



wwPDB EM Validation Summary Report ⓘ

Mar 27, 2026 – 09:00 PM UTC

PDB ID : 8RGG / pdb_00008rgg
EMDB ID : EMD-19132
Title : Structure of dynein-2 intermediate chain DYNC2I2 (WDR34) in complex with dynein-2 heavy chain DYNC2H1.
Authors : Mukhopadhyay, A.G.; Toropova, K.; Daly, L.; Wells, J.; Vuolo, L.; Mladenov, M.; Seda, M.; Jenkins, D.; Stephens, D.J.; Roberts, A.J.
Deposited on : 2023-12-13
Resolution : 4.00 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

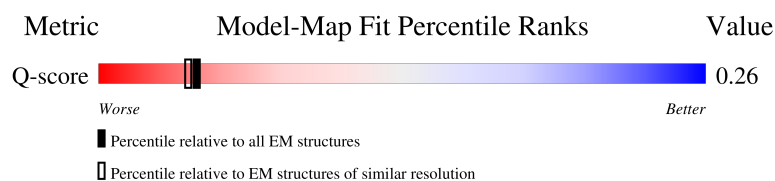
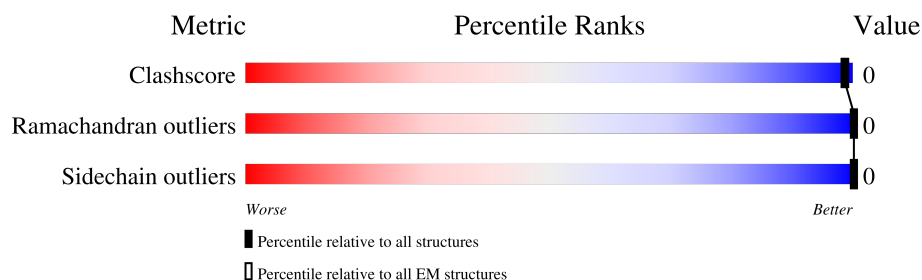
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

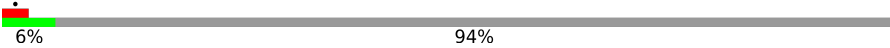
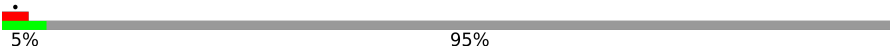
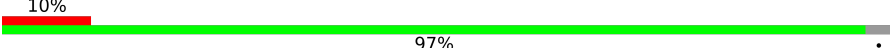
The reported resolution of this entry is 4.00 Å.

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	7587 (3.50 - 4.50)

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	B	4513	 6% 94%
2	C	1066	 5% 95%
3	D	564	 27% 79% 19%
4	G	96	 10% 97%

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Mol	Chain	Length	Quality of chain
4	H	96	6% 96% ..
5	I	89	28% 97% .
5	J	89	12% 96% ..

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 7679 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 Methylated-DNA--protein-cysteine methyltransferase,Cytoplasmic dynein 2 heavy chain 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	B	286	2297	1451	406	431	9	0	0

There are 47 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-205	GLY	-	expression tag	UNP P16455
B	-176	ARG	GLU	engineered mutation	UNP P16455
B	-174	ILE	LYS	engineered mutation	UNP P16455
B	-173	PHE	LEU	engineered mutation	UNP P16455
B	-144	ALA	CYS	engineered mutation	UNP P16455
B	-91	SER	GLN	engineered mutation	UNP P16455
B	-90	HIS	GLN	engineered mutation	UNP P16455
B	-81	ALA	LYS	engineered mutation	UNP P16455
B	-79	THR	ALA	engineered mutation	UNP P16455
B	-78	ALA	ARG	engineered mutation	UNP P16455
B	-75	LYS	GLY	engineered mutation	UNP P16455
B	-74	THR	GLY	engineered mutation	UNP P16455
B	-72	LEU	MET	engineered mutation	UNP P16455
B	-71	SER	ARG	engineered mutation	UNP P16455
B	-56	GLN	CYS	engineered mutation	UNP P16455
B	-55	GLY	SER	engineered mutation	UNP P16455
B	-54	ASP	SER	engineered mutation	UNP P16455
B	-53	LEU	GLY	engineered mutation	UNP P16455
B	-52	ASP	ALA	engineered mutation	UNP P16455
B	-49	GLY	ASN	engineered mutation	UNP P16455
B	-47	GLU	SER	engineered mutation	UNP P16455
B	-21	LEU	-	linker	UNP P16455
B	-20	GLU	-	linker	UNP P16455
B	-19	VAL	-	linker	UNP P16455
B	-18	LEU	-	linker	UNP P16455
B	-17	PHE	-	linker	UNP P16455
B	-16	GLN	-	linker	UNP P16455

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-15	GLY	-	linker	UNP P16455
B	-14	PRO	-	linker	UNP P16455
B	-13	ASP	-	linker	UNP P16455
B	-12	TYR	-	linker	UNP P16455
B	-11	ASP	-	linker	UNP P16455
B	-10	ILE	-	linker	UNP P16455
B	-9	PRO	-	linker	UNP P16455
B	-8	THR	-	linker	UNP P16455
B	-7	THR	-	linker	UNP P16455
B	-6	LEU	-	linker	UNP P16455
B	-5	GLU	-	linker	UNP P16455
B	-4	VAL	-	linker	UNP P16455
B	-3	LEU	-	linker	UNP P16455
B	-2	PHE	-	linker	UNP P16455
B	-1	GLN	-	linker	UNP P16455
B	0	GLY	-	linker	UNP P16455
B	1	PRO	-	linker	UNP P16455
B	1413	ARG	LYS	variant	UNP Q8NCM8
B	2871	GLN	ARG	variant	UNP Q8NCM8
B	3680	VAL	ALA	variant	UNP Q8NCM8

- Molecule 2 is a protein called Cytoplasmic dynein 2 intermediate chain 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	C	56	Total	C	N	O	0	0
			277	165	56	56		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	225	LYS	ASN	conflict	UNP Q8WVS4
C	292	PHE	SER	conflict	UNP Q8WVS4

- Molecule 3 is a protein called Cytoplasmic dynein 2 intermediate chain 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	456	Total	C	N	O	S	0	0
			3329	2111	581	625	12		

There are 29 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	60	GLY	TRP	conflict	UNP Q96EX3
D	537	TRP	-	expression tag	UNP Q96EX3
D	538	SER	-	expression tag	UNP Q96EX3
D	539	HIS	-	expression tag	UNP Q96EX3
D	540	PRO	-	expression tag	UNP Q96EX3
D	541	GLN	-	expression tag	UNP Q96EX3
D	542	PHE	-	expression tag	UNP Q96EX3
D	543	GLU	-	expression tag	UNP Q96EX3
D	544	LYS	-	expression tag	UNP Q96EX3
D	545	GLY	-	expression tag	UNP Q96EX3
D	546	SER	-	expression tag	UNP Q96EX3
D	547	ALA	-	expression tag	UNP Q96EX3
D	548	GLY	-	expression tag	UNP Q96EX3
D	549	SER	-	expression tag	UNP Q96EX3
D	550	ALA	-	expression tag	UNP Q96EX3
D	551	ALA	-	expression tag	UNP Q96EX3
D	552	GLY	-	expression tag	UNP Q96EX3
D	553	SER	-	expression tag	UNP Q96EX3
D	554	GLY	-	expression tag	UNP Q96EX3
D	555	ALA	-	expression tag	UNP Q96EX3
D	556	GLY	-	expression tag	UNP Q96EX3
D	557	TRP	-	expression tag	UNP Q96EX3
D	558	SER	-	expression tag	UNP Q96EX3
D	559	HIS	-	expression tag	UNP Q96EX3
D	560	PRO	-	expression tag	UNP Q96EX3
D	561	GLN	-	expression tag	UNP Q96EX3
D	562	PHE	-	expression tag	UNP Q96EX3
D	563	GLU	-	expression tag	UNP Q96EX3
D	564	LYS	-	expression tag	UNP Q96EX3

- Molecule 4 is a protein called Dynein light chain roadblock-type 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
4	G	93	Total	C	N	O	0	0
			462	276	93	93		
4	H	93	Total	C	N	O	0	0
			462	276	93	93		

- Molecule 5 is a protein called Dynein light chain 1, cytoplasmic.

Mol	Chain	Residues	Atoms				AltConf	Trace
5	I	86	Total	C	N	O	0	0
			426	254	86	86		

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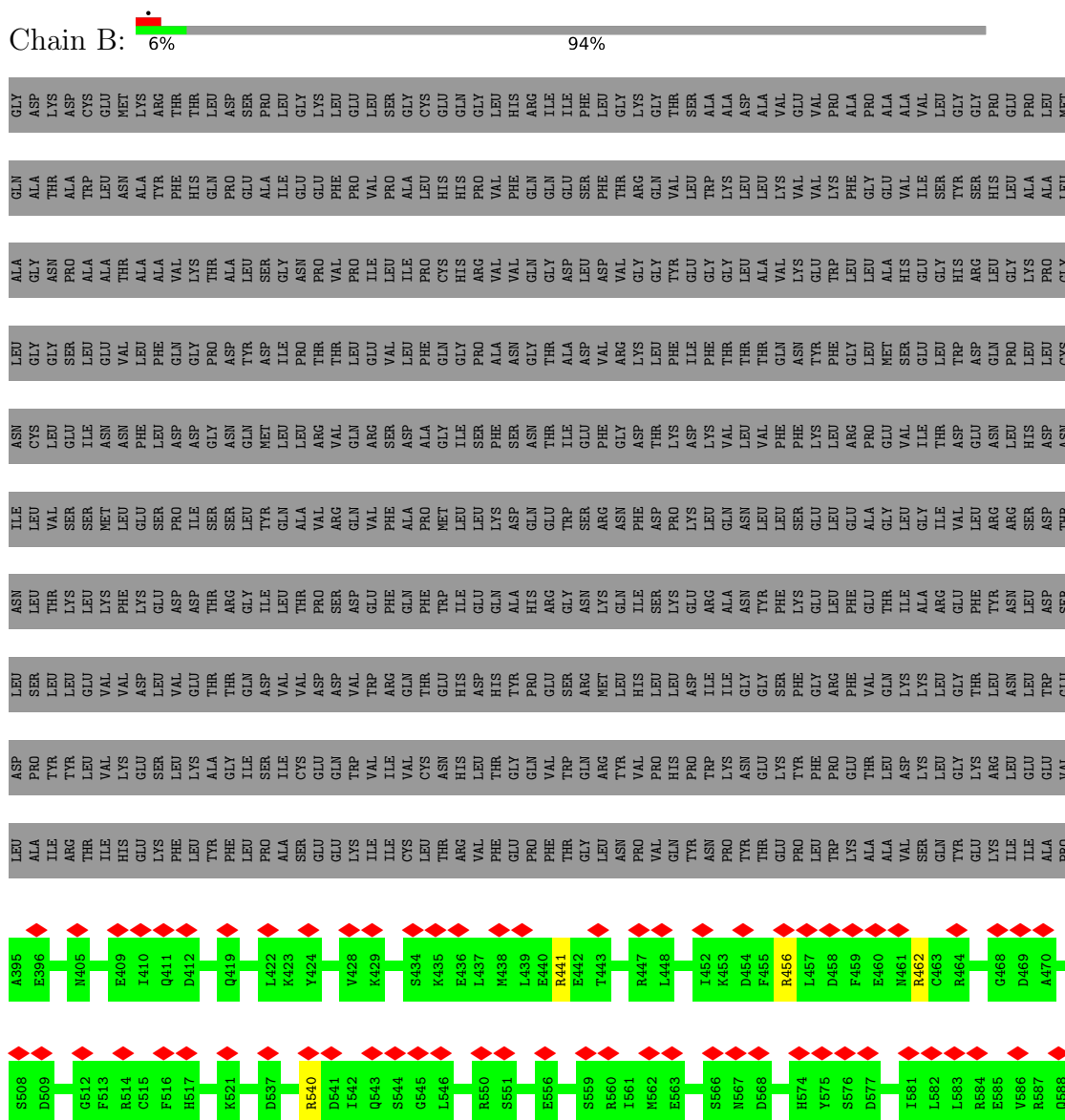
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Mol	Chain	Residues	Atoms				AltConf	Trace
5	J	86	Total	C	N	O	0	0
			426	254	86	86		

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: Methylated-DNA--protein-cysteine methyltransferase,Cytoplasmic dynein 2 heavy chain 1



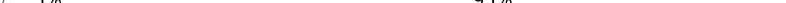






[illegible]

- Molecule 2: Cytoplasmic dynein 2 intermediate chain 1

Chain C:  5% 95%

MET	GLU	PRO	GLY	LYS	ARG	ARG	THR	LYS	ASP	ASP	THR	TRP	LYS	ALA	ALA	ASP	ASP	LEU	ARG	LYS	HIS	LEU	LEU	TRP	ALA	GLN	SER	GLY	GLY	SER	LYS	GLU	GLU	ARG	ARG	LYS	HIS	ARG	HIS	GLU	LYS	LYS	MET	GLU	GLU	GLY	ASP	LEU	LEU	GLU	PRO	ARG	CYS	ARG	ASP	PRO
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[illegible]

ARG	GLY	LYS	GLU	LYS	ASP	ARG	ARG	ALA	ARG	LYS	GLU	GLU	LEU	ARG	GLN	THR	VAL	HIS	HIS	ASN	LEU	LEU	GLY	GLN	GLU	THR	ARG	ASP	ARG	GLN	LEU	LEU	GLU	ARG	ALA	GLU	ARG	LYS	GLY	ARG	ARG	SER	VAL	LYS	LYS	VAL	ARG	ARG	SER	GLU	GLU	LYS	GLY	ASP	GLU	ASP	SER	GLY	ASP
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[illegible]

SER LYS GLU LYS LYS SER ASN SER PHE SER SER LYS GLY GLU GLU ARG HIS LYS GLU LYS ARG HIS ASP ASP GLU ARG HIS GLN SER SER ASN VAL ASP ARG LYS GLU LYS SER ALA LYS ASP ASP GLU PRO ARG LYS GLU PHE ARG GLU GLN ASN GLY GLU HIS ARG ASN ARG

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

THR	GLN	ALA	ALA	LEU	LYS	GLN	LYS	MET	MET	ARG	SER	THR	THR	LYS	LEU	LEU	ARG	ASP	PHE	SER	PHE	THR	PHE	SER	LEU	LEU	ASP	ASP	PRO	PRO	VAL	ASN	GLY	TYR	ASP	TYR	TYR	ILE	ILE	ARG	ASN	PHE	GLY	LYS	LYS	LYS	ASN	THR	THR	LYS	GLN	CYS	ASN	GLU	ASP	ASP	ASN	ASN	ASN
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Category	Item	Value
GLU	GLU	0.00
	ASP	0.00
	ARG	0.00
	ILE	0.00
	GLN	0.00
	THR	0.00
	GLU	0.00
	GLU	0.00
	GLU	0.00
	GLU	0.00
TSS1	TSS1	0.00
	R552	0.00
P559	P559	0.00
	C560	0.00
	E561	0.00
	S562	0.00
	T563	0.00
	V564	0.00
S569	S569	0.00
	GLU	0.00
GLN	GLN	0.00
	ARG	0.00
THR	THR	0.00
	ASP	0.00
S575	S575	0.00
	D576	0.00
	A577	0.00
	V578	0.00
	V579	0.00
	M580	0.00
	F581	0.00
	K582	0.00
	L583	0.00
	D584	0.00
T585	T585	0.00
	F586	0.00
R587	R587	0.00
	S590	0.00
F591	F591	0.00
	C596	0.00
Q597	Q597	0.00
	A600	0.00
V601	V601	0.00
	L608	0.00
A609	A609	0.00
	A610	0.00
E611	E611	0.00
	PRO	0.00
SER	SER	0.00
	TRP	0.00
	ASN	0.00
	LEU	0.00
	ARG	0.00

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

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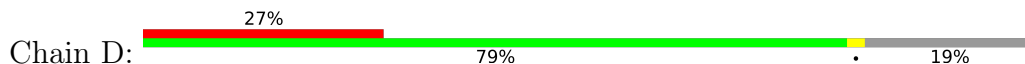
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GLY THR THR GLN THR THR LEU ASN VAL VAL LYS PHE LEU PRO LEU SER ASP ASP PRO PRO ASN HIS PHE PHE ILE ILE GLY THR THR ASP MET GLY LEU LEU ILE SER HIS GLY THR ARG ARG GLN GLN LEU LEU ARG VAL VAL ALA PRO PRO LYS LYS PHE PHE LYS LYS THR THR GLN GLN GLY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

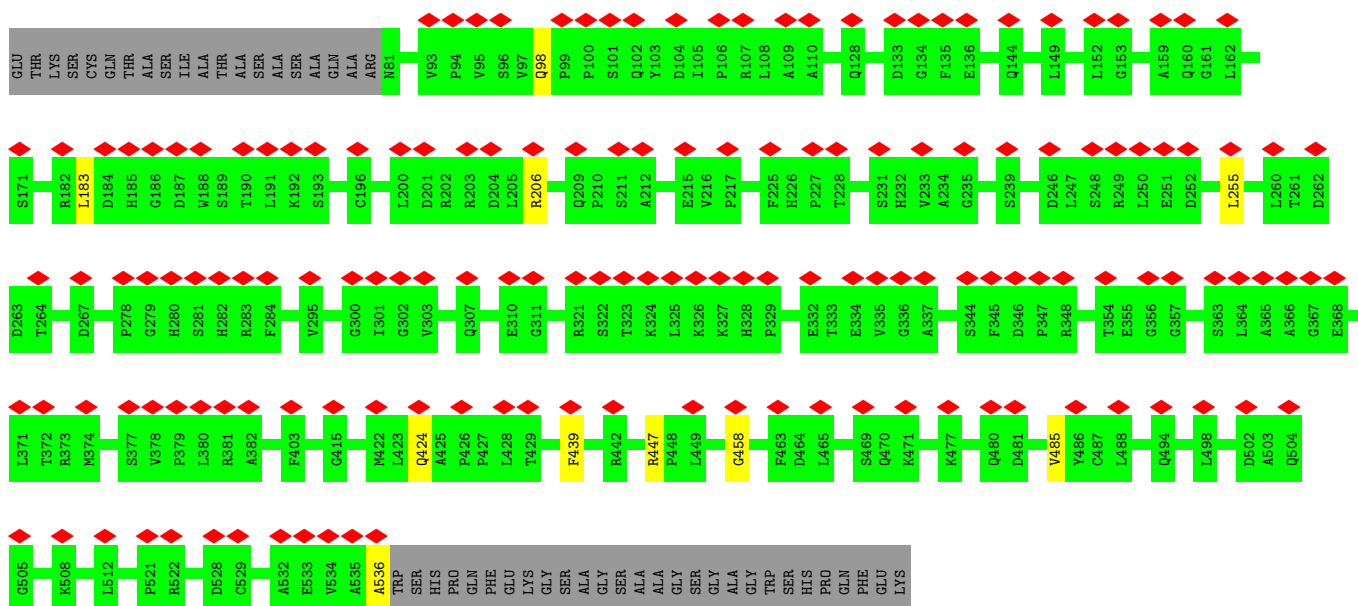
PRO	PHE	GLY	GLU	PRO	PRO	ILE	PHE	LEU	ALA	ALA	GLY	CYS	SER	ASP	GLY	SER	ILE	ARG	LEU	HIS	GLN	LEU	SER	SER	ALA	ALA	PHE	PRO	LEU	LEU	LEU	GLN	TRP	ASP	SER	SER	SER	THR	THR	ASP	SER	HIS	ALA	ALA	VAL	THR	THR	THR	ARG	ARG	PRO	PRO	ALA	VAL	PHE	PHE	LEU	VAL	GLN	ASP	ASP	THR	THR	SER	SER	SEN
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TRP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

- Molecule 3: Cytoplasmic dynein 2 intermediate chain 2



NET	ALA	THR	ARG	ALA	GLN	PRO	GLY	PRO	GLN	LEU	SER	SER	ALA	ALA	GLY	SER	GLY	VAL	ALA	ALA	ALA	LEU	THR	THR	VAL	GLY	VAL	ALA	SER	GLY	GLY	PRO	GLY	GLY	GLY	GLY	ASP	LEU	GLN	PRO	GLY	GLY	THR	LEU	GLY	VAL	ALA	ALA	SER	VAL	VAL	PRO	PRO	SER	GLN	GLN	GLY	ILE	ARG	GLY
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- Molecule 4: Dynein light chain roadblock-type 1



Diagram illustrating the positions of 12S-12S interactions (red diamonds) on the 12S protein structure. The interactions are located at the E3, V4, E5, E6, G16, V17, L51, S55, D85, P94, and T95 positions.

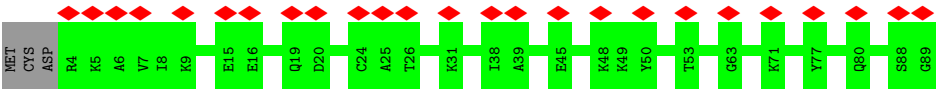
- Molecule 4: Dynein light chain roadblock-type 1



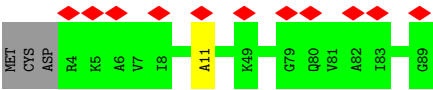
Diagram illustrating the structure of the 100-residue protein. The residues are shown in a sequence: MET, ALA, E3, N24, T25, P29, S48, K52, K84, T95, GLU. The residues E3, N24, T25, P29, S48, K52, K84, and T95 are highlighted in green. Red diamonds indicate disulfide bonds between Cys1, Cys2, Cys3, Cys4, Cys5, Cys6, Cys7, and Cys8.

- Molecule 5: Dynein light chain 1, cytoplasmic





• Molecule 5: Dynein light chain 1, cytoplasmic



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	113479	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 ($e^-/\text{\AA}^2$)	50.6	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.672	Depositor
Minimum map value	-0.226	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.017	Depositor
Recommended contour level	0.15	Depositor
Map size ($\text{\AA}$)	248.40001, 248.40001, 248.40001	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.828, 0.828, 0.828	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	B	0.77	0/2326	1.36	5/3122 (0.2%)
2	C	0.81	0/275	1.34	0/380
3	D	0.83	0/3411	1.38	9/4669 (0.2%)
4	G	0.83	0/461	1.40	0/642
4	H	0.75	0/461	1.38	2/642 (0.3%)
5	I	0.77	0/425	1.37	0/591
5	J	0.80	0/425	1.38	1/591 (0.2%)
All	All	0.80	0/7784	1.37	17/10637 (0.2%)

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	B	0	2
3	D	0	1
All	All	0	3

There are no bond length outliers.

The worst 5 of 17 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	439	PHE	CA-CB-CG	6.91	120.71	113.80
5	J	11	ALA	N-CA-C	6.51	118.10	107.23
1	B	441	ARG	NE-CZ-NH2	6.14	124.72	119.20
3	D	255	LEU	CA-C-N	5.99	130.50	121.40
3	D	255	LEU	C-N-CA	5.99	130.50	121.40

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	462	ARG	Sidechain
1	B	674	TYR	Sidechain
3	D	447	ARG	Sidechain

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	B	2297	0	2370	0	0
2	C	277	0	128	0	0
3	D	3329	0	3114	2	0
4	G	462	0	192	0	0
4	H	462	0	192	0	0
5	I	426	0	195	0	0
5	J	426	0	195	0	0
All	All	7679	0	6386	2	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 0.

All (2) 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)
3:D:424:GLN:NE2	3:D:536:ALA:H	2.19	0.41
3:D:458:GLY:HA2	3:D:485:VAL:HG23	2.03	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	B	282/4513 (6%)	279 (99%)	3 (1%)	0	100	100
2	C	52/1066 (5%)	50 (96%)	2 (4%)	0	100	100
3	D	454/564 (80%)	427 (94%)	27 (6%)	0	100	100
4	G	91/96 (95%)	84 (92%)	7 (8%)	0	100	100
4	H	91/96 (95%)	88 (97%)	3 (3%)	0	100	100
5	I	84/89 (94%)	82 (98%)	2 (2%)	0	100	100
5	J	84/89 (94%)	81 (96%)	3 (4%)	0	100	100
All	All	1138/6513 (18%)	1091 (96%)	47 (4%)	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	B	255/4008 (6%)	255 (100%)	0	100	100
3	D	330/457 (72%)	330 (100%)	0	100	100
All	All	585/4465 (13%)	585 (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. 5 of 11 such sidechains are listed below:

Mol	Chain	Res	Type
3	D	285	GLN
3	D	424	GLN
3	D	511	GLN
3	D	466	GLN
3	D	158	GLN

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.

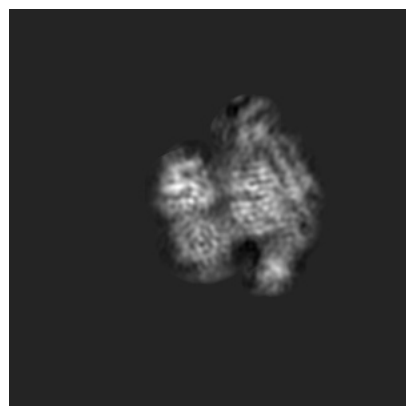
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-19132. These allow visual inspection of the internal detail of the map and identification of artifacts.

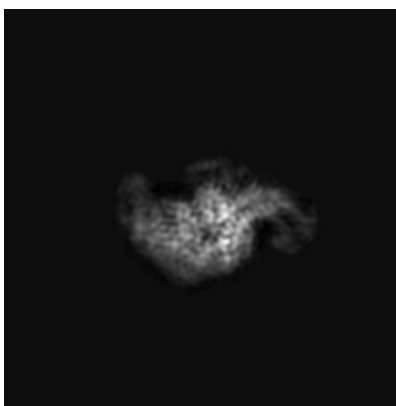
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

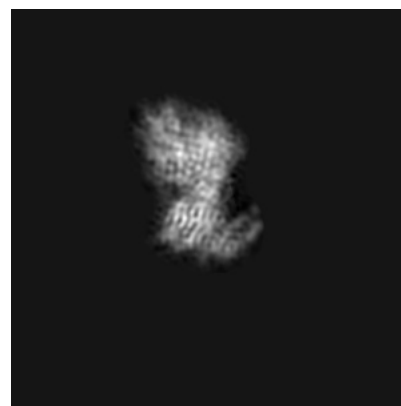
6.1.1 Primary map



X

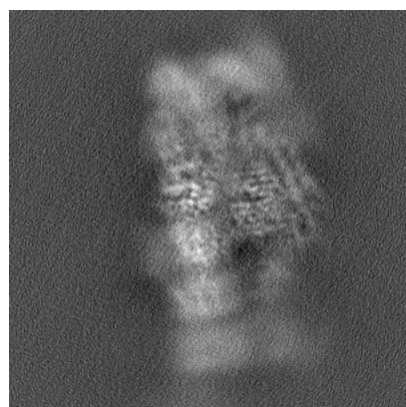


Y

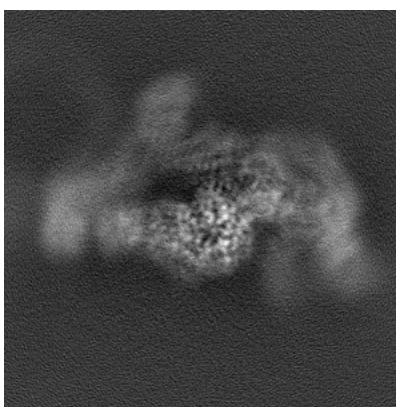


Z

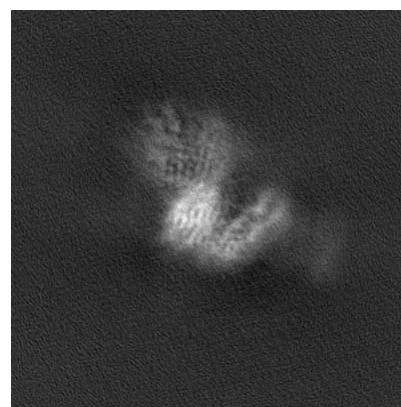
6.1.2 Raw map



X



Y

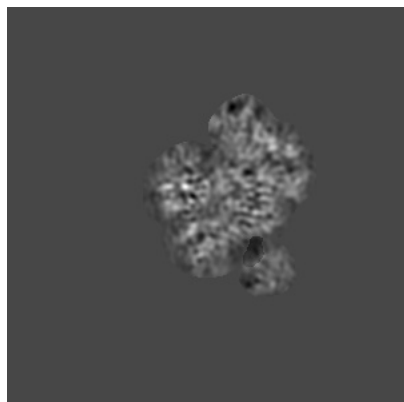


Z

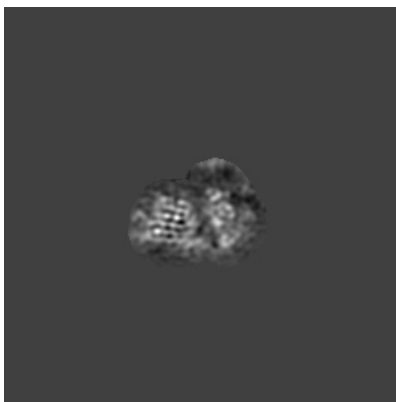
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

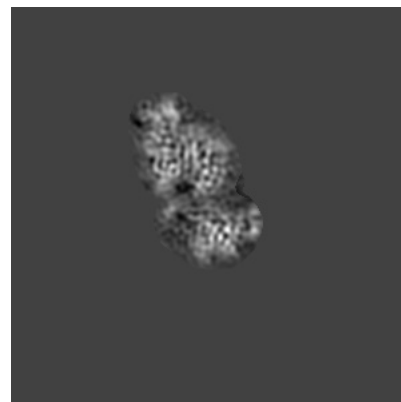
6.2.1 Primary map



X Index: 150

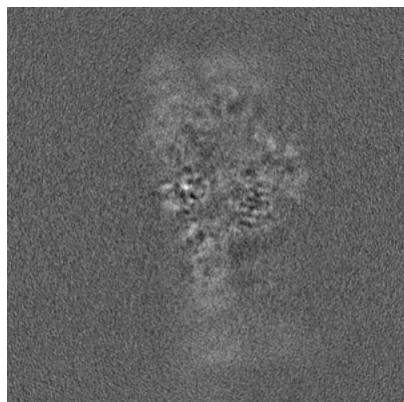


Y Index: 150

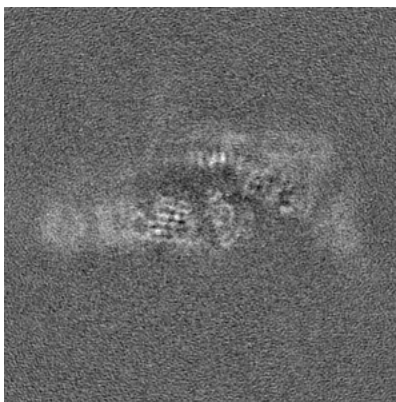


Z Index: 150

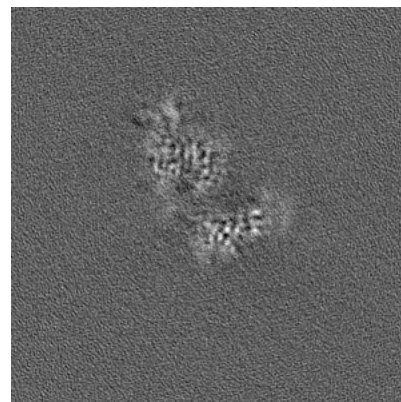
6.2.2 Raw map



X Index: 150



Y Index: 150

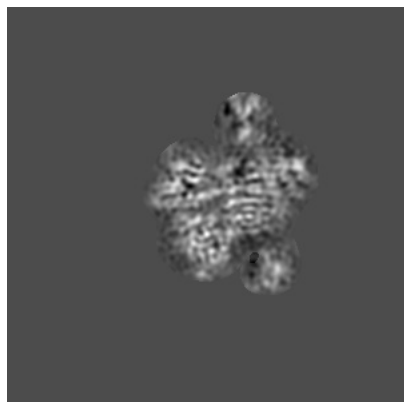


Z Index: 150

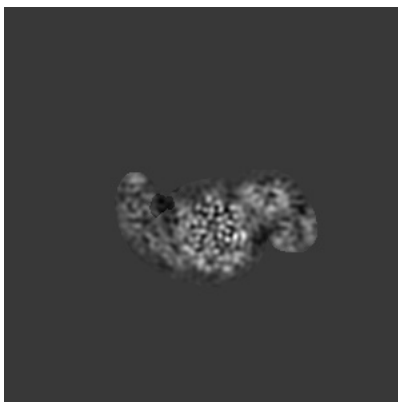
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

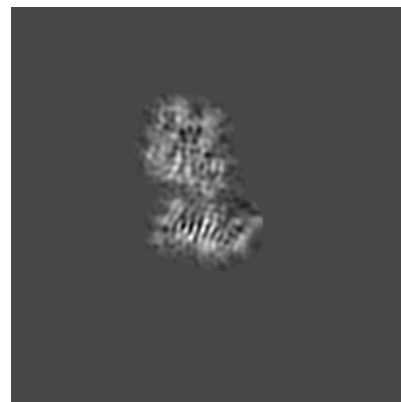
6.3.1 Primary map



X Index: 141

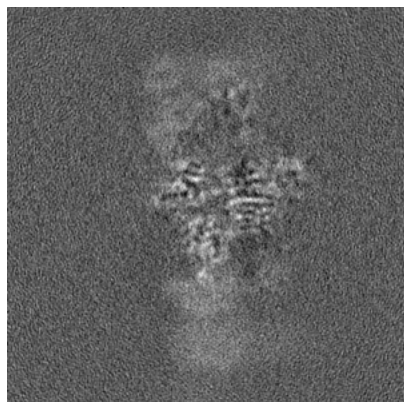


Y Index: 189

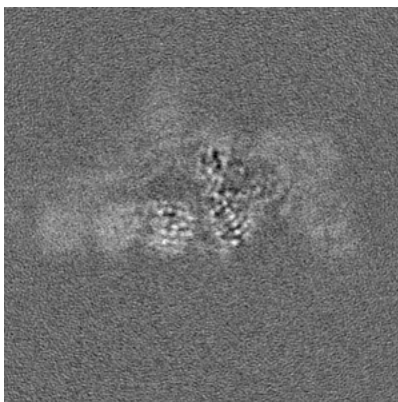


Z Index: 166

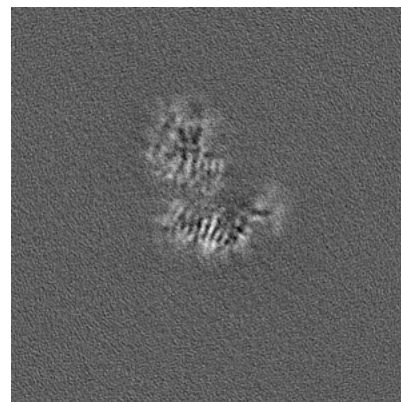
6.3.2 Raw map



X Index: 142



Y Index: 142

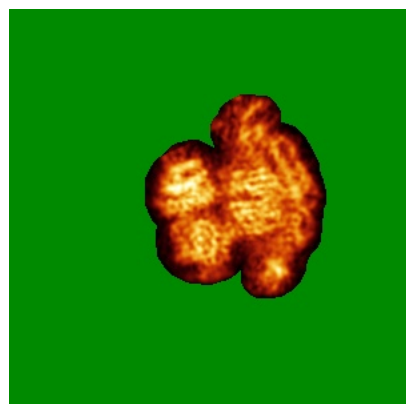


Z Index: 165

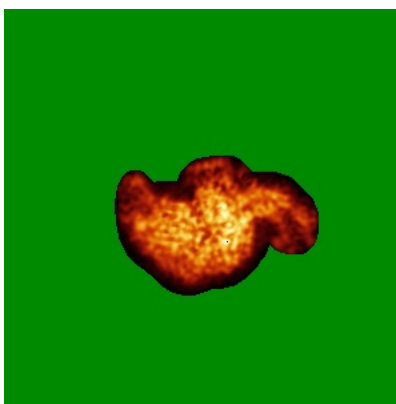
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



X

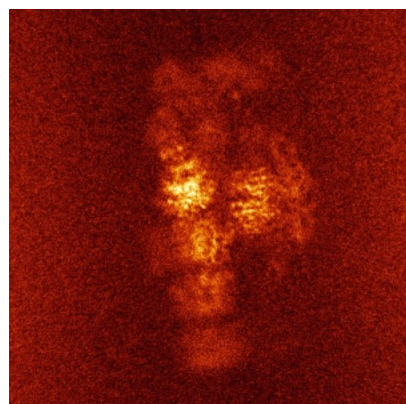


Y

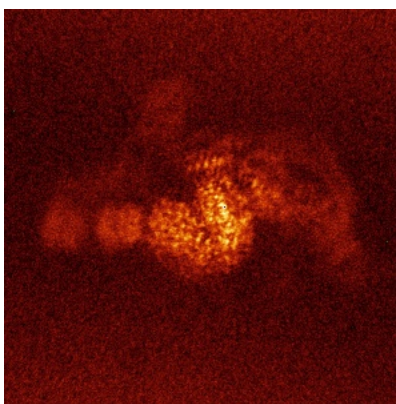


Z

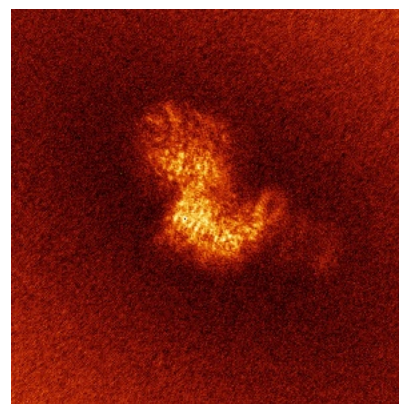
6.4.2 Raw map



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.

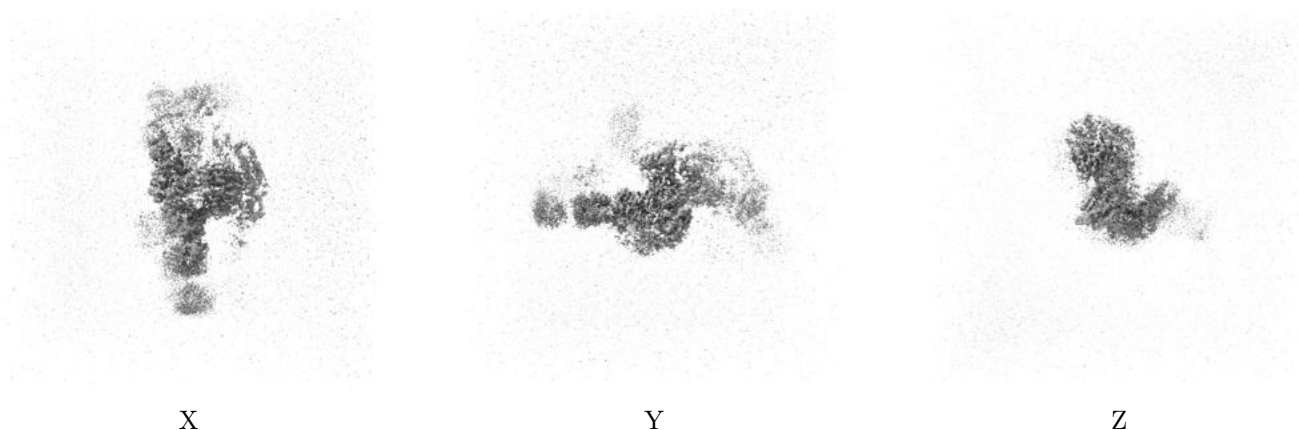
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.15. 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.

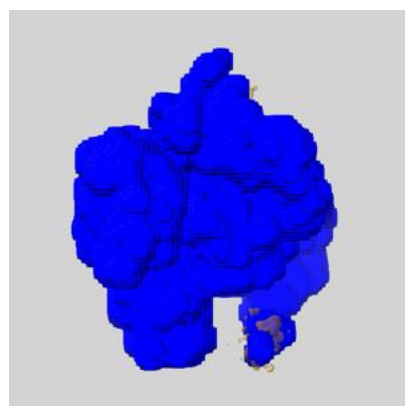
6.6 Mask visualisation [i](#)

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

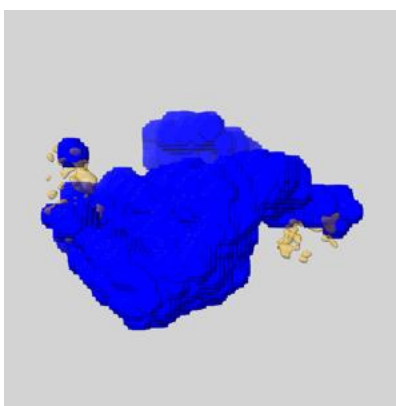
A mask typically either:

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

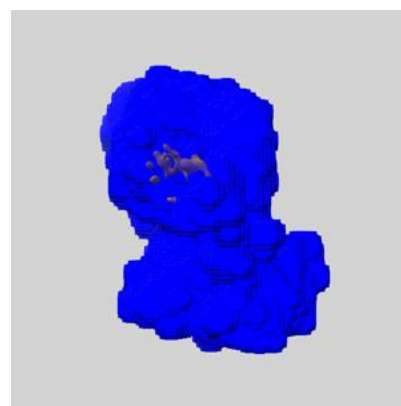
6.6.1 emd_19132_msk_1.map [i](#)



X



Y

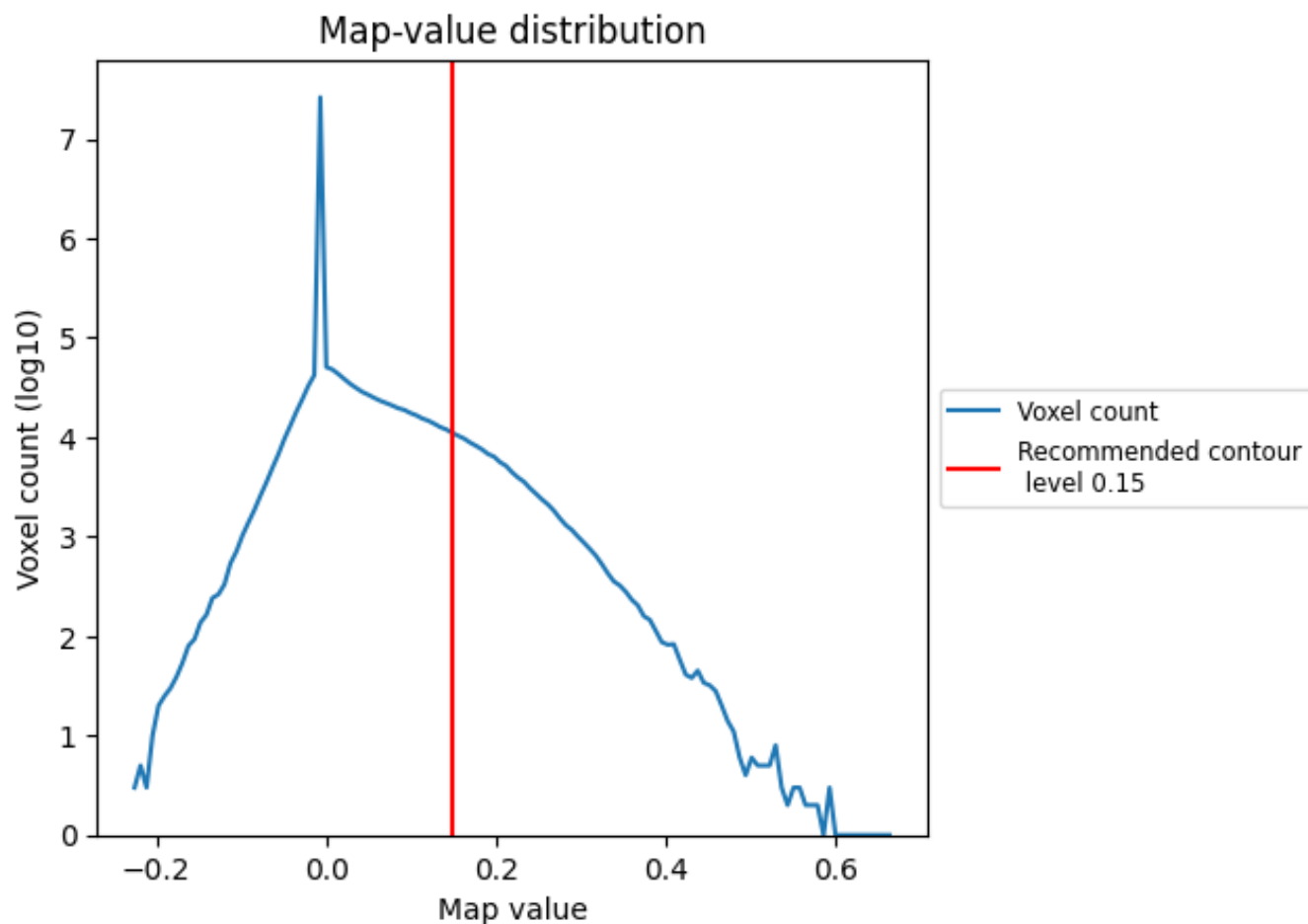


Z

7 Map analysis [i](#)

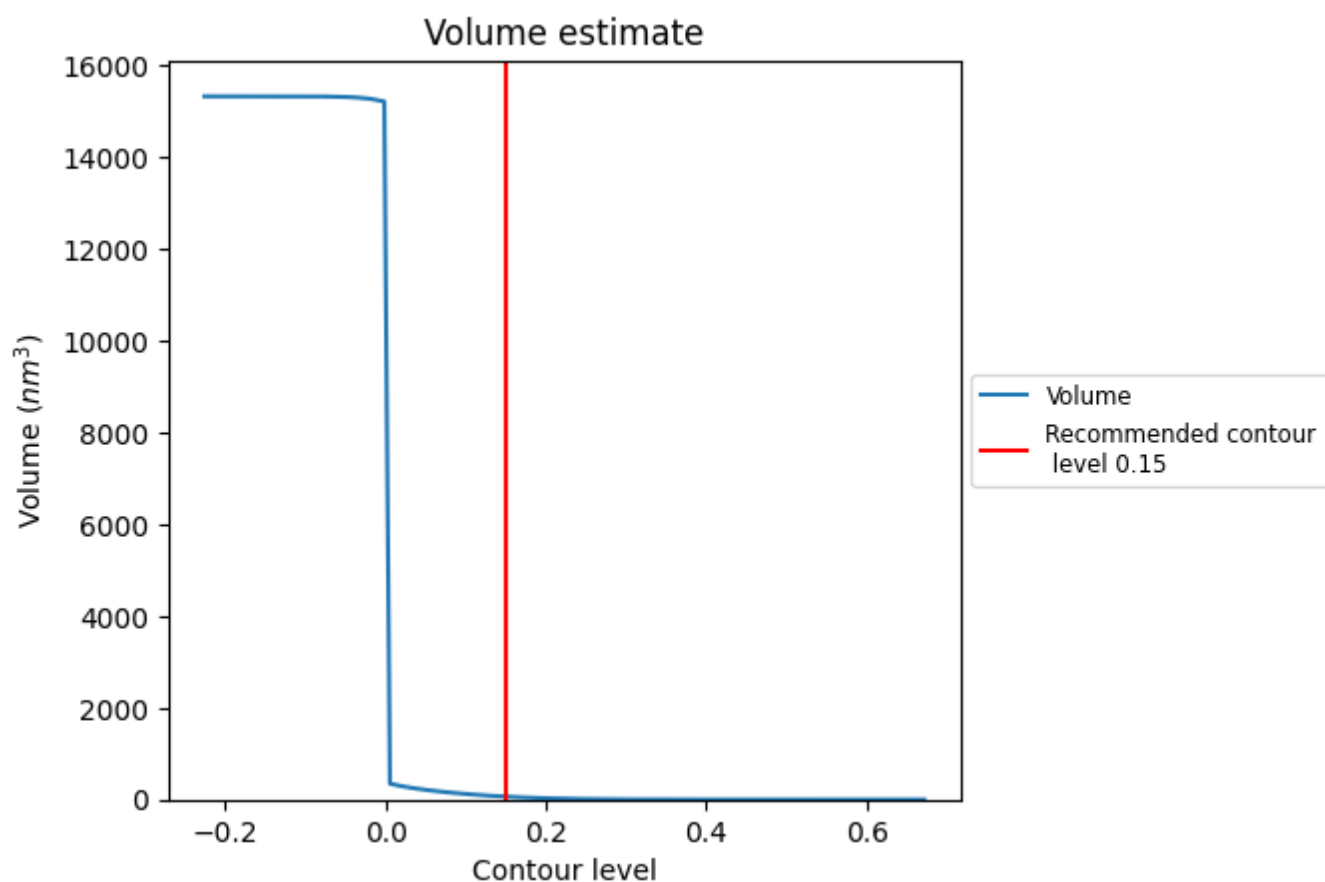
This section contains the results of statistical analysis of the map.

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.

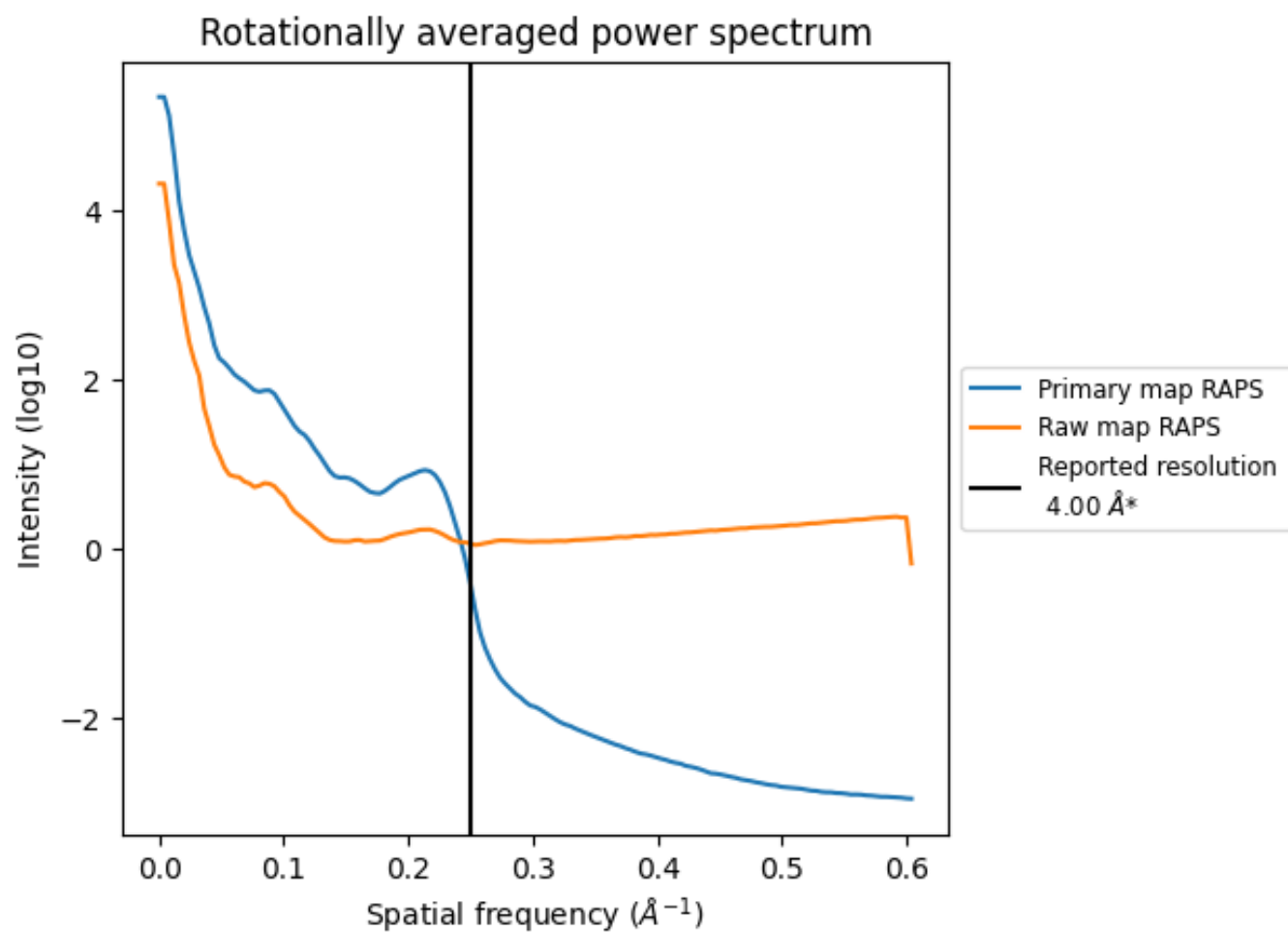
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 64 nm³; this corresponds to an approximate mass of 57 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 ⓘ

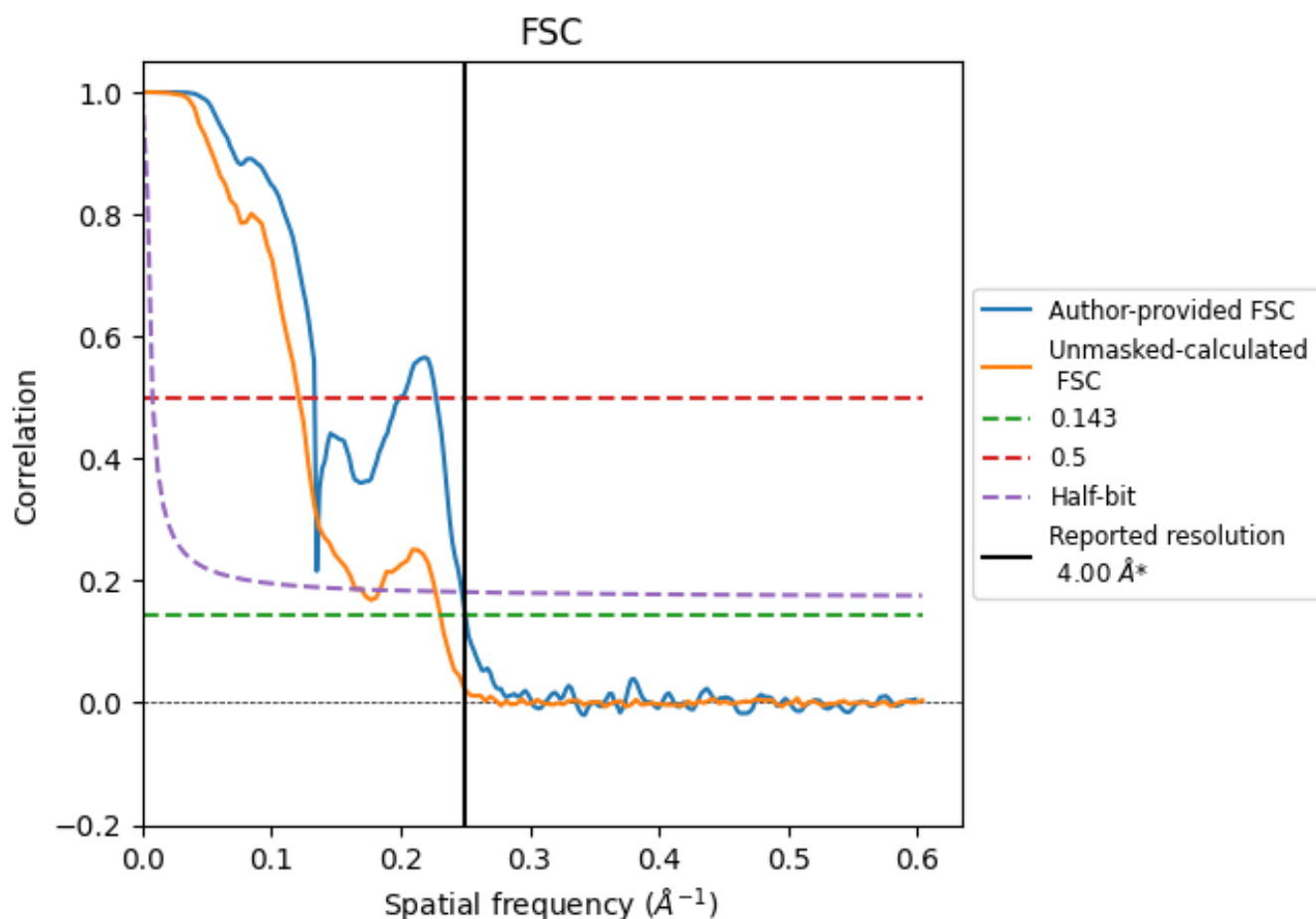


*Reported resolution corresponds to spatial frequency of 0.250 $\text{\AA}^{-1}$

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 0.250 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

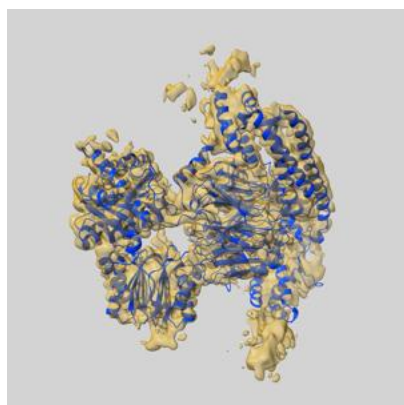
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.00	-	-
Author-provided FSC curve	4.00	7.49	4.04
Unmasked-calculated*	4.33	8.25	6.06

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

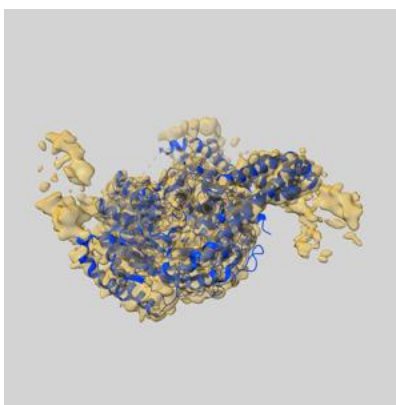
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-19132 and PDB model 8RGG. Per-residue inclusion information can be found in section [3](#) on page [8](#).

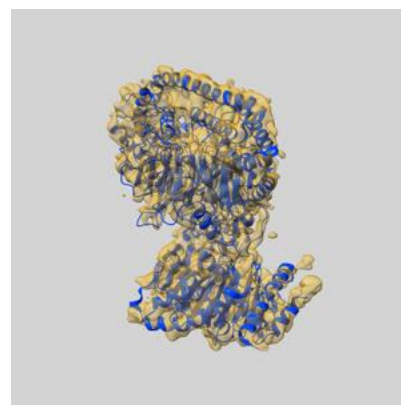
9.1 Map-model overlay [i](#)



X



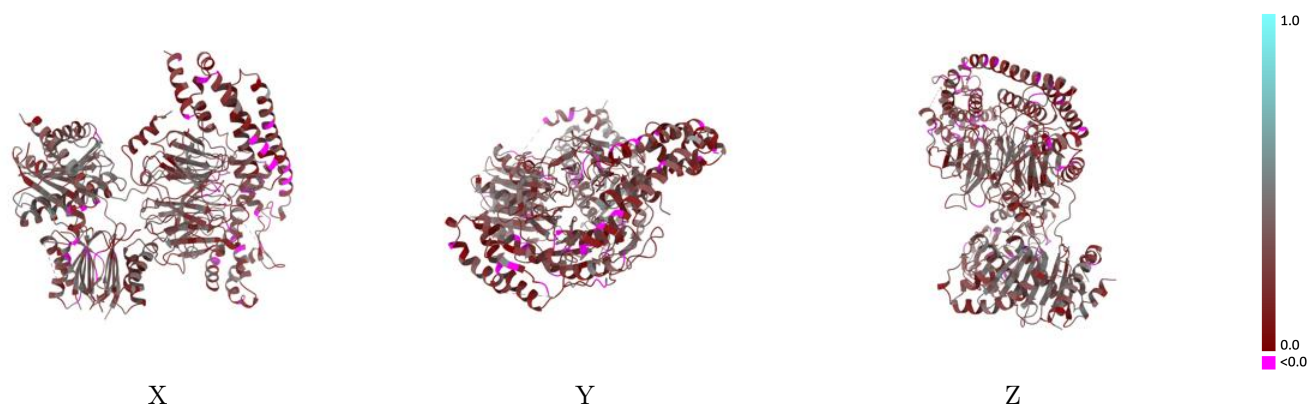
Y



Z

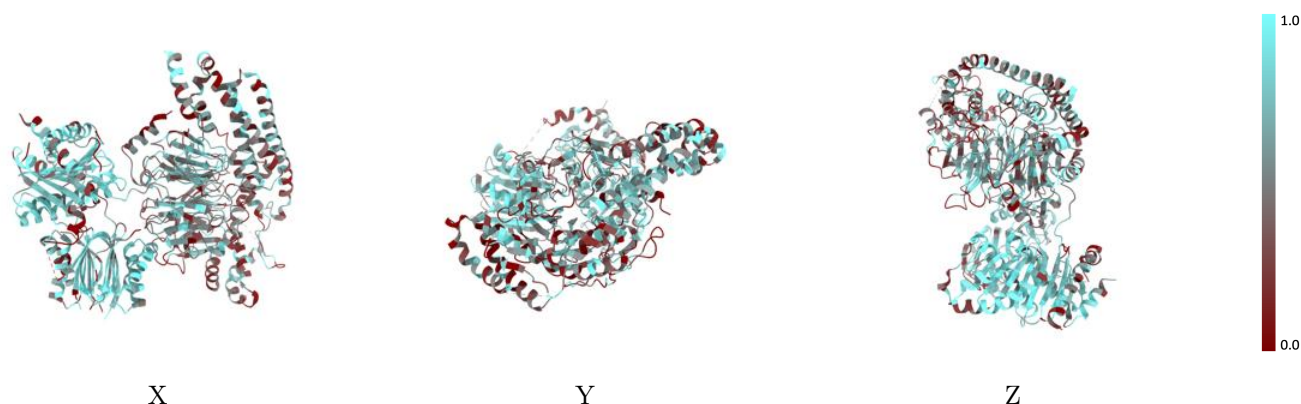
The images above show the 3D surface view of the map at the recommended contour level 0.15 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



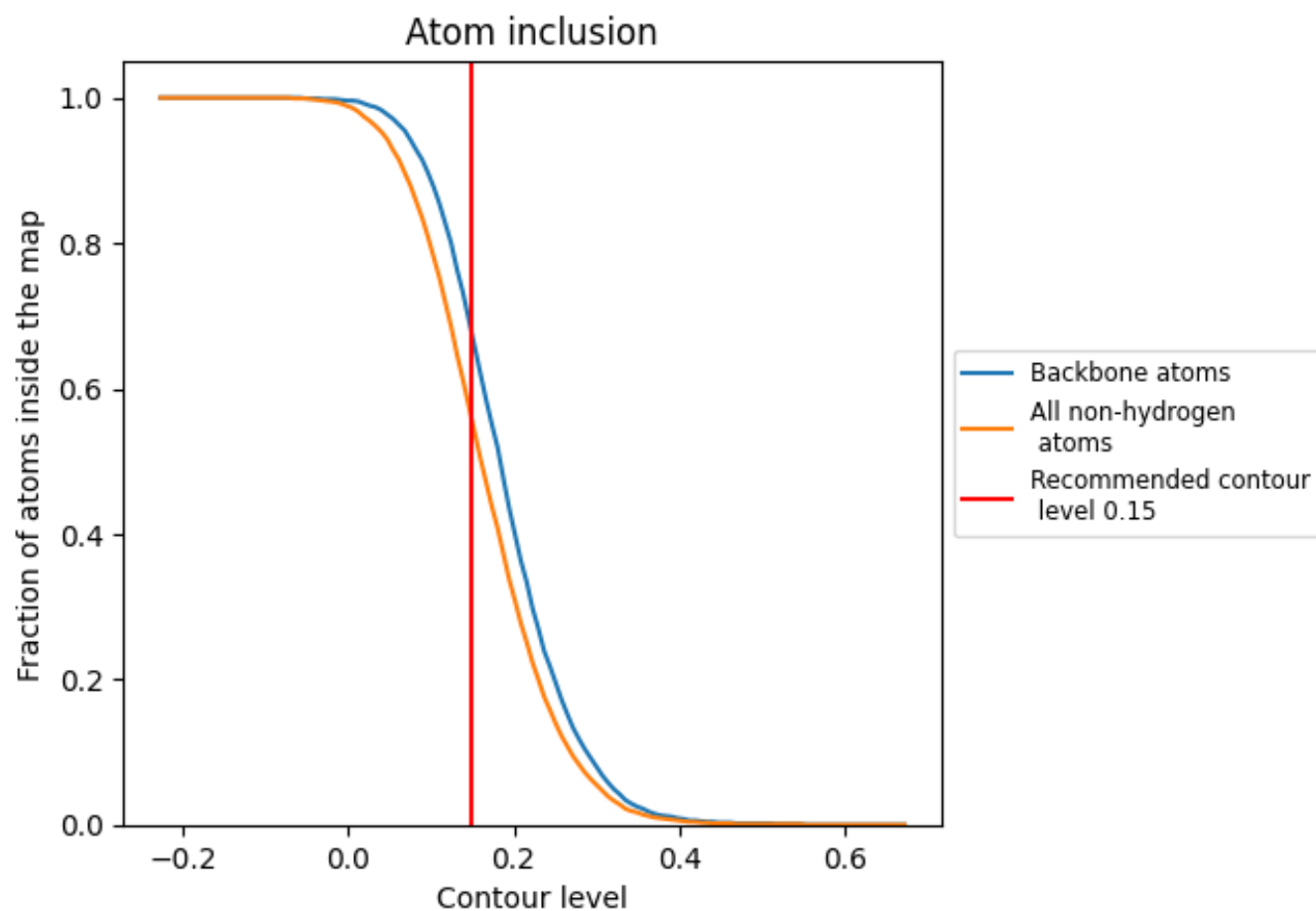
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.15).

9.4 Atom inclusion [i](#)



At the recommended contour level, 67% of all backbone atoms, 55% 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 (0.15) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5540	0.2600
B	0.4600	0.1920
C	0.4800	0.3070
D	0.5210	0.2760
G	0.7600	0.3400
H	0.8200	0.3620
I	0.6530	0.2490
J	0.7510	0.2840

1.0

0.0

<0.0