



wwPDB EM Validation Summary Report ⓘ

Mar 29, 2026 – 11:52 PM UTC

PDB ID : 8YGC / pdb_00008ygc
EMDB ID : EMD-39243
Title : The Dimer Structure of DSR2-SPR
Authors : Gao, X.; Zhu, H.; Cui, S.
Deposited on : 2024-02-26
Resolution : 4.03 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

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.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

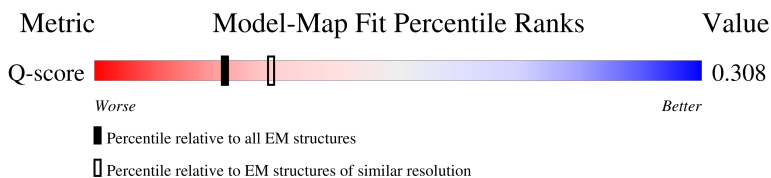
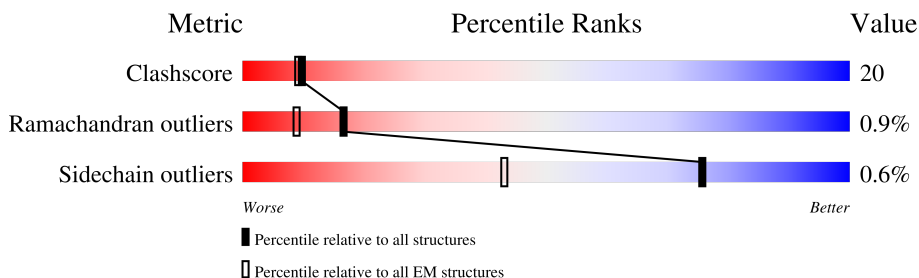
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.03 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	6618 (3.54 - 4.53)

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	1005	14% 68% 28% ..
1	B	1005	20% 65% 32% ..
1	E	1005	25% 23% 72% .
1	F	1005	24% 18% 9% 73%

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Mol	Chain	Length	Quality of chain
2	C	264	27% 28% 27% 43%
2	D	264	27% 29% 25% 43%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 23242 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 SIR2-like domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	983	Total	C	N	O	S	0	0
			8183	5292	1322	1538	31		
1	B	983	Total	C	N	O	S	0	0
			8183	5292	1322	1538	31		
1	E	277	Total	C	N	O	S	0	0
			2260	1455	367	430	8		
1	F	272	Total	C	N	O	S	0	0
			2220	1432	360	421	7		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	171	ALA	HIS	engineered mutation	UNP D4G637
B	171	ALA	HIS	engineered mutation	UNP D4G637
E	171	ALA	HIS	engineered mutation	UNP D4G637
F	171	ALA	HIS	engineered mutation	UNP D4G637

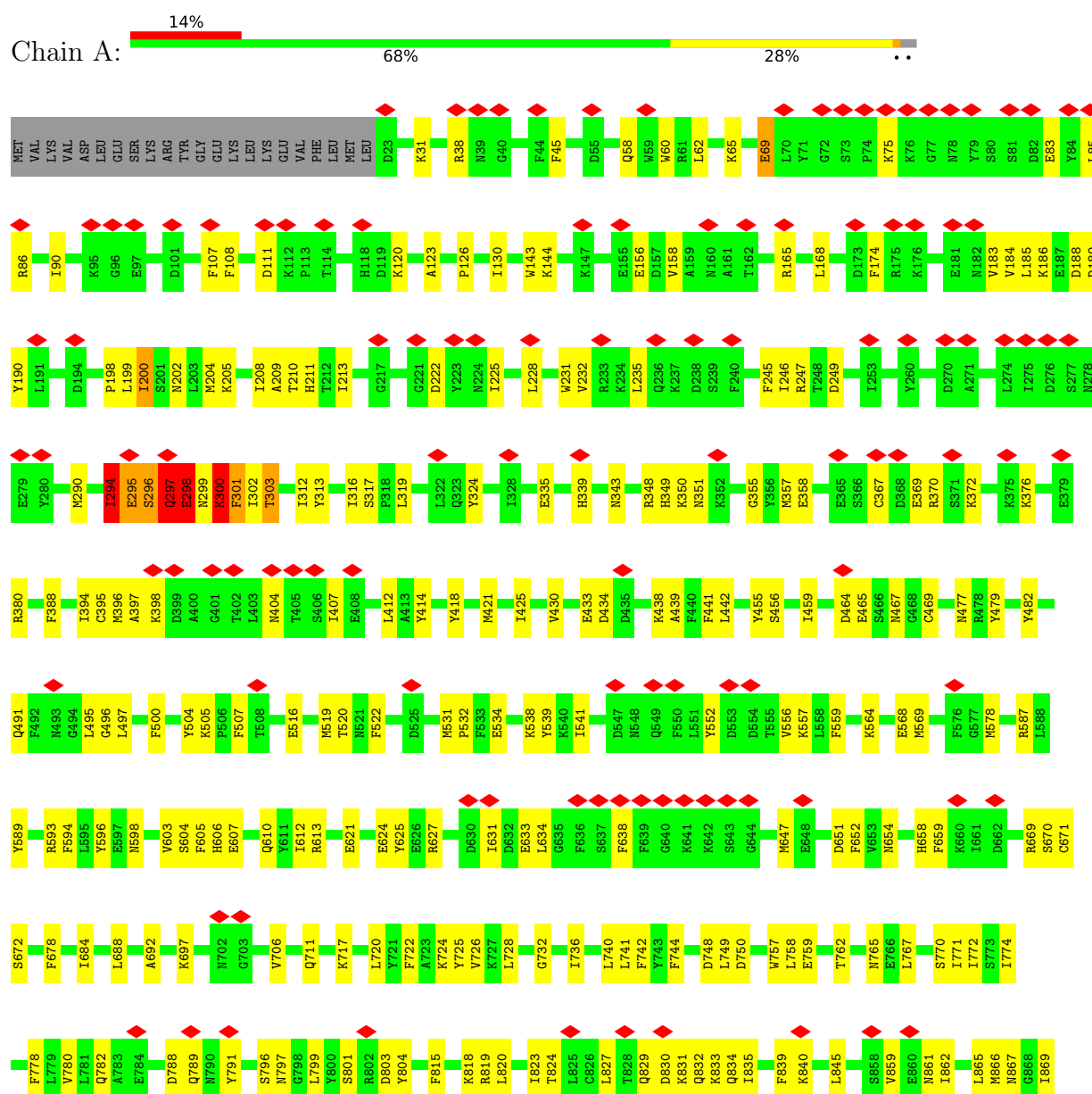
- Molecule 2 is a protein called SPR.

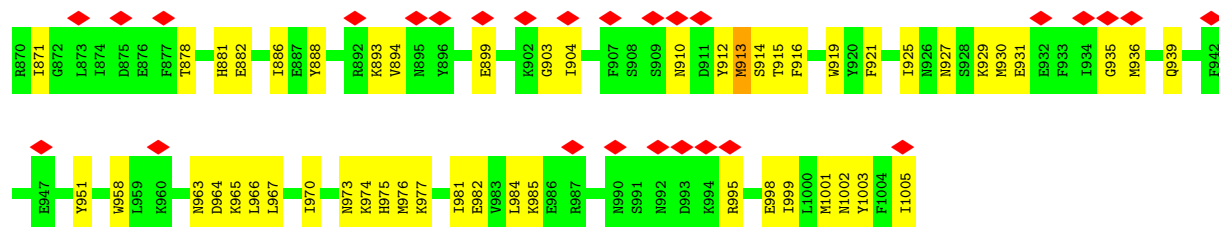
Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	151	Total	C	N	O	S	0	0
			1198	758	189	247	4		
2	D	151	Total	C	N	O	S	0	0
			1198	758	189	247	4		

3 Residue-property plots

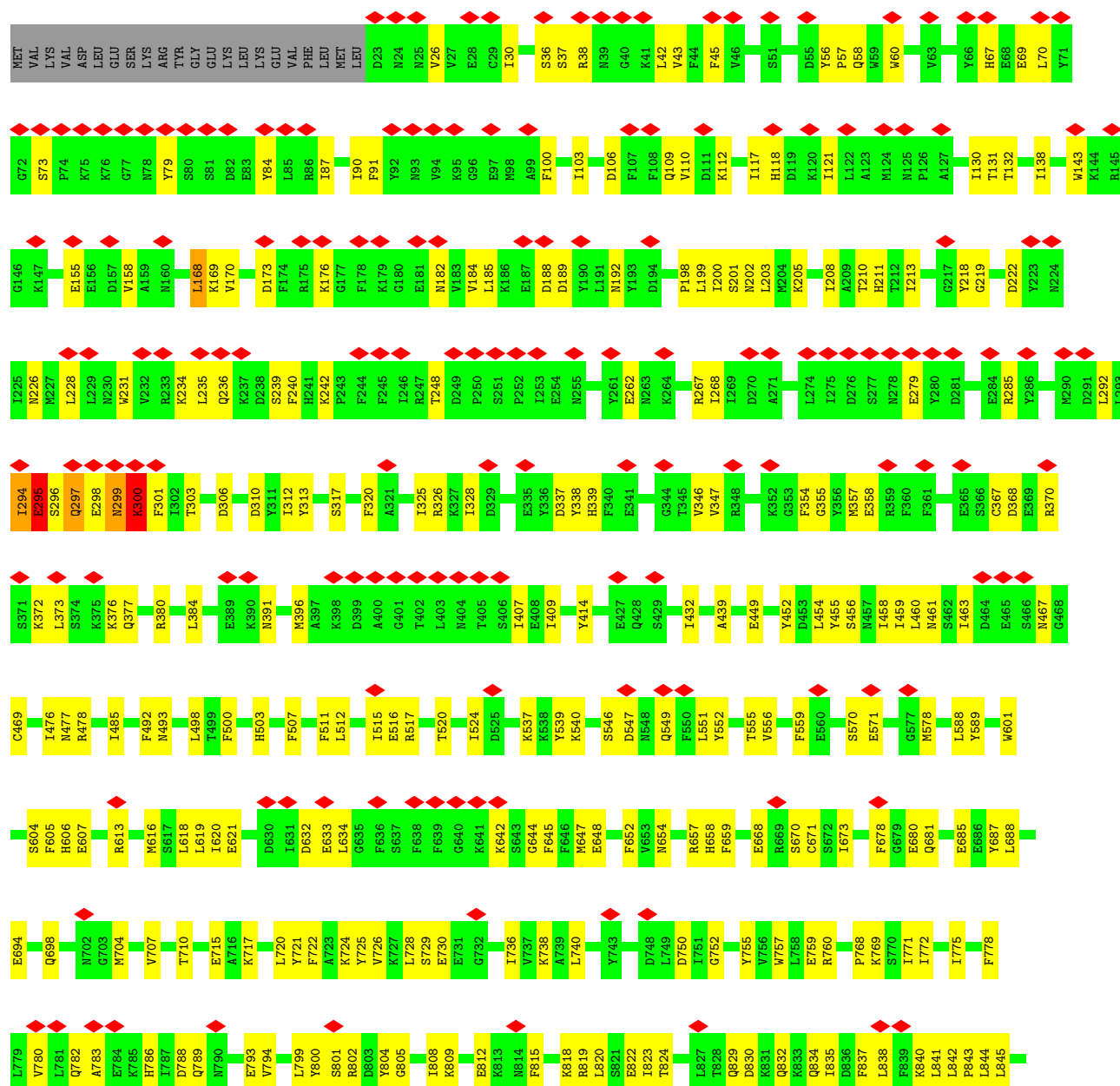
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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.

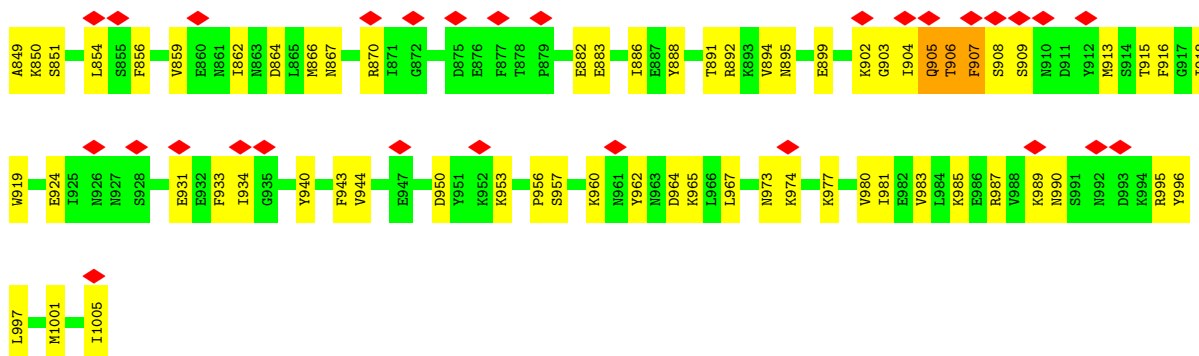
- Molecule 1: SIR2-like domain-containing protein



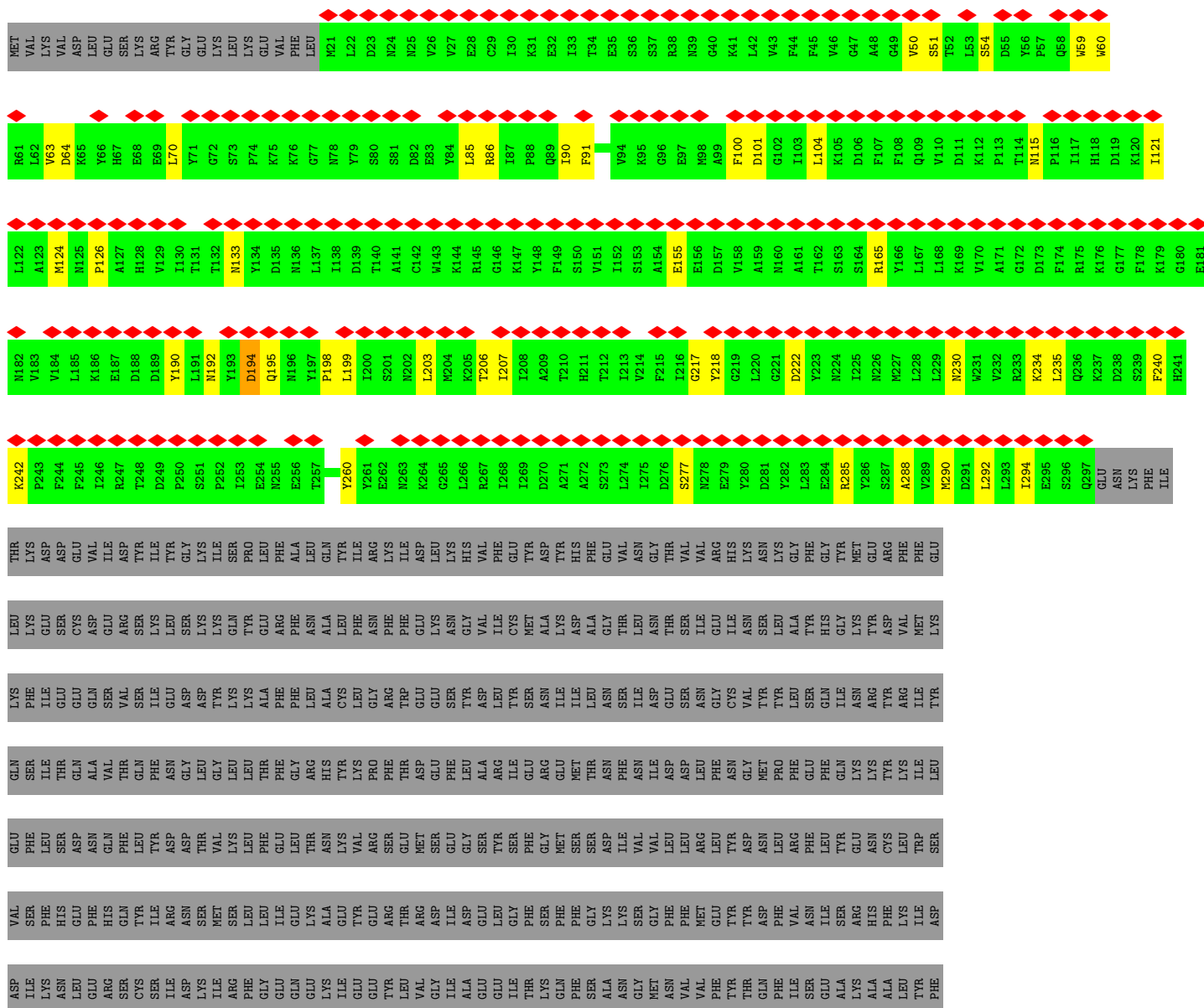


• Molecule 1: SIR2-like domain-containing protein





• Molecule 1: SIR2-like domain-containing protein

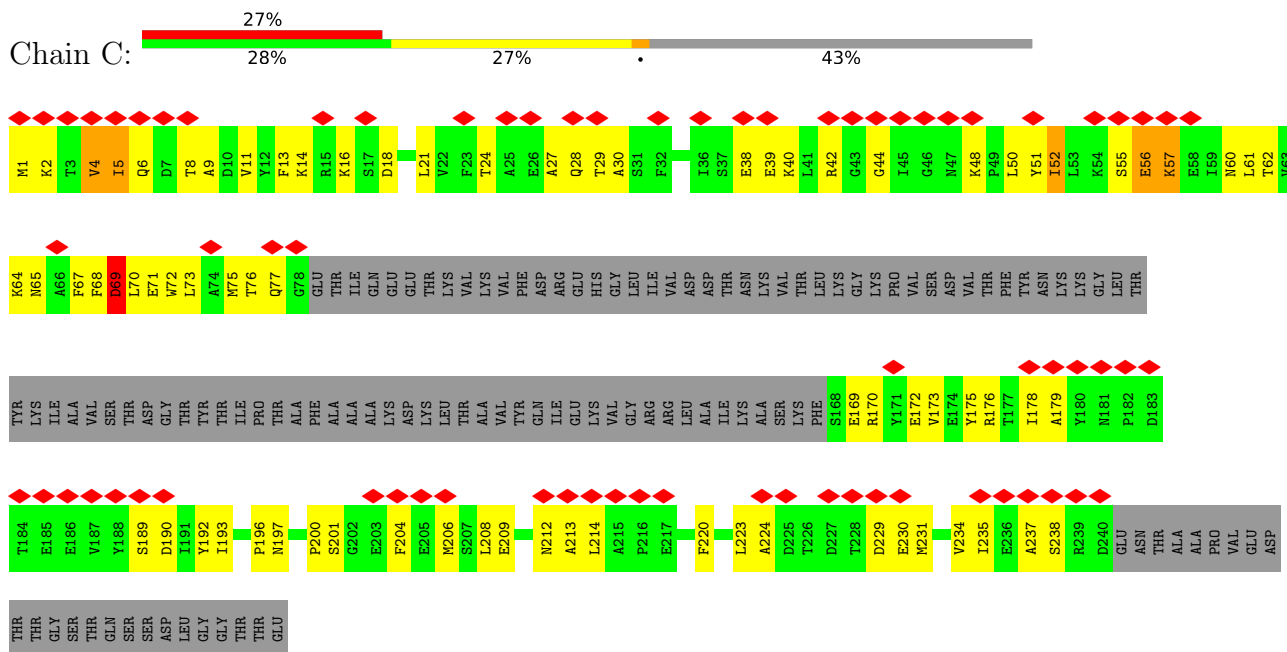


- Molecule 1: SIR2-like domain-containing protein

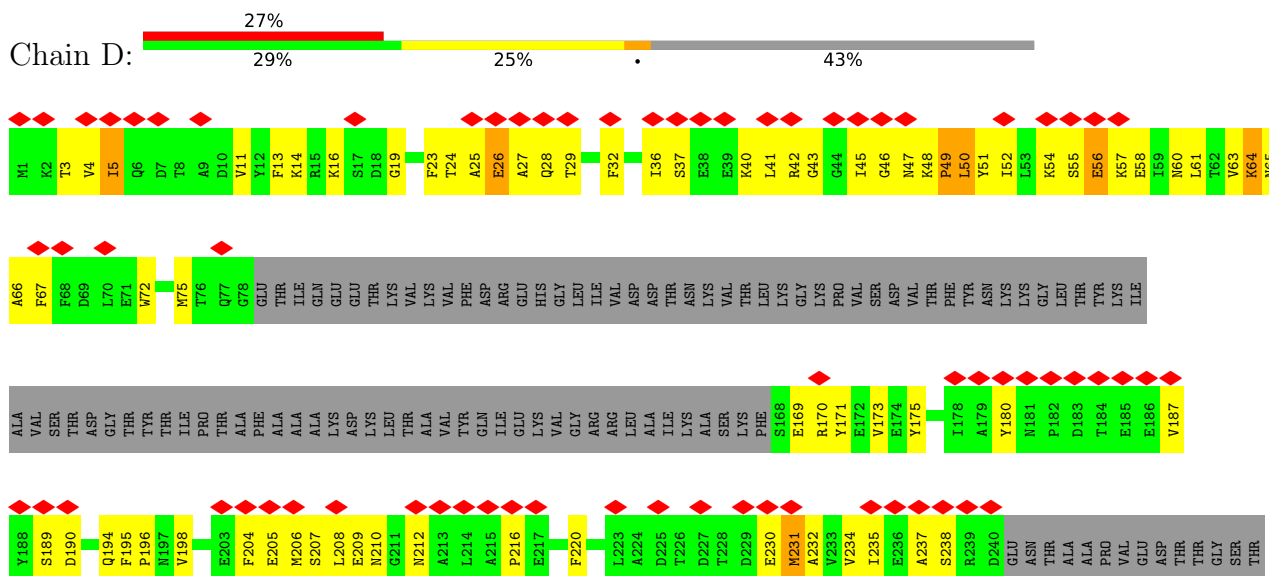
[illegible]

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

- Molecule 2: SPR



- Molecule 2: SPR



GLN
SER
SER
ASP
LEU
GLY
GLY
THR
GLU

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	23242	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	66	Depositor
Minimum defocus (nm)	1800	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.312	Depositor
Minimum map value	-0.155	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.009	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	381.8, 381.8, 381.8	wwPDB
Map dimensions	460, 460, 460	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.83, 0.83, 0.83	Depositor

5 Model quality

5.1 Standard geometry

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.35	0/8374	0.47	2/11280 (0.0%)
1	B	0.34	0/8374	0.47	2/11280 (0.0%)
1	E	0.14	0/2314	0.32	0/3136
1	F	0.23	0/2274	0.44	0/3082
2	C	0.25	0/1218	0.62	0/1645
2	D	0.28	0/1218	0.62	0/1645
All	All	0.31	0/23772	0.47	4/32068 (0.0%)

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
1	A	0	1
2	C	0	1
2	D	0	2
All	All	0	4

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	300	LYS	CA-C-N	-5.86	113.28	122.65
1	B	300	LYS	C-N-CA	-5.86	113.28	122.65
1	A	430	VAL	N-CA-C	-5.84	107.05	112.43
1	A	297	GLN	N-CA-C	-5.23	105.56	112.94

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	297	GLN	Peptide
2	C	69	ASP	Peptide
2	D	3	THR	Peptide
2	D	64	LYS	Peptide

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	8183	0	8009	345	0
1	B	8183	0	8010	334	0
1	E	2260	0	2209	33	0
1	F	2220	0	2173	90	0
2	C	1198	0	1159	89	0
2	D	1198	0	1159	93	0
All	All	23242	0	22719	904	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 20.

The worst 5 of 904 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:965:LYS:NZ	2:D:51:TYR:CZ	1.83	1.45
1:A:965:LYS:NZ	2:D:51:TYR:CE1	1.67	1.41
1:A:965:LYS:CE	2:D:51:TYR:CE1	2.11	1.31
2:D:50:LEU:O	2:D:51:TYR:HD1	1.15	1.28
1:A:866:MET:CE	1:A:912:TYR:CE2	2.25	1.20

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	981/1005 (98%)	918 (94%)	54 (6%)	9 (1%)	14	48
1	B	981/1005 (98%)	921 (94%)	55 (6%)	5 (0%)	24	60
1	E	275/1005 (27%)	267 (97%)	8 (3%)	0	100	100
1	F	270/1005 (27%)	258 (96%)	12 (4%)	0	100	100
2	C	147/264 (56%)	105 (71%)	36 (24%)	6 (4%)	2	21
2	D	147/264 (56%)	105 (71%)	36 (24%)	6 (4%)	2	21
All	All	2801/4548 (62%)	2574 (92%)	201 (7%)	26 (1%)	16	48

5 of 26 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	296	SER
1	A	298	GLU
1	A	303	THR
1	B	905	GLN
1	B	906	THR

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	901/922 (98%)	894 (99%)	7 (1%)	73	77
1	B	901/922 (98%)	895 (99%)	6 (1%)	76	79
1	E	249/922 (27%)	248 (100%)	1 (0%)	84	83
1	F	244/922 (26%)	242 (99%)	2 (1%)	73	77
2	C	130/225 (58%)	130 (100%)	0	100	100
2	D	130/225 (58%)	130 (100%)	0	100	100
All	All	2555/4138 (62%)	2539 (99%)	16 (1%)	76	80

5 of 16 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	64	ASP
1	E	194	ASP
1	B	294	ILE
1	B	883	GLU
1	B	168	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 20 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	832	GLN
2	D	60	ASN
1	E	133	ASN
1	E	118	HIS
1	B	192	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

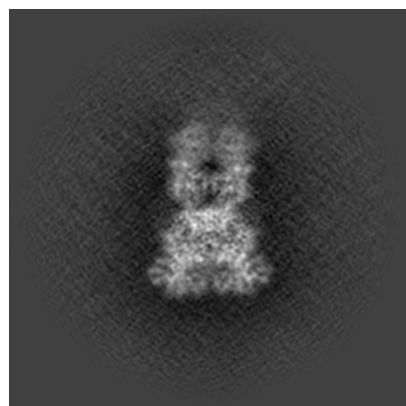
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-39243. These allow visual inspection of the internal detail of the map and identification of artifacts.

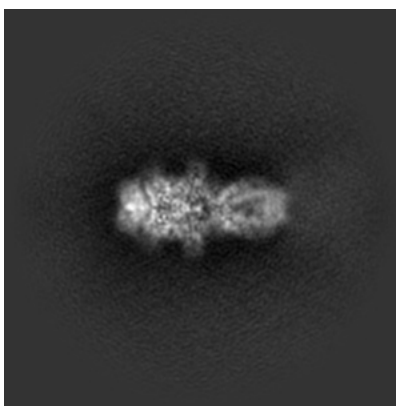
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

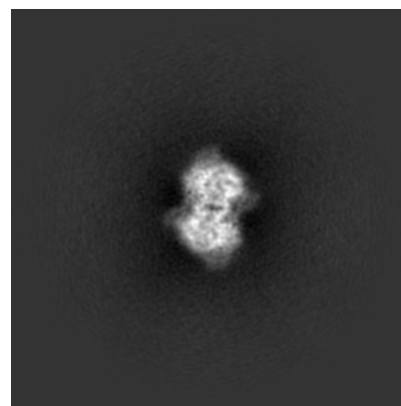
6.1.1 Primary map



X

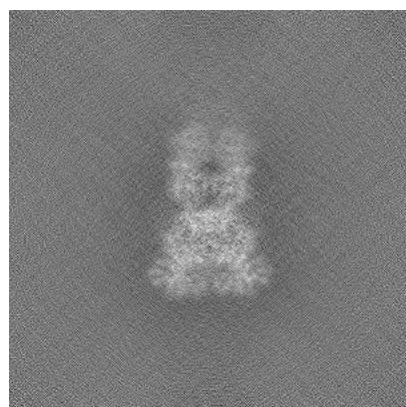


Y

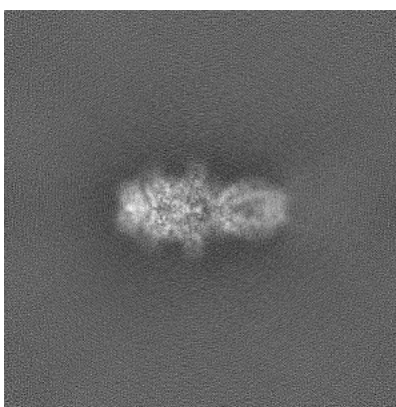


Z

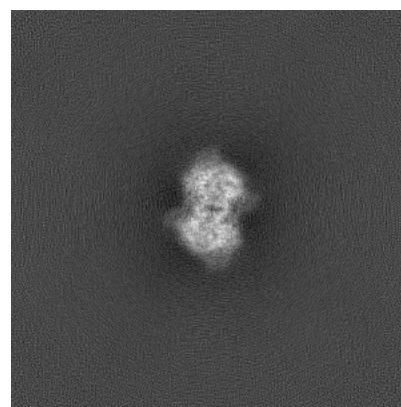
6.1.2 Raw map



X



Y

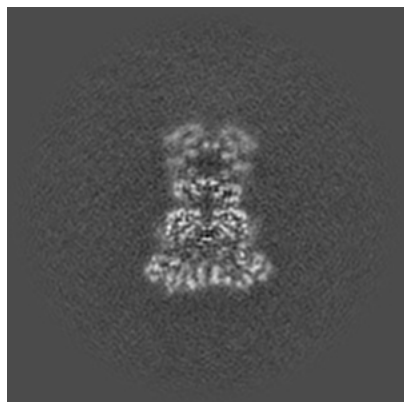


Z

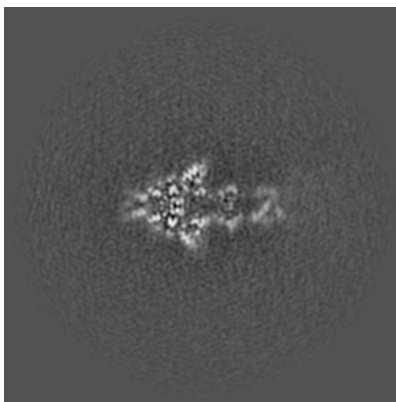
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

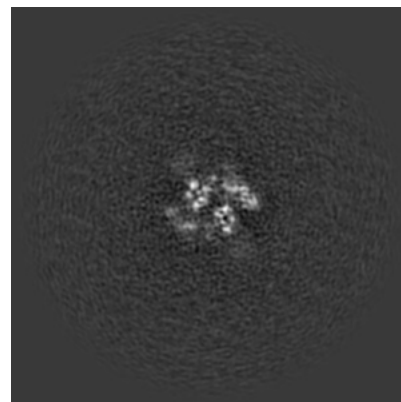
6.2.1 Primary map



X Index: 230

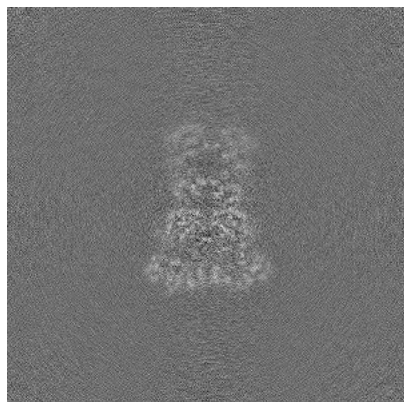


Y Index: 230

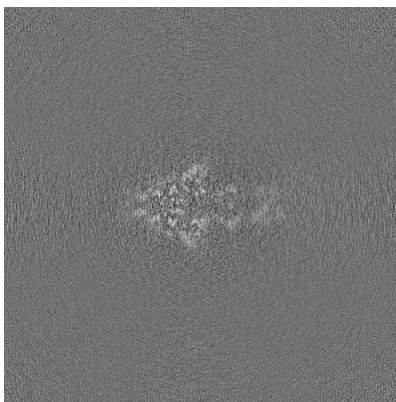


Z Index: 230

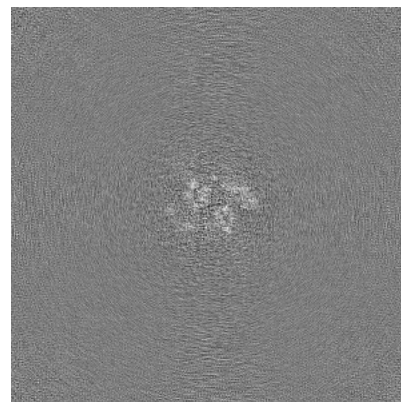
6.2.2 Raw map



X Index: 230



Y Index: 230

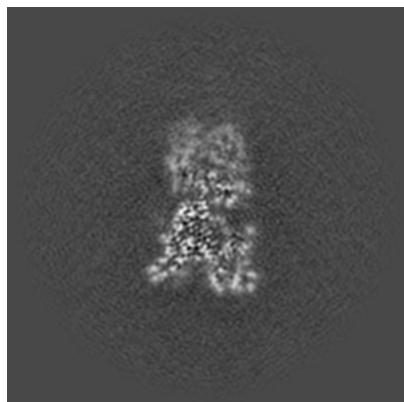


Z Index: 230

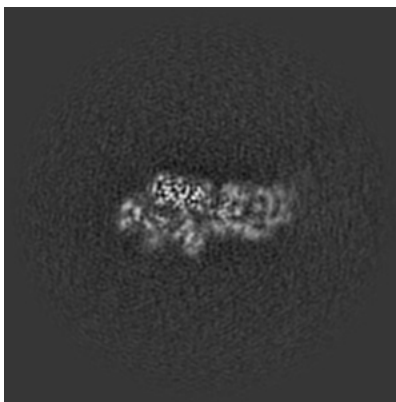
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

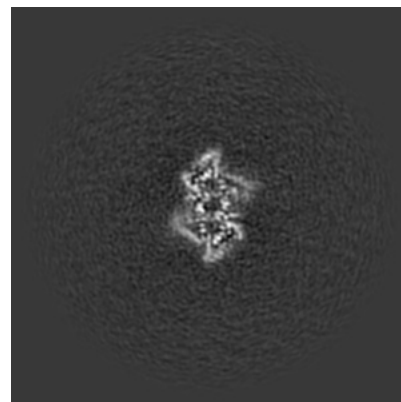
6.3.1 Primary map



X Index: 245

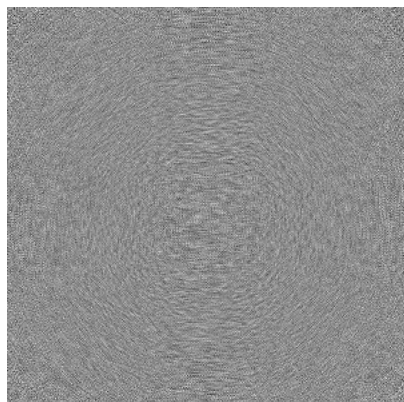


Y Index: 211

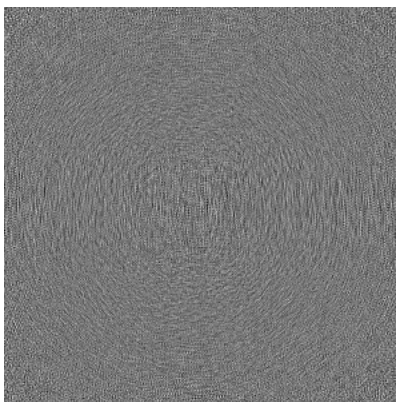


Z Index: 172

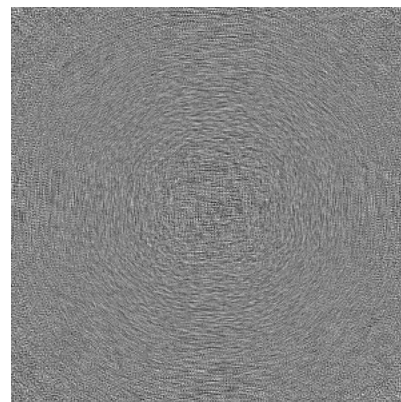
6.3.2 Raw map



X Index: 0



Y Index: 0

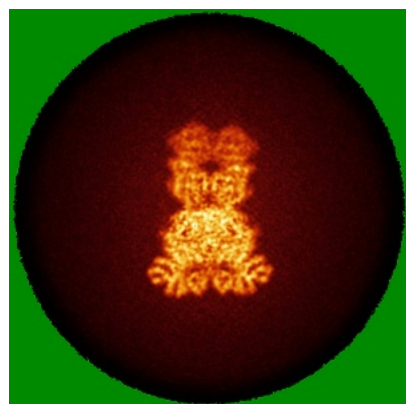


Z Index: 0

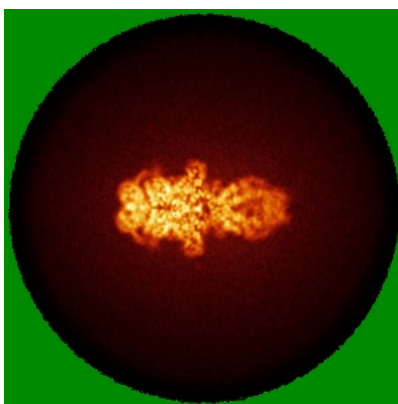
The images above show the largest variance slices of the map in three orthogonal directions.

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

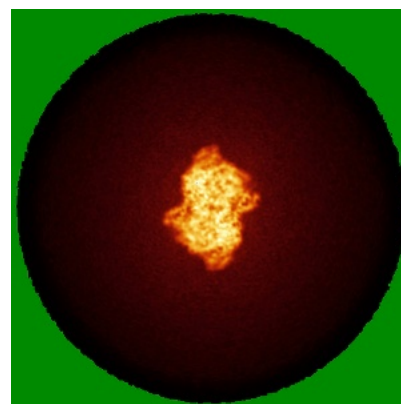
6.4.1 Primary map



X

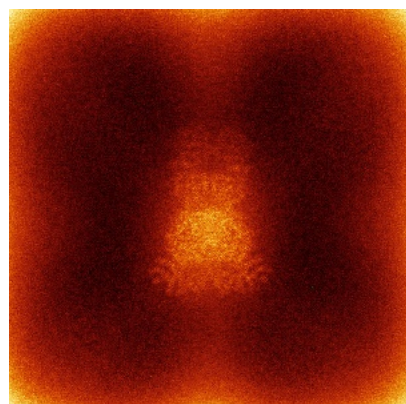


Y

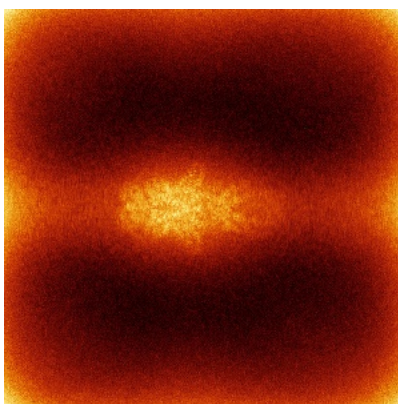


Z

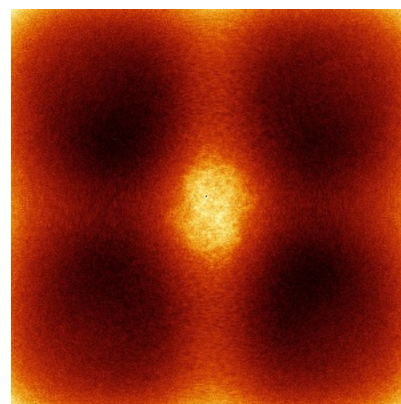
6.4.2 Raw map



X



Y

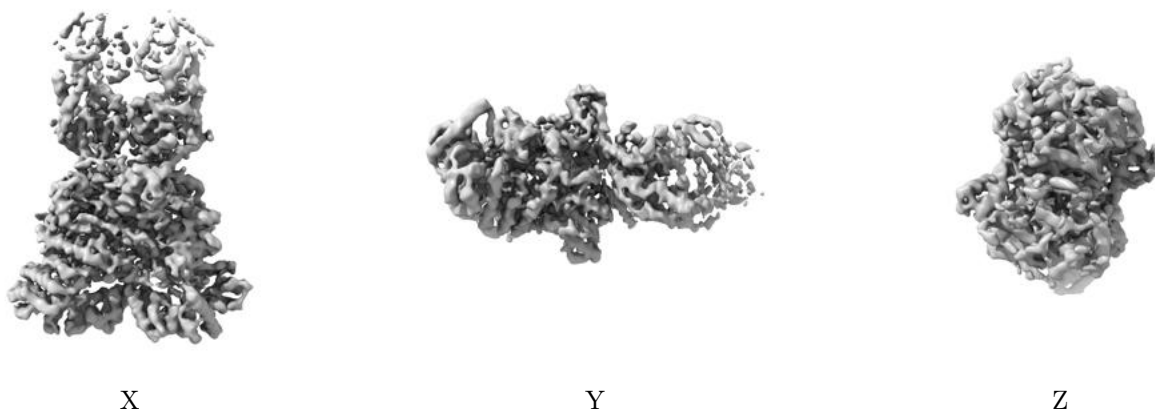


Z

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

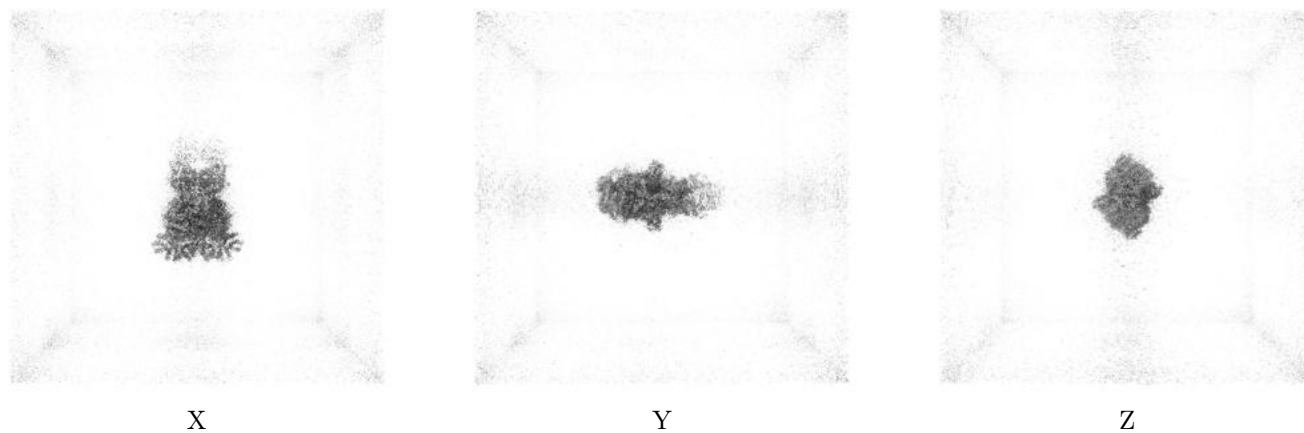
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.1. 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.

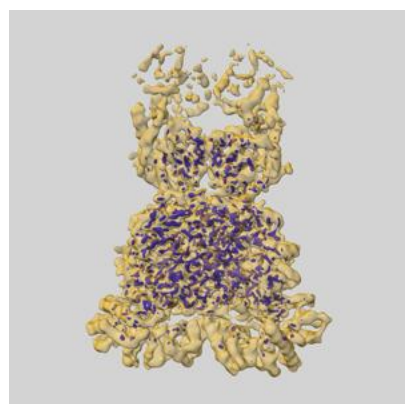
6.6 Mask visualisation [i](#)

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

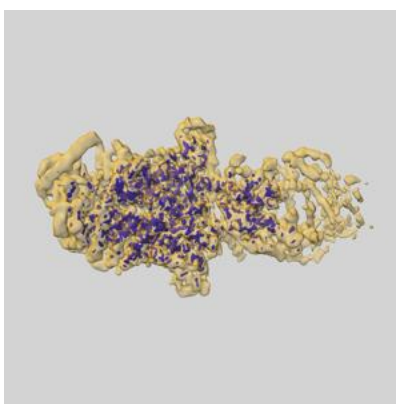
A mask typically either:

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

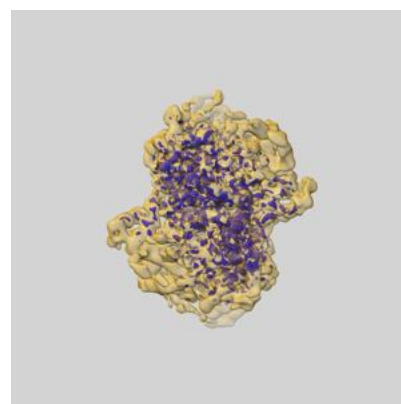
6.6.1 emd_39243_msk_1.map [i](#)



X



Y

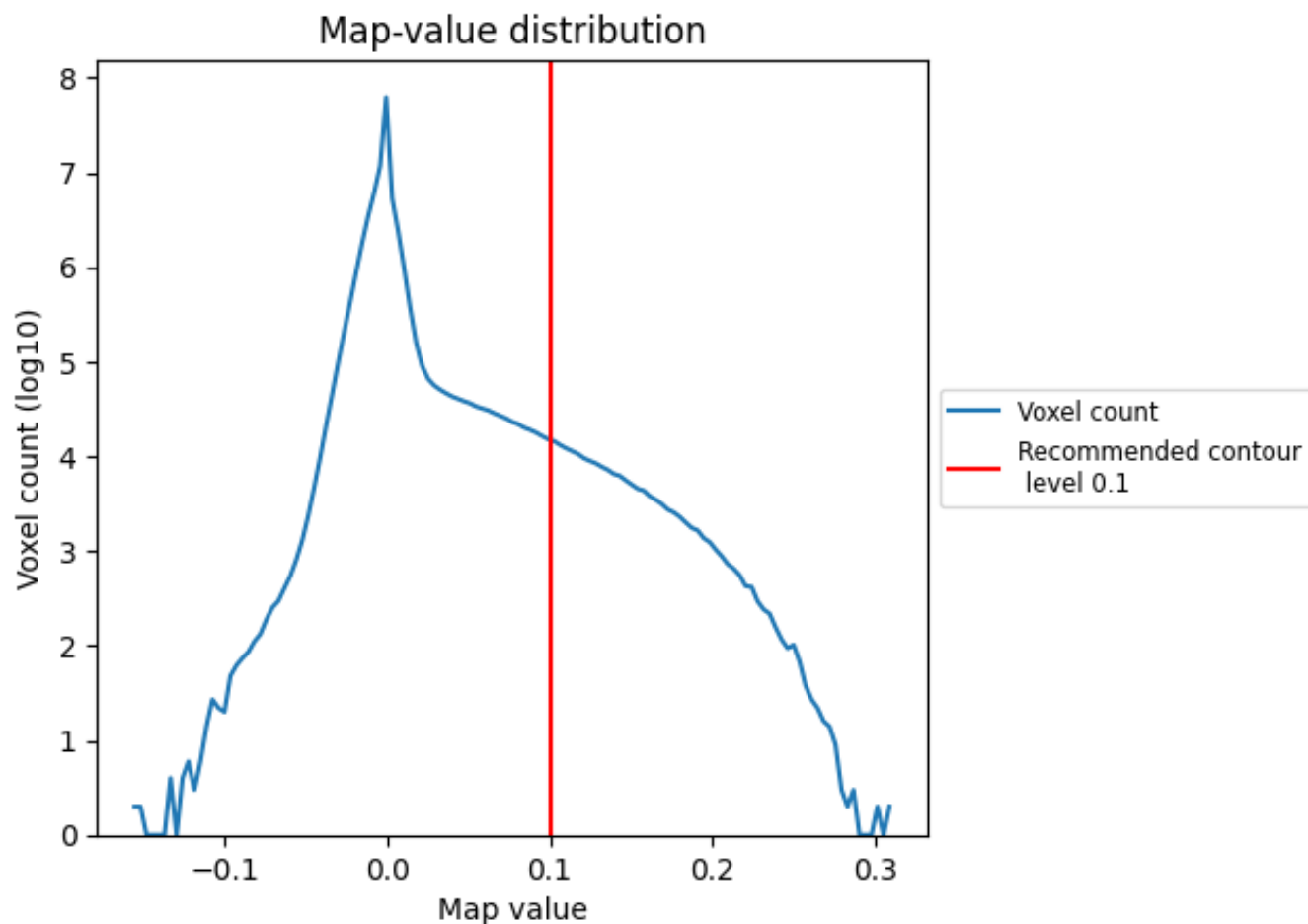


Z

7 Map analysis [i](#)

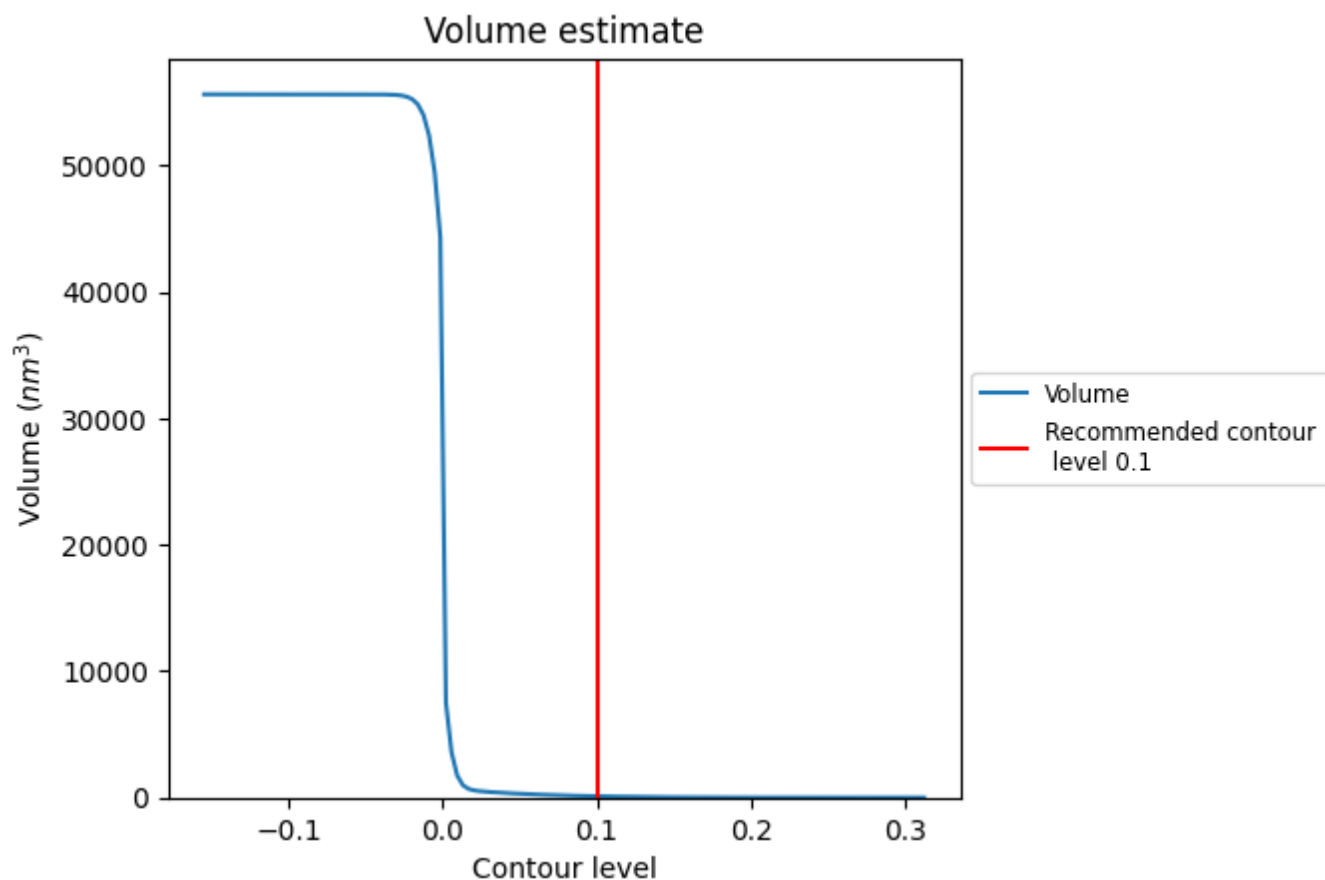
This section contains the results of statistical analysis of the map.

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.

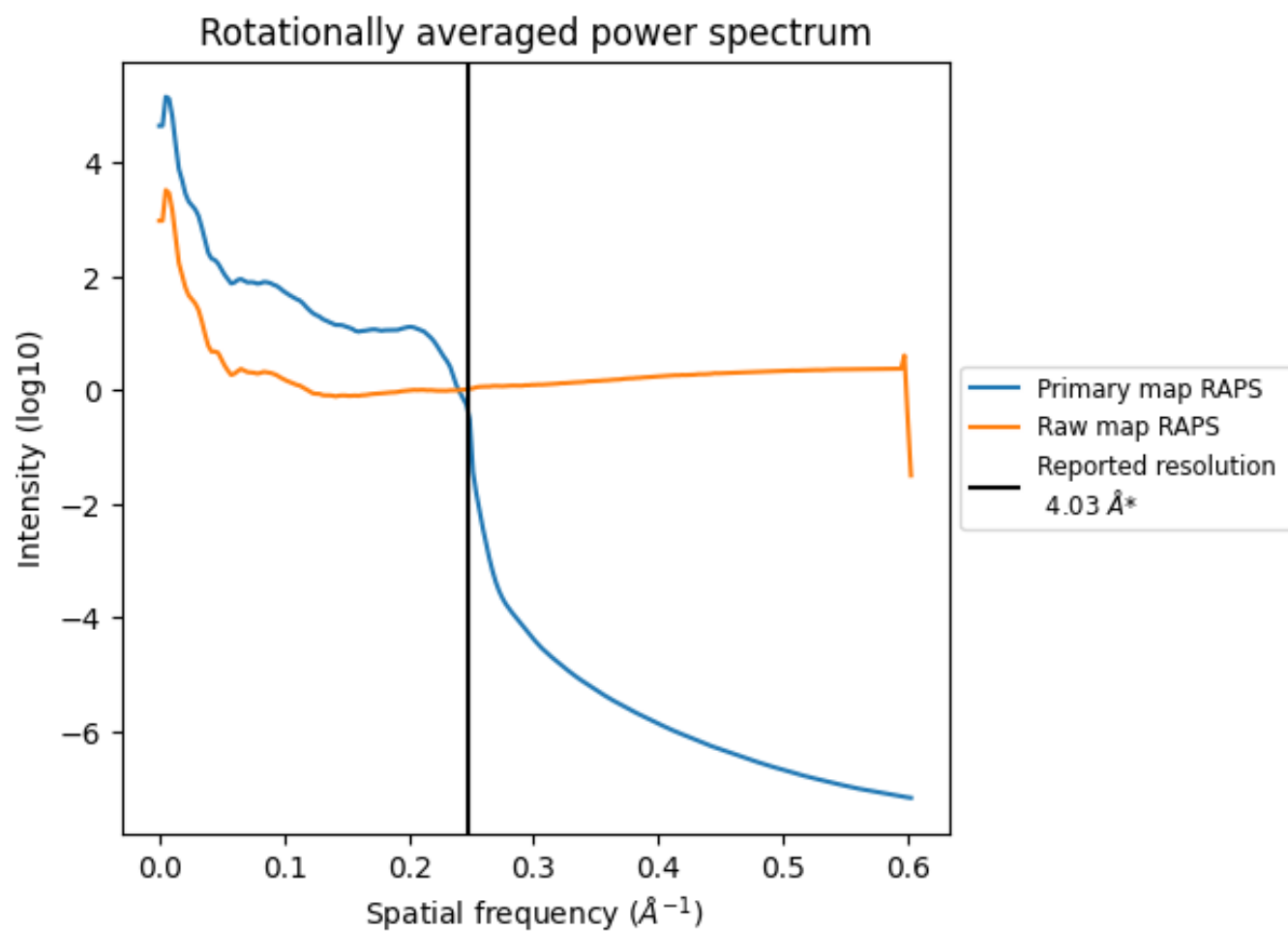
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 103 nm^3 ; this corresponds to an approximate mass of 93 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 ⓘ

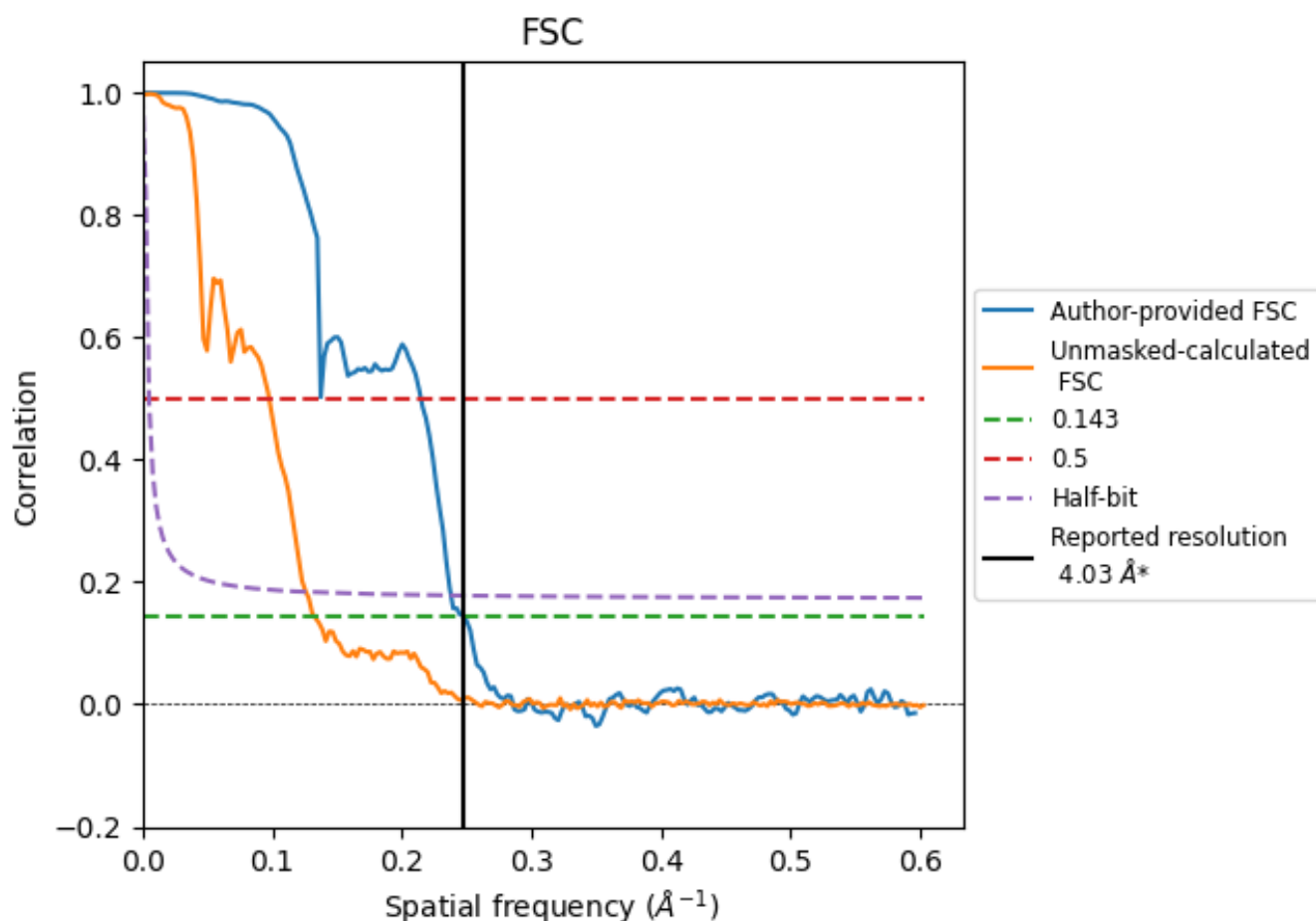


*Reported resolution corresponds to spatial frequency of $0.248 \text{ \AA}^{-1}$

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 0.248 Å⁻¹

8.2 Resolution estimates [i](#)

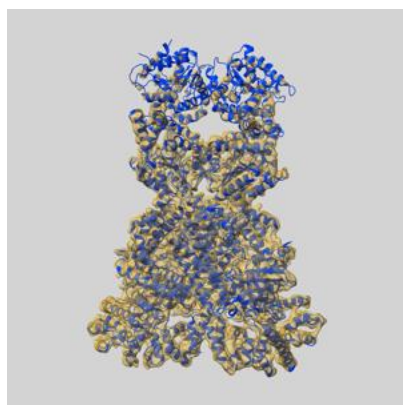
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.03	-	-
Author-provided FSC curve	4.03	4.66	4.20
Unmasked-calculated*	7.53	10.24	7.93

*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 7.53 differs from the reported value 4.03 by more than 10 %

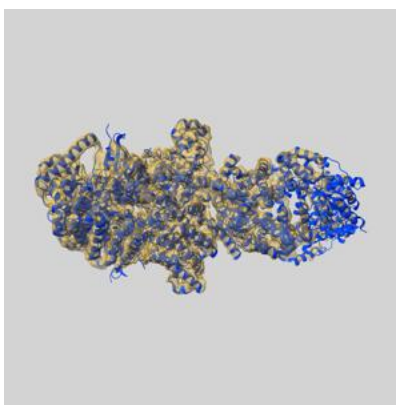
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-39243 and PDB model 8YGC. Per-residue inclusion information can be found in [section 3](#) on [page 5](#).

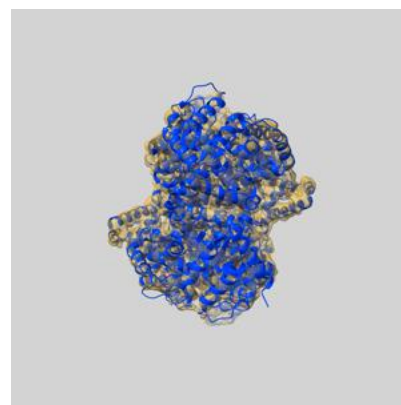
9.1 Map-model overlay [i](#)



X



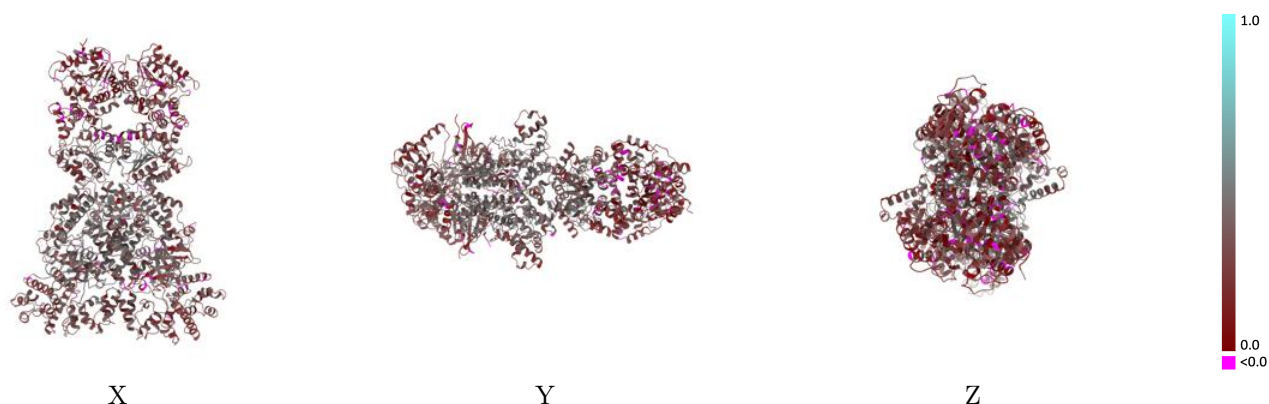
Y



Z

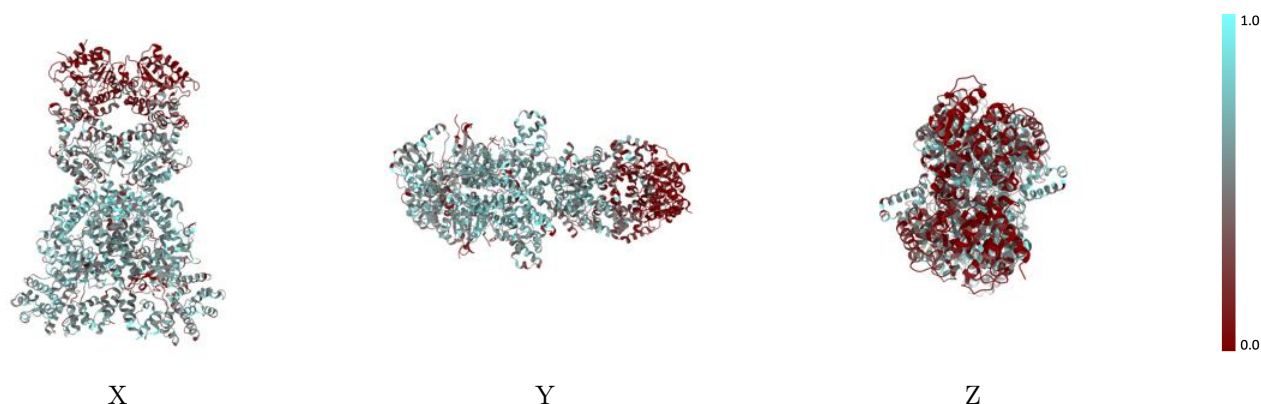
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



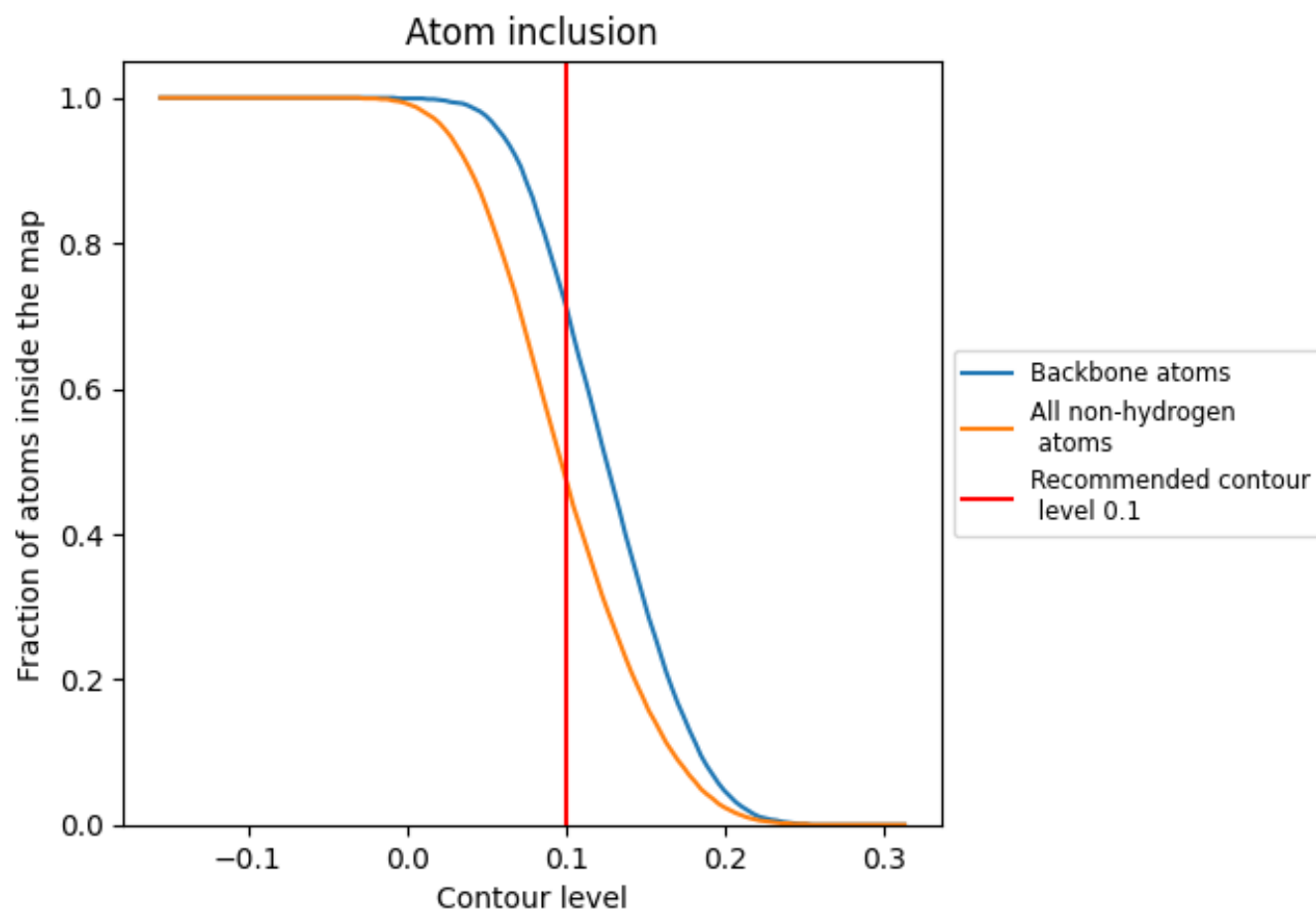
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.1).

9.4 Atom inclusion [i](#)



At the recommended contour level, 71% of all backbone atoms, 47% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4730	0.3080
A	0.5940	0.3500
B	0.5610	0.3310
C	0.3900	0.2760
D	0.4030	0.2780
E	0.1260	0.1960
F	0.1390	0.2200

1.0
0.0
-0.0