



wwPDB EM Validation Summary Report ⓘ

Aug 27, 2026 – 11:19 pm BST

PDB ID : 9T5M / pdb_00009t5m
EMDB ID : EMD-55589
Title : Structure of mouse full-length LRRC8D
Authors : Lehmann, E.F.; Deneka, D.; Stierli, F.; Rutz, S.; Dutzler, R.
Deposited on : 2025-11-05
Resolution : 2.99 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.dev133
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) : 2.50

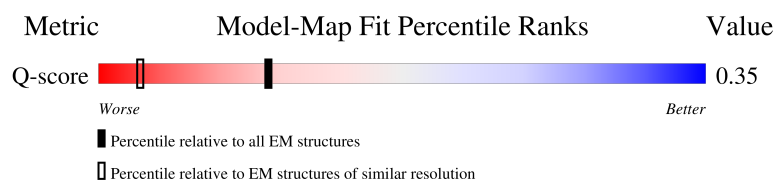
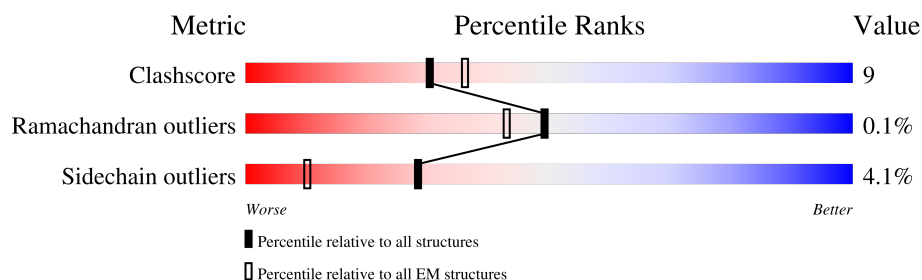
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.99 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	13287 (2.49 - 3.49)

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	924	
1	B	924	
1	C	924	
1	D	924	

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Mol	Chain	Length	Quality of chain
1	E	924	9%54%21%•24%
1	F	924	•53%21%•24%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 34368 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 Volume-regulated anion channel subunit LRRC8D.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	702	Total	C	N	O	S	1	0
			5728	3729	951	1013	35		
1	C	702	Total	C	N	O	S	1	0
			5728	3729	951	1013	35		
1	B	702	Total	C	N	O	S	1	0
			5728	3729	951	1013	35		
1	D	702	Total	C	N	O	S	1	0
			5728	3729	951	1013	35		
1	F	702	Total	C	N	O	S	1	0
			5728	3729	951	1013	35		
1	E	702	Total	C	N	O	S	1	0
			5728	3729	951	1013	35		

There are 420 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	MET	-	initiating methionine	UNP Q8BGR2
A	1	SER	-	expression tag	UNP Q8BGR2
A	61N	VAL	ILE	conflict	UNP Q8BGR2
A	63O	VAL	ALA	conflict	UNP Q8BGR2
A	313	VAL	LEU	conflict	UNP Q8BGR2
A	347	ILE	THR	conflict	UNP Q8BGR2
A	859	ALA	-	expression tag	UNP Q8BGR2
A	860	LEU	-	expression tag	UNP Q8BGR2
A	861	GLU	-	expression tag	UNP Q8BGR2
A	862	VAL	-	expression tag	UNP Q8BGR2
A	863	LEU	-	expression tag	UNP Q8BGR2
A	864	PHE	-	expression tag	UNP Q8BGR2
A	865	GLN	-	expression tag	UNP Q8BGR2
A	866	GLY	-	expression tag	UNP Q8BGR2
A	867	PRO	-	expression tag	UNP Q8BGR2
A	868	GLN	-	expression tag	UNP Q8BGR2
A	869	GLY	-	expression tag	UNP Q8BGR2
A	870	THR	-	expression tag	UNP Q8BGR2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	871	GLU	-	expression tag	UNP Q8BGR2
A	872	GLN	-	expression tag	UNP Q8BGR2
A	873	LYS	-	expression tag	UNP Q8BGR2
A	874	LEU	-	expression tag	UNP Q8BGR2
A	875	ILE	-	expression tag	UNP Q8BGR2
A	876	SER	-	expression tag	UNP Q8BGR2
A	877	GLU	-	expression tag	UNP Q8BGR2
A	878	GLU	-	expression tag	UNP Q8BGR2
A	879	ASP	-	expression tag	UNP Q8BGR2
A	880	LEU	-	expression tag	UNP Q8BGR2
A	881	ARG	-	expression tag	UNP Q8BGR2
A	882	GLY	-	expression tag	UNP Q8BGR2
A	883	ALA	-	expression tag	UNP Q8BGR2
A	884	SER	-	expression tag	UNP Q8BGR2
A	885	MET	-	expression tag	UNP Q8BGR2
A	886	ASP	-	expression tag	UNP Q8BGR2
A	887	GLU	-	expression tag	UNP Q8BGR2
A	888	LYS	-	expression tag	UNP Q8BGR2
A	889	THR	-	expression tag	UNP Q8BGR2
A	890	THR	-	expression tag	UNP Q8BGR2
A	891	GLY	-	expression tag	UNP Q8BGR2
A	892	TRP	-	expression tag	UNP Q8BGR2
A	893	ARG	-	expression tag	UNP Q8BGR2
A	894	GLY	-	expression tag	UNP Q8BGR2
A	895	GLY	-	expression tag	UNP Q8BGR2
A	896	HIS	-	expression tag	UNP Q8BGR2
A	897	VAL	-	expression tag	UNP Q8BGR2
A	898	VAL	-	expression tag	UNP Q8BGR2
A	899	GLU	-	expression tag	UNP Q8BGR2
A	900	GLY	-	expression tag	UNP Q8BGR2
A	901	LEU	-	expression tag	UNP Q8BGR2
A	902	ALA	-	expression tag	UNP Q8BGR2
A	903	GLY	-	expression tag	UNP Q8BGR2
A	904	GLU	-	expression tag	UNP Q8BGR2
A	905	LEU	-	expression tag	UNP Q8BGR2
A	906	GLU	-	expression tag	UNP Q8BGR2
A	907	GLN	-	expression tag	UNP Q8BGR2
A	908	LEU	-	expression tag	UNP Q8BGR2
A	909	ARG	-	expression tag	UNP Q8BGR2
A	910	ALA	-	expression tag	UNP Q8BGR2
A	911	ARG	-	expression tag	UNP Q8BGR2
A	912	LEU	-	expression tag	UNP Q8BGR2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	913	GLU	-	expression tag	UNP Q8BGR2
A	914	HIS	-	expression tag	UNP Q8BGR2
A	915	HIS	-	expression tag	UNP Q8BGR2
A	916	PRO	-	expression tag	UNP Q8BGR2
A	917	GLN	-	expression tag	UNP Q8BGR2
A	918	GLY	-	expression tag	UNP Q8BGR2
A	919	GLN	-	expression tag	UNP Q8BGR2
A	920	ARG	-	expression tag	UNP Q8BGR2
A	921	GLU	-	expression tag	UNP Q8BGR2
A	922	PRO	-	expression tag	UNP Q8BGR2
C	0	MET	-	initiating methionine	UNP Q8BGR2
C	1	SER	-	expression tag	UNP Q8BGR2
C	61N	VAL	ILE	conflict	UNP Q8BGR2
C	63O	VAL	ALA	conflict	UNP Q8BGR2
C	313	VAL	LEU	conflict	UNP Q8BGR2
C	347	ILE	THR	conflict	UNP Q8BGR2
C	859	ALA	-	expression tag	UNP Q8BGR2
C	860	LEU	-	expression tag	UNP Q8BGR2
C	861	GLU	-	expression tag	UNP Q8BGR2
C	862	VAL	-	expression tag	UNP Q8BGR2
C	863	LEU	-	expression tag	UNP Q8BGR2
C	864	PHE	-	expression tag	UNP Q8BGR2
C	865	GLN	-	expression tag	UNP Q8BGR2
C	866	GLY	-	expression tag	UNP Q8BGR2
C	867	PRO	-	expression tag	UNP Q8BGR2
C	868	GLN	-	expression tag	UNP Q8BGR2
C	869	GLY	-	expression tag	UNP Q8BGR2
C	870	THR	-	expression tag	UNP Q8BGR2
C	871	GLU	-	expression tag	UNP Q8BGR2
C	872	GLN	-	expression tag	UNP Q8BGR2
C	873	LYS	-	expression tag	UNP Q8BGR2
C	874	LEU	-	expression tag	UNP Q8BGR2
C	875	ILE	-	expression tag	UNP Q8BGR2
C	876	SER	-	expression tag	UNP Q8BGR2
C	877	GLU	-	expression tag	UNP Q8BGR2
C	878	GLU	-	expression tag	UNP Q8BGR2
C	879	ASP	-	expression tag	UNP Q8BGR2
C	880	LEU	-	expression tag	UNP Q8BGR2
C	881	ARG	-	expression tag	UNP Q8BGR2
C	882	GLY	-	expression tag	UNP Q8BGR2
C	883	ALA	-	expression tag	UNP Q8BGR2
C	884	SER	-	expression tag	UNP Q8BGR2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	885	MET	-	expression tag	UNP Q8BGR2
C	886	ASP	-	expression tag	UNP Q8BGR2
C	887	GLU	-	expression tag	UNP Q8BGR2
C	888	LYS	-	expression tag	UNP Q8BGR2
C	889	THR	-	expression tag	UNP Q8BGR2
C	890	THR	-	expression tag	UNP Q8BGR2
C	891	GLY	-	expression tag	UNP Q8BGR2
C	892	TRP	-	expression tag	UNP Q8BGR2
C	893	ARG	-	expression tag	UNP Q8BGR2
C	894	GLY	-	expression tag	UNP Q8BGR2
C	895	GLY	-	expression tag	UNP Q8BGR2
C	896	HIS	-	expression tag	UNP Q8BGR2
C	897	VAL	-	expression tag	UNP Q8BGR2
C	898	VAL	-	expression tag	UNP Q8BGR2
C	899	GLU	-	expression tag	UNP Q8BGR2
C	900	GLY	-	expression tag	UNP Q8BGR2
C	901	LEU	-	expression tag	UNP Q8BGR2
C	902	ALA	-	expression tag	UNP Q8BGR2
C	903	GLY	-	expression tag	UNP Q8BGR2
C	904	GLU	-	expression tag	UNP Q8BGR2
C	905	LEU	-	expression tag	UNP Q8BGR2
C	906	GLU	-	expression tag	UNP Q8BGR2
C	907	GLN	-	expression tag	UNP Q8BGR2
C	908	LEU	-	expression tag	UNP Q8BGR2
C	909	ARG	-	expression tag	UNP Q8BGR2
C	910	ALA	-	expression tag	UNP Q8BGR2
C	911	ARG	-	expression tag	UNP Q8BGR2
C	912	LEU	-	expression tag	UNP Q8BGR2
C	913	GLU	-	expression tag	UNP Q8BGR2
C	914	HIS	-	expression tag	UNP Q8BGR2
C	915	HIS	-	expression tag	UNP Q8BGR2
C	916	PRO	-	expression tag	UNP Q8BGR2
C	917	GLN	-	expression tag	UNP Q8BGR2
C	918	GLY	-	expression tag	UNP Q8BGR2
C	919	GLN	-	expression tag	UNP Q8BGR2
C	920	ARG	-	expression tag	UNP Q8BGR2
C	921	GLU	-	expression tag	UNP Q8BGR2
C	922	PRO	-	expression tag	UNP Q8BGR2
B	0	MET	-	initiating methionine	UNP Q8BGR2
B	1	SER	-	expression tag	UNP Q8BGR2
B	61N	VAL	ILE	conflict	UNP Q8BGR2
B	63O	VAL	ALA	conflict	UNP Q8BGR2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	313	VAL	LEU	conflict	UNP Q8BGR2
B	347	ILE	THR	conflict	UNP Q8BGR2
B	859	ALA	-	expression tag	UNP Q8BGR2
B	860	LEU	-	expression tag	UNP Q8BGR2
B	861	GLU	-	expression tag	UNP Q8BGR2
B	862	VAL	-	expression tag	UNP Q8BGR2
B	863	LEU	-	expression tag	UNP Q8BGR2
B	864	PHE	-	expression tag	UNP Q8BGR2
B	865	GLN	-	expression tag	UNP Q8BGR2
B	866	GLY	-	expression tag	UNP Q8BGR2
B	867	PRO	-	expression tag	UNP Q8BGR2
B	868	GLN	-	expression tag	UNP Q8BGR2
B	869	GLY	-	expression tag	UNP Q8BGR2
B	870	THR	-	expression tag	UNP Q8BGR2
B	871	GLU	-	expression tag	UNP Q8BGR2
B	872	GLN	-	expression tag	UNP Q8BGR2
B	873	LYS	-	expression tag	UNP Q8BGR2
B	874	LEU	-	expression tag	UNP Q8BGR2
B	875	ILE	-	expression tag	UNP Q8BGR2
B	876	SER	-	expression tag	UNP Q8BGR2
B	877	GLU	-	expression tag	UNP Q8BGR2
B	878	GLU	-	expression tag	UNP Q8BGR2
B	879	ASP	-	expression tag	UNP Q8BGR2
B	880	LEU	-	expression tag	UNP Q8BGR2
B	881	ARG	-	expression tag	UNP Q8BGR2
B	882	GLY	-	expression tag	UNP Q8BGR2
B	883	ALA	-	expression tag	UNP Q8BGR2
B	884	SER	-	expression tag	UNP Q8BGR2
B	885	MET	-	expression tag	UNP Q8BGR2
B	886	ASP	-	expression tag	UNP Q8BGR2
B	887	GLU	-	expression tag	UNP Q8BGR2
B	888	LYS	-	expression tag	UNP Q8BGR2
B	889	THR	-	expression tag	UNP Q8BGR2
B	890	THR	-	expression tag	UNP Q8BGR2
B	891	GLY	-	expression tag	UNP Q8BGR2
B	892	TRP	-	expression tag	UNP Q8BGR2
B	893	ARG	-	expression tag	UNP Q8BGR2
B	894	GLY	-	expression tag	UNP Q8BGR2
B	895	GLY	-	expression tag	UNP Q8BGR2
B	896	HIS	-	expression tag	UNP Q8BGR2
B	897	VAL	-	expression tag	UNP Q8BGR2
B	898	VAL	-	expression tag	UNP Q8BGR2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	899	GLU	-	expression tag	UNP Q8BGR2
B	900	GLY	-	expression tag	UNP Q8BGR2
B	901	LEU	-	expression tag	UNP Q8BGR2
B	902	ALA	-	expression tag	UNP Q8BGR2
B	903	GLY	-	expression tag	UNP Q8BGR2
B	904	GLU	-	expression tag	UNP Q8BGR2
B	905	LEU	-	expression tag	UNP Q8BGR2
B	906	GLU	-	expression tag	UNP Q8BGR2
B	907	GLN	-	expression tag	UNP Q8BGR2
B	908	LEU	-	expression tag	UNP Q8BGR2
B	909	ARG	-	expression tag	UNP Q8BGR2
B	910	ALA	-	expression tag	UNP Q8BGR2
B	911	ARG	-	expression tag	UNP Q8BGR2
B	912	LEU	-	expression tag	UNP Q8BGR2
B	913	GLU	-	expression tag	UNP Q8BGR2
B	914	HIS	-	expression tag	UNP Q8BGR2
B	915	HIS	-	expression tag	UNP Q8BGR2
B	916	PRO	-	expression tag	UNP Q8BGR2
B	917	GLN	-	expression tag	UNP Q8BGR2
B	918	GLY	-	expression tag	UNP Q8BGR2
B	919	GLN	-	expression tag	UNP Q8BGR2
B	920	ARG	-	expression tag	UNP Q8BGR2
B	921	GLU	-	expression tag	UNP Q8BGR2
B	922	PRO	-	expression tag	UNP Q8BGR2
D	0	MET	-	initiating methionine	UNP Q8BGR2
D	1	SER	-	expression tag	UNP Q8BGR2
D	61N	VAL	ILE	conflict	UNP Q8BGR2
D	63O	VAL	ALA	conflict	UNP Q8BGR2
D	313	VAL	LEU	conflict	UNP Q8BGR2
D	347	ILE	THR	conflict	UNP Q8BGR2
D	859	ALA	-	expression tag	UNP Q8BGR2
D	860	LEU	-	expression tag	UNP Q8BGR2
D	861	GLU	-	expression tag	UNP Q8BGR2
D	862	VAL	-	expression tag	UNP Q8BGR2
D	863	LEU	-	expression tag	UNP Q8BGR2
D	864	PHE	-	expression tag	UNP Q8BGR2
D	865	GLN	-	expression tag	UNP Q8BGR2
D	866	GLY	-	expression tag	UNP Q8BGR2
D	867	PRO	-	expression tag	UNP Q8BGR2
D	868	GLN	-	expression tag	UNP Q8BGR2
D	869	GLY	-	expression tag	UNP Q8BGR2
D	870	THR	-	expression tag	UNP Q8BGR2

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Chain	Residue	Modelled	Actual	Comment	Reference
D	871	GLU	-	expression tag	UNP Q8BGR2
D	872	GLN	-	expression tag	UNP Q8BGR2
D	873	LYS	-	expression tag	UNP Q8BGR2
D	874	LEU	-	expression tag	UNP Q8BGR2
D	875	ILE	-	expression tag	UNP Q8BGR2
D	876	SER	-	expression tag	UNP Q8BGR2
D	877	GLU	-	expression tag	UNP Q8BGR2
D	878	GLU	-	expression tag	UNP Q8BGR2
D	879	ASP	-	expression tag	UNP Q8BGR2
D	880	LEU	-	expression tag	UNP Q8BGR2
D	881	ARG	-	expression tag	UNP Q8BGR2
D	882	GLY	-	expression tag	UNP Q8BGR2
D	883	ALA	-	expression tag	UNP Q8BGR2
D	884	SER	-	expression tag	UNP Q8BGR2
D	885	MET	-	expression tag	UNP Q8BGR2
D	886	ASP	-	expression tag	UNP Q8BGR2
D	887	GLU	-	expression tag	UNP Q8BGR2
D	888	LYS	-	expression tag	UNP Q8BGR2
D	889	THR	-	expression tag	UNP Q8BGR2
D	890	THR	-	expression tag	UNP Q8BGR2
D	891	GLY	-	expression tag	UNP Q8BGR2
D	892	TRP	-	expression tag	UNP Q8BGR2
D	893	ARG	-	expression tag	UNP Q8BGR2
D	894	GLY	-	expression tag	UNP Q8BGR2
D	895	GLY	-	expression tag	UNP Q8BGR2
D	896	HIS	-	expression tag	UNP Q8BGR2
D	897	VAL	-	expression tag	UNP Q8BGR2
D	898	VAL	-	expression tag	UNP Q8BGR2
D	899	GLU	-	expression tag	UNP Q8BGR2
D	900	GLY	-	expression tag	UNP Q8BGR2
D	901	LEU	-	expression tag	UNP Q8BGR2
D	902	ALA	-	expression tag	UNP Q8BGR2
D	903	GLY	-	expression tag	UNP Q8BGR2
D	904	GLU	-	expression tag	UNP Q8BGR2
D	905	LEU	-	expression tag	UNP Q8BGR2
D	906	GLU	-	expression tag	UNP Q8BGR2
D	907	GLN	-	expression tag	UNP Q8BGR2
D	908	LEU	-	expression tag	UNP Q8BGR2
D	909	ARG	-	expression tag	UNP Q8BGR2
D	910	ALA	-	expression tag	UNP Q8BGR2
D	911	ARG	-	expression tag	UNP Q8BGR2
D	912	LEU	-	expression tag	UNP Q8BGR2

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Chain	Residue	Modelled	Actual	Comment	Reference
D	913	GLU	-	expression tag	UNP Q8BGR2
D	914	HIS	-	expression tag	UNP Q8BGR2
D	915	HIS	-	expression tag	UNP Q8BGR2
D	916	PRO	-	expression tag	UNP Q8BGR2
D	917	GLN	-	expression tag	UNP Q8BGR2
D	918	GLY	-	expression tag	UNP Q8BGR2
D	919	GLN	-	expression tag	UNP Q8BGR2
D	920	ARG	-	expression tag	UNP Q8BGR2
D	921	GLU	-	expression tag	UNP Q8BGR2
D	922	PRO	-	expression tag	UNP Q8BGR2
F	0	MET	-	initiating methionine	UNP Q8BGR2
F	1	SER	-	expression tag	UNP Q8BGR2
F	61N	VAL	ILE	conflict	UNP Q8BGR2
F	63O	VAL	ALA	conflict	UNP Q8BGR2
F	313	VAL	LEU	conflict	UNP Q8BGR2
F	347	ILE	THR	conflict	UNP Q8BGR2
F	859	ALA	-	expression tag	UNP Q8BGR2
F	860	LEU	-	expression tag	UNP Q8BGR2
F	861	GLU	-	expression tag	UNP Q8BGR2
F	862	VAL	-	expression tag	UNP Q8BGR2
F	863	LEU	-	expression tag	UNP Q8BGR2
F	864	PHE	-	expression tag	UNP Q8BGR2
F	865	GLN	-	expression tag	UNP Q8BGR2
F	866	GLY	-	expression tag	UNP Q8BGR2
F	867	PRO	-	expression tag	UNP Q8BGR2
F	868	GLN	-	expression tag	UNP Q8BGR2
F	869	GLY	-	expression tag	UNP Q8BGR2
F	870	THR	-	expression tag	UNP Q8BGR2
F	871	GLU	-	expression tag	UNP Q8BGR2
F	872	GLN	-	expression tag	UNP Q8BGR2
F	873	LYS	-	expression tag	UNP Q8BGR2
F	874	LEU	-	expression tag	UNP Q8BGR2
F	875	ILE	-	expression tag	UNP Q8BGR2
F	876	SER	-	expression tag	UNP Q8BGR2
F	877	GLU	-	expression tag	UNP Q8BGR2
F	878	GLU	-	expression tag	UNP Q8BGR2
F	879	ASP	-	expression tag	UNP Q8BGR2
F	880	LEU	-	expression tag	UNP Q8BGR2
F	881	ARG	-	expression tag	UNP Q8BGR2
F	882	GLY	-	expression tag	UNP Q8BGR2
F	883	ALA	-	expression tag	UNP Q8BGR2
F	884	SER	-	expression tag	UNP Q8BGR2

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Chain	Residue	Modelled	Actual	Comment	Reference
F	885	MET	-	expression tag	UNP Q8BGR2
F	886	ASP	-	expression tag	UNP Q8BGR2
F	887	GLU	-	expression tag	UNP Q8BGR2
F	888	LYS	-	expression tag	UNP Q8BGR2
F	889	THR	-	expression tag	UNP Q8BGR2
F	890	THR	-	expression tag	UNP Q8BGR2
F	891	GLY	-	expression tag	UNP Q8BGR2
F	892	TRP	-	expression tag	UNP Q8BGR2
F	893	ARG	-	expression tag	UNP Q8BGR2
F	894	GLY	-	expression tag	UNP Q8BGR2
F	895	GLY	-	expression tag	UNP Q8BGR2
F	896	HIS	-	expression tag	UNP Q8BGR2
F	897	VAL	-	expression tag	UNP Q8BGR2
F	898	VAL	-	expression tag	UNP Q8BGR2
F	899	GLU	-	expression tag	UNP Q8BGR2
F	900	GLY	-	expression tag	UNP Q8BGR2
F	901	LEU	-	expression tag	UNP Q8BGR2
F	902	ALA	-	expression tag	UNP Q8BGR2
F	903	GLY	-	expression tag	UNP Q8BGR2
F	904	GLU	-	expression tag	UNP Q8BGR2
F	905	LEU	-	expression tag	UNP Q8BGR2
F	906	GLU	-	expression tag	UNP Q8BGR2
F	907	GLN	-	expression tag	UNP Q8BGR2
F	908	LEU	-	expression tag	UNP Q8BGR2
F	909	ARG	-	expression tag	UNP Q8BGR2
F	910	ALA	-	expression tag	UNP Q8BGR2
F	911	ARG	-	expression tag	UNP Q8BGR2
F	912	LEU	-	expression tag	UNP Q8BGR2
F	913	GLU	-	expression tag	UNP Q8BGR2
F	914	HIS	-	expression tag	UNP Q8BGR2
F	915	HIS	-	expression tag	UNP Q8BGR2
F	916	PRO	-	expression tag	UNP Q8BGR2
F	917	GLN	-	expression tag	UNP Q8BGR2
F	918	GLY	-	expression tag	UNP Q8BGR2
F	919	GLN	-	expression tag	UNP Q8BGR2
F	920	ARG	-	expression tag	UNP Q8BGR2
F	921	GLU	-	expression tag	UNP Q8BGR2
F	922	PRO	-	expression tag	UNP Q8BGR2
E	0	MET	-	initiating methionine	UNP Q8BGR2
E	1	SER	-	expression tag	UNP Q8BGR2
E	61N	VAL	ILE	conflict	UNP Q8BGR2
E	63O	VAL	ALA	conflict	UNP Q8BGR2

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Chain	Residue	Modelled	Actual	Comment	Reference
E	313	VAL	LEU	conflict	UNP Q8BGR2
E	347	ILE	THR	conflict	UNP Q8BGR2
E	859	ALA	-	expression tag	UNP Q8BGR2
E	860	LEU	-	expression tag	UNP Q8BGR2
E	861	GLU	-	expression tag	UNP Q8BGR2
E	862	VAL	-	expression tag	UNP Q8BGR2
E	863	LEU	-	expression tag	UNP Q8BGR2
E	864	PHE	-	expression tag	UNP Q8BGR2
E	865	GLN	-	expression tag	UNP Q8BGR2
E	866	GLY	-	expression tag	UNP Q8BGR2
E	867	PRO	-	expression tag	UNP Q8BGR2
E	868	GLN	-	expression tag	UNP Q8BGR2
E	869	GLY	-	expression tag	UNP Q8BGR2
E	870	THR	-	expression tag	UNP Q8BGR2
E	871	GLU	-	expression tag	UNP Q8BGR2
E	872	GLN	-	expression tag	UNP Q8BGR2
E	873	LYS	-	expression tag	UNP Q8BGR2
E	874	LEU	-	expression tag	UNP Q8BGR2
E	875	ILE	-	expression tag	UNP Q8BGR2
E	876	SER	-	expression tag	UNP Q8BGR2
E	877	GLU	-	expression tag	UNP Q8BGR2
E	878	GLU	-	expression tag	UNP Q8BGR2
E	879	ASP	-	expression tag	UNP Q8BGR2
E	880	LEU	-	expression tag	UNP Q8BGR2
E	881	ARG	-	expression tag	UNP Q8BGR2
E	882	GLY	-	expression tag	UNP Q8BGR2
E	883	ALA	-	expression tag	UNP Q8BGR2
E	884	SER	-	expression tag	UNP Q8BGR2
E	885	MET	-	expression tag	UNP Q8BGR2
E	886	ASP	-	expression tag	UNP Q8BGR2
E	887	GLU	-	expression tag	UNP Q8BGR2
E	888	LYS	-	expression tag	UNP Q8BGR2
E	889	THR	-	expression tag	UNP Q8BGR2
E	890	THR	-	expression tag	UNP Q8BGR2
E	891	GLY	-	expression tag	UNP Q8BGR2
E	892	TRP	-	expression tag	UNP Q8BGR2
E	893	ARG	-	expression tag	UNP Q8BGR2
E	894	GLY	-	expression tag	UNP Q8BGR2
E	895	GLY	-	expression tag	UNP Q8BGR2
E	896	HIS	-	expression tag	UNP Q8BGR2
E	897	VAL	-	expression tag	UNP Q8BGR2
E	898	VAL	-	expression tag	UNP Q8BGR2

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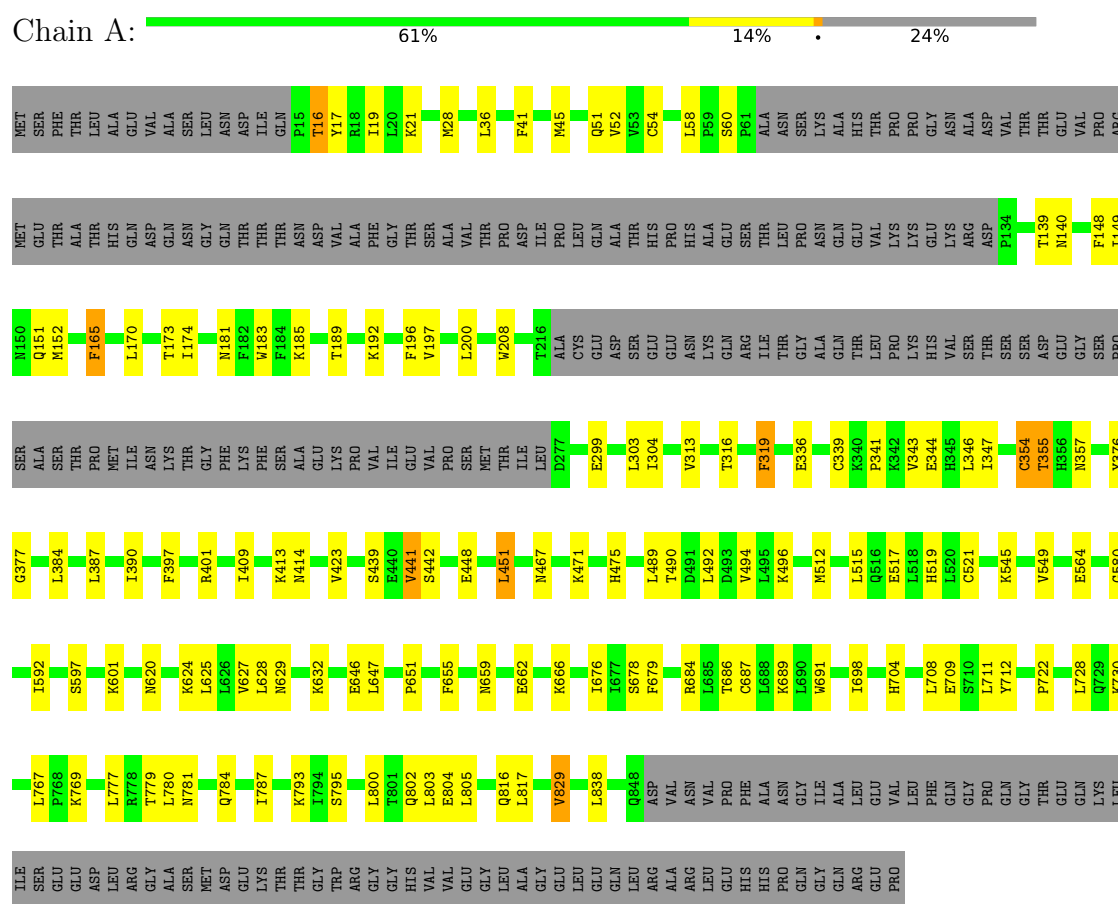
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Chain	Residue	Modelled	Actual	Comment	Reference
E	899	GLU	-	expression tag	UNP Q8BGR2
E	900	GLY	-	expression tag	UNP Q8BGR2
E	901	LEU	-	expression tag	UNP Q8BGR2
E	902	ALA	-	expression tag	UNP Q8BGR2
E	903	GLY	-	expression tag	UNP Q8BGR2
E	904	GLU	-	expression tag	UNP Q8BGR2
E	905	LEU	-	expression tag	UNP Q8BGR2
E	906	GLU	-	expression tag	UNP Q8BGR2
E	907	GLN	-	expression tag	UNP Q8BGR2
E	908	LEU	-	expression tag	UNP Q8BGR2
E	909	ARG	-	expression tag	UNP Q8BGR2
E	910	ALA	-	expression tag	UNP Q8BGR2
E	911	ARG	-	expression tag	UNP Q8BGR2
E	912	LEU	-	expression tag	UNP Q8BGR2
E	913	GLU	-	expression tag	UNP Q8BGR2
E	914	HIS	-	expression tag	UNP Q8BGR2
E	915	HIS	-	expression tag	UNP Q8BGR2
E	916	PRO	-	expression tag	UNP Q8BGR2
E	917	GLN	-	expression tag	UNP Q8BGR2
E	918	GLY	-	expression tag	UNP Q8BGR2
E	919	GLN	-	expression tag	UNP Q8BGR2
E	920	ARG	-	expression tag	UNP Q8BGR2
E	921	GLU	-	expression tag	UNP Q8BGR2
E	922	PRO	-	expression tag	UNP Q8BGR2

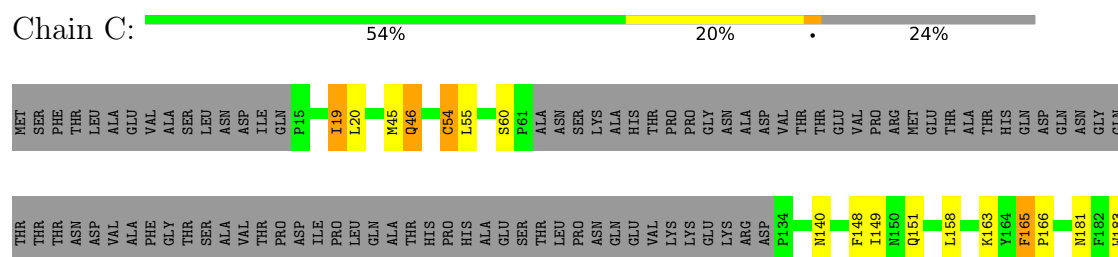
3 Residue-property plots

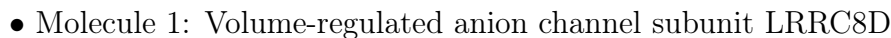
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Volume-regulated anion channel subunit LRRC8D



• Molecule 1: Volume-regulated anion channel subunit LRRC8D







ARG	GLY	ALA	SER	MET	ASP	GLU	LYS	THR	GLY	TRP	ARG	GLY	GLY	HIS	VAL	VAL	GLU	GLY	LEU	ALA	GLY	ARG	ARG	GLU	GLU	HIS	HIS	PRO	PRO	GLN	GLY	GLN	ALA	ASN	GLY	ILE	ALA	LEU	GLU	VAL	VAL	LEU	PHE	ALA	ASN	GLY	ILE	ALA	LEU	GLU	VAL	LEU	PHE	GLN	GLY	PRO	GLN	GLY	THR	GLU	LYS	LEU	ILE	SER	GLU	GLU	ASP	LEU
D811	R812	L813	P814	L817	C820	S826	V829	Q833	L834	F835	D836	T837	L838	F839	L840	K843	E844	A845	L846	N847	Q848	ASP	VAL	ASN	VAL	VAL	PRO	PRO	PHE	ALA	ALA	ASN	GLY	ILE	ALA	LEU	GLU	VAL	VAL	LEU	PHE	GLN	GLY	PRO	GLN	GLY	THR	GLU	LYS	LEU	ILE	SER	GLU	GLU	ASP	LEU												
I741	S742	I743	I744	P745	I746	E747	I748	G749	N753	L754	Q755	H756	I759	T760	K763	I766	L767	P768	K769	Q770	L771	F772	K773	K776	L777	R778	T779	L780	N781	L782	G783	C786	I787	A788	S789	L790	P791	I794	S795	Q796	L797	L800	T801	Q802	L803	E804	L805	N808	C809	L810																		
K666	S667	R671	T672	K673	E674	E675	I676	I677	S678	F679	Q680	H681	L682	K683	R684	C687	L688	K689	L690	W691	H692	I695	P699	P700	S701	I702	T703	H704	N707	L708	Y712	N716	E719	S720	L721	P722	T723	A724	V725	L728	Q729	L731	R732	C733	L734	D735	V736	N740																				
E586	L587	R588	H589	L590	K591	I592	L593	H594	V595	K596	L599	T600	K601	V602	I606	K615	L616	V617	I618	H619	N620	D621	L626	V627	L628	N629	S630	L631	K632	K633	E639	L640	E641	L642	Q643	N644	R649	I650	P651	H652	A653	I654	F655	S656	L657	S658	N659	L660	Q661	E662	L663	D664	L665															
K496	I509	S510	Q511	M512	L515	Q516	E517	L518	H519	L520	C521	K526	L535	R536	L539	H543	V544	K545	F546	I552	P553	A554	W555	V556	L559	K560	N561	L562	H563	E564	L565	Y566	L567	I568	G569	N570	L571	N572	S573	E574	N575	N576	K577	M578	I579	G580	L581	E582	S583	L584	R585																	

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	530537	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	59.285	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2600	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.537	Depositor
Minimum map value	-0.601	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.028	Depositor
Recommended contour level	0.111	Depositor
Map size ($\text{\AA}$)	437.47202, 437.47202, 437.47202	wwPDB
Map dimensions	336, 336, 336	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.302, 1.302, 1.302	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.11	0/5860	0.25	0/7934
1	B	0.12	0/5860	0.26	0/7934
1	C	0.12	0/5860	0.27	2/7934 (0.0%)
1	D	0.09	0/5860	0.22	0/7934
1	E	0.10	0/5860	0.24	0/7934
1	F	0.11	0/5860	0.26	2/7934 (0.0%)
All	All	0.11	0/35160	0.25	4/47604 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	511	GLN	CA-C-N	5.40	131.43	121.70
1	F	511	GLN	C-N-CA	5.40	131.43	121.70
1	C	511	GLN	CA-C-N	5.38	131.39	121.70
1	C	511	GLN	C-N-CA	5.38	131.39	121.70

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5728	0	5887	67	0
1	B	5728	0	5887	81	0
1	C	5728	0	5887	132	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	5728	0	5887	109	0
1	E	5728	0	5887	120	0
1	F	5728	0	5887	125	0
All	All	34368	0	35322	625	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 9.

The worst 5 of 625 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:E:149:ILE:HD11	1:E:347:ILE:HG13	1.64	0.80
1:F:149:ILE:HD11	1:F:347:ILE:HG13	1.64	0.79
1:C:712:TYR:HA	1:C:735:ASP:HB3	1.64	0.79
1:B:149:ILE:HD11	1:B:347:ILE:HG13	1.63	0.79
1:A:149:ILE:HD11	1:A:347:ILE:HG13	1.64	0.78

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	697/924 (75%)	676 (97%)	20 (3%)	1 (0%)	48	80
1	B	697/924 (75%)	669 (96%)	27 (4%)	1 (0%)	48	80
1	C	697/924 (75%)	662 (95%)	34 (5%)	1 (0%)	48	80
1	D	697/924 (75%)	671 (96%)	25 (4%)	1 (0%)	48	80
1	E	697/924 (75%)	676 (97%)	20 (3%)	1 (0%)	48	80
1	F	697/924 (75%)	671 (96%)	25 (4%)	1 (0%)	48	80
All	All	4182/5544 (75%)	4025 (96%)	151 (4%)	6 (0%)	49	80

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	60	SER
1	A	60	SER
1	C	60	SER
1	B	60	SER
1	F	60	SER

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	655/842 (78%)	630 (96%)	25 (4%)	29	63
1	B	655/842 (78%)	625 (95%)	30 (5%)	24	58
1	C	655/842 (78%)	625 (95%)	30 (5%)	24	58
1	D	655/842 (78%)	634 (97%)	21 (3%)	34	67
1	E	655/842 (78%)	629 (96%)	26 (4%)	28	62
1	F	655/842 (78%)	625 (95%)	30 (5%)	24	58
All	All	3930/5052 (78%)	3768 (96%)	162 (4%)	28	61

5 of 162 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	300	ASP
1	E	141	LEU
1	F	346	LEU
1	F	512[B]	MET
1	E	336	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 62 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	467	ASN
1	E	181	ASN

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Mol	Chain	Res	Type
1	D	181	ASN
1	E	145	GLN
1	E	808	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 [i](#)

There are no chain breaks in this entry.

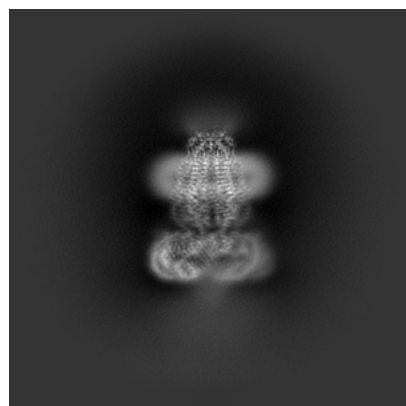
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-55589. These allow visual inspection of the internal detail of the map and identification of artifacts.

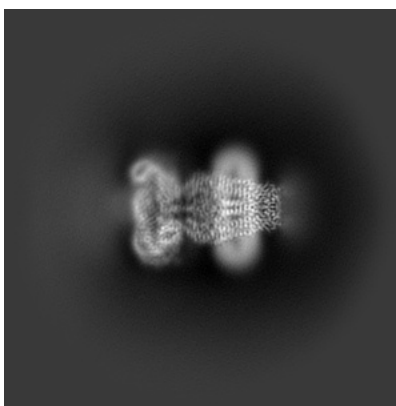
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

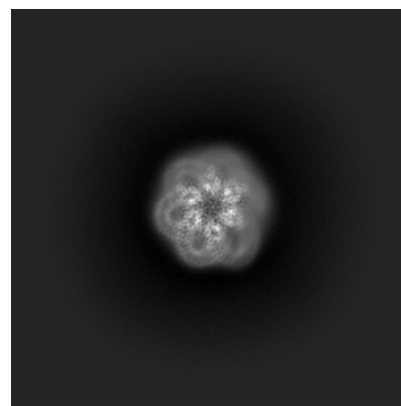
6.1.1 Primary map



X

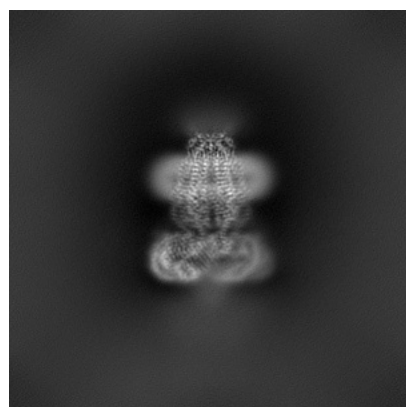


Y

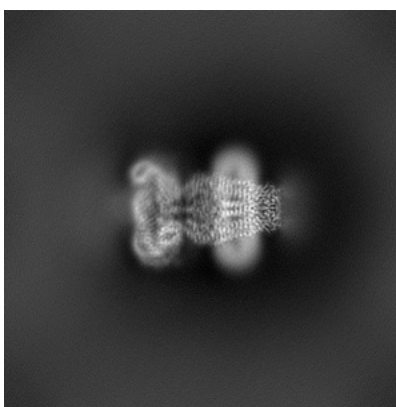


Z

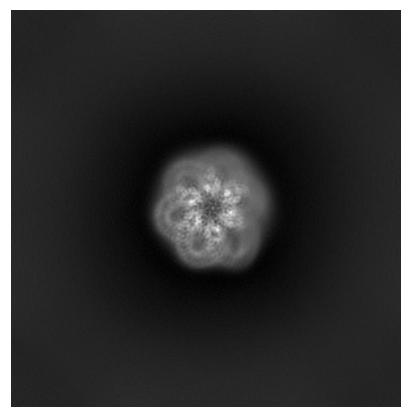
6.1.2 Raw map



X



Y

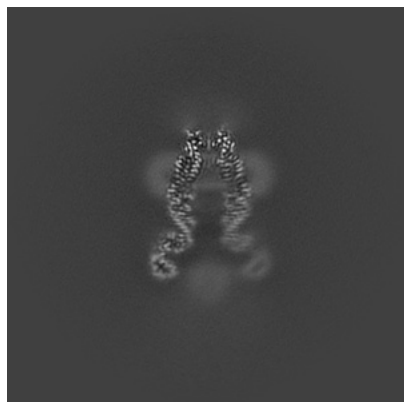


Z

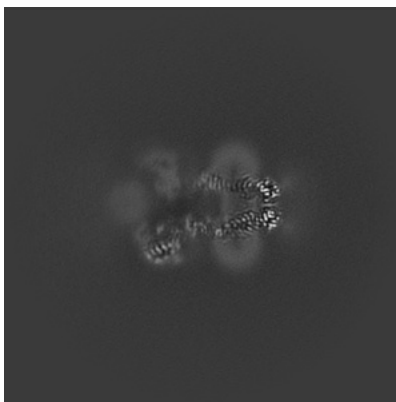
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

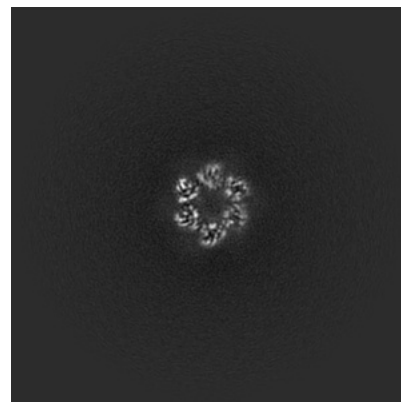
6.2.1 Primary map



X Index: 168

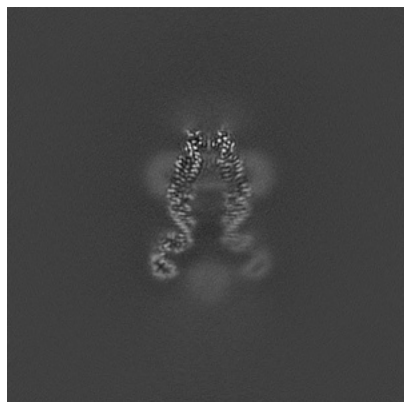


Y Index: 168

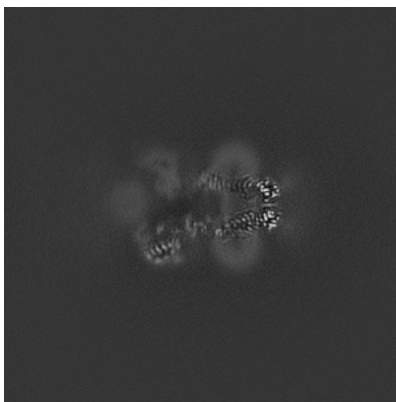


Z Index: 168

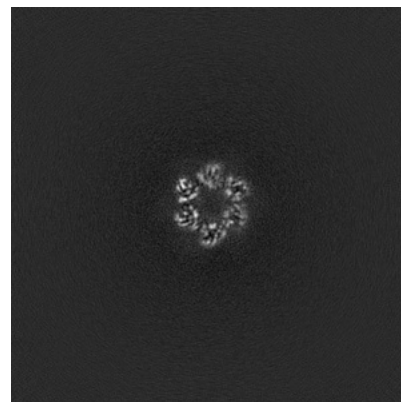
6.2.2 Raw map



X Index: 168



Y Index: 168

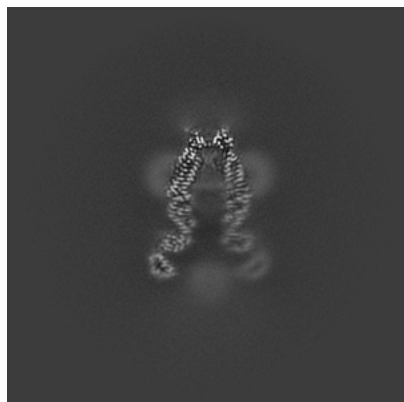


Z Index: 168

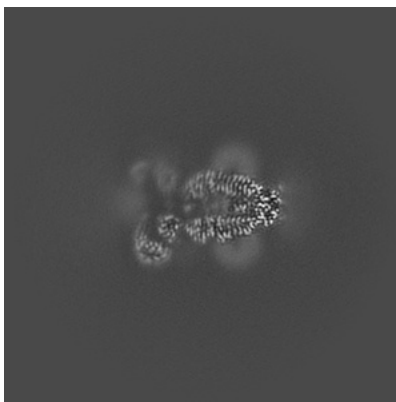
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

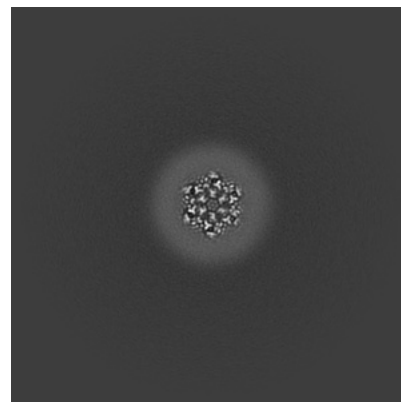
6.3.1 Primary map



X Index: 166

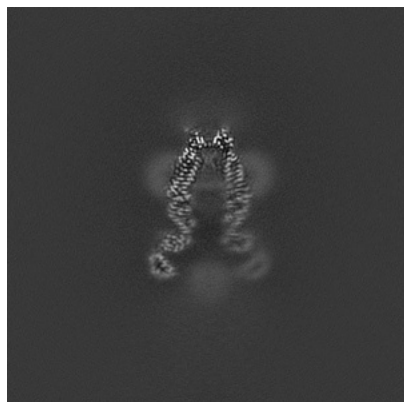


Y Index: 157

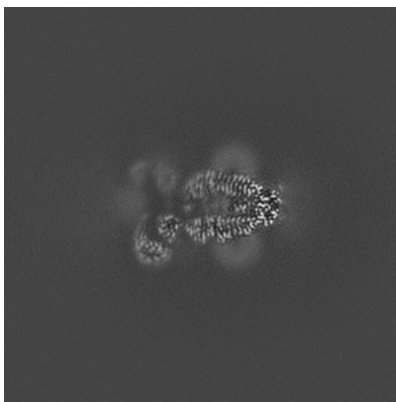


Z Index: 206

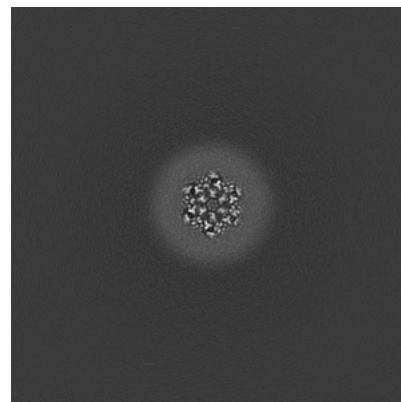
6.3.2 Raw map



X Index: 166



Y Index: 157

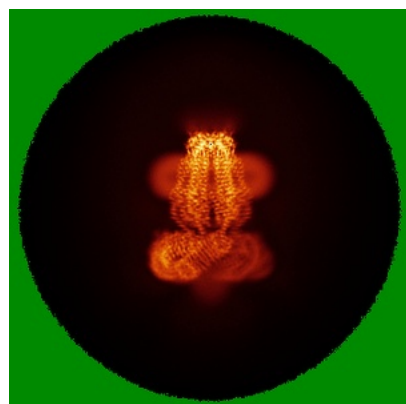


Z Index: 206

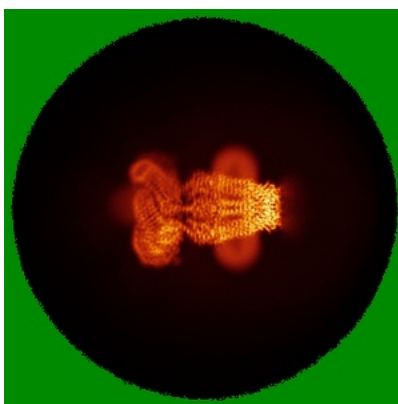
The images above show the largest variance slices of the map in three orthogonal directions.

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

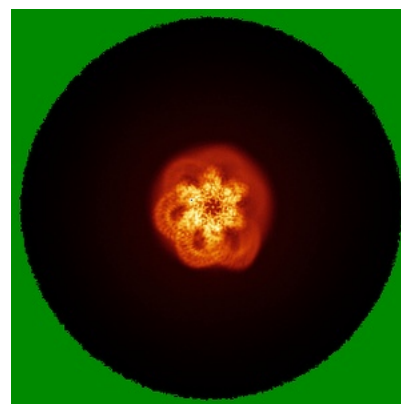
6.4.1 Primary map



X

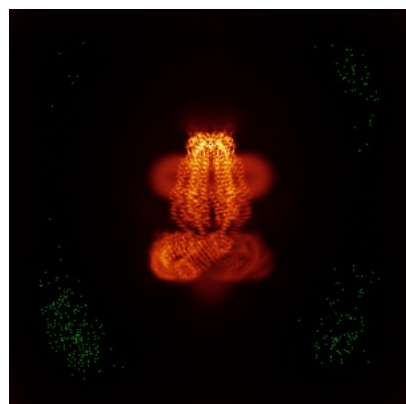


Y

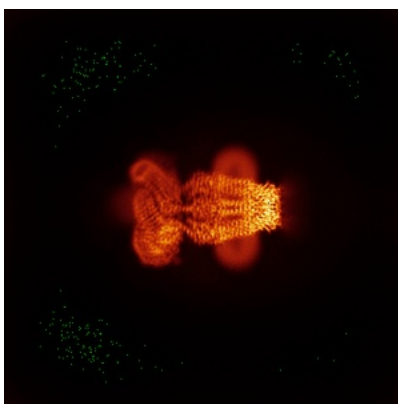


Z

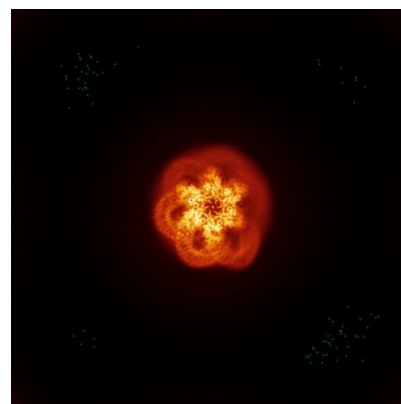
6.4.2 Raw map



X



Y

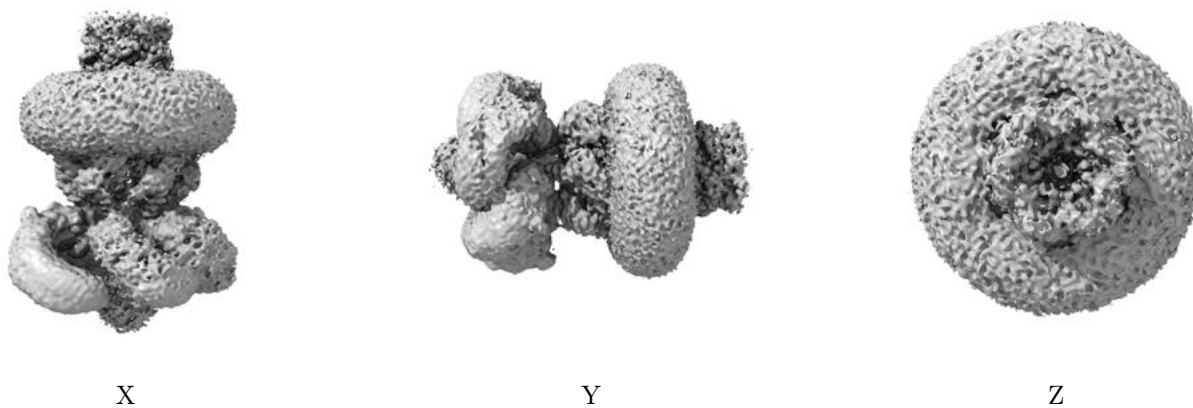


Z

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.

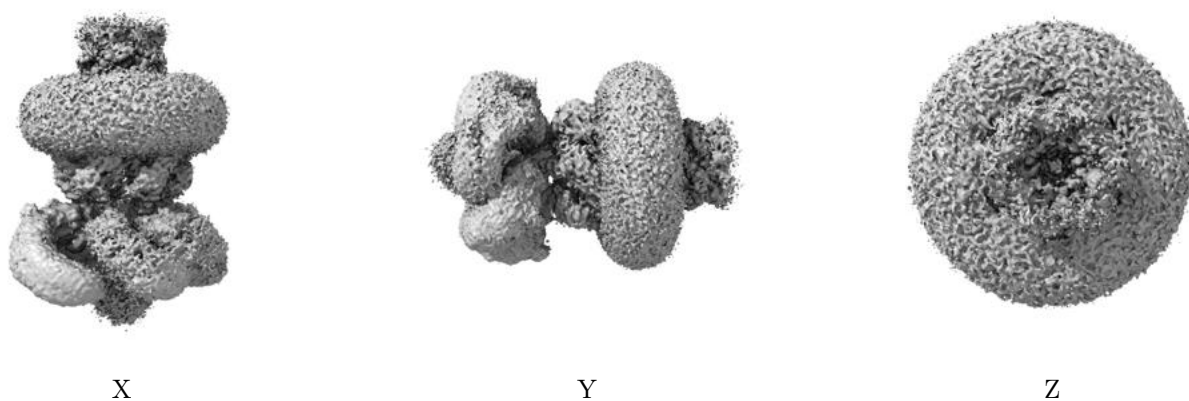
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.111. 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.

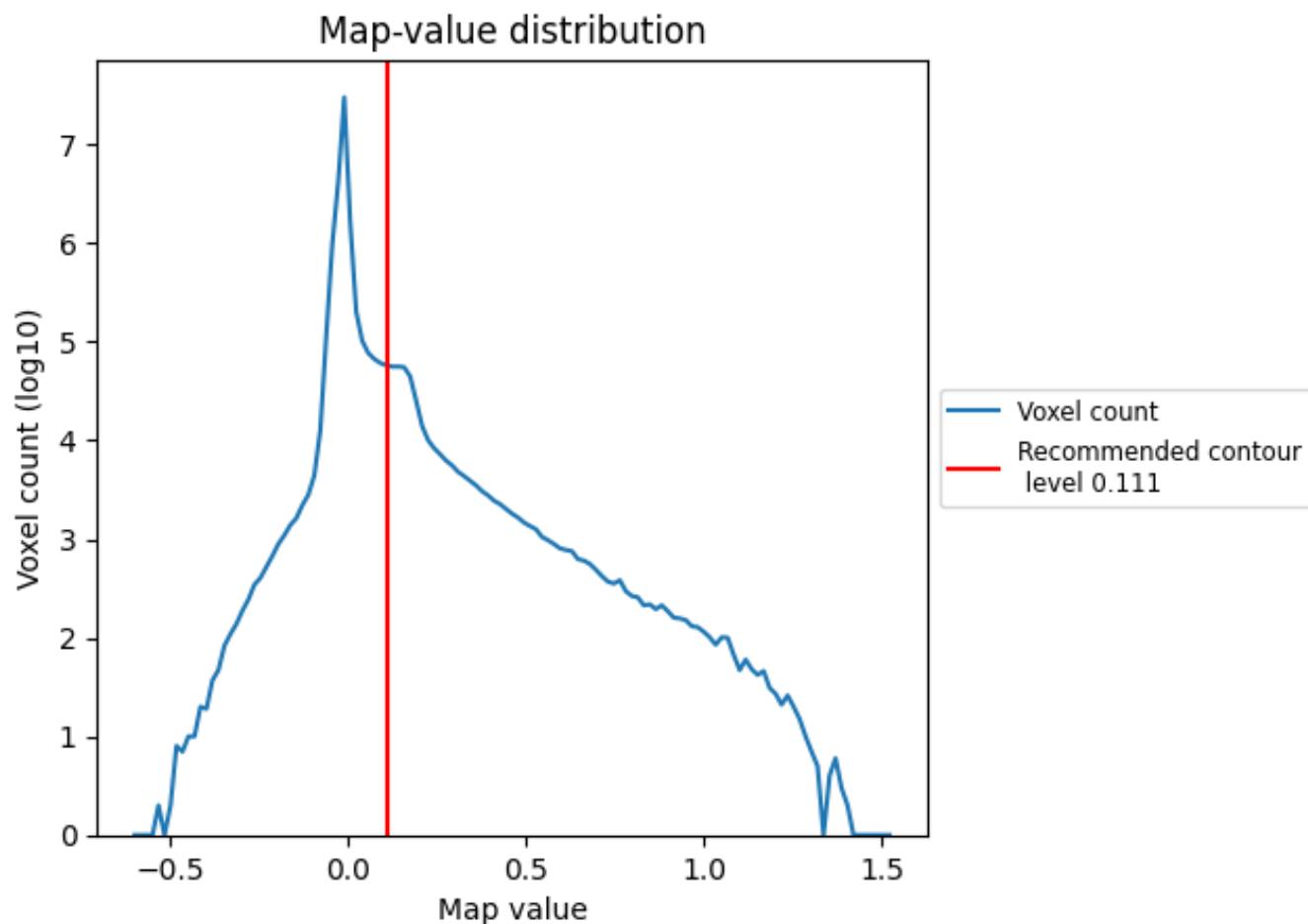
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

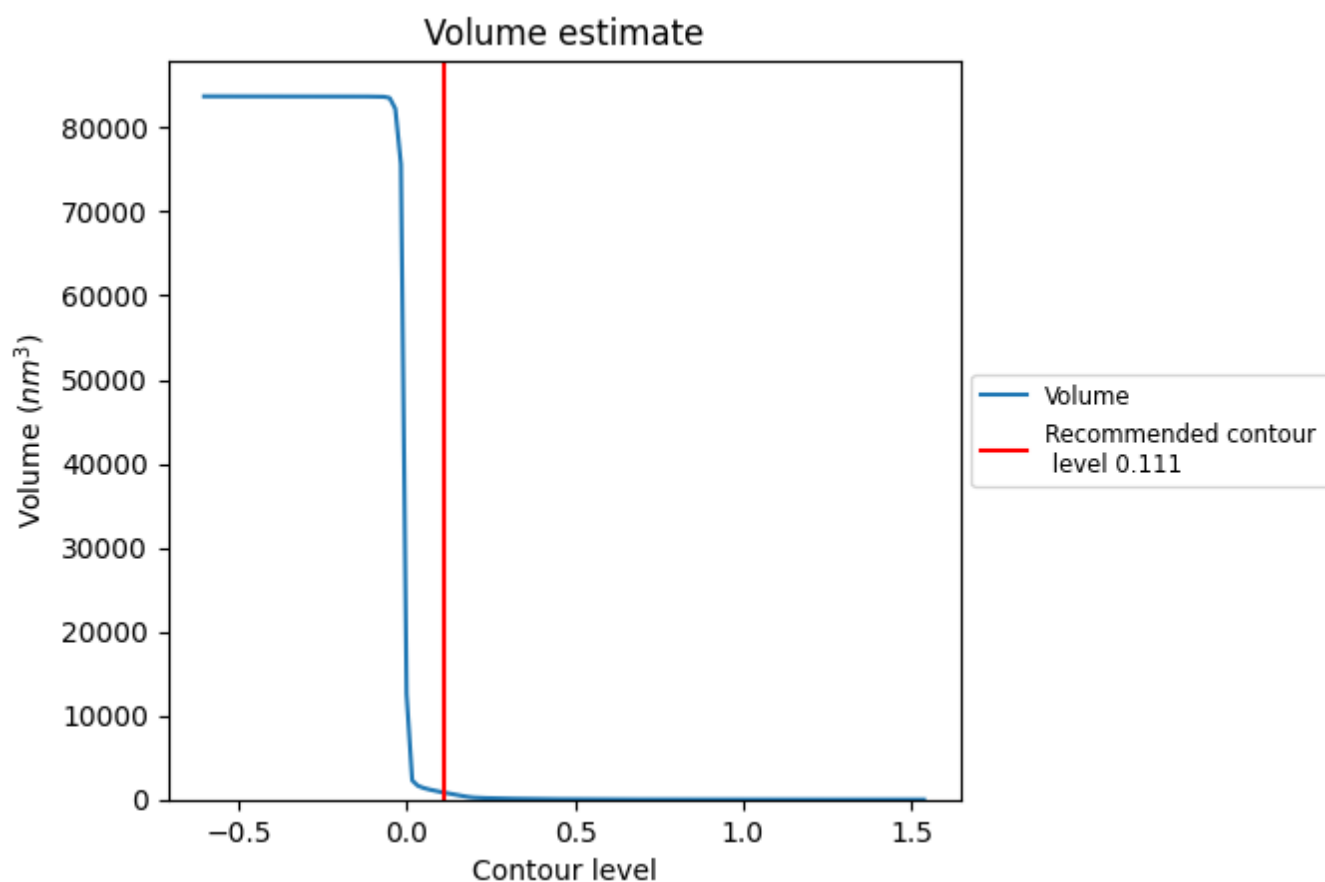
This section contains the results of statistical analysis of the map.

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.

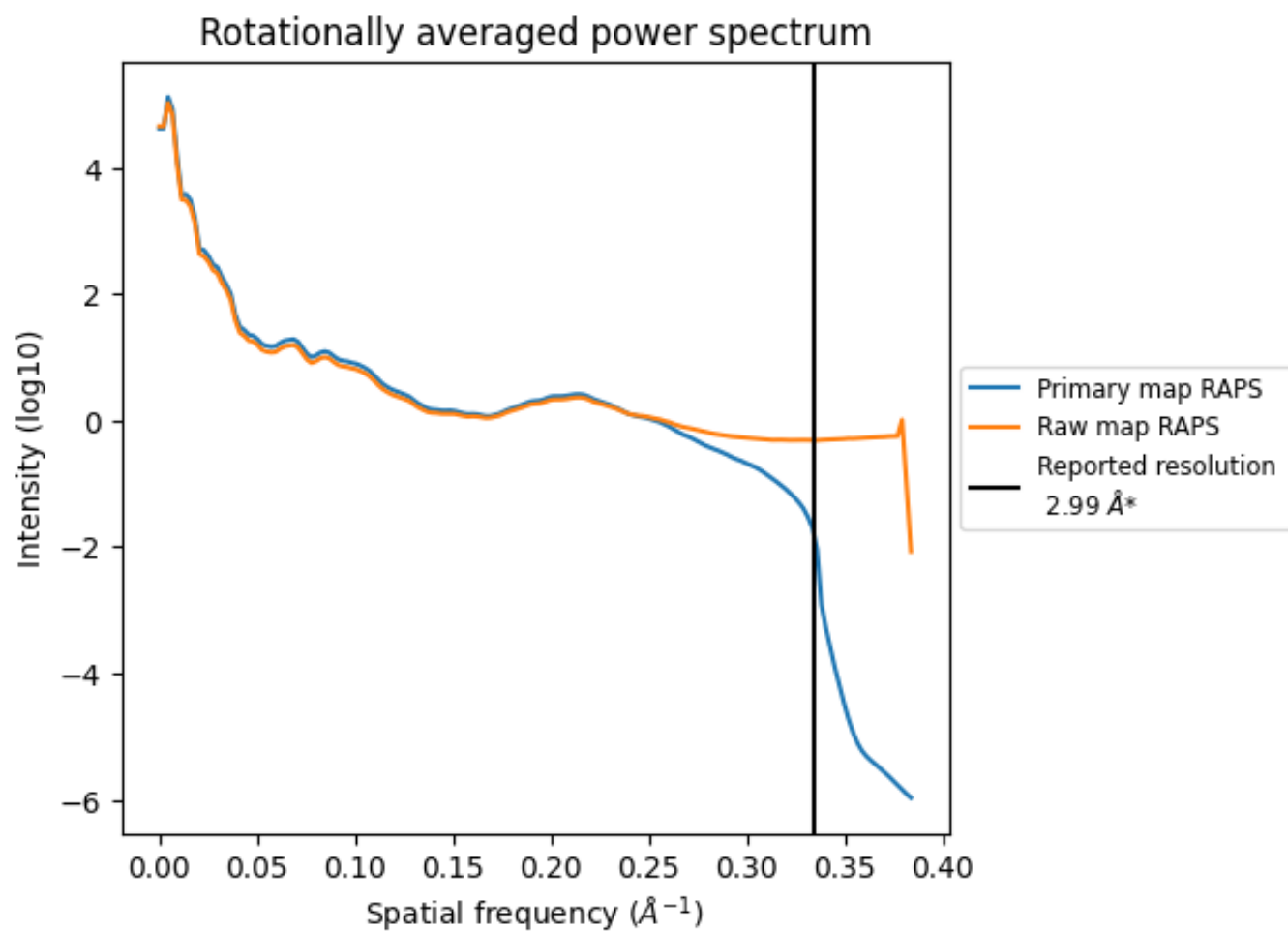
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 835 nm^3 ; this corresponds to an approximate mass of 754 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 ⓘ

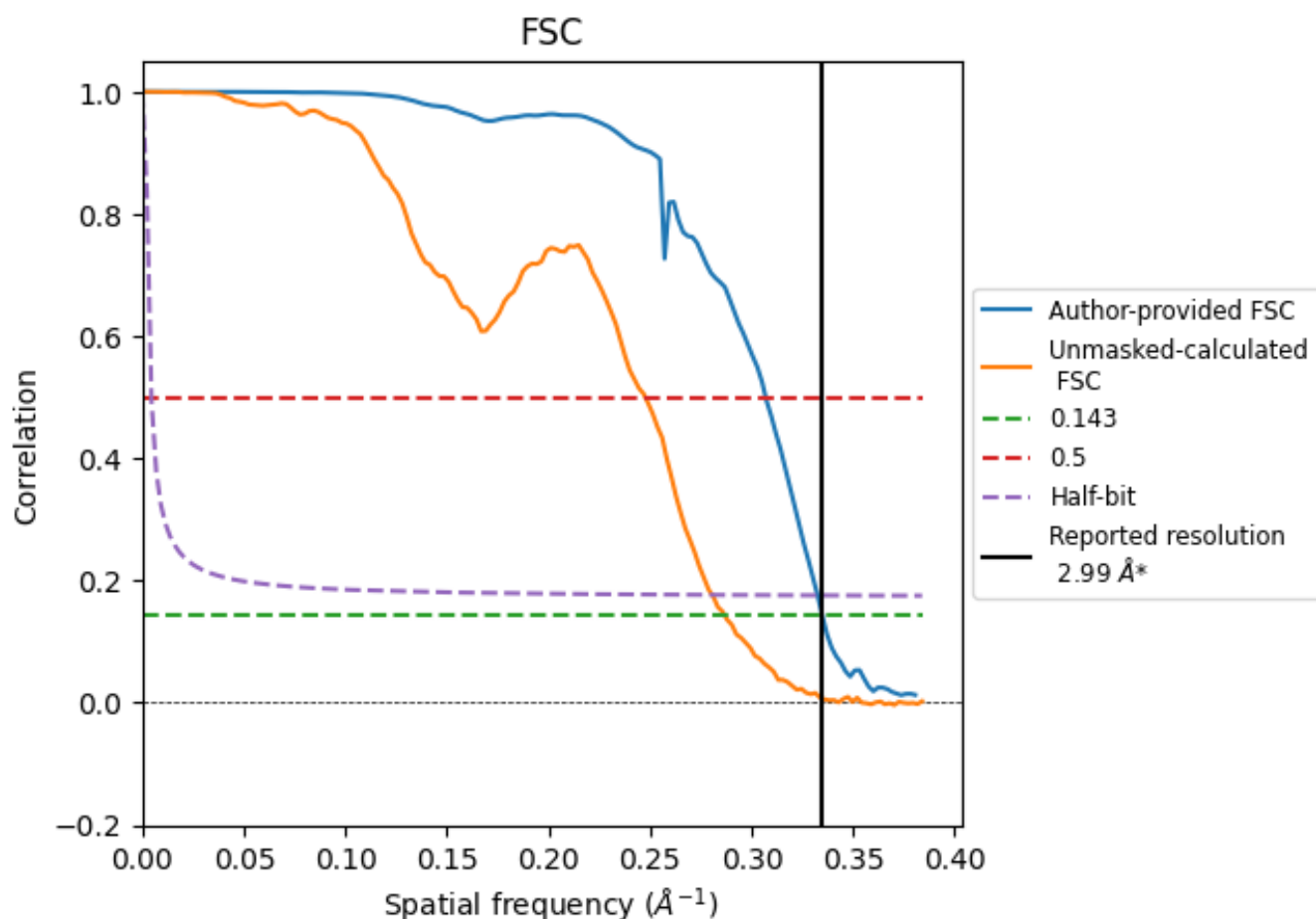


*Reported resolution corresponds to spatial frequency of 0.334 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of $0.334 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

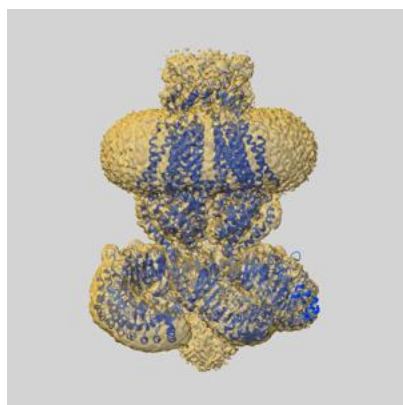
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.99	-	-
Author-provided FSC curve	2.99	3.26	3.01
Unmasked-calculated*	3.49	4.04	3.56

*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 3.49 differs from the reported value 2.99 by more than 10 %

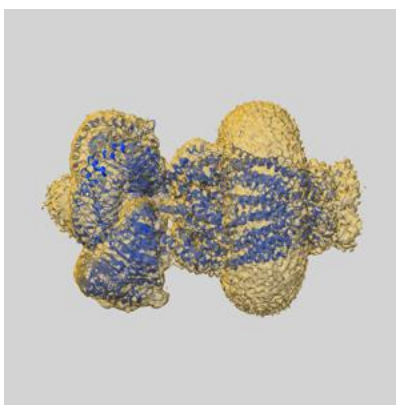
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-55589 and PDB model 9T5M. Per-residue inclusion information can be found in section 3 on page 15.

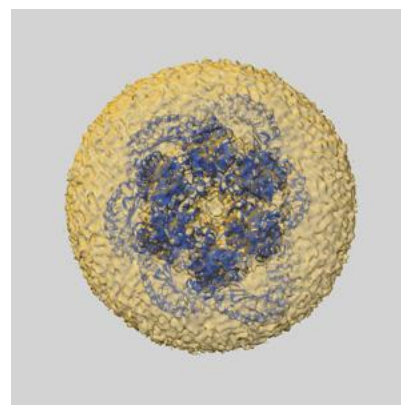
9.1 Map-model overlay [i](#)



X



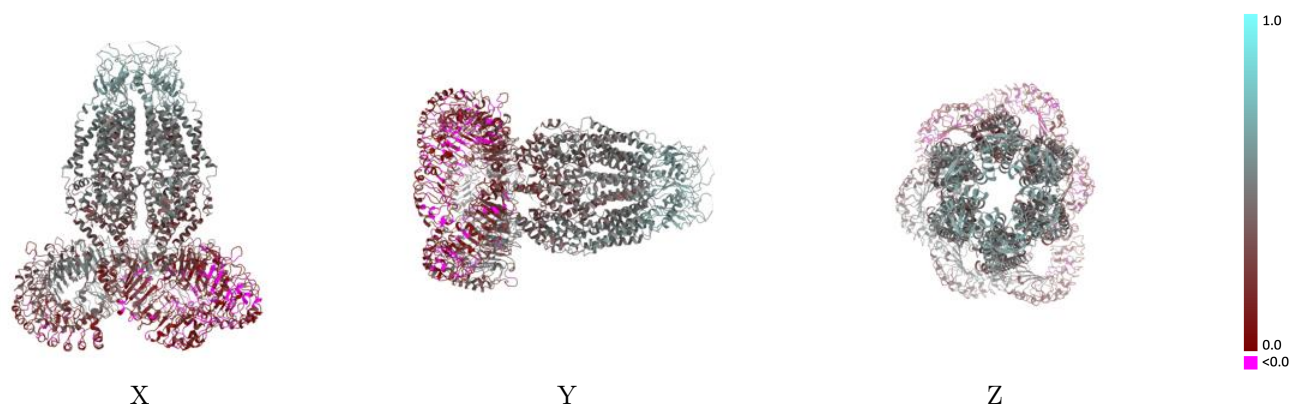
Y



Z

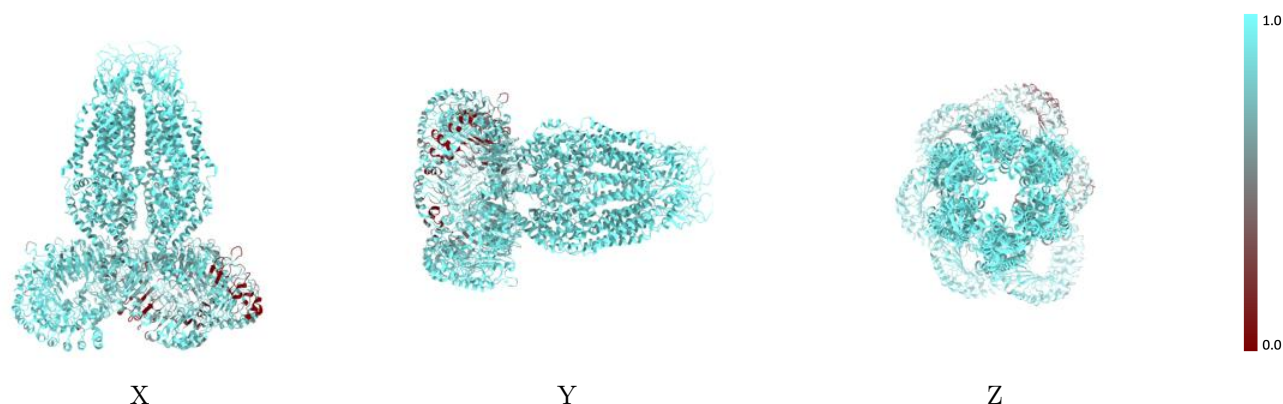
The images above show the 3D surface view of the map at the recommended contour level 0.111 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



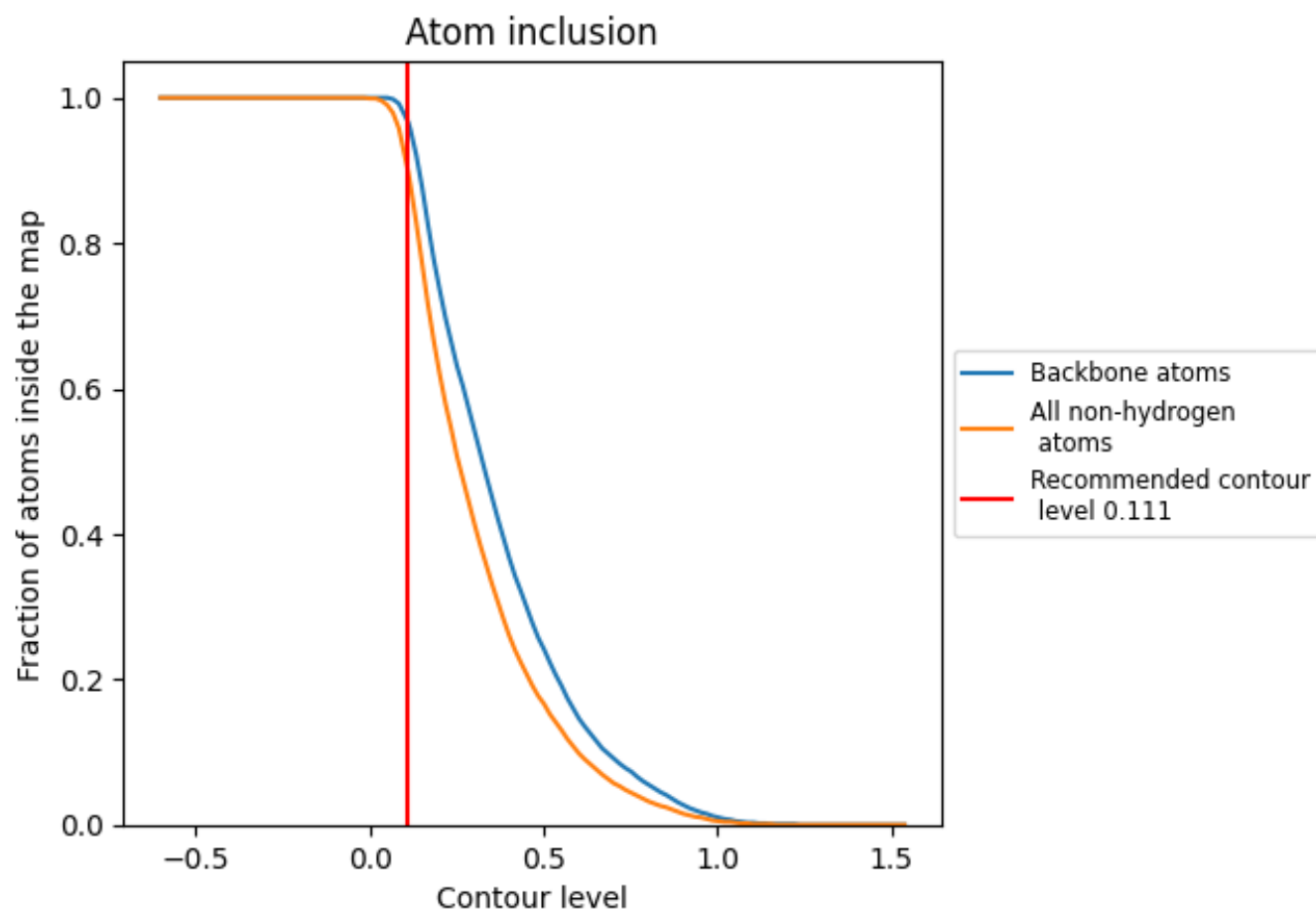
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.111).

9.4 Atom inclusion [i](#)



At the recommended contour level, 97% of all backbone atoms, 90% 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 (0.111) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8970	0.3500
A	0.9610	0.4510
B	0.9630	0.4470
C	0.9490	0.3720
D	0.8250	0.2920
E	0.8120	0.2740
F	0.8700	0.2640

1.0

0.0

<0.0