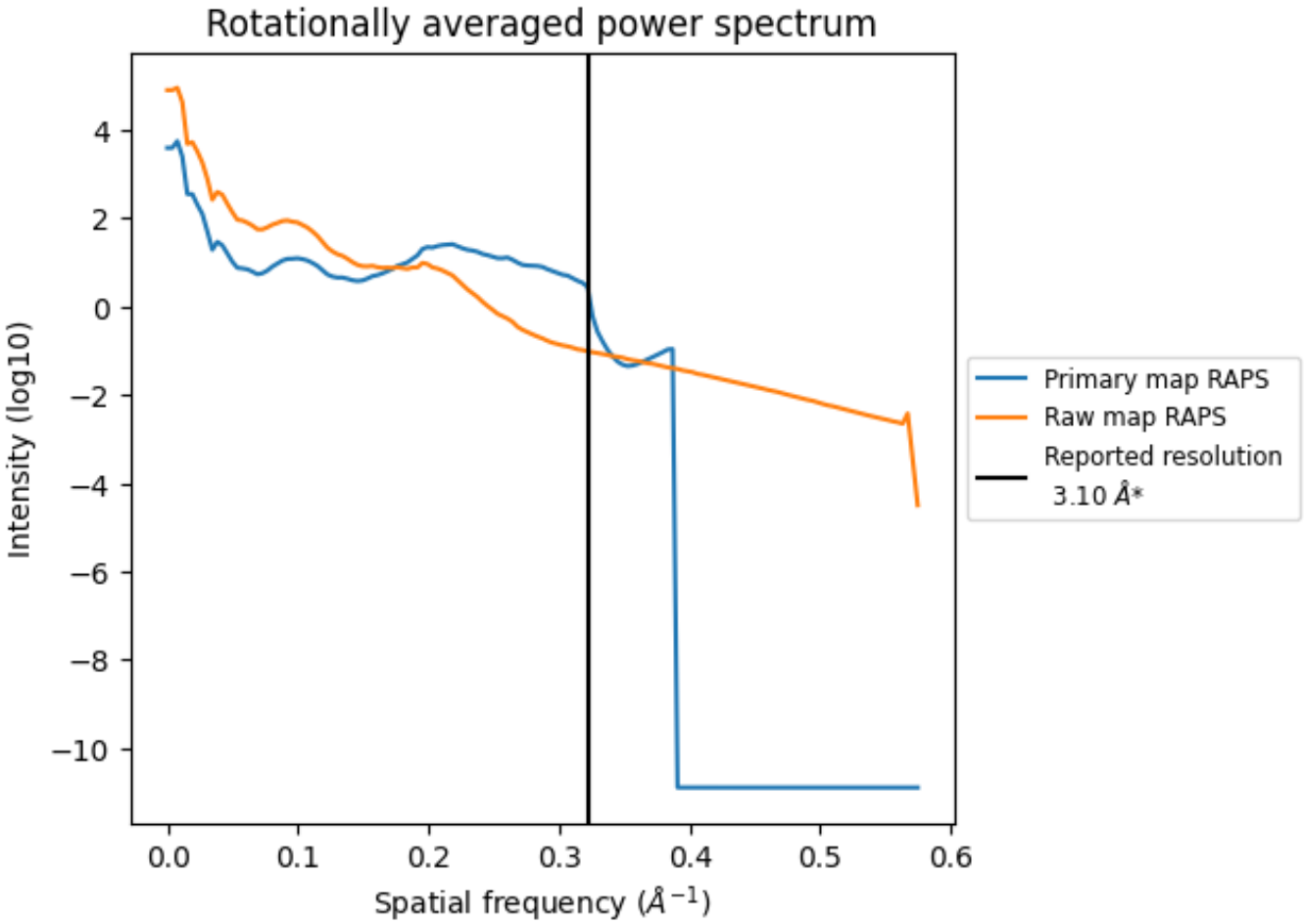
7.2 Volume estimate



The volume at the recommended contour level is 199 nm^3; this corresponds to an approximate mass of 179 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)

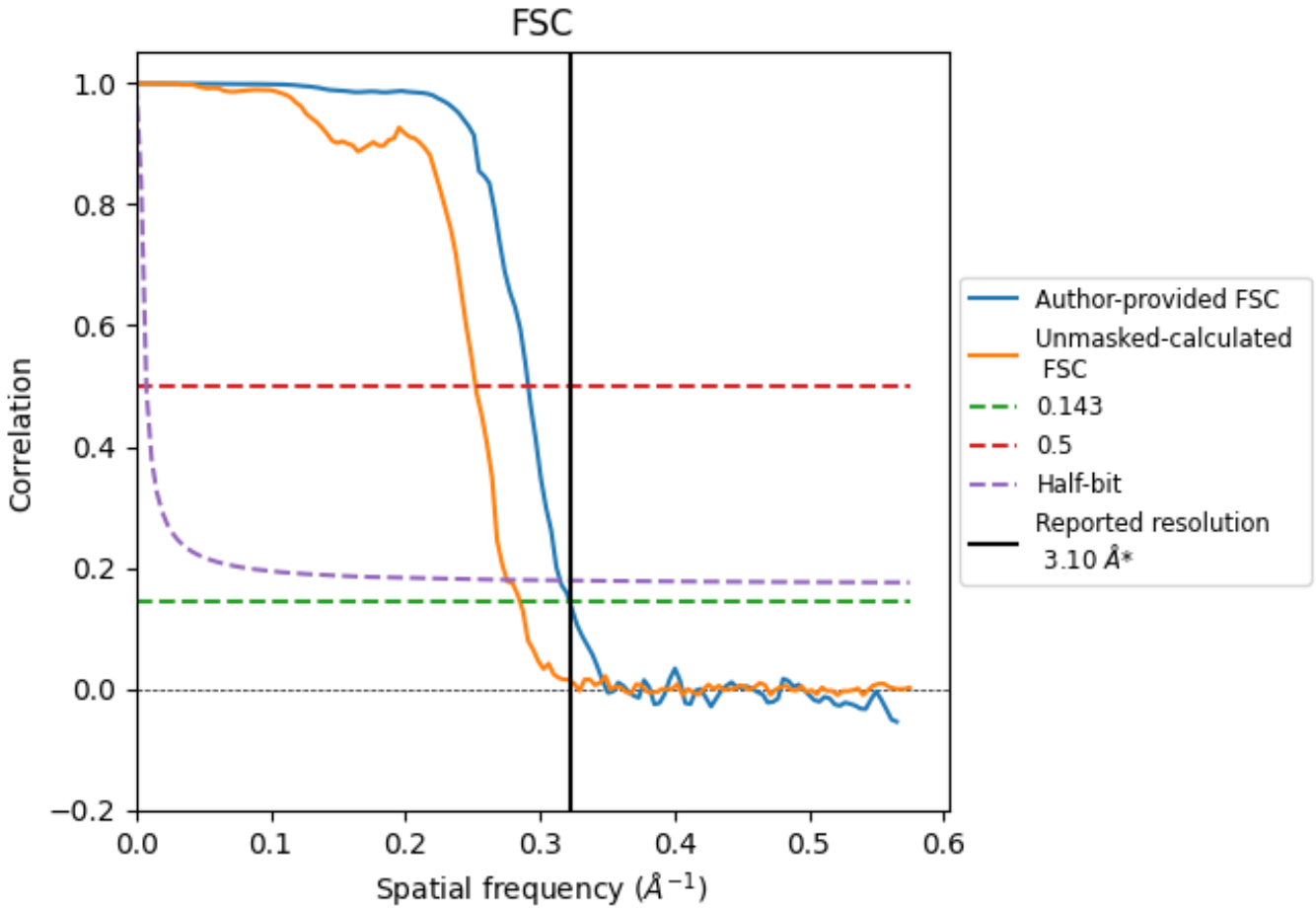


*Reported resolution corresponds to spatial frequency of 0.323 Å^{-1}

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 0.323 Å^{-1}

8.2 Resolution estimates (i)

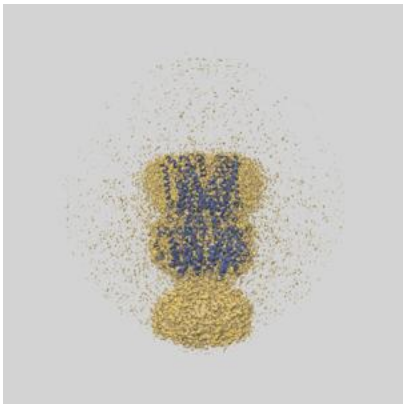
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	3.10	3.43	3.17
Unmasked-calculated*	3.51	3.97	3.63

*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 3.51 differs from the reported value 3.1 by more than 10 %

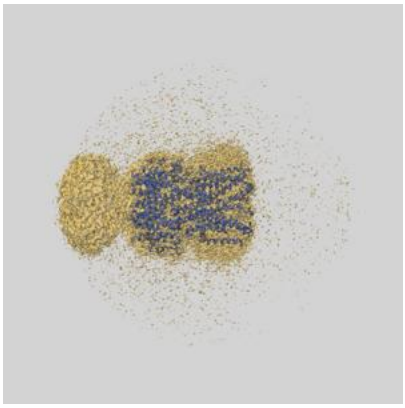
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-62246 and PDB model 9KC9. Per-residue inclusion information can be found in section 3 on page 9.

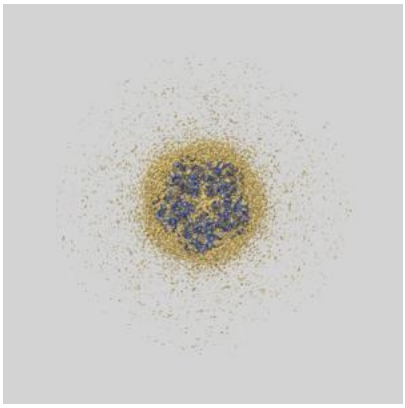
9.1 Map-model overlay



X



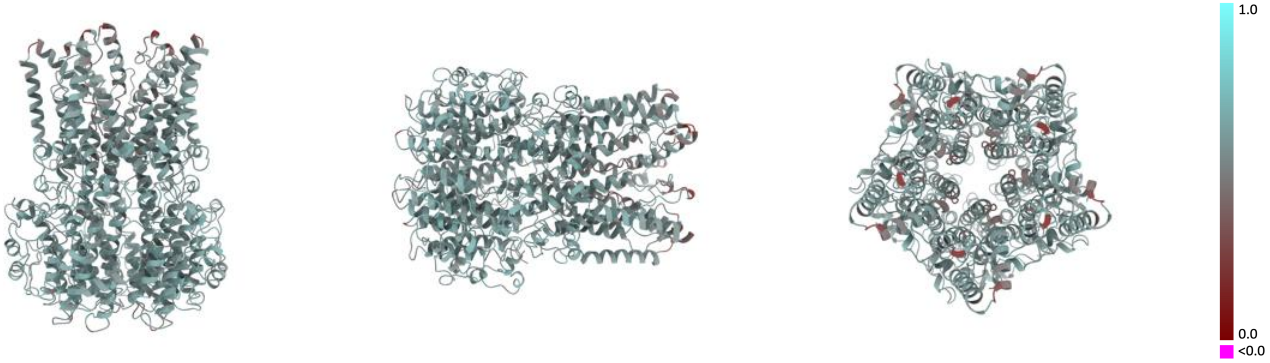
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.5 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.

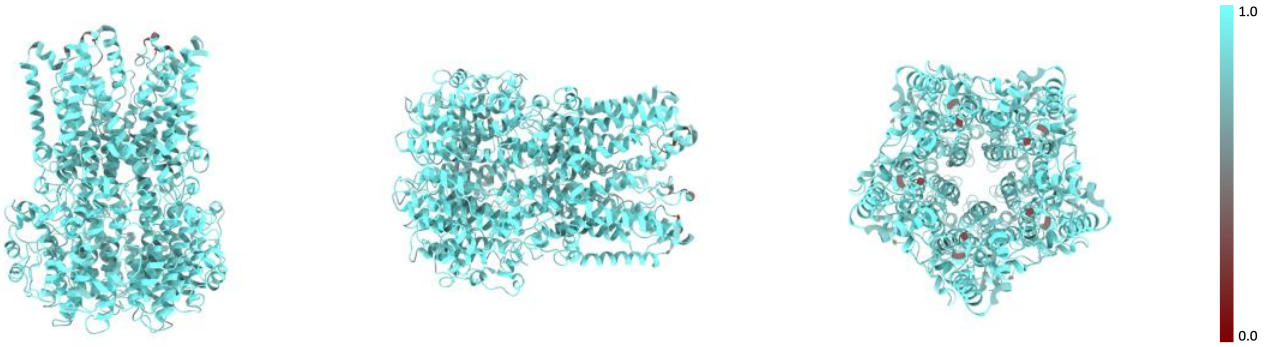
9.2 Q-score mapped to coordinate model (i)



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.

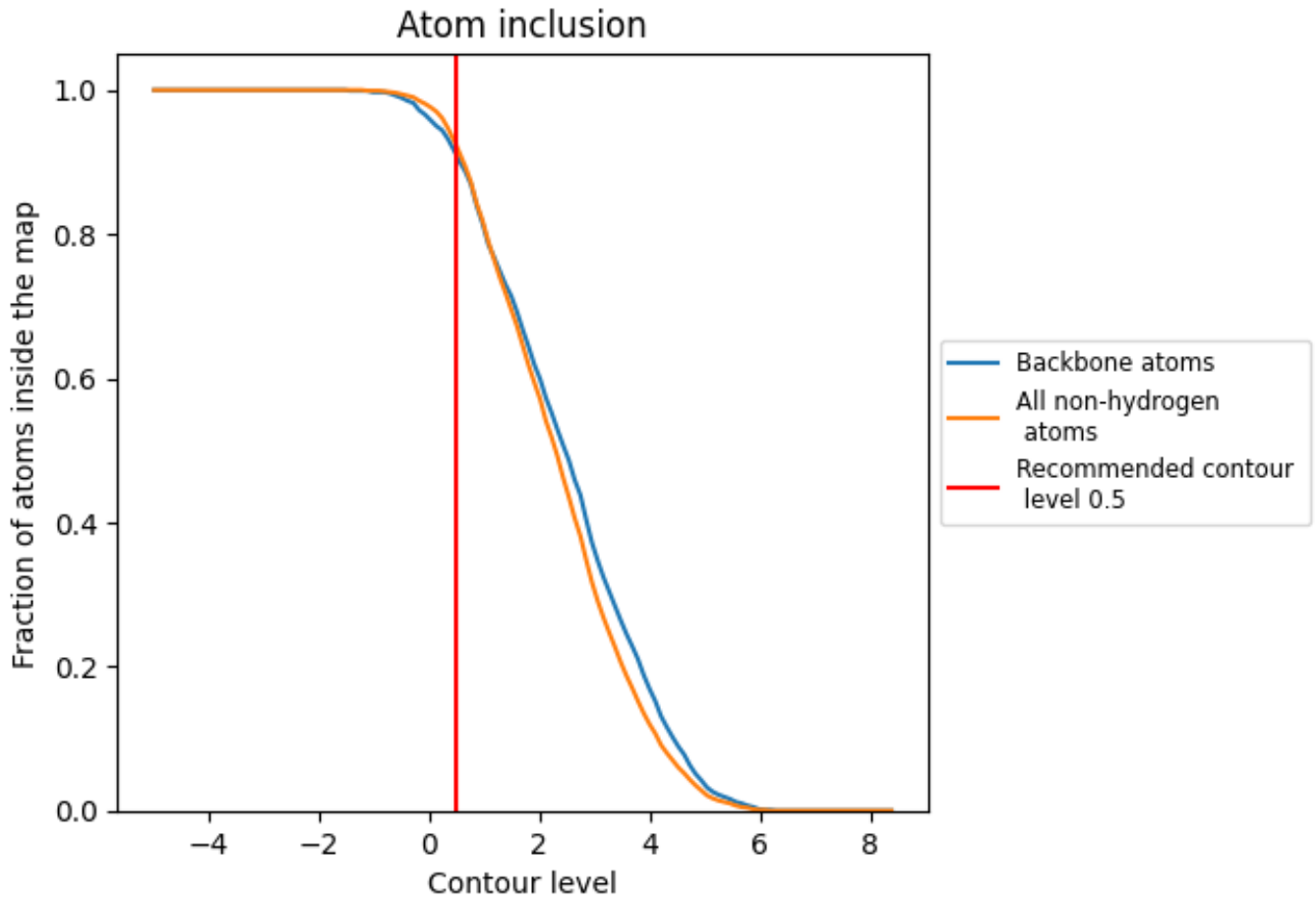
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.5).

9.4 Atom inclusion (i)



At the recommended contour level, 91% of all backbone atoms, 92% 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 (0.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9230	0.5720
A	0.9240	0.5710
B	0.9210	0.5720
C	0.9220	0.5730
D	0.9220	0.5710
E	0.9240	0.5710