



wwPDB EM Validation Summary Report ⓘ

Mar 14, 2026 – 02:48 AM UTC

PDB ID : 9EFK / pdb_00009efk
EMDB ID : EMD-47975
Title : Cryo-EM structure of the portal-tail complex of LME-1 phage
Authors : Deme, J.C.; Lea, S.M.
Deposited on : 2024-11-20
Resolution : 1.90 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:

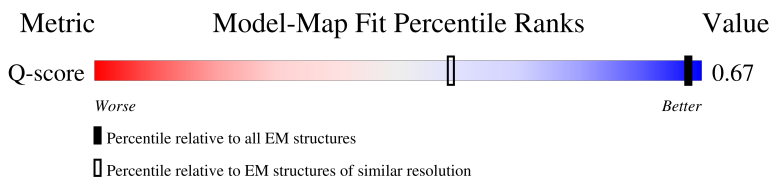
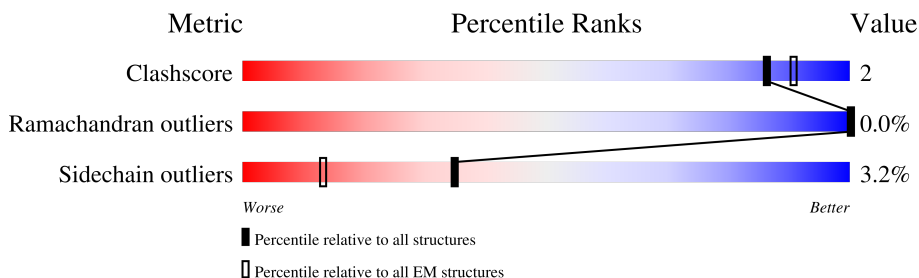
EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & 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 1.90 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	1185 (1.40 - 2.40)

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	554	
1	B	554	
1	C	554	
1	D	554	









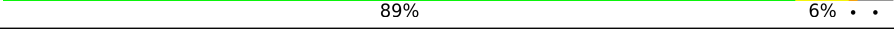


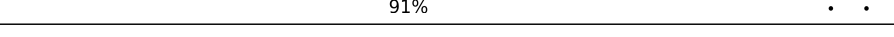

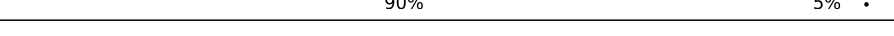


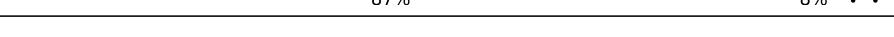

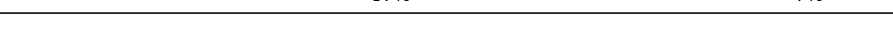
Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	E	554	
1	F	554	
1	G	554	
1	H	554	
1	I	554	
1	J	554	
1	K	554	
1	L	554	
2	M	818	
2	N	818	
2	O	818	
2	P	818	
2	Q	818	
2	R	818	
3	AE	658	
3	AF	658	
3	AG	658	
3	AN	658	
3	AO	658	
3	AP	658	
3	AW	658	
3	AX	658	
3	AY	658	
3	BF	658	
3	BG	658	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	BH	658	
3	BO	658	
3	BP	658	
3	BQ	658	
3	BX	658	
3	BY	658	
3	BZ	658	
4	AA	201	
4	AB	201	
4	AC	201	
4	AD	201	
4	S	201	
4	T	201	
4	U	201	
4	V	201	
4	W	201	
4	X	201	
4	Y	201	
4	Z	201	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 129576 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 orf12.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	B	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	C	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	D	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	E	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	F	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	G	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	H	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	I	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	J	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	K	519	Total 4128	C 2626	N 705	O 778	S 19	0	0
1	L	519	Total 4128	C 2626	N 705	O 778	S 19	0	0

- Molecule 2 is a protein called orf18.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	M	817	Total 6330	C 4003	N 1050	O 1259	S 18	0	0
2	N	817	Total 6330	C 4003	N 1050	O 1259	S 18	0	0
2	O	817	Total 6330	C 4003	N 1050	O 1259	S 18	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf	Trace
2	P	817	Total	C	N	O	S	0	0
			6330	4003	1050	1259	18		
2	Q	817	Total	C	N	O	S	0	0
			6330	4003	1050	1259	18		
2	R	817	Total	C	N	O	S	0	0
			6330	4003	1050	1259	18		

- Molecule 3 is a protein called orf22.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	AE	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	AF	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	AG	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	AN	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	AO	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	AP	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	AW	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	AX	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	AY	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	BF	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	BG	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	BH	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	BO	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	BP	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	BQ	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	BX	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf	Trace
3	BY	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		
3	BZ	172	Total	C	N	O	S	0	0
			1320	836	217	262	5		

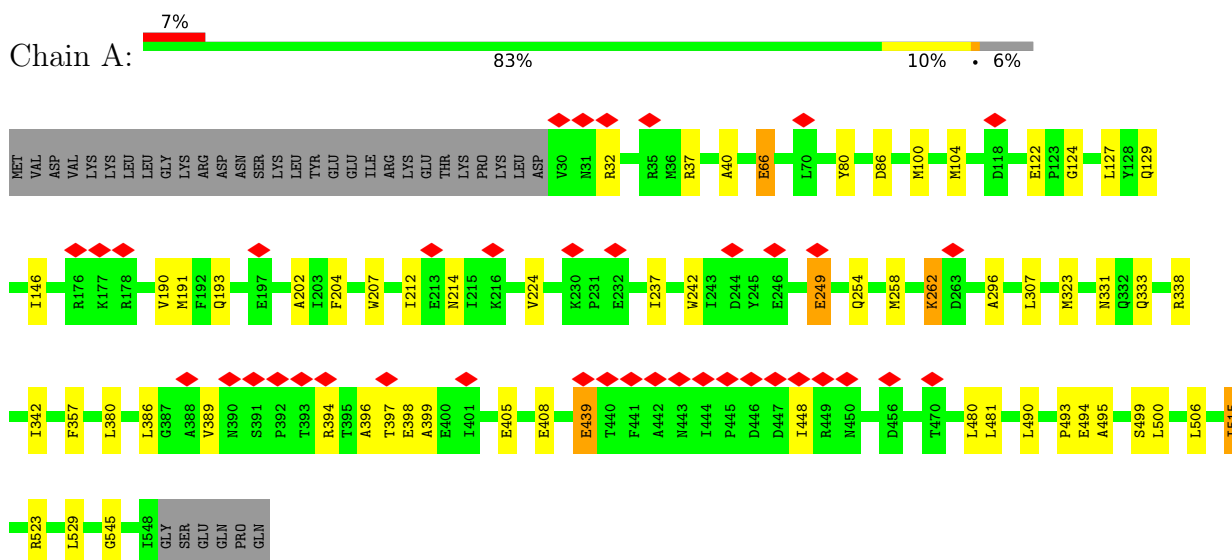
- Molecule 4 is a protein called orf17.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	T	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	AC	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	AD	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	S	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	X	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	U	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	V	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	W	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	Y	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	Z	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	AA	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		
4	AB	193	Total	C	N	O	S	0	0
			1525	982	250	284	9		

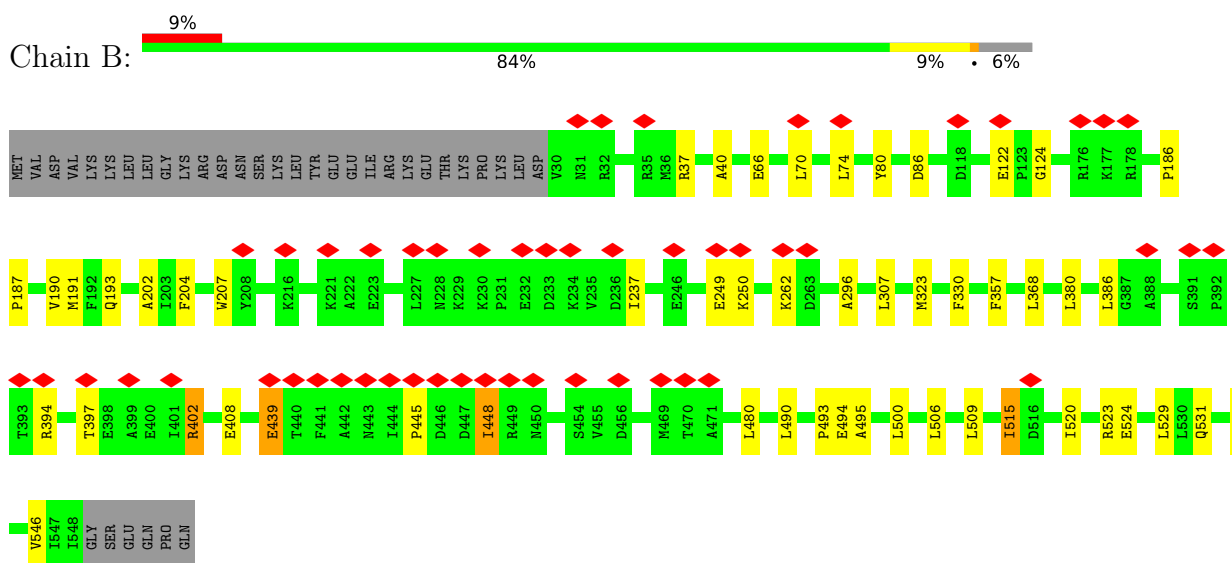
3 Residue-property plots [i](#)

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


- Molecule 1: orf12

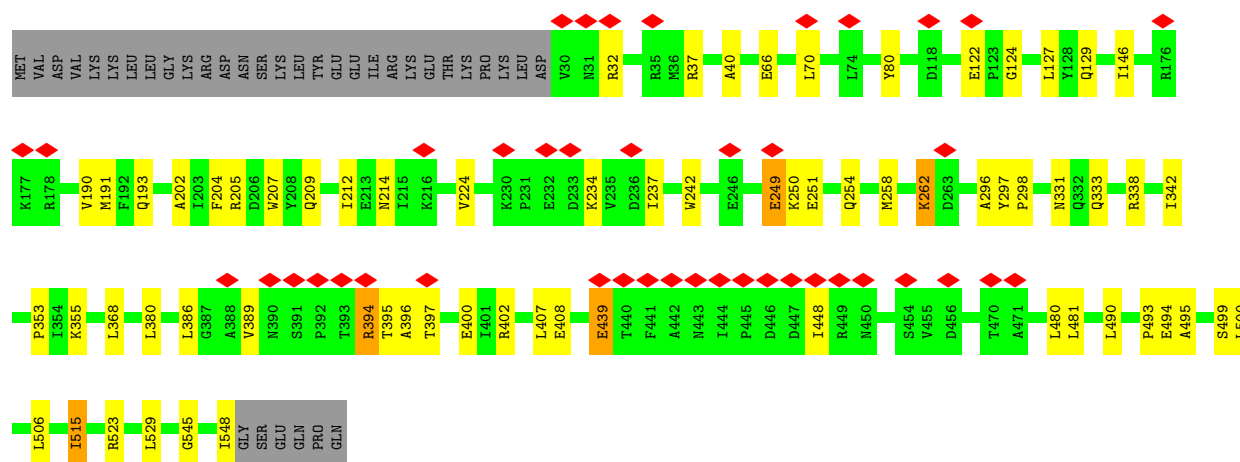


- Molecule 1: orf12




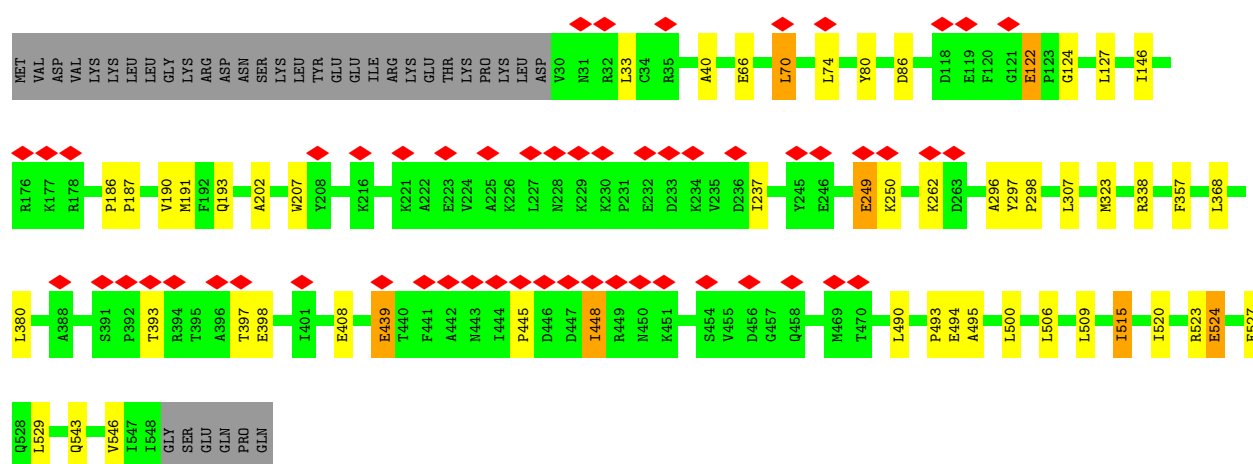
- Molecule 1: orf12

Chain C: 




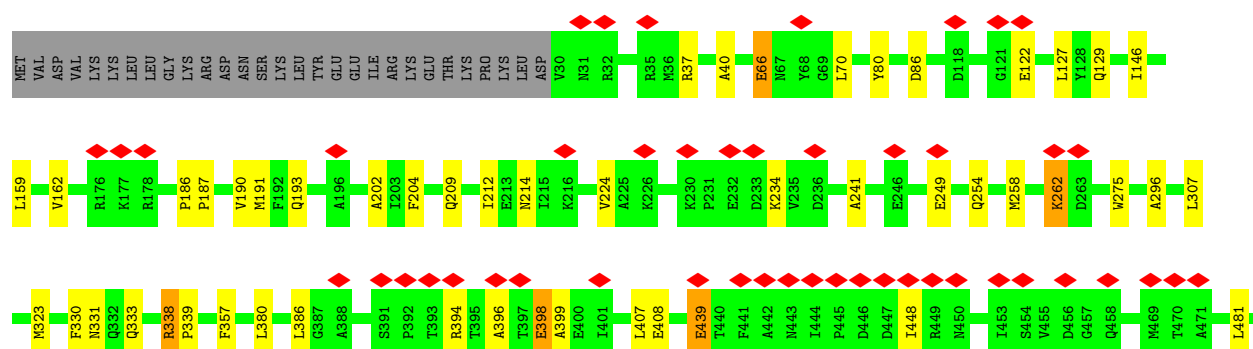
• Molecule 1: orf12

Chain D: 



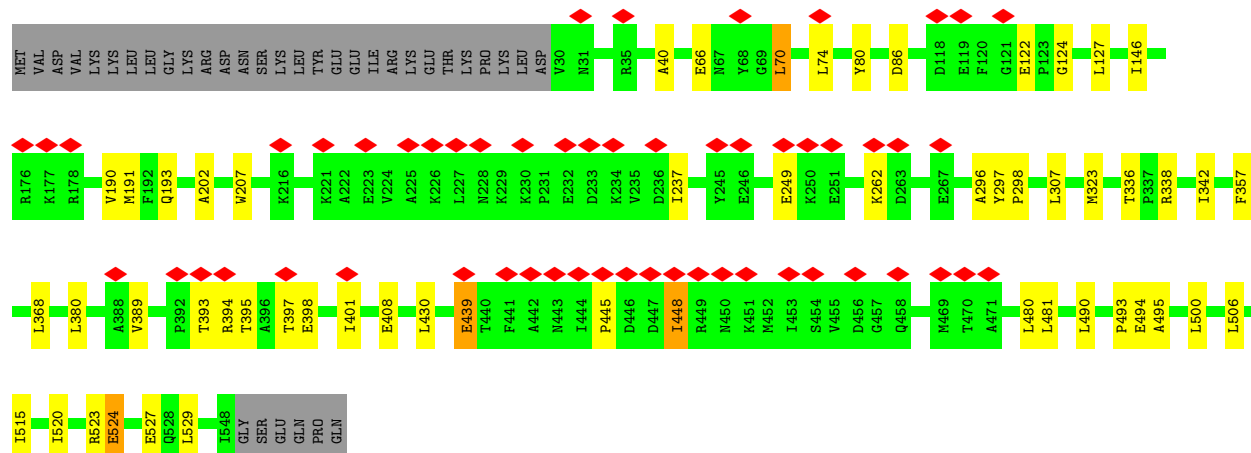
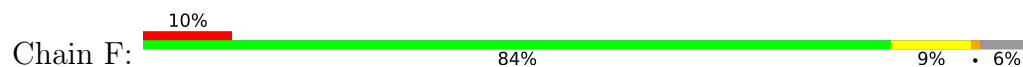
• Molecule 1: orf12

Chain E: 

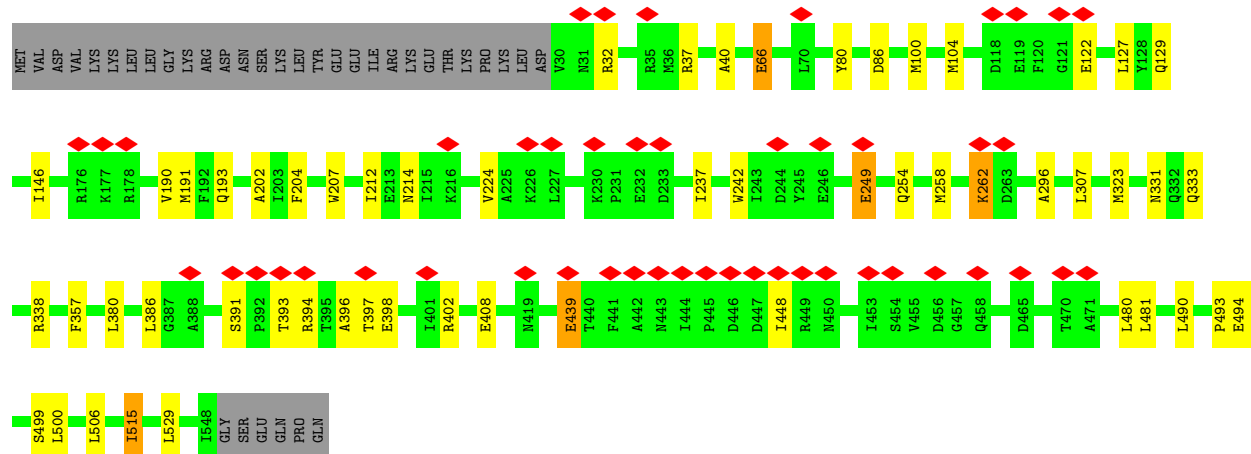
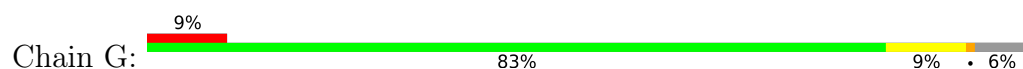




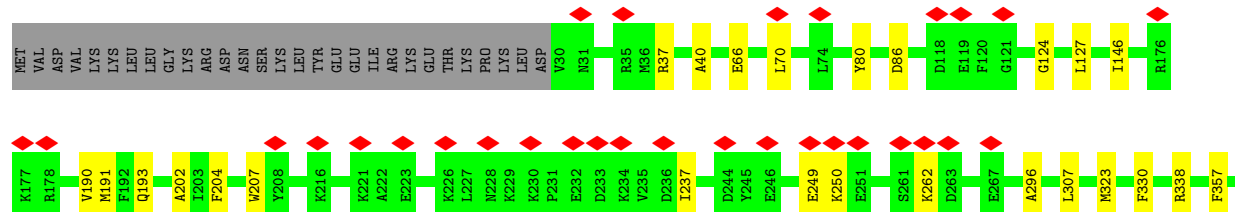
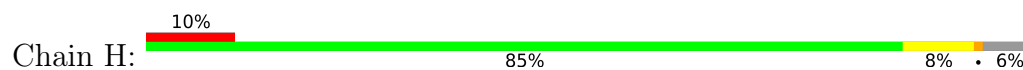
• Molecule 1: orf12

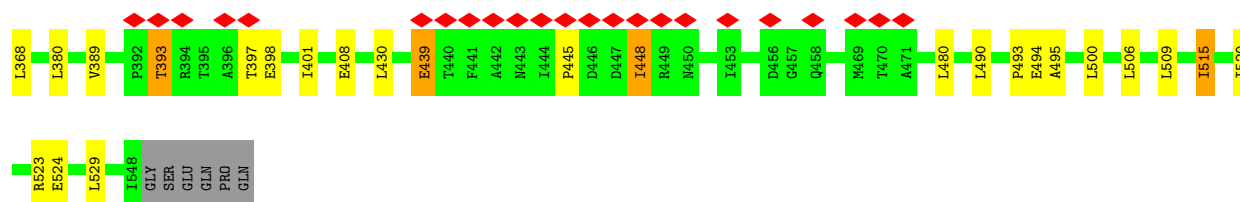


• Molecule 1: orf12

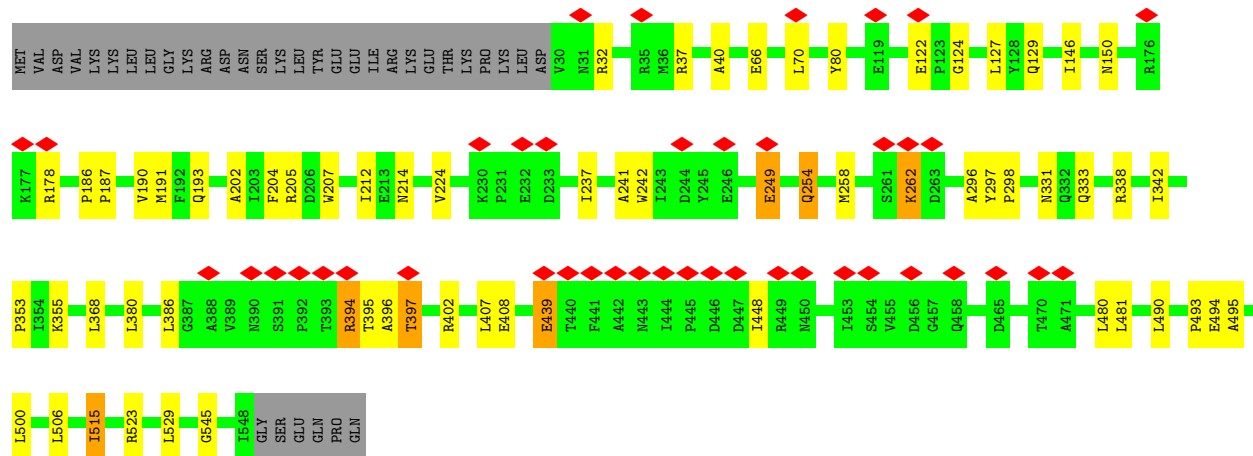
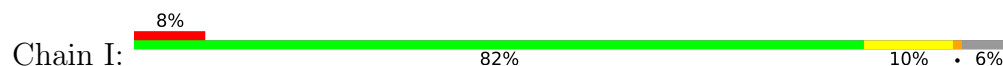


• Molecule 1: orf12

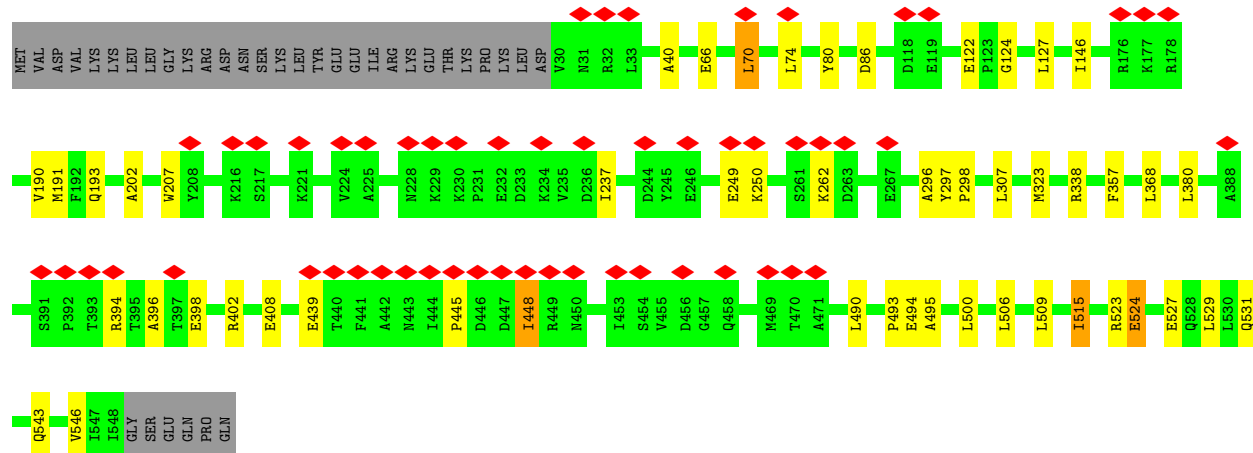
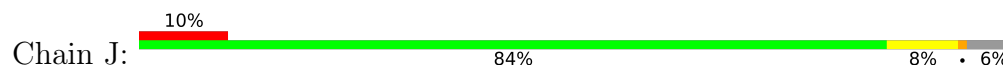




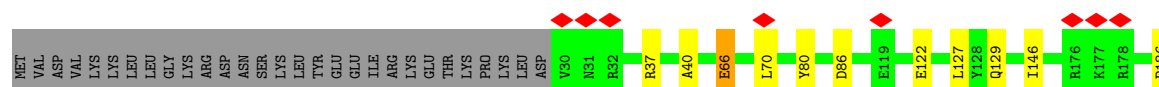
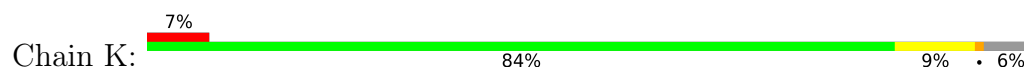
• Molecule 1: orf12

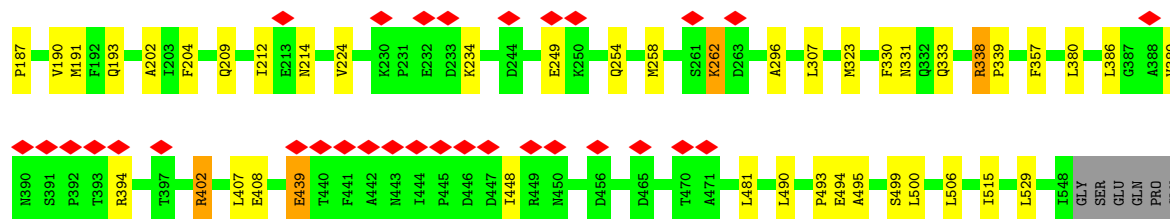


• Molecule 1: orf12

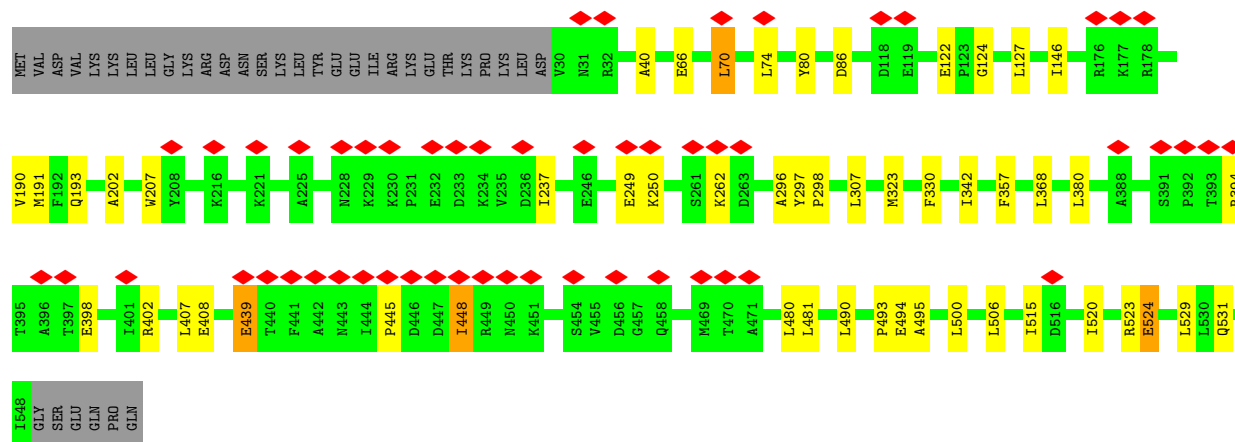
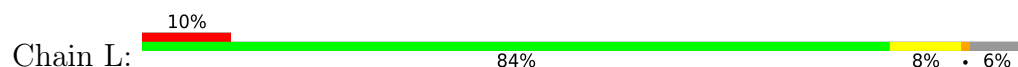


• Molecule 1: orf12

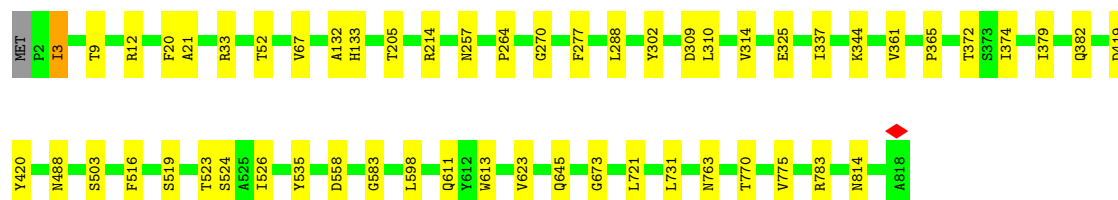




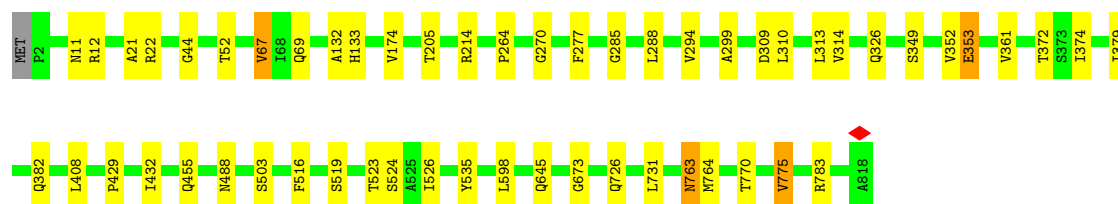
- Molecule 1: orf12



- Molecule 2: orf18



- Molecule 2: orf18



- Molecule 2: orf18





[illegible]

Chain AX: 24% . 74%

[illegible]

Chain AY: 25% . 74%

Chain BF:  24% 74%



[illegible]

- Molecule 3: orf22

[illegible]

- Molecule 3: orf22



ASN	THR	ALA	PRO	GLY	SER	GLN	SER	THR	GLN	MET
THR	ILE	PHE	ALA	ASP	THR	ALA	THR	ALA	VAL	S2
ILE	SER	SER	SER	SER	ASN	THR	PHE	GLY	GLY	I26
LEU	LEU	ILE	ILE	PRO	PRO	ALA	ASN	GLY	GLY	I67
SER	SER	VAL	VAL	ALA	SER	THR	SER	SER	SER	S98
SER	SER	THR	THR	ILE	THR	THR	THR	THR	THR	Q120
GLY	GLY	ILE	ILE	LEU	THR	THR	ASN	LEU	LEU	Q123
LEU	ARG	GLY	GLY	ARG	ALA	ALA	GLY	ILE	ILE	Q123
LEU	ASN	GLN	GLN	THR	THR	SER	SER	ALA	ALA	A131
GLY	GLY	ILE	ILE	PHE	THR	GLY	GLY	ASN	GLN	A131
ALA	ALA	THR	THR	ASP	VAL	ALA	VAL	ALA	ALA	L134
ASN	ASN	GLY	GLY	GLN	GLY	GLY	GLY	VAL	VAL	E135
ALA	ALA	ASP	PRO	PRO	ALA	ALA	ALA	ASP	ASP	V136
ARG	ARG	LYS	LYS	SER	THR	THR	THR	THR	THR	R146
VAL	VAL	THR	THR	GLU	GLU	LEU	LEU	THR	TRP	P149
SER	SER	PHE	PHE	ILE	ILE	GLN	ALA	ALA	PRO	P149
THR	THR	GLY	GLY	PRO	PRO	GLY	THR	GLY	GLY	E167
LEU	LEU	THR	THR	ASP	ASP	ASN	SER	SER	ASP	E167
ASP	ASP	THR	THR	LEU	LEU	GLY	GLY	GLY	GLU	D172
GLU	GLU	THR	THR	VAL	VAL	VAL	ALA	THR	THR	E173
ASP	ASP	LEU	ASP	PRO	PRO	PRO	PHE	ARG	ARG	THR
MET	MET	ASN	ASN	VAL	VAL	VAL	SER	SER	SER	PRO
ALA	ALA	PHE	PHE	LEU	LEU	LEU	LEU	GLN	GLN	ALA
SER	SER	ILE	ILE	ALA	ALA	ALA	GLY	ALA	ALA	PRO
ASP	ASP	PHE	PHE	GLY	GLY	GLY	ASP	PRO	PRO	SER
SER	SER	VAL	VAL	THR	THR	GLN	GLN	VAL	VAL	SER
ALA	ALA	GLY	GLY	VAL	VAL	VAL	ALA	SER	SER	SER
THR	THR	SER	SER	ASN	ASN	ASN	GLY	PRO	PRO	PRO
ALA	ALA	ASN	ASN	ASN	VAL	VAL	VAL	ASP	ASP	PHE
LEU	LEU	ILE	ILE	GLY	GLY	LEU	LEU	ASP	ASP	ILE
ALA	ALA	GLN	GLN	THR	THR	GLN	ASN	VAL	VAL	ILE
THR	THR	HIS	HIS	LEU	LEU	LYS	LYS	VAL	VAL	TYR
GLN	GLN	LEU	LEU	TRP	TRP	SER	SER	ASN	GLN	GLN
GLN	GLN	GLY	GLY	LEU	LEU	LYS	TYR	LYS	ALA	ALA
SER	SER	ASP	ASP	GLN	GLN	LEU	LEU	ALA	ASP	ASP
ILE	ILE	THR	THR	THR	THR	THR	MET	THR	ALA	THR
LYS	LYS	GLY	GLY	ASP	THR	LYS	LYS	ALA	THR	THR
ALA	ALA	THR	THR	THR	THR	GLN	GLN	ASP	LEU	LEU
ASN	ASN	PHE	PHE	VAL	VAL	THR	THR	SER	SER	ASN
ASP	ASP	ILE	ILE	ALA	ALA	ASN	ASN	ILE	ALA	ALA
ASN	ASN	PHE	PHE	VAL	VAL	THR	THR	ALA	SER	GLM
PHE	PHE	GLY	GLY	GLY	GLY	THR	PHE	GLY	GLY	ASN
ARG	ARG	THR	THR	THR	THR	THR	GLU	PHE	THR	LEU
ALA	ALA	ALA	ALA	ASP	ASN	ASN	ASN	THR	THR	GLY
ALA	ALA	THR	THR	PRO	PRO	GLY	GLY	PHE	PHE	ALA
GLY	GLY	GLN	GLN	ILE	ILE	ILE	ILE	ILE	ILE	LEU
ALA	ALA	ILE	ILE	THR	THR	THR	TYR	ASN	ASN	THR
ILE	ILE	ASN	ASN	PHE	ILE	ILE	ILE	PRO	PRO	SER
LEU	LEU	THR	THR	ILE	ILE	THR	THR	LEU	ASN	GLY
GLN	GLN	ILE	ILE	ALA	ALA	THR	THR	VAL	VAL	ILE
THR	THR	ASN	ASN	PHE	THR	GLN	GLN	VAL	ALA	ALA
VAL	VAL	THR	THR	LEU	LEU	THR	THR	THR	THR	THR

[illegible]

- Molecule 3: orf22

Chain BQ:  25% 74%

[illegible]

- Molecule 3: orf22

Chain BX:  25% 74%

[illegible]

[illegible]

- Molecule 3: orf22

Chain BY:  25% 74%

[illegible]

- Molecule 3: orf22

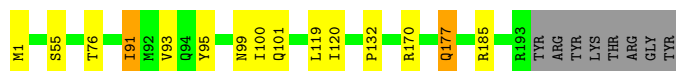
Chain BZ:  25% 74%

[illegible]



- Molecule 4: orf17

Chain V: 89% 6% . .



- Molecule 4: orf17

Chain W: 89% 6% .



- Molecule 4: orf17

Chain Y: 91% . .



- Molecule 4: orf17

Chain Z: 87% 7% . .



- Molecule 4: orf17

Chain AA: 91% . . .



- Molecule 4: orf17

Chain AB: 89% 6% . .



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	88530	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	52.9	Depositor
Minimum defocus (nm)	100	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	TFS FALCON 4i (4k x 4k)	Depositor
Maximum map value	1.337	Depositor
Minimum map value	-0.451	Depositor
Average map value	-0.002	Depositor
Map value standard deviation	0.034	Depositor
Recommended contour level	0.25	Depositor
Map size (\AA)	702.4, 702.4, 702.4	wwPDB
Map dimensions	800, 800, 800	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	0.878, 0.878, 0.878	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	0.19	0/4223	0.29	0/5744
1	B	0.18	0/4223	0.28	0/5744
1	C	0.19	0/4223	0.31	1/5744 (0.0%)
1	D	0.19	0/4223	0.29	0/5744
1	E	0.19	0/4223	0.30	0/5744
1	F	0.19	0/4223	0.29	0/5744
1	G	0.19	0/4223	0.30	0/5744
1	H	0.18	0/4223	0.28	0/5744
1	I	0.19	0/4223	0.31	1/5744 (0.0%)
1	J	0.19	0/4223	0.29	0/5744
1	K	0.19	0/4223	0.29	0/5744
1	L	0.19	0/4223	0.29	0/5744
2	M	0.21	0/6466	0.30	0/8830
2	N	0.21	0/6466	0.30	0/8830
2	O	0.21	0/6466	0.31	0/8830
2	P	0.21	0/6466	0.31	0/8830
2	Q	0.21	0/6466	0.30	0/8830
2	R	0.21	0/6466	0.30	0/8830
3	AE	0.21	0/1347	0.28	0/1837
3	AF	0.20	0/1347	0.27	0/1837
3	AG	0.21	0/1347	0.28	0/1837
3	AN	0.21	0/1347	0.29	0/1837
3	AO	0.20	0/1347	0.27	0/1837
3	AP	0.21	0/1347	0.31	0/1837
3	AW	0.21	0/1347	0.29	0/1837
3	AX	0.20	0/1347	0.27	0/1837
3	AY	0.21	0/1347	0.28	0/1837
3	BF	0.22	0/1347	0.29	0/1837
3	BG	0.20	0/1347	0.27	0/1837
3	BH	0.21	0/1347	0.29	0/1837
3	BO	0.21	0/1347	0.29	0/1837
3	BP	0.20	0/1347	0.27	0/1837
3	BQ	0.21	0/1347	0.29	0/1837
3	BX	0.21	0/1347	0.28	0/1837

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
3	BY	0.20	0/1347	0.27	0/1837
3	BZ	0.21	0/1347	0.28	0/1837
4	AA	0.22	0/1561	0.32	0/2127
4	AB	0.22	0/1561	0.32	0/2127
4	AC	0.22	0/1561	0.32	0/2127
4	AD	0.23	0/1561	0.35	0/2127
4	S	0.22	0/1561	0.30	0/2127
4	T	0.22	0/1561	0.32	0/2127
4	U	0.22	0/1561	0.31	0/2127
4	V	0.22	0/1561	0.33	0/2127
4	W	0.23	0/1561	0.33	0/2127
4	X	0.22	0/1561	0.32	0/2127
4	Y	0.22	0/1561	0.31	0/2127
4	Z	0.22	0/1561	0.34	0/2127
All	All	0.20	0/132450	0.30	2/180498 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	368	LEU	N-CA-C	-5.04	106.47	113.18
1	I	368	LEU	N-CA-C	-5.02	106.50	113.18

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	4128	0	4062	29	0
1	B	4128	0	4062	28	0
1	C	4128	0	4062	31	0
1	D	4128	0	4062	27	0
1	E	4128	0	4062	27	0
1	F	4128	0	4062	25	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	G	4128	0	4062	28	0
1	H	4128	0	4062	25	0
1	I	4128	0	4062	31	0
1	J	4128	0	4062	22	0
1	K	4128	0	4062	25	0
1	L	4128	0	4062	25	0
2	M	6330	0	6142	24	0
2	N	6330	0	6142	29	0
2	O	6330	0	6142	27	0
2	P	6330	0	6142	23	0
2	Q	6330	0	6142	30	0
2	R	6330	0	6142	23	0
3	AE	1320	0	1285	2	0
3	AF	1320	0	1285	5	0
3	AG	1320	0	1285	4	0
3	AN	1320	0	1285	5	0
3	AO	1320	0	1285	6	0
3	AP	1320	0	1285	6	0
3	AW	1320	0	1285	4	0
3	AX	1320	0	1285	8	0
3	AY	1320	0	1285	6	0
3	BF	1320	0	1285	5	0
3	BG	1320	0	1285	6	0
3	BH	1320	0	1285	6	0
3	BO	1320	0	1285	2	0
3	BP	1320	0	1285	5	0
3	BQ	1320	0	1285	4	0
3	BX	1320	0	1285	3	0
3	BY	1320	0	1285	4	0
3	BZ	1320	0	1285	3	0
4	AA	1525	0	1526	7	0
4	AB	1525	0	1526	8	0
4	AC	1525	0	1526	8	0
4	AD	1525	0	1526	12	0
4	S	1525	0	1526	4	0
4	T	1525	0	1526	9	0
4	U	1525	0	1526	6	0
4	V	1525	0	1526	10	0
4	W	1525	0	1526	7	0
4	X	1525	0	1526	14	0
4	Y	1525	0	1526	5	0
4	Z	1525	0	1526	10	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	129576	0	127038	542	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 2.

The worst 5 of 542 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)
4:V:99:ASN:HB3	4:V:185:ARG:HE	1.44	0.83
4:Z:99:ASN:HB3	4:Z:185:ARG:HE	1.51	0.76
1:I:397:THR:HB	1:J:396:ALA:HA	1.67	0.76
1:B:394:ARG:HH21	1:B:402:ARG:HH12	1.38	0.71
3:BZ:37:LEU:HD13	4:Z:1:MET:HE2	1.73	0.71

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	517/554 (93%)	498 (96%)	19 (4%)	0	100	100
1	B	517/554 (93%)	494 (96%)	23 (4%)	0	100	100
1	C	517/554 (93%)	495 (96%)	22 (4%)	0	100	100
1	D	517/554 (93%)	495 (96%)	22 (4%)	0	100	100
1	E	517/554 (93%)	495 (96%)	22 (4%)	0	100	100
1	F	517/554 (93%)	495 (96%)	22 (4%)	0	100	100
1	G	517/554 (93%)	493 (95%)	24 (5%)	0	100	100
1	H	517/554 (93%)	496 (96%)	21 (4%)	0	100	100
1	I	517/554 (93%)	496 (96%)	21 (4%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	J	517/554 (93%)	494 (96%)	23 (4%)	0	100	100
1	K	517/554 (93%)	497 (96%)	20 (4%)	0	100	100
1	L	517/554 (93%)	495 (96%)	22 (4%)	0	100	100
2	M	815/818 (100%)	790 (97%)	24 (3%)	1 (0%)	48	40
2	N	815/818 (100%)	791 (97%)	24 (3%)	0	100	100
2	O	815/818 (100%)	788 (97%)	27 (3%)	0	100	100
2	P	815/818 (100%)	791 (97%)	23 (3%)	1 (0%)	48	40
2	Q	815/818 (100%)	792 (97%)	23 (3%)	0	100	100
2	R	815/818 (100%)	790 (97%)	25 (3%)	0	100	100
3	AE	170/658 (26%)	167 (98%)	3 (2%)	0	100	100
3	AF	170/658 (26%)	168 (99%)	2 (1%)	0	100	100
3	AG	170/658 (26%)	167 (98%)	3 (2%)	0	100	100
3	AN	170/658 (26%)	167 (98%)	3 (2%)	0	100	100
3	AO	170/658 (26%)	167 (98%)	3 (2%)	0	100	100
3	AP	170/658 (26%)	167 (98%)	3 (2%)	0	100	100
3	AW	170/658 (26%)	167 (98%)	3 (2%)	0	100	100
3	AX	170/658 (26%)	167 (98%)	3 (2%)	0	100	100
3	AY	170/658 (26%)	167 (98%)	3 (2%)	0	100	100
3	BF	170/658 (26%)	167 (98%)	3 (2%)	0	100	100
3	BG	170/658 (26%)	168 (99%)	2 (1%)	0	100	100
3	BH	170/658 (26%)	166 (98%)	4 (2%)	0	100	100
3	BO	170/658 (26%)	166 (98%)	4 (2%)	0	100	100
3	BP	170/658 (26%)	168 (99%)	2 (1%)	0	100	100
3	BQ	170/658 (26%)	166 (98%)	4 (2%)	0	100	100
3	BX	170/658 (26%)	167 (98%)	3 (2%)	0	100	100
3	BY	170/658 (26%)	168 (99%)	2 (1%)	0	100	100
3	BZ	170/658 (26%)	168 (99%)	2 (1%)	0	100	100
4	AA	191/201 (95%)	190 (100%)	1 (0%)	0	100	100
4	AB	191/201 (95%)	188 (98%)	3 (2%)	0	100	100
4	AC	191/201 (95%)	190 (100%)	1 (0%)	0	100	100
4	AD	191/201 (95%)	190 (100%)	1 (0%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	S	191/201 (95%)	190 (100%)	1 (0%)	0	100	100
4	T	191/201 (95%)	190 (100%)	1 (0%)	0	100	100
4	U	191/201 (95%)	190 (100%)	1 (0%)	0	100	100
4	V	191/201 (95%)	188 (98%)	3 (2%)	0	100	100
4	W	191/201 (95%)	190 (100%)	1 (0%)	0	100	100
4	X	191/201 (95%)	189 (99%)	2 (1%)	0	100	100
4	Y	191/201 (95%)	190 (100%)	1 (0%)	0	100	100
4	Z	191/201 (95%)	189 (99%)	2 (1%)	0	100	100
All	All	16446/25812 (64%)	15967 (97%)	477 (3%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	M	337	ILE
2	P	337	ILE

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	440/473 (93%)	417 (95%)	23 (5%)	21	13
1	B	440/473 (93%)	424 (96%)	16 (4%)	31	23
1	C	440/473 (93%)	413 (94%)	27 (6%)	17	9
1	D	440/473 (93%)	419 (95%)	21 (5%)	23	15
1	E	440/473 (93%)	417 (95%)	23 (5%)	21	13
1	F	440/473 (93%)	419 (95%)	21 (5%)	23	15
1	G	440/473 (93%)	418 (95%)	22 (5%)	22	14
1	H	440/473 (93%)	421 (96%)	19 (4%)	26	18
1	I	440/473 (93%)	415 (94%)	25 (6%)	18	11
1	J	440/473 (93%)	418 (95%)	22 (5%)	22	14

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	K	440/473 (93%)	418 (95%)	22 (5%)	22	14
1	L	440/473 (93%)	421 (96%)	19 (4%)	26	18
2	M	694/695 (100%)	681 (98%)	13 (2%)	50	47
2	N	694/695 (100%)	682 (98%)	12 (2%)	53	52
2	O	694/695 (100%)	685 (99%)	9 (1%)	61	61
2	P	694/695 (100%)	680 (98%)	14 (2%)	48	46
2	Q	694/695 (100%)	682 (98%)	12 (2%)	53	52
2	R	694/695 (100%)	681 (98%)	13 (2%)	50	47
3	AE	144/532 (27%)	142 (99%)	2 (1%)	59	59
3	AF	144/532 (27%)	141 (98%)	3 (2%)	47	44
3	AG	144/532 (27%)	143 (99%)	1 (1%)	76	78
3	AN	144/532 (27%)	141 (98%)	3 (2%)	47	44
3	AO	144/532 (27%)	141 (98%)	3 (2%)	47	44
3	AP	144/532 (27%)	143 (99%)	1 (1%)	76	78
3	AW	144/532 (27%)	142 (99%)	2 (1%)	59	59
3	AX	144/532 (27%)	142 (99%)	2 (1%)	59	59
3	AY	144/532 (27%)	142 (99%)	2 (1%)	59	59
3	BF	144/532 (27%)	139 (96%)	5 (4%)	32	24
3	BG	144/532 (27%)	142 (99%)	2 (1%)	59	59
3	BH	144/532 (27%)	141 (98%)	3 (2%)	47	44
3	BO	144/532 (27%)	140 (97%)	4 (3%)	38	32
3	BP	144/532 (27%)	141 (98%)	3 (2%)	47	44
3	BQ	144/532 (27%)	142 (99%)	2 (1%)	59	59
3	BX	144/532 (27%)	143 (99%)	1 (1%)	76	78
3	BY	144/532 (27%)	142 (99%)	2 (1%)	59	59
3	BZ	144/532 (27%)	140 (97%)	4 (3%)	38	32
4	AA	169/176 (96%)	163 (96%)	6 (4%)	31	23
4	AB	169/176 (96%)	162 (96%)	7 (4%)	27	19
4	AC	169/176 (96%)	165 (98%)	4 (2%)	43	38
4	AD	169/176 (96%)	162 (96%)	7 (4%)	27	19
4	S	169/176 (96%)	162 (96%)	7 (4%)	27	19

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	T	169/176 (96%)	164 (97%)	5 (3%)	36	30
4	U	169/176 (96%)	163 (96%)	6 (4%)	31	23
4	V	169/176 (96%)	165 (98%)	4 (2%)	43	38
4	W	169/176 (96%)	163 (96%)	6 (4%)	31	23
4	X	169/176 (96%)	165 (98%)	4 (2%)	43	38
4	Y	169/176 (96%)	163 (96%)	6 (4%)	31	23
4	Z	169/176 (96%)	159 (94%)	10 (6%)	18	10
All	All	14064/21534 (65%)	13614 (97%)	450 (3%)	35	27

5 of 450 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	146	ILE
4	AB	4	LEU
1	H	506	LEU
4	AA	39	ILE
4	S	155	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 185 such sidechains are listed below:

Mol	Chain	Res	Type
1	G	67	ASN
1	J	543	GLN
1	G	141	HIS
1	I	107	GLN
1	L	67	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [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.

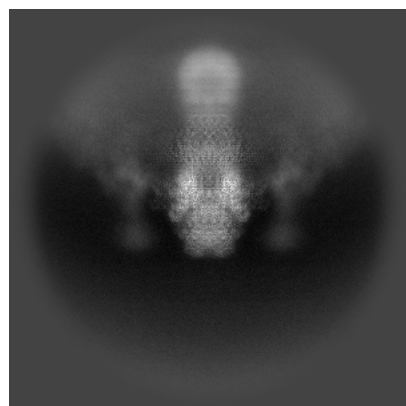
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-47975. These allow visual inspection of the internal detail of the map and identification of artifacts.

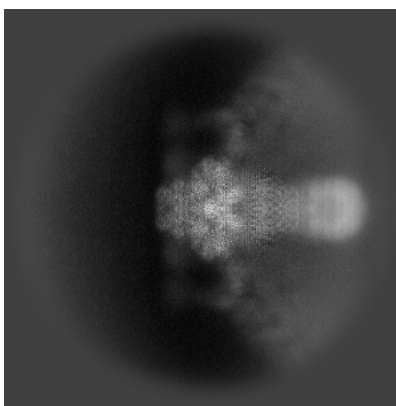
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

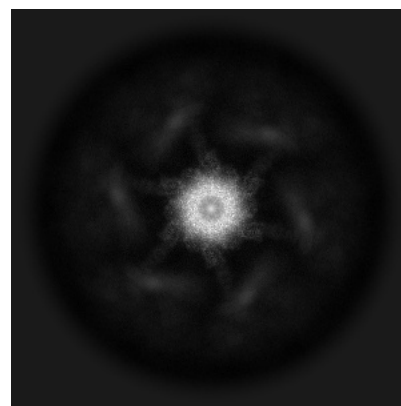
6.1.1 Primary map



X

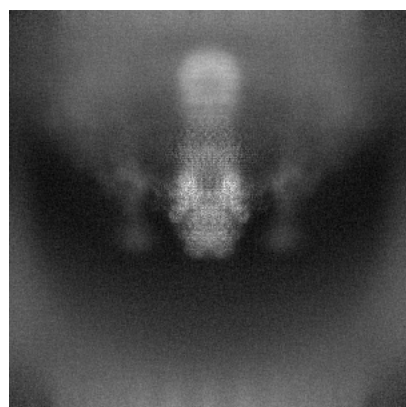


Y

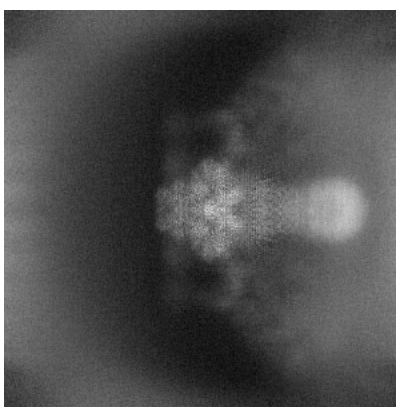


Z

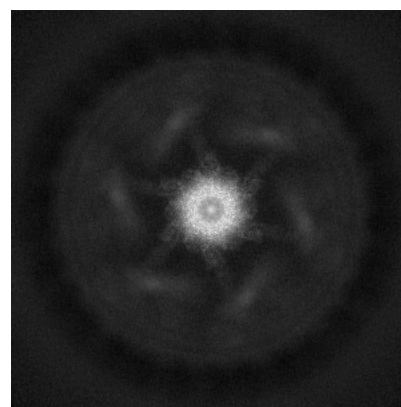
6.1.2 Raw map



X



Y

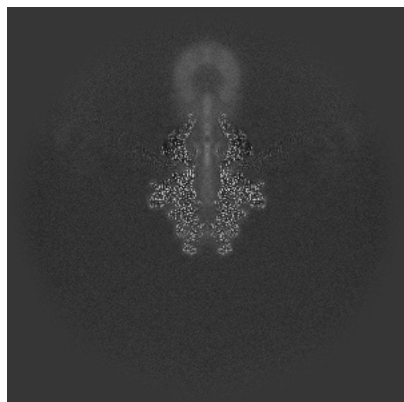


Z

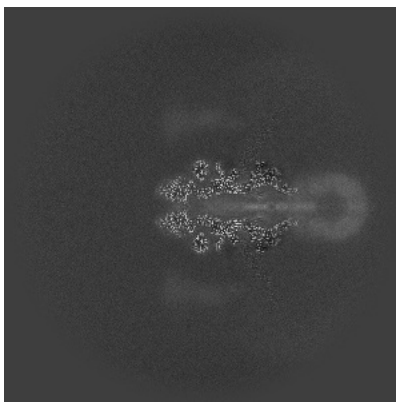
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

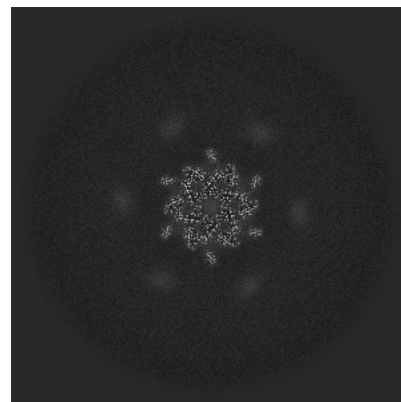
6.2.1 Primary map



X Index: 400

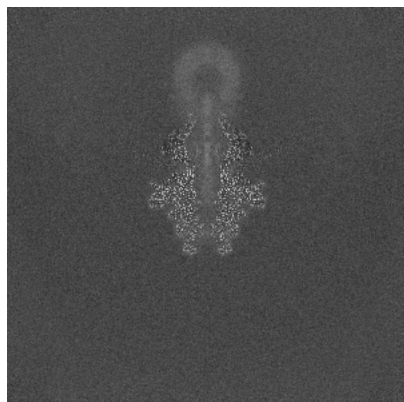


Y Index: 400

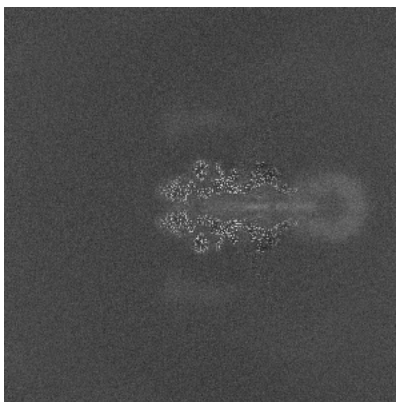


Z Index: 400

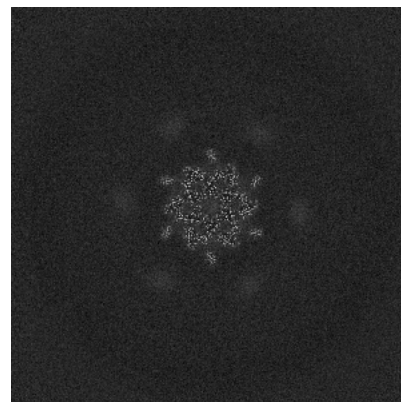
6.2.2 Raw map



X Index: 400



Y Index: 400

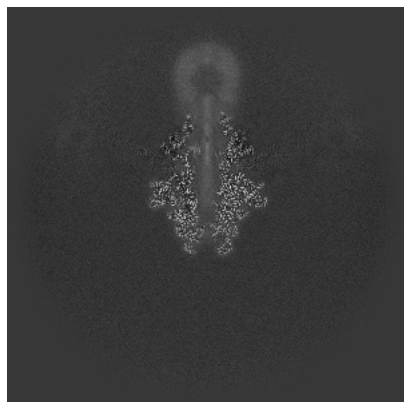


Z Index: 400

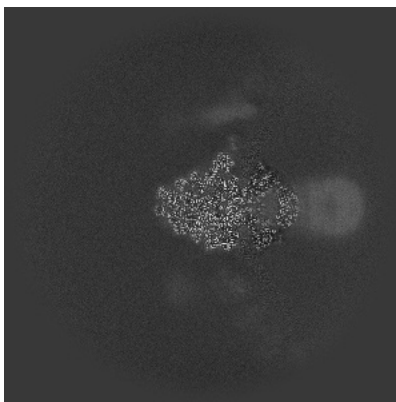
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

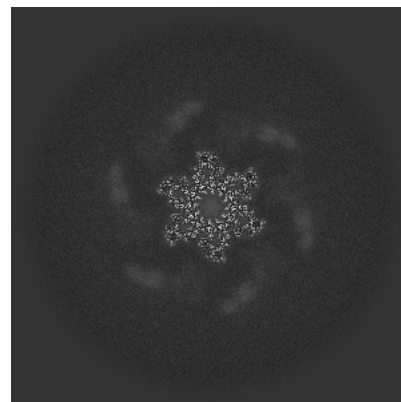
6.3.1 Primary map



X Index: 403

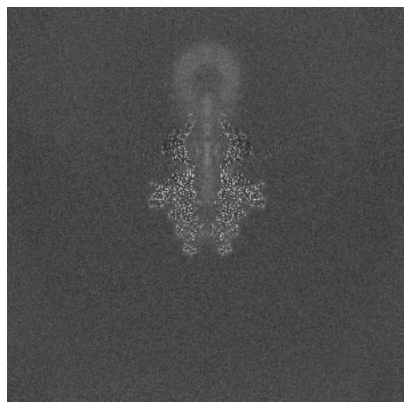


Y Index: 370

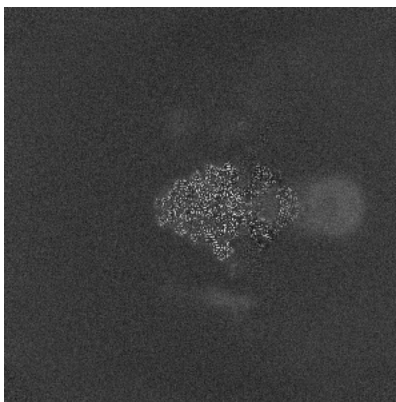


Z Index: 436

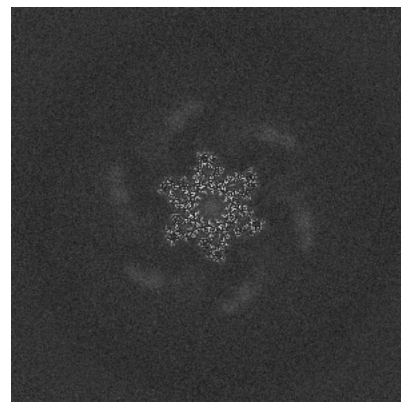
6.3.2 Raw map



X Index: 400



Y Index: 430

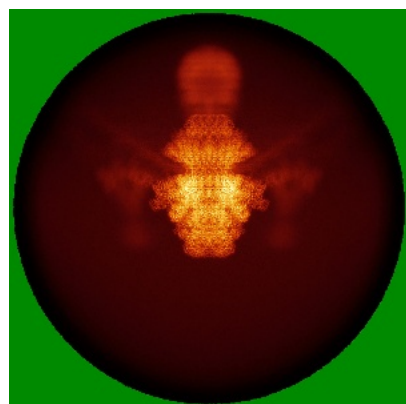


Z Index: 436

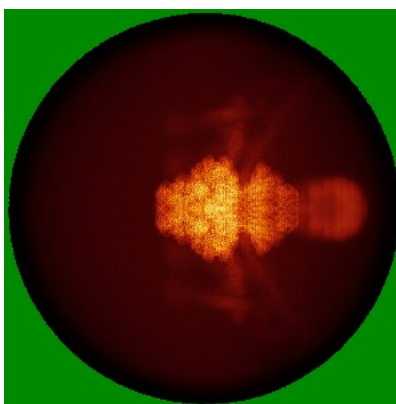
The images above show the largest variance slices of the map in three orthogonal directions.

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

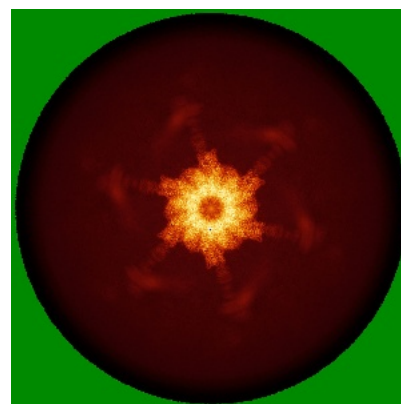
6.4.1 Primary map



X

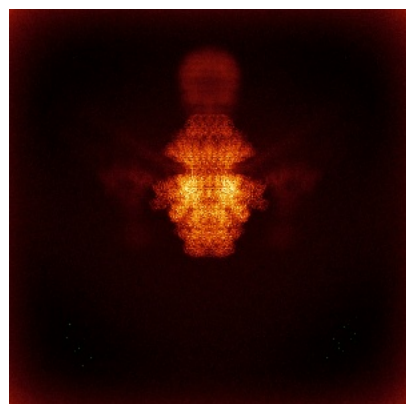


Y

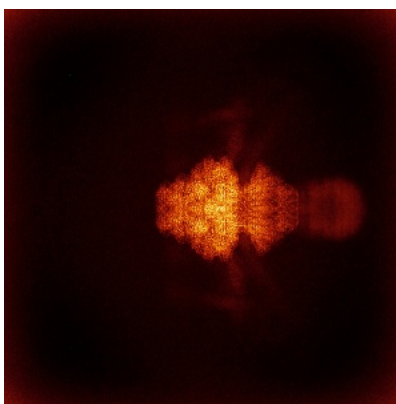


Z

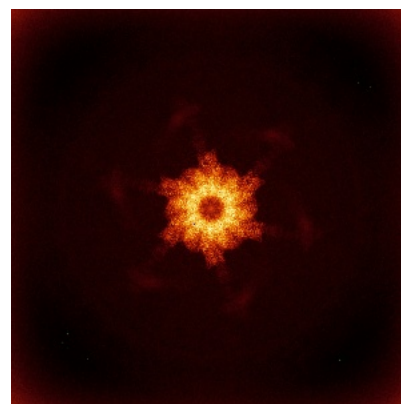
6.4.2 Raw map



X



Y

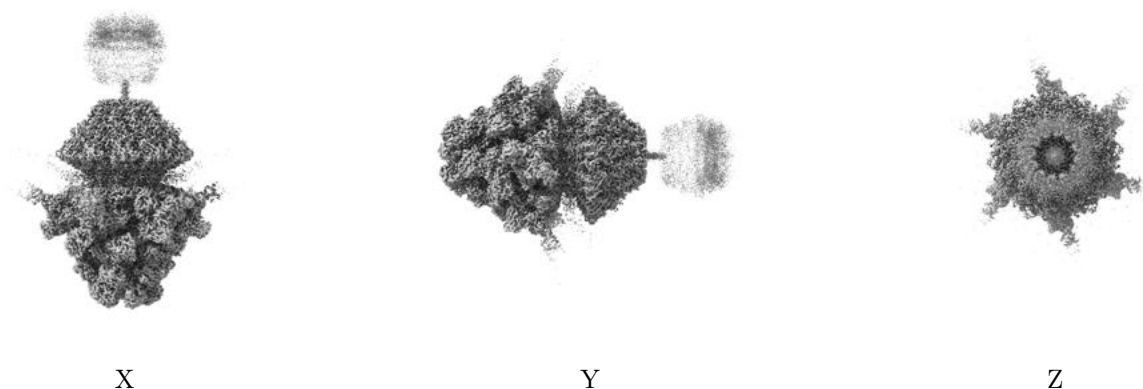


Z

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.

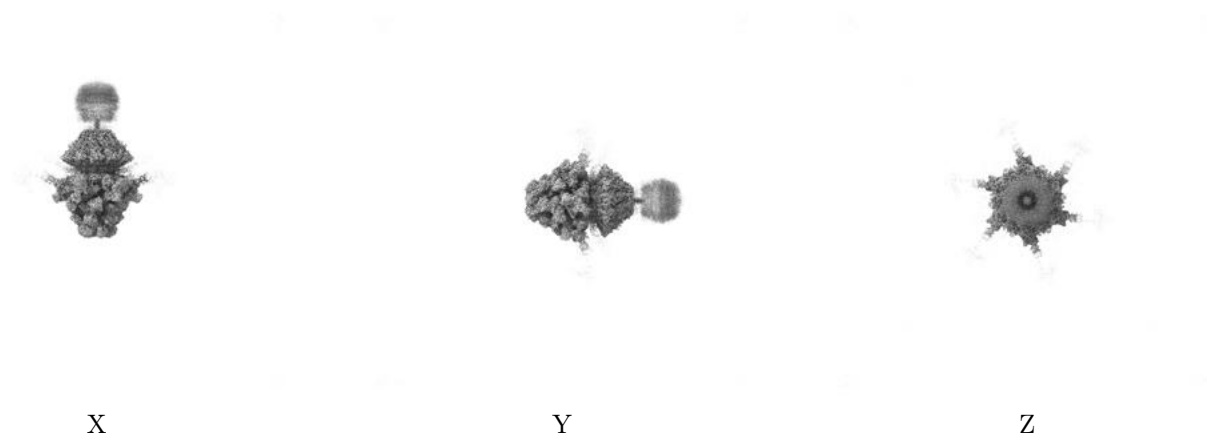
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.25. 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.

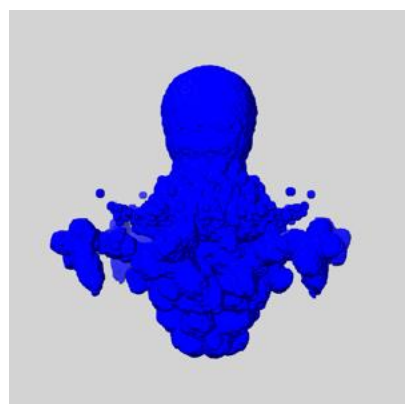
6.6 Mask visualisation [i](#)

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

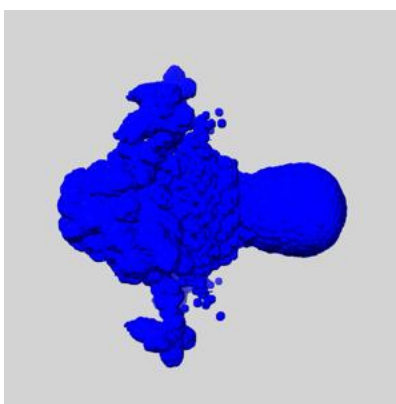
A mask typically either:

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

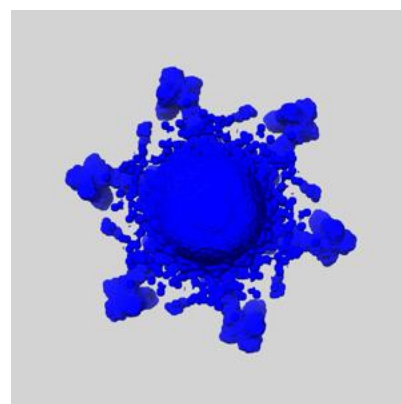
6.6.1 emd_47975_msk_1.map [i](#)



X



Y

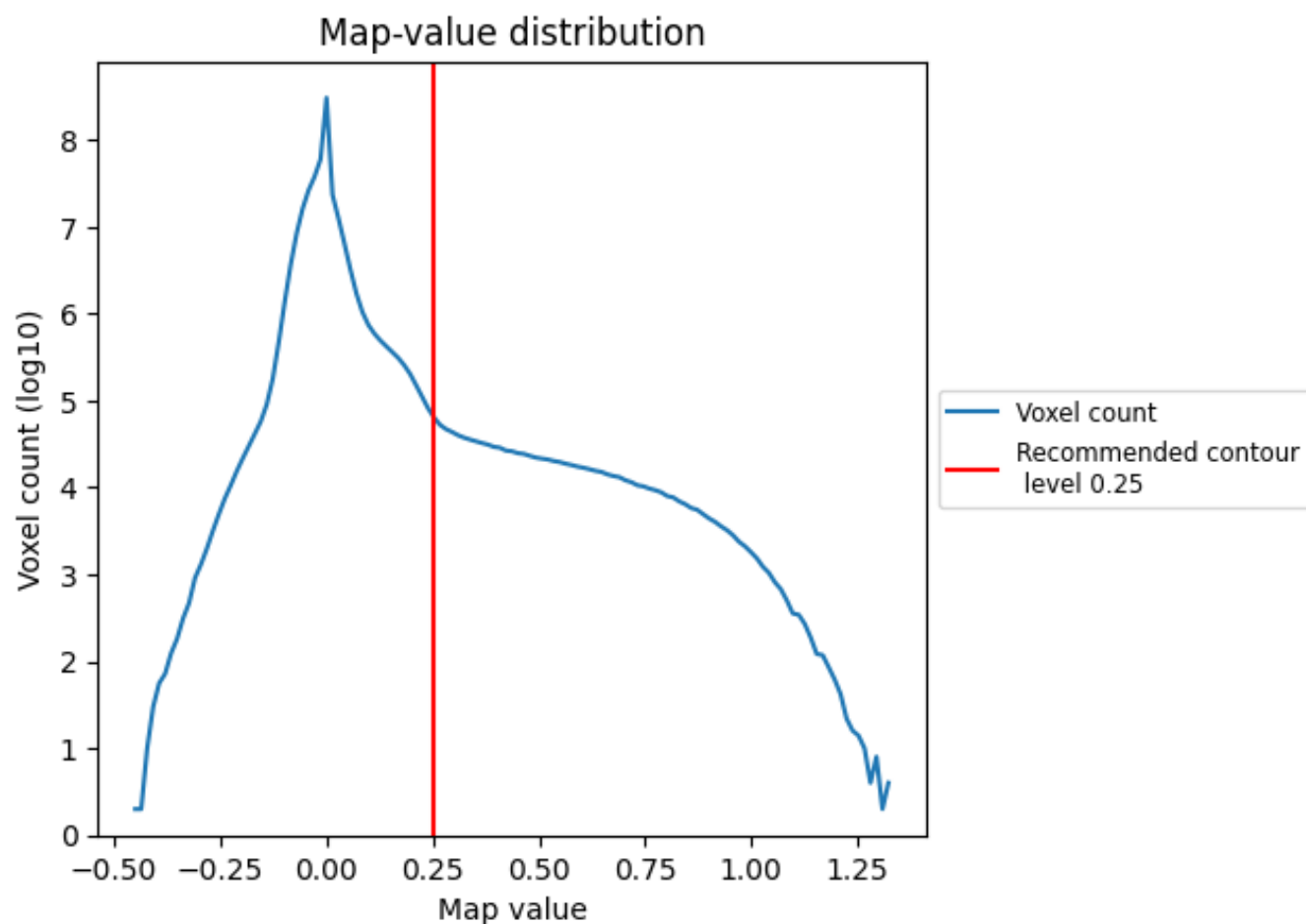


Z

7 Map analysis [i](#)

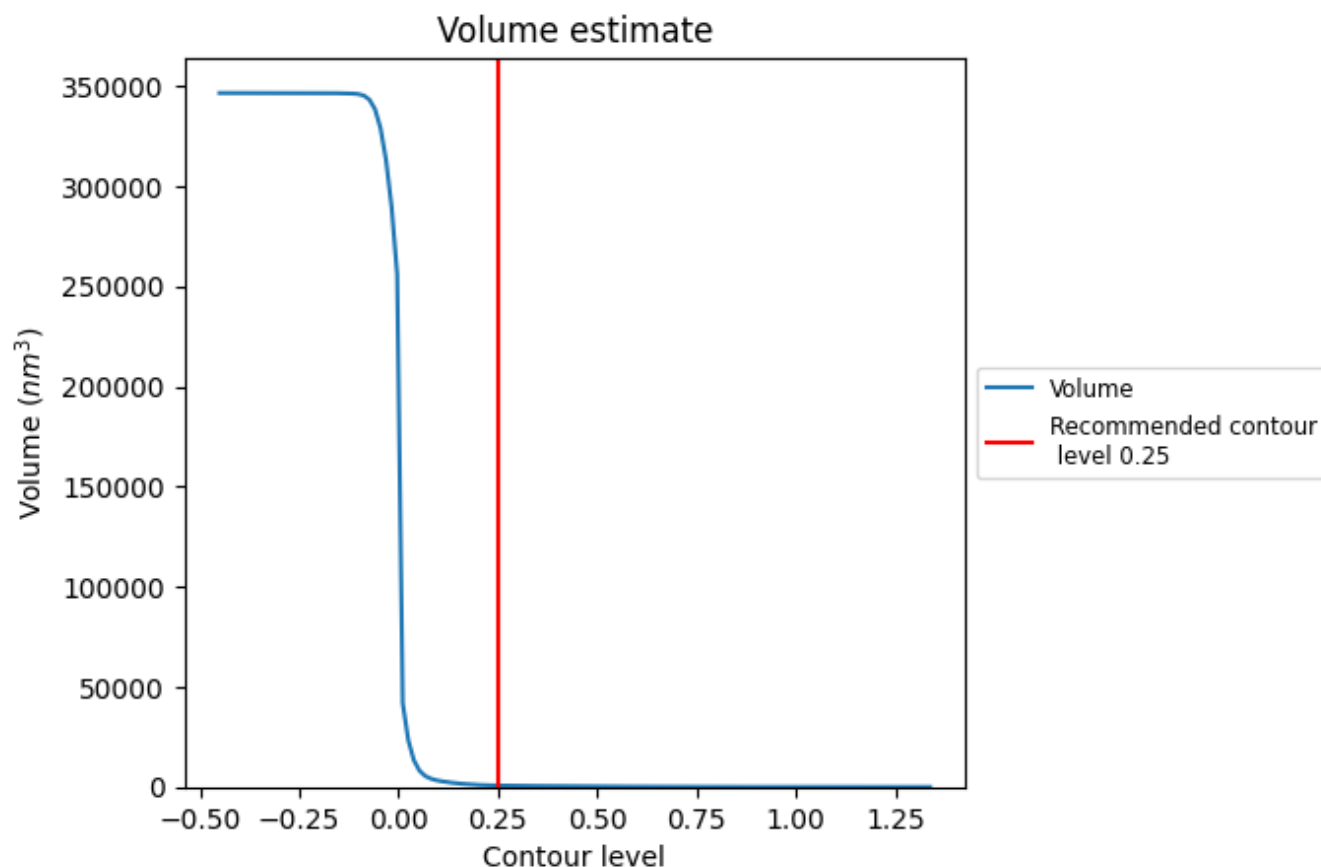
This section contains the results of statistical analysis of the map.

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.

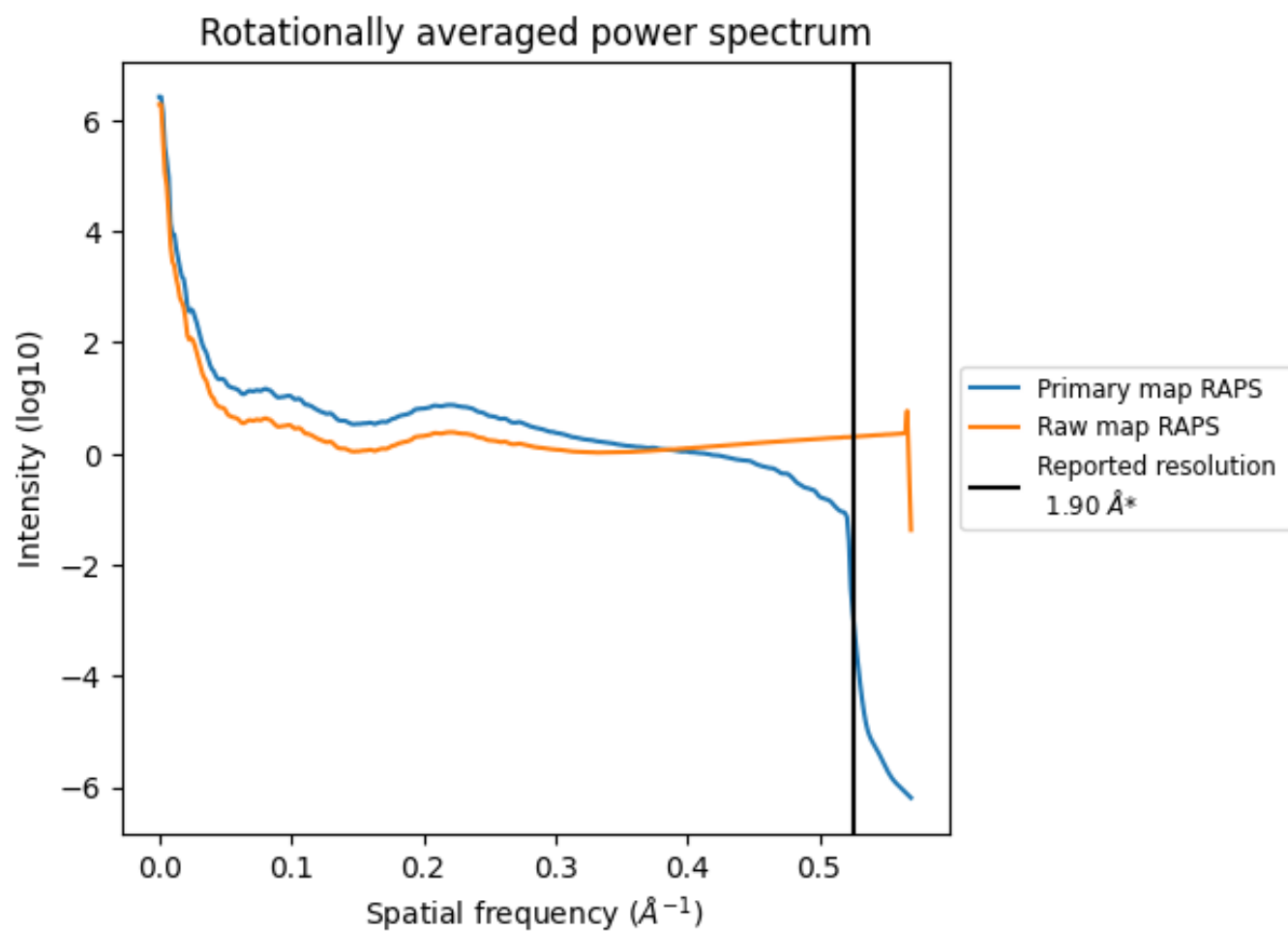
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 699 nm³; this corresponds to an approximate mass of 631 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 ⓘ

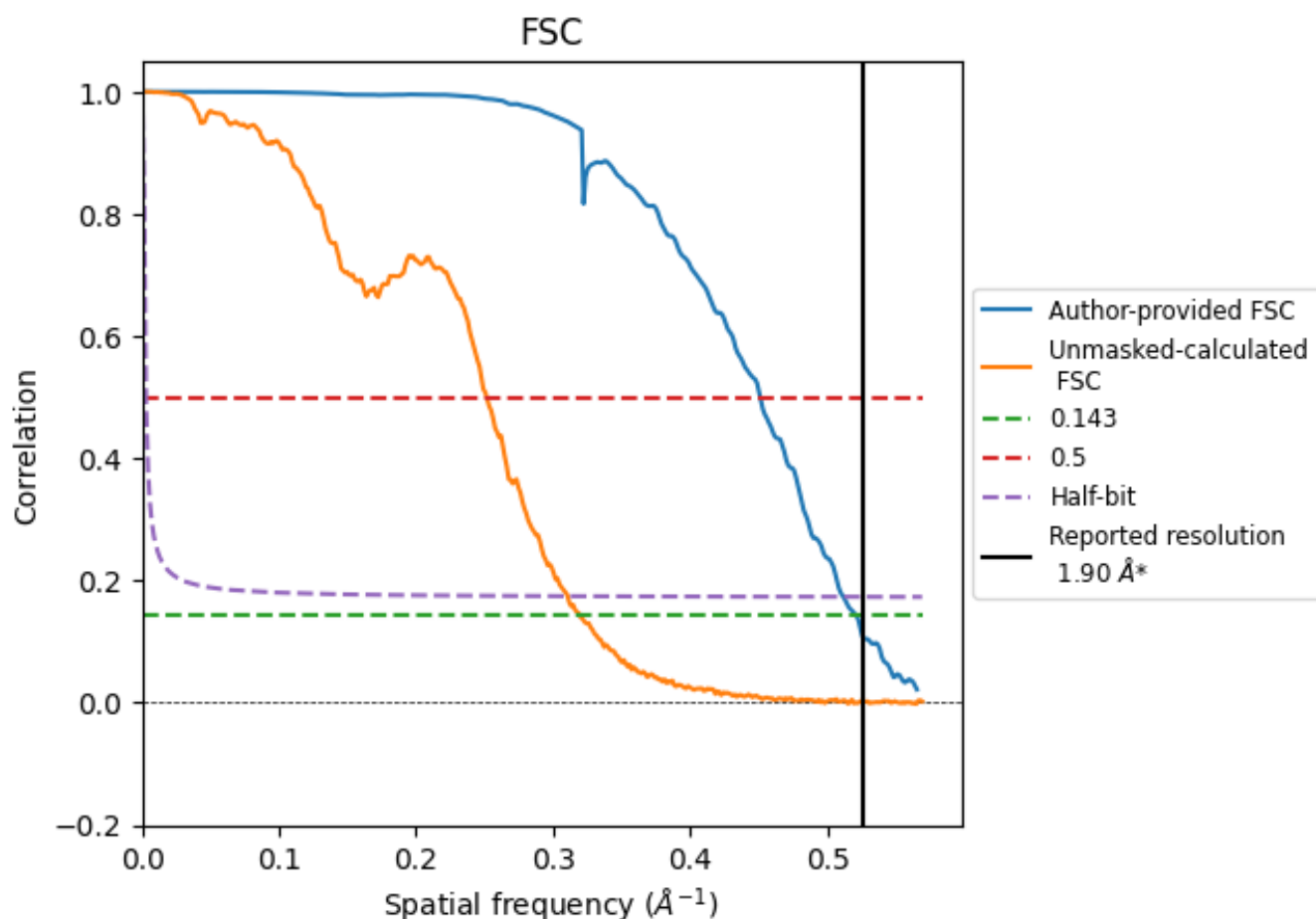


*Reported resolution corresponds to spatial frequency of 0.526 Å⁻¹

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 0.526 Å⁻¹

8.2 Resolution estimates [i](#)

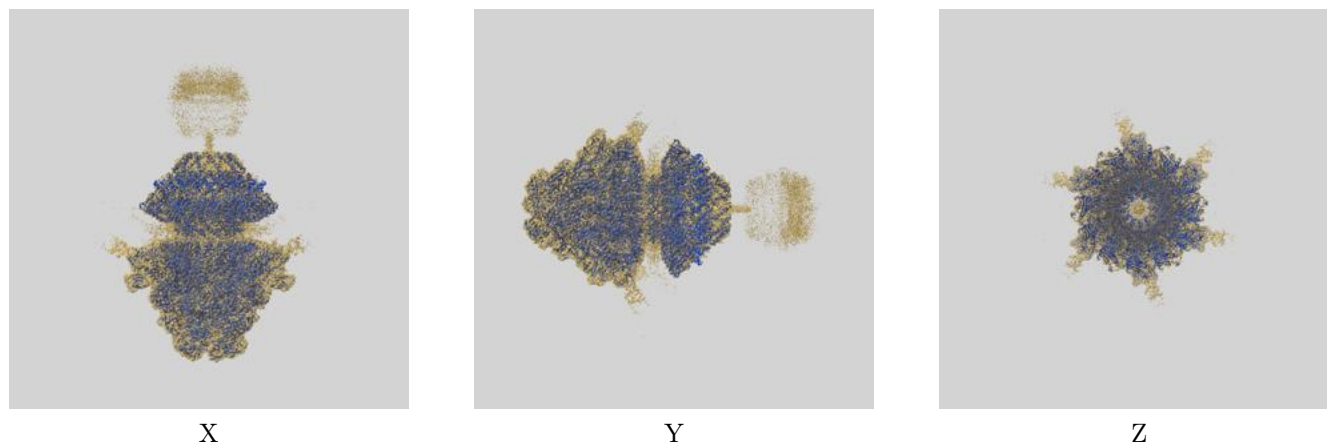
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	1.90	-	-
Author-provided FSC curve	1.92	2.22	1.95
Unmasked-calculated*	3.13	3.97	3.22

*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 3.13 differs from the reported value 1.9 by more than 10 %

9 Map-model fit [i](#)

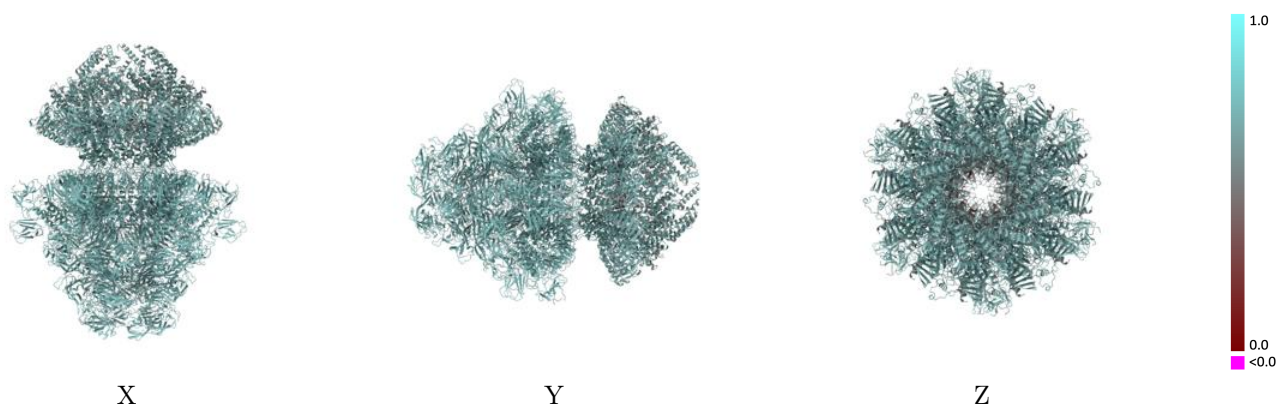
This section contains information regarding the fit between EMDB map EMD-47975 and PDB model 9EFK. Per-residue inclusion information can be found in section [3](#) on page [8](#).

9.1 Map-model overlay [i](#)



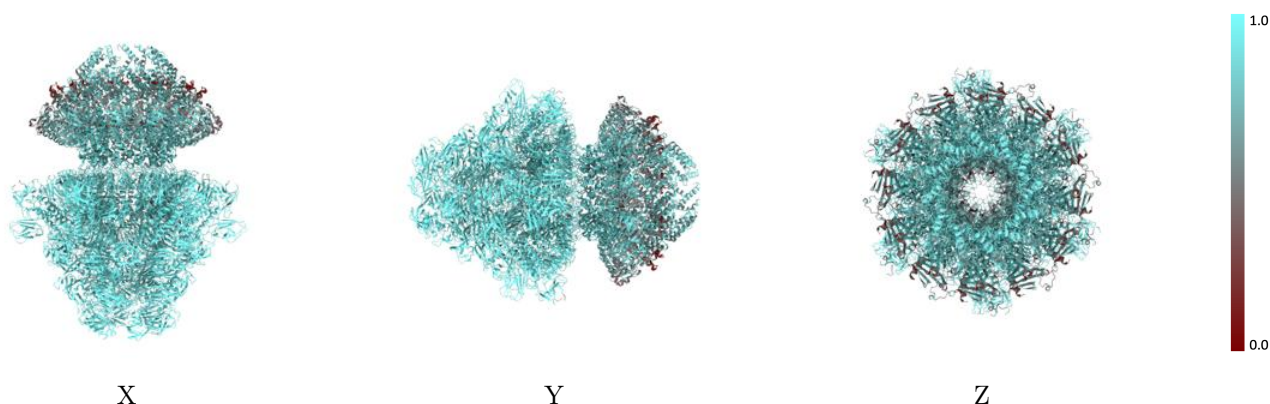
The images above show the 3D surface view of the map at the recommended contour level 0.25 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



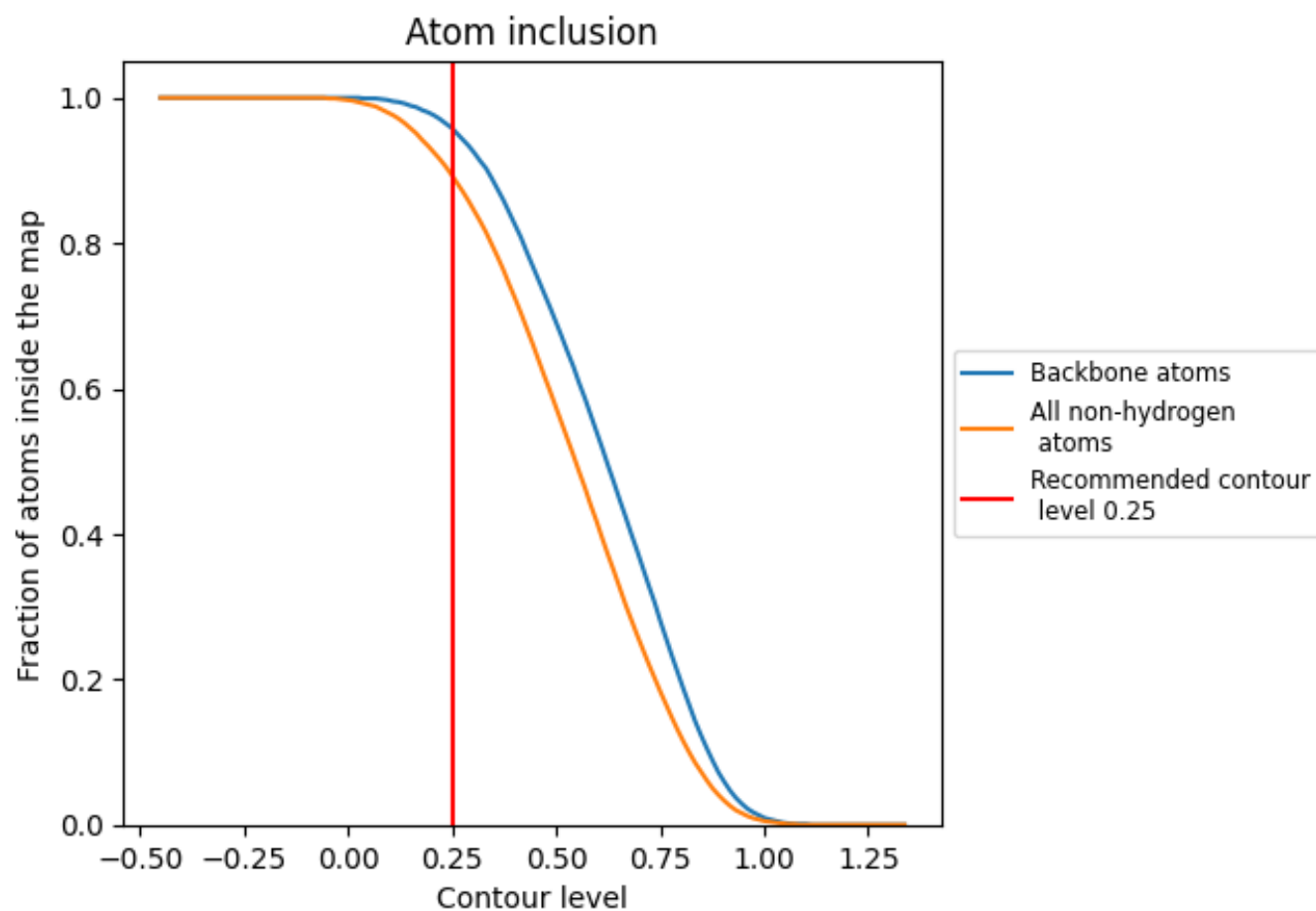
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.25).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 96% of all backbone atoms, 89% 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 (0.25) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8930	 0.6700
A	 0.7890	 0.6500
AA	 0.9660	 0.7020
AB	 0.9600	 0.6950
AC	 0.9650	 0.7000
AD	 0.9550	 0.6940
AE	 0.9630	 0.6890
AF	 0.9570	 0.6770
AG	 0.9620	 0.6910
AN	 0.9600	 0.6920
AO	 0.9580	 0.6780
AP	 0.9590	 0.6940
AW	 0.9610	 0.6850
AX	 0.9530	 0.6740
AY	 0.9580	 0.6860
B	 0.7760	 0.6440
BF	 0.9640	 0.6930
BG	 0.9580	 0.6820
BH	 0.9580	 0.6910
BO	 0.9650	 0.6860
BP	 0.9530	 0.6760
BQ	 0.9590	 0.6880
BX	 0.9650	 0.6910
BY	 0.9550	 0.6820
BZ	 0.9590	 0.6920
C	 0.7860	 0.6470
D	 0.7710	 0.6410
E	 0.7870	 0.6460
F	 0.7740	 0.6410
G	 0.7870	 0.6430
H	 0.7750	 0.6390
I	 0.7850	 0.6420
J	 0.7760	 0.6400
K	 0.7860	 0.6450
L	 0.7730	 0.6430



Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
M	 0.9670	 0.6810
N	 0.9650	 0.6830
O	 0.9640	 0.6830
P	 0.9660	 0.6820
Q	 0.9660	 0.6810
R	 0.9660	 0.6790
S	 0.9680	 0.7010
T	 0.9580	 0.6970
U	 0.9670	 0.7010
V	 0.9570	 0.6950
W	 0.9670	 0.7030
X	 0.9650	 0.7010
Y	 0.9670	 0.7040
Z	 0.9590	 0.6950