



wwPDB EM Validation Summary Report ⓘ

Aug 13, 2025 – 06:18 PM EDT

PDB ID : 9ML2 / pdb_00009ml2
EMDB ID : EMD-48345
Title : A7M08 Fab bound to HPV16 L1 pentamer
Authors : Hurlburt, N.K.; Singh, S.; Rodarte, J.V.; Pancera, M.
Deposited on : 2024-12-18
Resolution : 2.70 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.dev126
MolProbity : 4-5-2 with Phenix2.0rc1
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.45.1

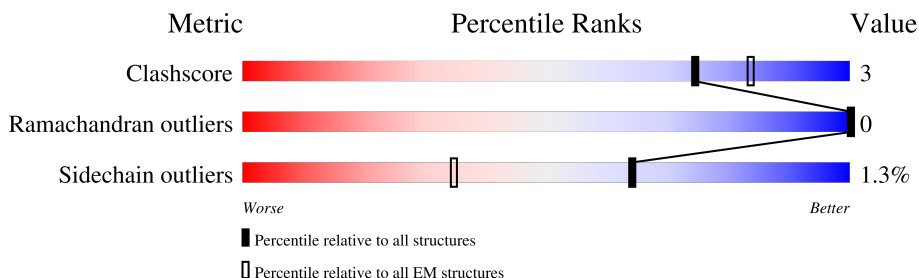
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.70 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	426	
1	B	426	
1	C	426	
1	D	426	
1	E	426	
2	F	235	
2	H	235	
2	I	235	

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Mol	Chain	Length	Quality of chain
2	M	235	<div><div></div><div>46%6%48%</div></div>
2	O	235	<div><div></div><div>46%6%48%</div></div>
3	G	217	<div><div></div><div>49%.49%</div></div>
3	J	217	<div><div></div><div>49%.49%</div></div>
3	L	217	<div><div></div><div>50%.49%</div></div>
3	N	217	<div><div></div><div>50%.49%</div></div>
3	P	217	<div><div></div><div>50%.49%</div></div>

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 46470 atoms, of which 22925 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 Major capsid protein L1.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	371	Total	C	H	N	O	S	0	0
			5782	1863	2861	496	544	18		
1	B	371	Total	C	H	N	O	S	0	0
			5782	1863	2861	496	544	18		
1	C	371	Total	C	H	N	O	S	0	0
			5782	1863	2861	496	544	18		
1	D	371	Total	C	H	N	O	S	0	0
			5782	1863	2861	496	544	18		
1	E	371	Total	C	H	N	O	S	0	0
			5782	1863	2861	496	544	18		

There are 160 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	34	ALA	-	expression tag	UNP A0A451ER69
A	447	GLY	PHE	conflict	UNP A0A451ER69
A	?	-	LEU	deletion	UNP A0A451ER69
A	?	-	GLN	deletion	UNP A0A451ER69
A	?	-	PRO	deletion	UNP A0A451ER69
A	?	-	PRO	deletion	UNP A0A451ER69
A	449	SER	PRO	conflict	UNP A0A451ER69
A	?	-	THR	deletion	UNP A0A451ER69
A	?	-	LEU	deletion	UNP A0A451ER69
A	?	-	GLU	deletion	UNP A0A451ER69
A	?	-	ASP	deletion	UNP A0A451ER69
A	?	-	THR	deletion	UNP A0A451ER69
A	?	-	TYR	deletion	UNP A0A451ER69
A	?	-	ARG	deletion	UNP A0A451ER69
A	?	-	PHE	deletion	UNP A0A451ER69
A	?	-	VAL	deletion	UNP A0A451ER69
A	?	-	THR	deletion	UNP A0A451ER69
A	?	-	SER	deletion	UNP A0A451ER69
A	?	-	GLN	deletion	UNP A0A451ER69
A	?	-	ALA	deletion	UNP A0A451ER69

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Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	ILE	deletion	UNP A0A451ER69
A	?	-	ALA	deletion	UNP A0A451ER69
A	?	-	CYS	deletion	UNP A0A451ER69
A	?	-	GLN	deletion	UNP A0A451ER69
A	?	-	LYS	deletion	UNP A0A451ER69
A	?	-	HIS	deletion	UNP A0A451ER69
A	?	-	THR	deletion	UNP A0A451ER69
A	?	-	PRO	deletion	UNP A0A451ER69
A	?	-	PRO	deletion	UNP A0A451ER69
A	?	-	ALA	deletion	UNP A0A451ER69
A	?	-	PRO	deletion	UNP A0A451ER69
A	?	-	LYS	deletion	UNP A0A451ER69
B	34	ALA	-	expression tag	UNP A0A451ER69
B	447	GLY	PHE	conflict	UNP A0A451ER69
B	?	-	LEU	deletion	UNP A0A451ER69
B	?	-	GLN	deletion	UNP A0A451ER69
B	?	-	PRO	deletion	UNP A0A451ER69
B	?	-	PRO	deletion	UNP A0A451ER69
B	449	SER	PRO	conflict	UNP A0A451ER69
B	?	-	THR	deletion	UNP A0A451ER69
B	?	-	LEU	deletion	UNP A0A451ER69
B	?	-	GLU	deletion	UNP A0A451ER69
B	?	-	ASP	deletion	UNP A0A451ER69
B	?	-	THR	deletion	UNP A0A451ER69
B	?	-	TYR	deletion	UNP A0A451ER69
B	?	-	ARG	deletion	UNP A0A451ER69
B	?	-	PHE	deletion	UNP A0A451ER69
B	?	-	VAL	deletion	UNP A0A451ER69
B	?	-	THR	deletion	UNP A0A451ER69
B	?	-	SER	deletion	UNP A0A451ER69
B	?	-	GLN	deletion	UNP A0A451ER69
B	?	-	ALA	deletion	UNP A0A451ER69
B	?	-	ILE	deletion	UNP A0A451ER69
B	?	-	ALA	deletion	UNP A0A451ER69
B	?	-	CYS	deletion	UNP A0A451ER69
B	?	-	GLN	deletion	UNP A0A451ER69
B	?	-	LYS	deletion	UNP A0A451ER69
B	?	-	HIS	deletion	UNP A0A451ER69
B	?	-	THR	deletion	UNP A0A451ER69
B	?	-	PRO	deletion	UNP A0A451ER69
B	?	-	PRO	deletion	UNP A0A451ER69
B	?	-	ALA	deletion	UNP A0A451ER69

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Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	PRO	deletion	UNP A0A451ER69
B	?	-	LYS	deletion	UNP A0A451ER69
C	34	ALA	-	expression tag	UNP A0A451ER69
C	447	GLY	PHE	conflict	UNP A0A451ER69
C	?	-	LEU	deletion	UNP A0A451ER69
C	?	-	GLN	deletion	UNP A0A451ER69
C	?	-	PRO	deletion	UNP A0A451ER69
C	?	-	PRO	deletion	UNP A0A451ER69
C	449	SER	PRO	conflict	UNP A0A451ER69
C	?	-	THR	deletion	UNP A0A451ER69
C	?	-	LEU	deletion	UNP A0A451ER69
C	?	-	GLU	deletion	UNP A0A451ER69
C	?	-	ASP	deletion	UNP A0A451ER69
C	?	-	THR	deletion	UNP A0A451ER69
C	?	-	TYR	deletion	UNP A0A451ER69
C	?	-	ARG	deletion	UNP A0A451ER69
C	?	-	PHE	deletion	UNP A0A451ER69
C	?	-	VAL	deletion	UNP A0A451ER69
C	?	-	THR	deletion	UNP A0A451ER69
C	?	-	SER	deletion	UNP A0A451ER69
C	?	-	GLN	deletion	UNP A0A451ER69
C	?	-	ALA	deletion	UNP A0A451ER69
C	?	-	ILE	deletion	UNP A0A451ER69
C	?	-	ALA	deletion	UNP A0A451ER69
C	?	-	CYS	deletion	UNP A0A451ER69
C	?	-	GLN	deletion	UNP A0A451ER69
C	?	-	LYS	deletion	UNP A0A451ER69
C	?	-	HIS	deletion	UNP A0A451ER69
C	?	-	THR	deletion	UNP A0A451ER69
C	?	-	PRO	deletion	UNP A0A451ER69
C	?	-	PRO	deletion	UNP A0A451ER69
C	?	-	ALA	deletion	UNP A0A451ER69
C	?	-	PRO	deletion	UNP A0A451ER69
C	?	-	LYS	deletion	UNP A0A451ER69
D	34	ALA	-	expression tag	UNP A0A451ER69
D	447	GLY	PHE	conflict	UNP A0A451ER69
D	?	-	LEU	deletion	UNP A0A451ER69
D	?	-	GLN	deletion	UNP A0A451ER69
D	?	-	PRO	deletion	UNP A0A451ER69
D	?	-	PRO	deletion	UNP A0A451ER69
D	449	SER	PRO	conflict	UNP A0A451ER69
D	?	-	THR	deletion	UNP A0A451ER69

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Chain	Residue	Modelled	Actual	Comment	Reference
D	?	-	LEU	deletion	UNP A0A451ER69
D	?	-	GLU	deletion	UNP A0A451ER69
D	?	-	ASP	deletion	UNP A0A451ER69
D	?	-	THR	deletion	UNP A0A451ER69
D	?	-	TYR	deletion	UNP A0A451ER69
D	?	-	ARG	deletion	UNP A0A451ER69
D	?	-	PHE	deletion	UNP A0A451ER69
D	?	-	VAL	deletion	UNP A0A451ER69
D	?	-	THR	deletion	UNP A0A451ER69
D	?	-	SER	deletion	UNP A0A451ER69
D	?	-	GLN	deletion	UNP A0A451ER69
D	?	-	ALA	deletion	UNP A0A451ER69
D	?	-	ILE	deletion	UNP A0A451ER69
D	?	-	ALA	deletion	UNP A0A451ER69
D	?	-	CYS	deletion	UNP A0A451ER69
D	?	-	GLN	deletion	UNP A0A451ER69
D	?	-	LYS	deletion	UNP A0A451ER69
D	?	-	HIS	deletion	UNP A0A451ER69
D	?	-	THR	deletion	UNP A0A451ER69
D	?	-	PRO	deletion	UNP A0A451ER69
D	?	-	PRO	deletion	UNP A0A451ER69
D	?	-	ALA	deletion	UNP A0A451ER69
D	?	-	PRO	deletion	UNP A0A451ER69
D	?	-	LYS	deletion	UNP A0A451ER69
E	34	ALA	-	expression tag	UNP A0A451ER69
E	447	GLY	PHE	conflict	UNP A0A451ER69
E	?	-	LEU	deletion	UNP A0A451ER69
E	?	-	GLN	deletion	UNP A0A451ER69
E	?	-	PRO	deletion	UNP A0A451ER69
E	?	-	PRO	deletion	UNP A0A451ER69
E	449	SER	PRO	conflict	UNP A0A451ER69
E	?	-	THR	deletion	UNP A0A451ER69
E	?	-	LEU	deletion	UNP A0A451ER69
E	?	-	GLU	deletion	UNP A0A451ER69
E	?	-	ASP	deletion	UNP A0A451ER69
E	?	-	THR	deletion	UNP A0A451ER69
E	?	-	TYR	deletion	UNP A0A451ER69
E	?	-	ARG	deletion	UNP A0A451ER69
E	?	-	PHE	deletion	UNP A0A451ER69
E	?	-	VAL	deletion	UNP A0A451ER69
E	?	-	THR	deletion	UNP A0A451ER69
E	?	-	SER	deletion	UNP A0A451ER69

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Chain	Residue	Modelled	Actual	Comment	Reference
E	?	-	GLN	deletion	UNP A0A451ER69
E	?	-	ALA	deletion	UNP A0A451ER69
E	?	-	ILE	deletion	UNP A0A451ER69
E	?	-	ALA	deletion	UNP A0A451ER69
E	?	-	CYS	deletion	UNP A0A451ER69
E	?	-	GLN	deletion	UNP A0A451ER69
E	?	-	LYS	deletion	UNP A0A451ER69
E	?	-	HIS	deletion	UNP A0A451ER69
E	?	-	THR	deletion	UNP A0A451ER69
E	?	-	PRO	deletion	UNP A0A451ER69
E	?	-	PRO	deletion	UNP A0A451ER69
E	?	-	ALA	deletion	UNP A0A451ER69
E	?	-	PRO	deletion	UNP A0A451ER69
E	?	-	LYS	deletion	UNP A0A451ER69

- Molecule 2 is a protein called A7M08 Heavy Chain.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	F	122	Total	C	H	N	O	S	0	0
			1906	618	937	158	187	6		
2	H	122	Total	C	H	N	O	S	0	0
			1906	618	937	158	187	6		
2	I	122	Total	C	H	N	O	S	0	0
			1906	618	937	158	187	6		
2	M	122	Total	C	H	N	O	S	0	0
			1906	618	937	158	187	6		
2	O	122	Total	C	H	N	O	S	0	0
			1906	618	937	158	187	6		

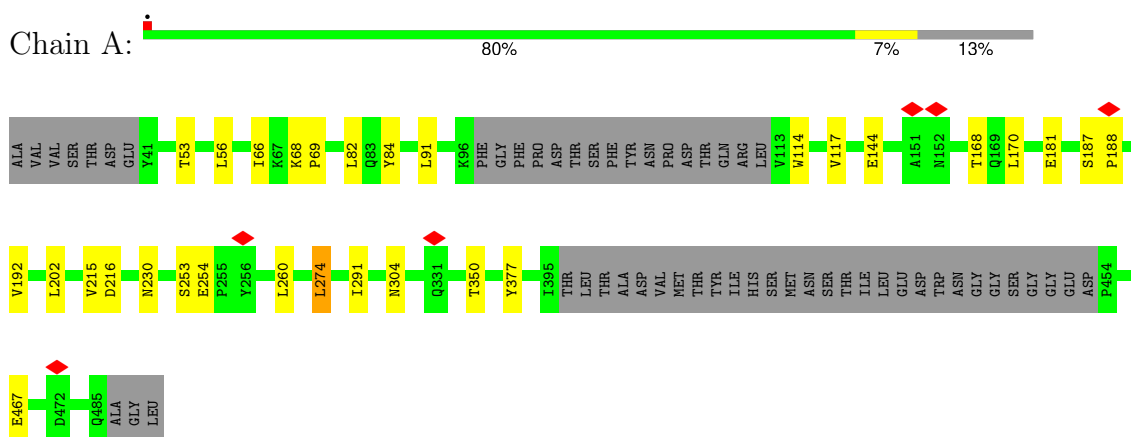
- Molecule 3 is a protein called A7M08 Light Chain.

Mol	Chain	Residues	Atoms						AltConf	Trace
3	G	111	Total	C	H	N	O	S	0	0
			1606	515	787	138	164	2		
3	J	111	Total	C	H	N	O	S	0	0
			1606	515	787	138	164	2		
3	L	111	Total	C	H	N	O	S	0	0
			1606	515	787	138	164	2		
3	N	111	Total	C	H	N	O	S	0	0
			1606	515	787	138	164	2		
3	P	111	Total	C	H	N	O	S	0	0
			1606	515	787	138	164	2		

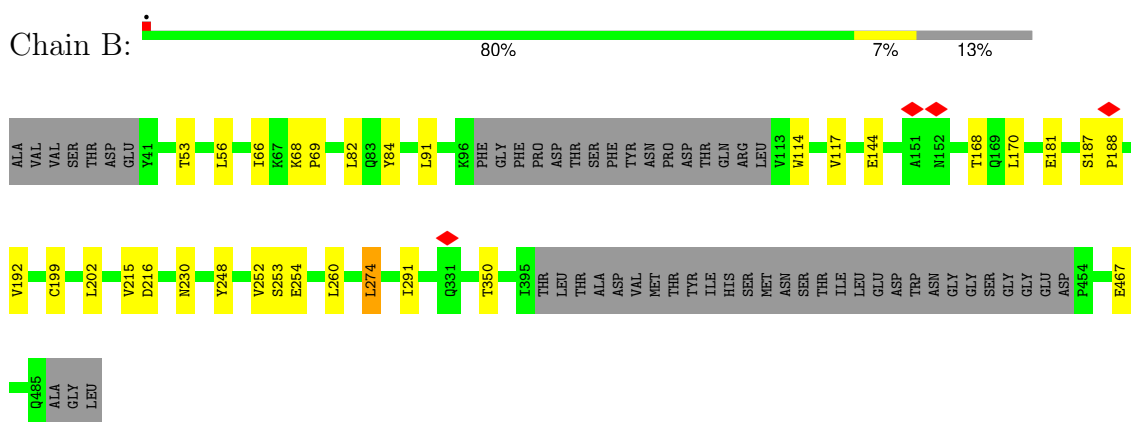
3 Residue-property plots

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.

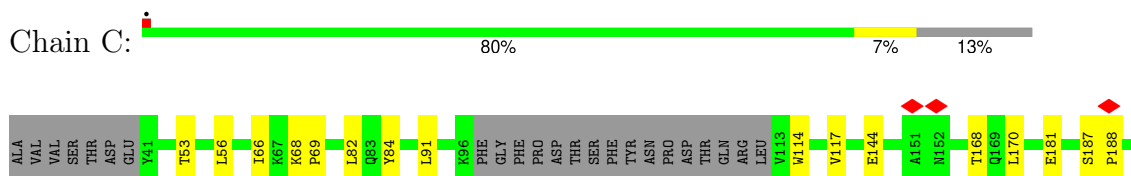
- Molecule 1: Major capsid protein L1

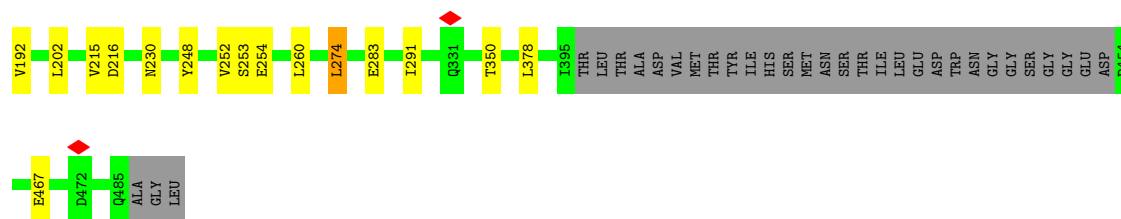


- Molecule 1: Major capsid protein L1

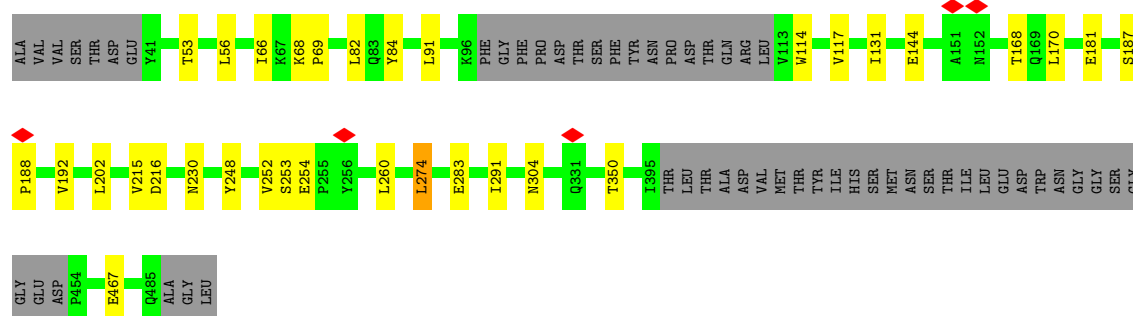
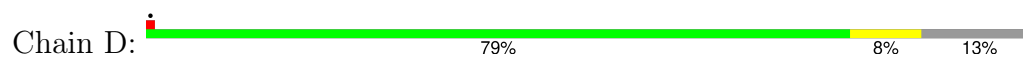


- Molecule 1: Major capsid protein L1

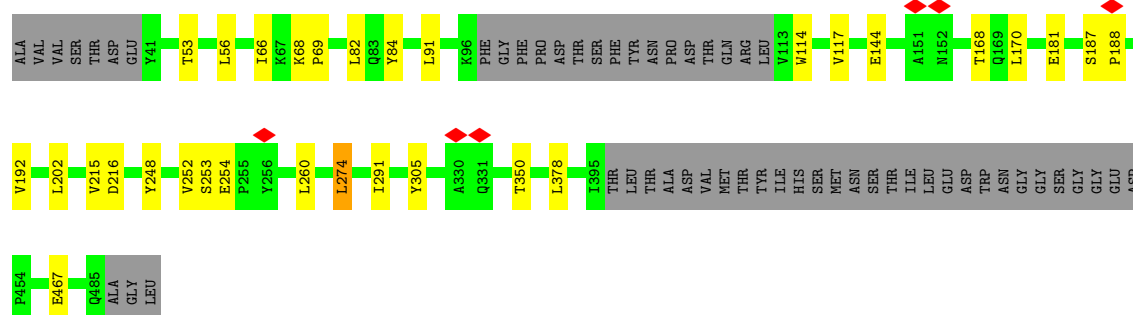
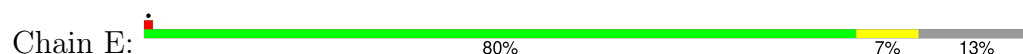




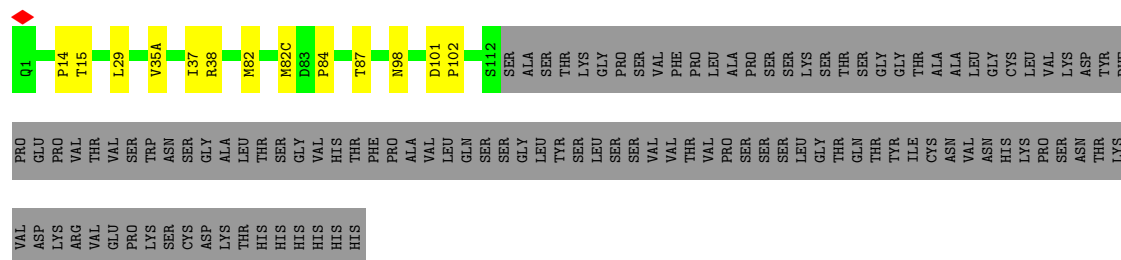
- Molecule 1: Major capsid protein L1



- Molecule 1: Major capsid protein L1



- Molecule 2: A7M08 Heavy Chain



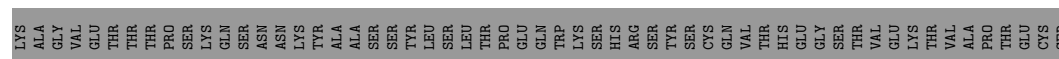
- Molecule 2: A7M08 Heavy Chain

Residue	Position	Score
VAL	Q1	0.99
ASP	P14	0.98
LYS	T15	0.98
ARG	L29	0.97
VAL	V35A	0.96
GLU	L37	0.95
PRO	R38	0.94
LYS	M62	0.93
PRO	M62C	0.92
SER	M63	0.91
GLY	P64	0.90
HIS	T67	0.89
HIS	N98	0.88
HIS	D101	0.87
HIS	P102	0.86
HIS	S112	0.85
GLU	SER	0.84
LEU	ALA	0.83
TYR	SER	0.82
LEU	THR	0.81
SER	LYS	0.80
SER	PRO	0.79
VAL	SER	0.78
VAL	VAL	0.77
THR	CYS	0.76
VAL	PRO	0.75
SER	SER	0.74
SER	SER	0.73
LEU	SER	0.72
GLY	LYS	0.71
THR	THR	0.70
THR	GLN	0.69
TYR	THR	0.68
ILE	GLY	0.67
CYS	ASN	0.66
VAL	VAL	0.65
ASN	ASN	0.64
HIS	HIS	0.63
LYS	LYS	0.62
PRO	PRO	0.61
SER	SER	0.60
ASN	ASN	0.59
THR	THR	0.58
LYS	LYS	0.57

Residue	Position	Score
VAL	1	0.00
ASP	2	0.00
LYS	3	0.00
ARG	4	0.00
VAL	5	0.00
GLU	6	0.00
PRO	7	0.00
TRP	8	0.00
LYS	9	0.00
SER	10	0.00
CYS	11	0.00
ASP	12	0.00
LYS	13	0.00
THR	14	0.00
HIS	15	0.00
HIS	16	0.00
HIS	17	0.00
HIS	18	0.00
HIS	19	0.00
HIS	20	0.00
PRO	21	0.00
GLU	22	0.00
THR	23	0.00
GLN	24	0.00
SER	25	0.00
SER	26	0.00
GLY	27	0.00
LEU	28	0.00
VAL	29	0.00
THR	30	0.00
VAL	31	0.00
PRO	32	0.00
SER	33	0.00
SER	34	0.00
LEU	35	0.00
GLY	36	0.00
THR	37	0.00
GLN	38	0.00
THR	39	0.00
TYR	40	0.00
ILE	41	0.00
CYS	42	0.00
ASN	43	0.00
VAL	44	0.00
ASN	45	0.00
HIS	46	0.00
LYS	47	0.00
PRO	48	0.00
VAL	49	0.00
ASN	50	0.00
ASP	51	0.00
THR	52	0.00
LYS	53	0.00
ASP	54	0.00
LEU	55	0.00
GLN	56	0.00
SER	57	0.00
SER	58	0.00
GLY	59	0.00
LEU	60	0.00
ALA	61	0.00
SER	62	0.00
THR	63	0.00
LYS	64	0.00
GLY	65	0.00
PRO	66	0.00
SER	67	0.00
VAL	68	0.00
VAL	69	0.00
PHE	70	0.00
PRO	71	0.00
THR	72	0.00
LEU	73	0.00
GLN	74	0.00
SER	75	0.00
SER	76	0.00
SER	77	0.00
VAL	78	0.00
VAL	79	0.00
THR	80	0.00
THR	81	0.00
THR	82	0.00
THR	83	0.00
THR	84	0.00
THR	85	0.00
THR	86	0.00
THR	87	0.00
THR	88	0.00
THR	89	0.00
THR	90	0.00
THR	91	0.00
THR	92	0.00
THR	93	0.00
THR	94	0.00
THR	95	0.00
THR	96	0.00
THR	97	0.00
THR	98	0.00
THR	99	0.00
THR	100	0.00
THR	101	0.00
THR	102	0.00
THR	103	0.00
THR	104	0.00
THR	105	0.00
THR	106	0.00
THR	107	0.00
THR	108	0.00
THR	109	0.00
THR	110	0.00
THR	111	0.00
THR	112	0.00
THR	113	0.00
THR	114	0.00
THR	115	0.00
THR	116	0.00
THR	117	0.00
THR	118	0.00
THR	119	0.00
THR	120	0.00
THR	121	0.00
THR	122	0.00
THR	123	0.00
THR	124	0.00
THR	125	0.00
THR	126	0.00
THR	127	0.00
THR	128	0.00
THR	129	0.00
THR	130	0.00
THR	131	0.00
THR	132	0.00
THR	133	0.00
THR	134	0.00
THR	135	0.00
THR	136	0.00
THR	137	0.00
THR	138	0.00
THR	139	0.00
THR	140	0.00
THR	141	0.00
THR	142	0.00
THR	143	0.00
THR	144	0.00
THR	145	0.00
THR	146	0.00
THR	147	0.00
THR	148	0.

Residue	Position	Score
PRO	Q1	0.99
GLU	P14	0.98
PRO	T15	0.97
VAL	L29	0.96
THR	V35A	0.95
VAL	L37	0.94
SER	R38	0.93
ASN	M82	0.92
SER	L37	0.91
GLY	R38	0.90
ALA	M82C	0.89
LEU	R83	0.88
THR	P84	0.87
THR	T87	0.86
PHE	N98	0.85
PRO	D101	0.84
ALA	P102	0.83
VAL	S112	0.82
LEU	SER	0.81
GLN	ALA	0.80
SER	SER	0.79
SER	THR	0.78
SER	THR	0.77
SER	LYS	0.76
VAL	GLY	0.75
SER	PRO	0.74
VAL	SER	0.73
VAL	VAL	0.72
THR	PHE	0.71
THR	PRO	0.70
PRO	LEU	0.69
SER	ALA	0.68
SER	PRO	0.67
SER	SER	0.66
LEU	SER	0.65
GLY	LYS	0.64
THR	THR	0.63
THR	GLN	0.62
THR	GLY	0.61
TYR	THR	0.60
ILE	GLY	0.59
CYS	ASN	0.58
ASN	ALA	0.57
VAL	VAL	0.56
ASN	ASN	0.55
HIS	HIS	0.54
LYS	LYS	0.53
PRO	VAL	0.52
SER	SER	0.51
ASN	ASN	0.50
THR	THR	0.49
LYS	LYS	0.48

Residue	Position	Frequency
PRO	Q1	0.000000
GLU	P14	0.000000
ASP	T15	0.000000
LYS	L29	0.000000
ARG	V35A	0.000000
VAL	L37	0.000000
GLU	R38	0.000000
PRO	M82	0.000000
SER	M82C	0.000000
ASN	R83	0.000000
SER	P84	0.000000
GLY	T87	0.000000
ALA	M98	0.000000
LEU	D101	0.000000
THR	P102	0.000000
GLY	S112	0.000000
HIS	SER	0.000000
HIS	ALA	0.000000
HIS	SER	0.000000
HIS	THR	0.000000
HIS	LYS	0.000000
HIS	GLY	0.000000
HIS	PRO	0.000000
HIS	THR	0.000000
HIS	LEU	0.000000
HIS	GLN	0.000000
HIS	SER	0.000000
HIS	VAL	0.000000
HIS	VAL	0.000000
HIS	CYS	0.000000
HIS	THR	0.000000
HIS	PRO	0.000000
HIS	VAL	0.000000
HIS	LEU	0.000000
HIS	GLY	0.000000
HIS	THR	0.000000
HIS	GLN	0.000000
HIS	THR	0.000000
HIS	TYR	0.000000
HIS	ILE	0.000000
HIS	CYS	0.000000
HIS	ASN	0.000000
HIS	VAL	0.000000
HIS	ASN	0.000000
HIS	HIS	0.000000
HIS	LYS	0.000000
HIS	PRO	0.000000
HIS	SER	0.000000
HIS	ASN	0.000000
HIS	THR	0.000000
HIS	LYS	0.000000



LYS	ALA	GLY	VAL	GLU	THR	THR	THR	THR	PRO	SER	SER	LYS	GLN	SER	ASN	ASN	LYS	TYR	TYR	LEU	LEU	THR	PRO	GLU	GLN	GLN	TRP	LYS	SER	SER	HIS	ARG	SER	SER	TYR	SER	CYS	GLN	VAL	VAL	THR	THR	GLU	GLY	LYS	THR	VAL	VAL	ALA	ALA	ALA	PRO	GLU	GLY	THR	GLU	GLY	CYS
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VAL	GLU	THR	THR	PRO	SER	LYS	GLN	SER	ASN	ASN	LYS	TYR	ALA	ALA	SER	SER	TYR	LEU	SER	LEU	THR	PRO	GLU	GLN	TRP	LYS	SER	HIS	HIS	ARG	SER	TYR	CYS	CYS	GLN	VAL	THR	THR	GLU	GLU	LYS	THR	THR	VAL	ALA	ALA	PRO	THR	GLU	CYS	SER
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VAL	GLU	THR	THR	THR	PRO	PRO	LYS	GLN	ASN	ASN	LYS	TYR	ALA	ALA	ALA	SER	SER	SER	TYR	LEU	LEU	THR	PRO	GLU	GLN	TRP	LYS	SER	HIS	HIS	ARG	SER	TYR	CYS	CYS	GLN	VAL	THR	THR	HIS	GLU	GLU	GLY	SER	SER	THR	THR	VAL	GLU	LYS	THR	THR	VAL	VAL	ALA	PRO	PRO	THR	THR	GLU	GLU	CYS	SER
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VAL	GLU	THR	THR	THR	PRO	PRO	LYS	GLN	ASN	ASN	LYS	TYR	ALA	ALA	ALA	SER	SER	SER	TYR	LEU	LEU	THR	PRO	GLU	GLN	TRP	LYS	LYS	HIS	SER	HIS	ARG	SER	TYR	CYS	CYS	GLN	VAL	THR	THR	HIS	GLU	GLU	GLY	SER	SER	THR	THR	VAL	GLU	LYS	THR	THR	VAL	VAL	ALA	PRO	PRO	THR	THR	GLU	GLU	CYS	SER
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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	301713	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1800	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	36000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	10.689	Depositor
Minimum map value	-5.366	Depositor
Average map value	-0.002	Depositor
Map value standard deviation	0.246	Depositor
Recommended contour level	1	Depositor
Map size (\AA)	359.03998, 359.03998, 359.03998	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.122, 1.122, 1.122	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	0.28	0/2995	0.35	0/4066
1	B	0.27	0/2995	0.34	0/4066
1	C	0.28	0/2995	0.35	0/4066
1	D	0.27	0/2995	0.34	0/4066
1	E	0.27	0/2995	0.34	0/4066
2	F	0.17	0/996	0.28	0/1365
2	H	0.17	0/996	0.28	0/1365
2	I	0.17	0/996	0.28	0/1365
2	M	0.17	0/996	0.28	0/1365
2	O	0.17	0/996	0.28	0/1365
3	G	0.20	0/839	0.32	0/1144
3	J	0.20	0/839	0.32	0/1144
3	L	0.20	0/839	0.32	0/1144
3	N	0.20	0/839	0.32	0/1144
3	P	0.20	0/839	0.32	0/1144
All	All	0.24	0/24150	0.33	0/32875

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [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	2921	2861	2859	19	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	2921	2861	2859	21	0
1	C	2921	2861	2859	22	0
1	D	2921	2861	2859	22	0
1	E	2921	2861	2859	20	0
2	F	969	937	939	8	0
2	H	969	937	939	8	0
2	I	969	937	939	8	0
2	M	969	937	939	8	0
2	O	969	937	939	8	0
3	G	819	787	786	2	0
3	J	819	787	786	2	0
3	L	819	787	786	1	0
3	N	819	787	786	1	0
3	P	819	787	786	1	0
All	All	23545	22925	22920	141	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 3.

The worst 5 of 141 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)
2:I:29:LEU:HD21	2:I:35(A):VAL:HG23	1.68	0.74
2:M:29:LEU:HD21	2:M:35(A):VAL:HG23	1.68	0.74
2:F:29:LEU:HD21	2:F:35(A):VAL:HG23	1.68	0.74
2:O:29:LEU:HD21	2:O:35(A):VAL:HG23	1.68	0.74
2:H:29:LEU:HD21	2:H:35(A):VAL:HG23	1.68	0.73

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	365/426 (86%)	349 (96%)	16 (4%)	0	100	100
1	B	365/426 (86%)	349 (96%)	16 (4%)	0	100	100
1	C	365/426 (86%)	348 (95%)	17 (5%)	0	100	100
1	D	365/426 (86%)	348 (95%)	17 (5%)	0	100	100
1	E	365/426 (86%)	348 (95%)	17 (5%)	0	100	100
2	F	120/235 (51%)	115 (96%)	5 (4%)	0	100	100
2	H	120/235 (51%)	115 (96%)	5 (4%)	0	100	100
2	I	120/235 (51%)	115 (96%)	5 (4%)	0	100	100
2	M	120/235 (51%)	115 (96%)	5 (4%)	0	100	100
2	O	120/235 (51%)	115 (96%)	5 (4%)	0	100	100
3	G	109/217 (50%)	103 (94%)	6 (6%)	0	100	100
3	J	109/217 (50%)	103 (94%)	6 (6%)	0	100	100
3	L	109/217 (50%)	103 (94%)	6 (6%)	0	100	100
3	N	109/217 (50%)	103 (94%)	6 (6%)	0	100	100
3	P	109/217 (50%)	103 (94%)	6 (6%)	0	100	100
All	All	2970/4390 (68%)	2832 (95%)	138 (5%)	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	A	322/368 (88%)	316 (98%)	6 (2%)	52	79
1	B	322/368 (88%)	316 (98%)	6 (2%)	52	79
1	C	322/368 (88%)	316 (98%)	6 (2%)	52	79
1	D	322/368 (88%)	316 (98%)	6 (2%)	52	79
1	E	322/368 (88%)	316 (98%)	6 (2%)	52	79
2	F	110/210 (52%)	109 (99%)	1 (1%)	75	90

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	H	110/210 (52%)	109 (99%)	1 (1%)	75	90
2	I	110/210 (52%)	109 (99%)	1 (1%)	75	90
2	M	110/210 (52%)	109 (99%)	1 (1%)	75	90
2	O	110/210 (52%)	109 (99%)	1 (1%)	75	90
3	G	89/182 (49%)	89 (100%)	0	100	100
3	J	89/182 (49%)	89 (100%)	0	100	100
3	L	89/182 (49%)	89 (100%)	0	100	100
3	N	89/182 (49%)	89 (100%)	0	100	100
3	P	89/182 (49%)	89 (100%)	0	100	100
All	All	2605/3800 (69%)	2570 (99%)	35 (1%)	64	85

5 of 35 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	274	LEU
1	E	467	GLU
2	I	98	ASN
1	C	168	THR
1	B	467	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 13 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	191	ASN
3	G	89	GLN
3	P	89	GLN
3	L	89	GLN
3	N	89	GLN

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.

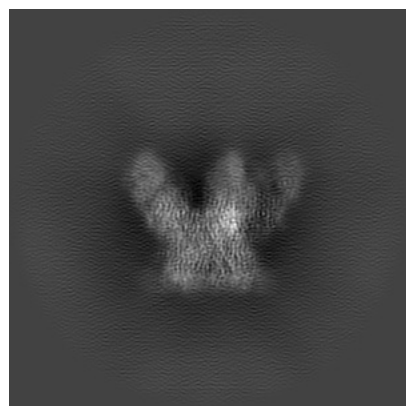
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-48345. These allow visual inspection of the internal detail of the map and identification of artifacts.

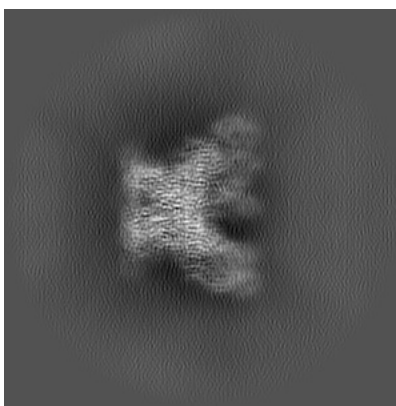
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

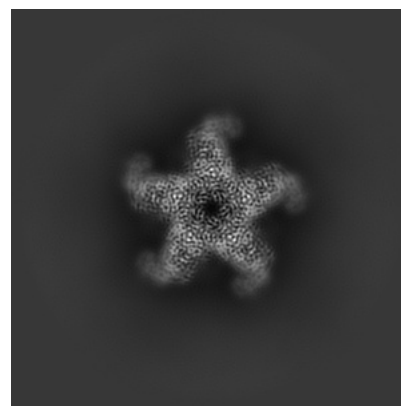
6.1.1 Primary map



X

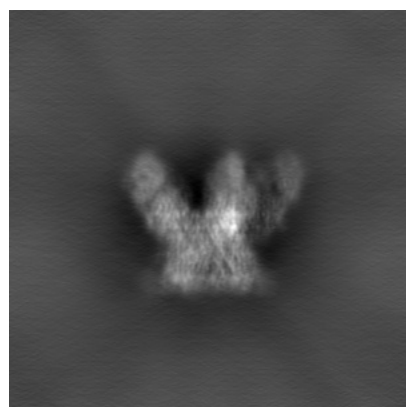


Y

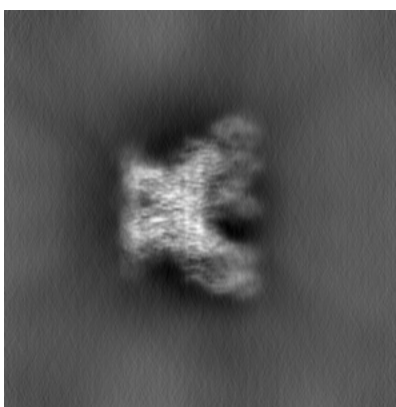


Z

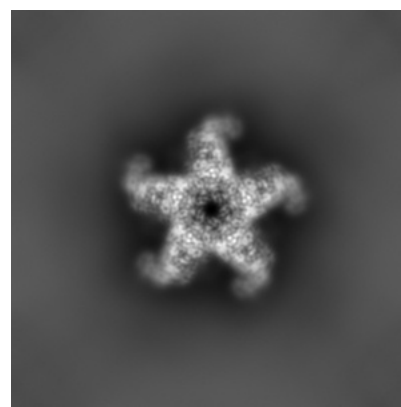
6.1.2 Raw map



X



Y

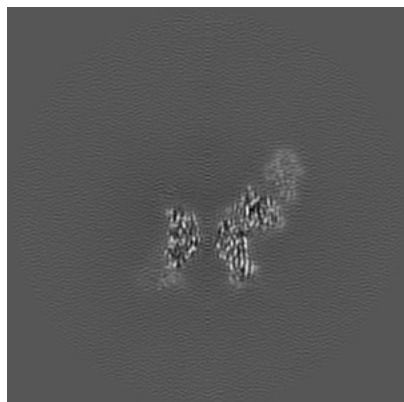


Z

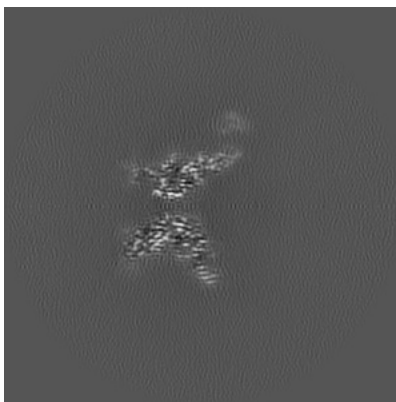
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

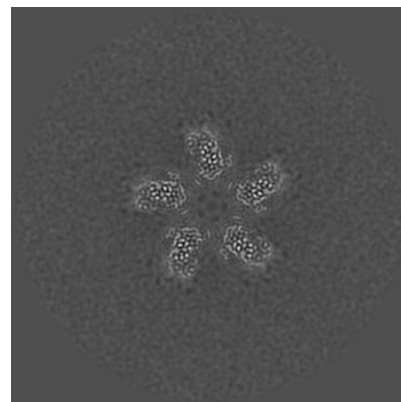
6.2.1 Primary map



X Index: 160

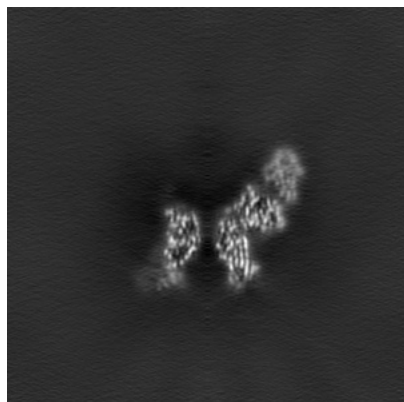


Y Index: 160

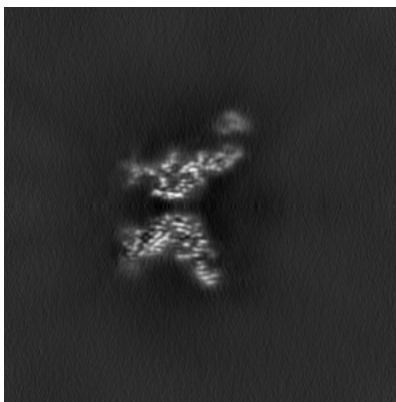


Z Index: 160

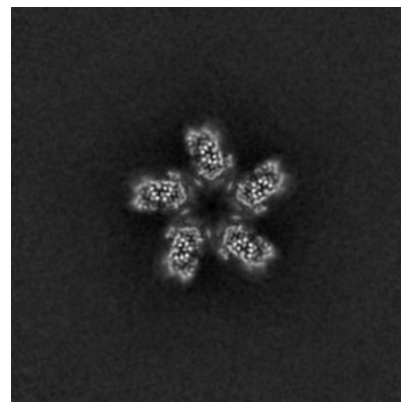
6.2.2 Raw map



X Index: 160



Y Index: 160

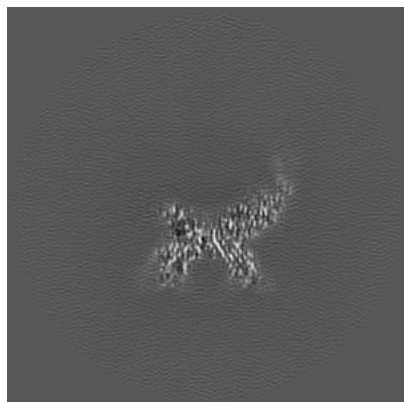


Z Index: 160

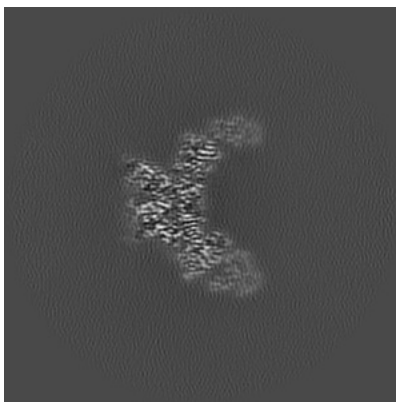
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

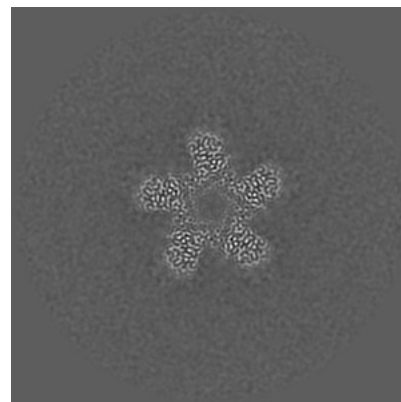
6.3.1 Primary map



X Index: 152

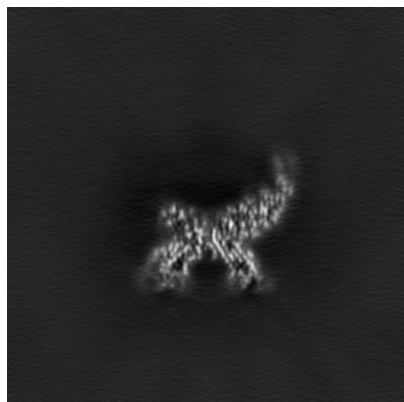


Y Index: 179

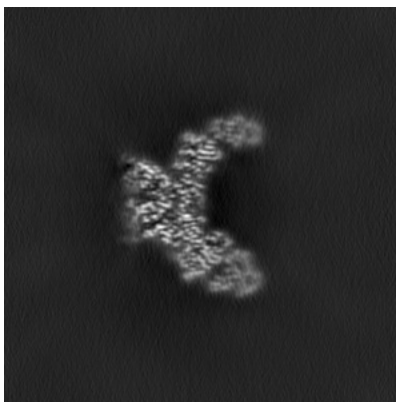


Z Index: 156

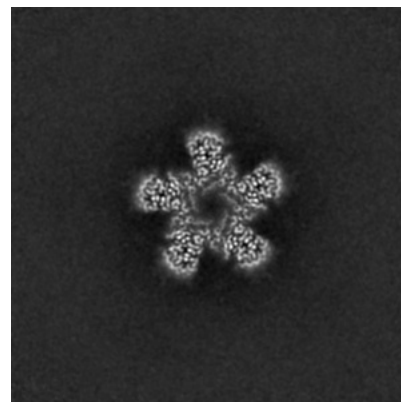
6.3.2 Raw map



X Index: 152



Y Index: 179

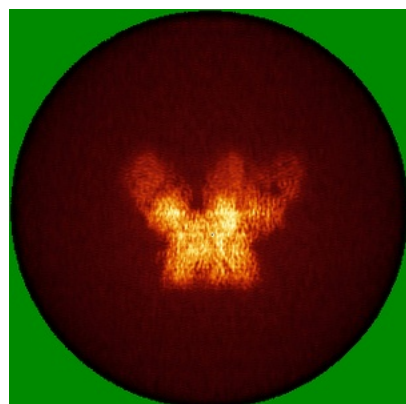


Z Index: 156

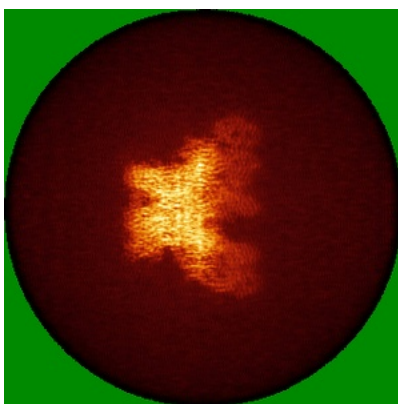
The images above show the largest variance slices of the map in three orthogonal directions.

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

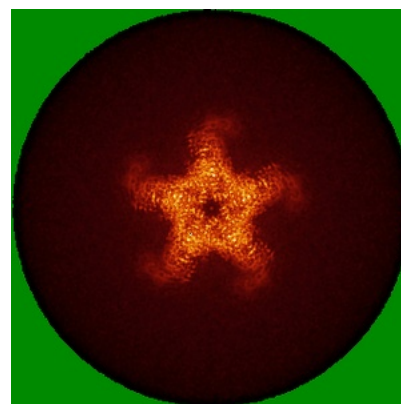
6.4.1 Primary map



X

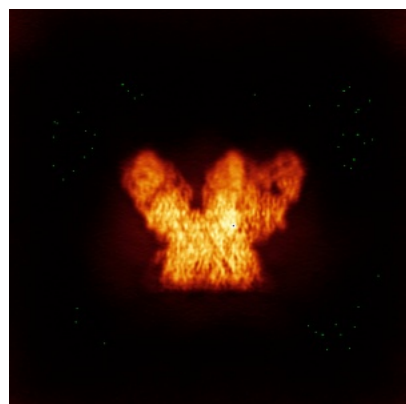


Y

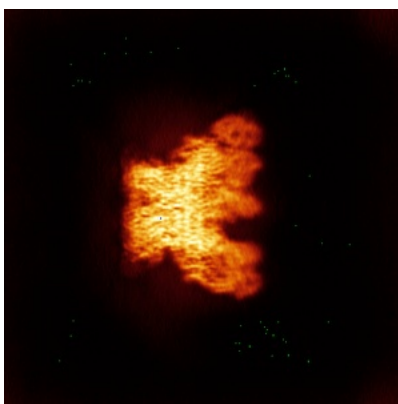


Z

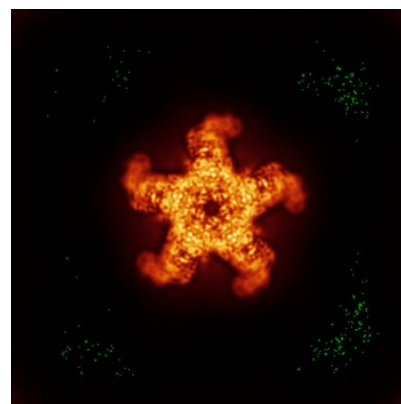
6.4.2 Raw map



X



Y

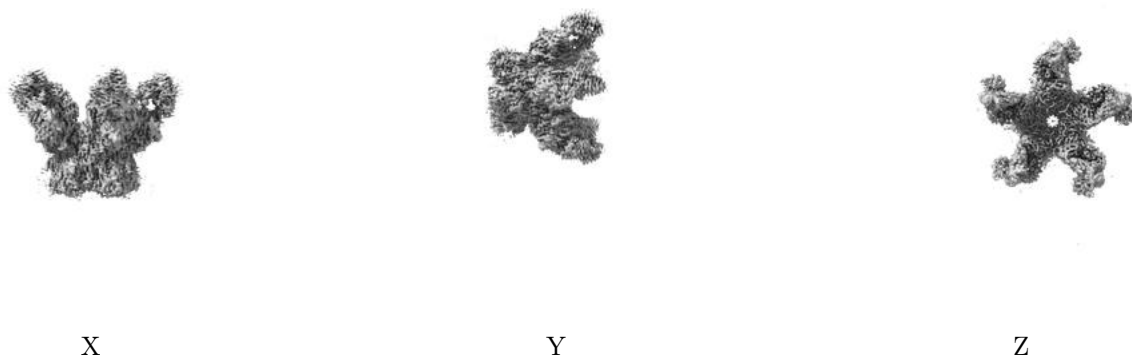


Z

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.

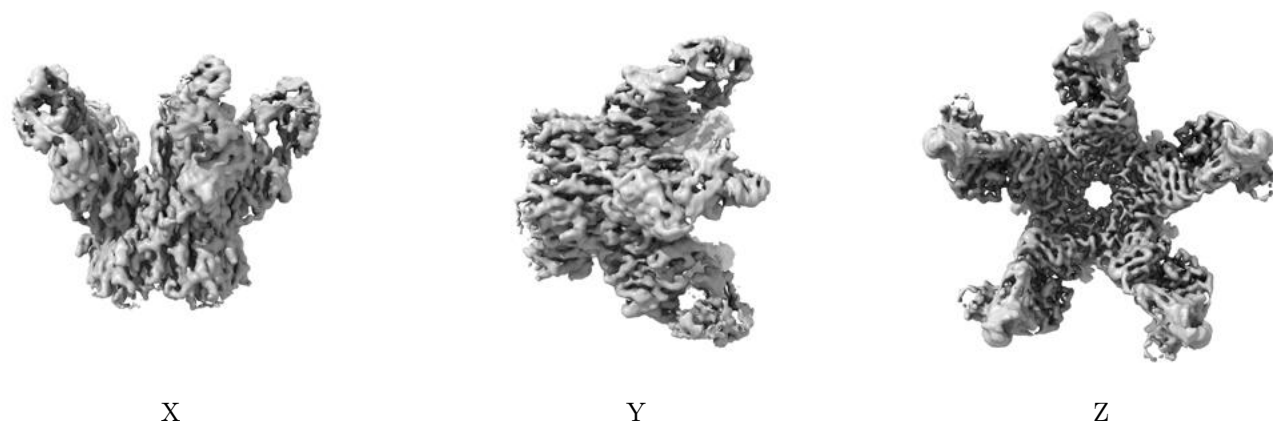
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 1.0. 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.

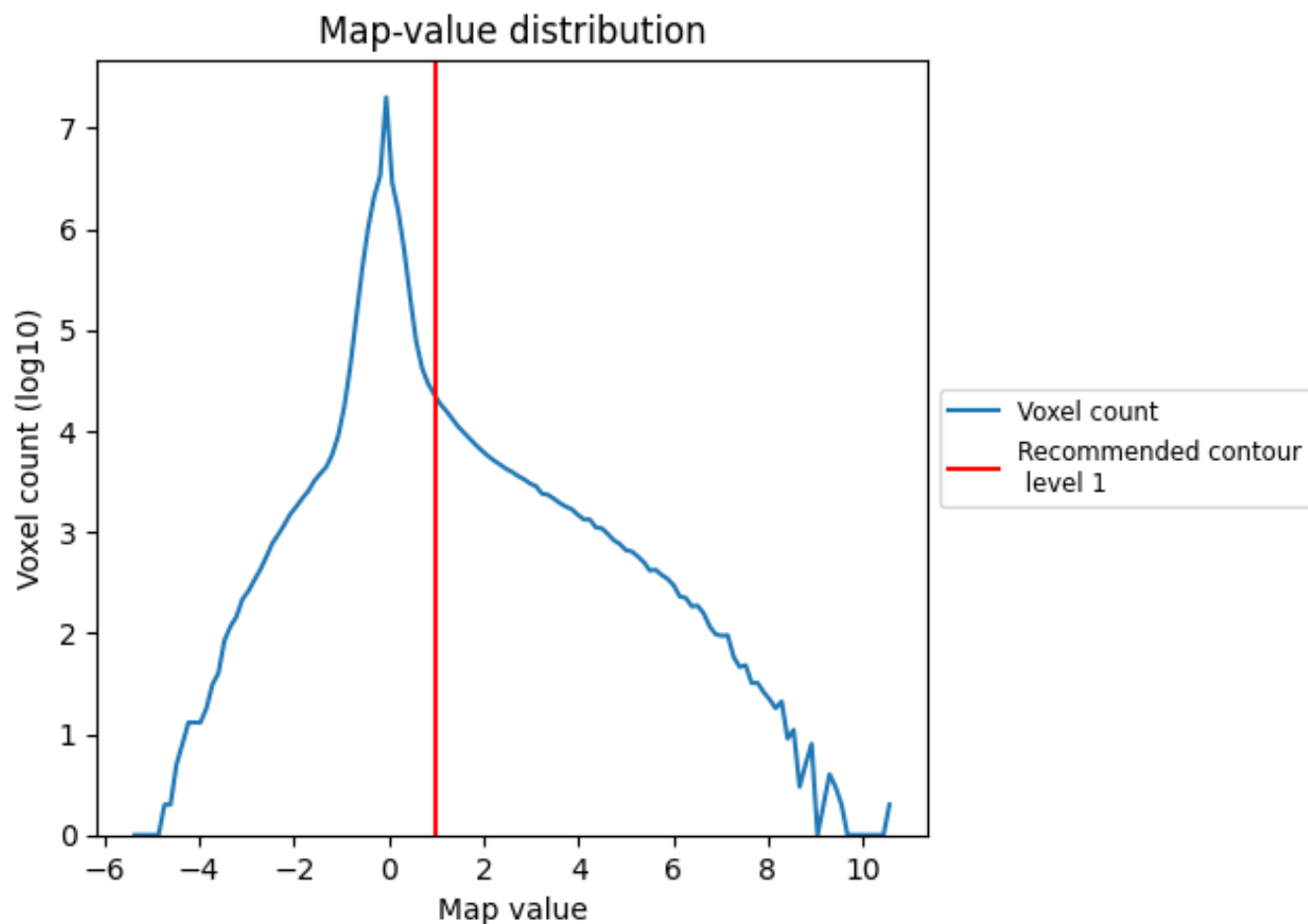
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

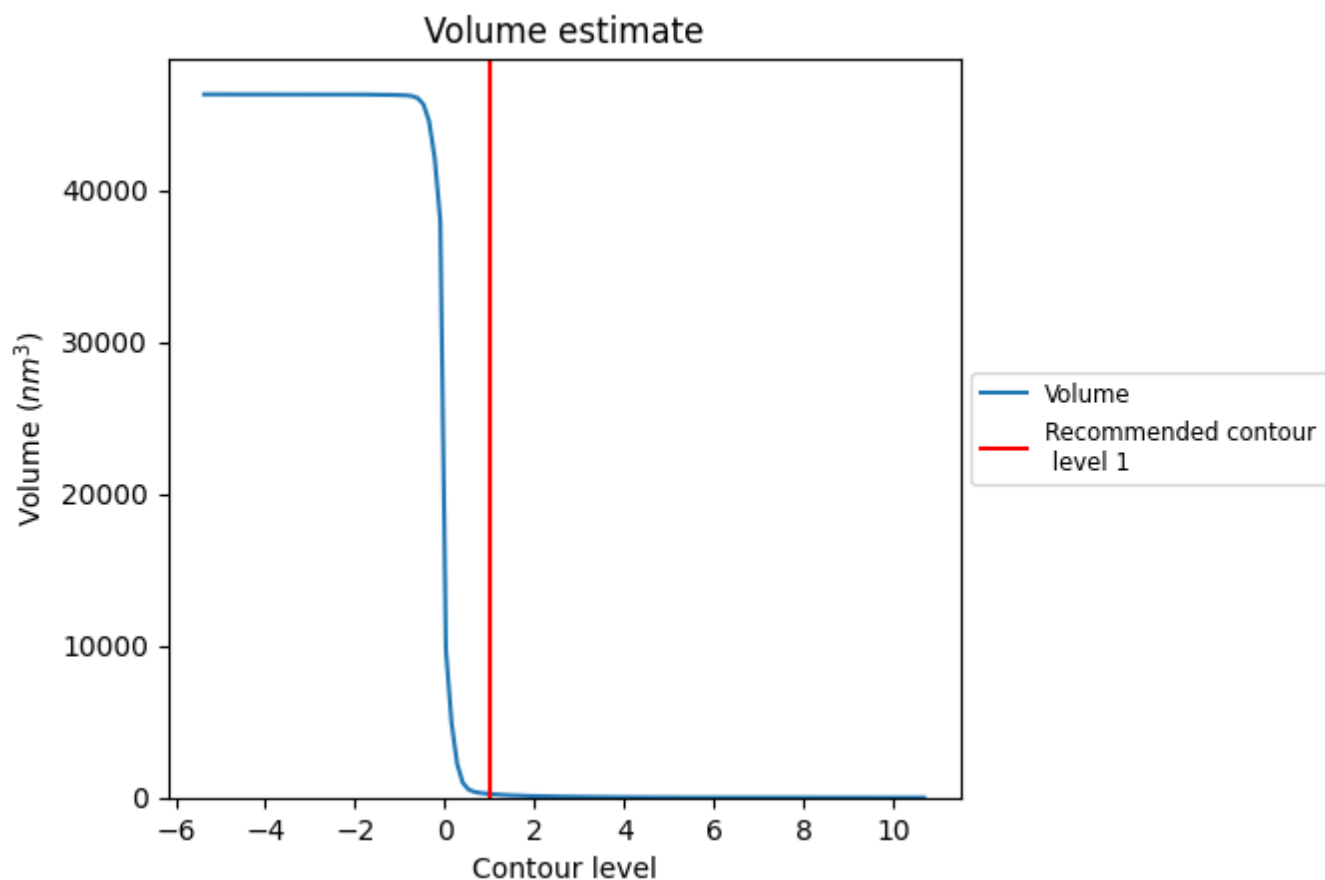
This section contains the results of statistical analysis of the map.

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.

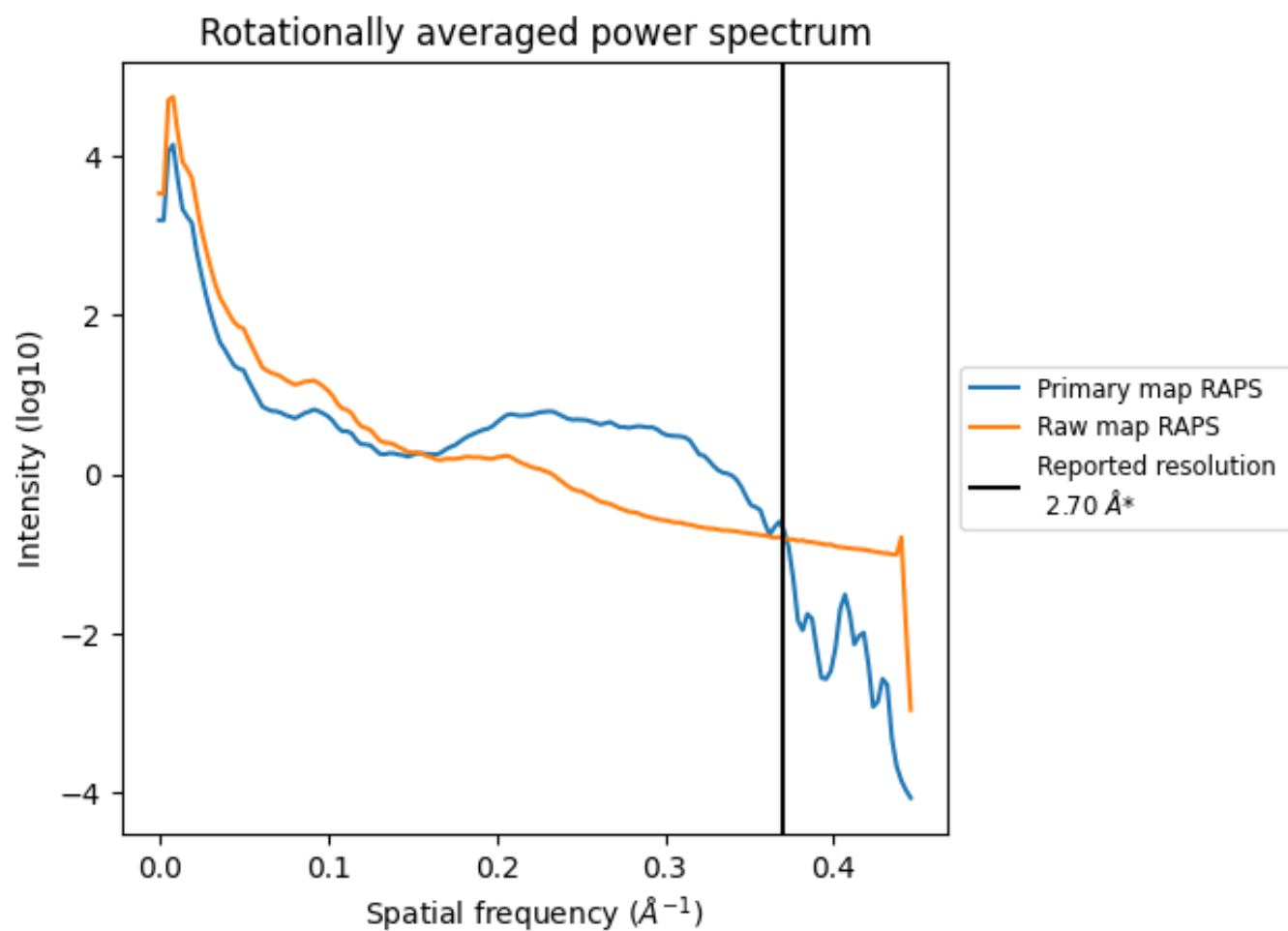
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 238 nm^3 ; this corresponds to an approximate mass of 215 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 ⓘ

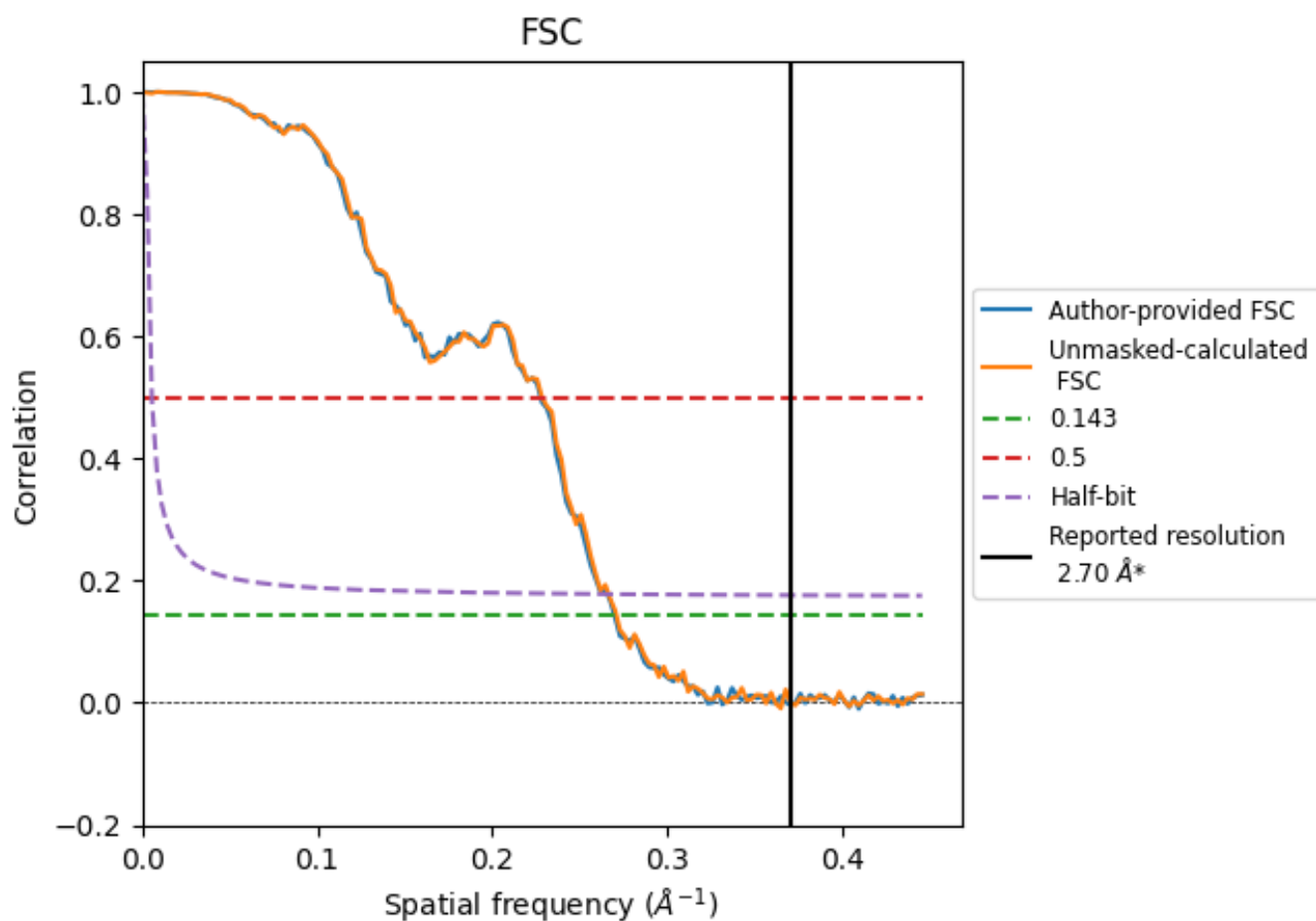


*Reported resolution corresponds to spatial frequency of 0.370 \AA^{-1}

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 0.370 \AA^{-1}

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.70	-	-
Author-provided FSC curve	3.71	4.39	3.76
Unmasked-calculated*	3.69	4.38	3.75

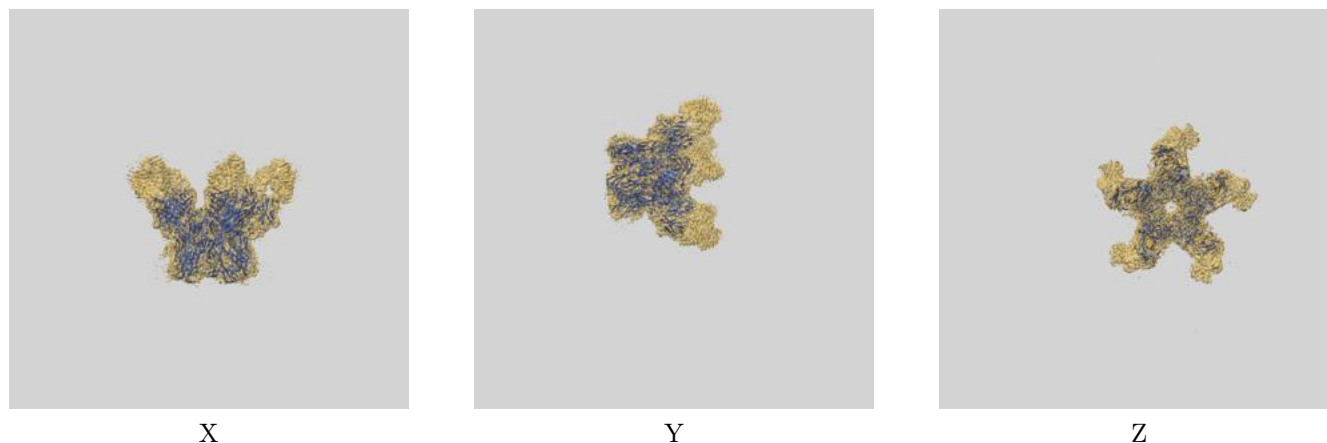
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 3.71 differs from the reported value 2.7 by more than 10 %

The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.69 differs from the reported value 2.7 by more than 10 %

9 Map-model fit [i](#)

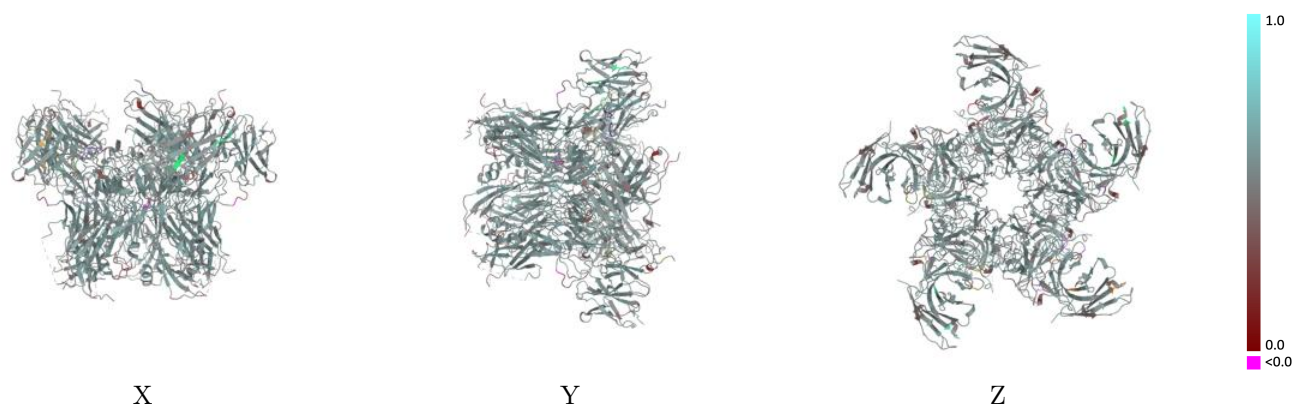
This section contains information regarding the fit between EMDB map EMD-48345 and PDB model 9ML2. Per-residue inclusion information can be found in section [3](#) on page [9](#).

9.1 Map-model overlay [i](#)



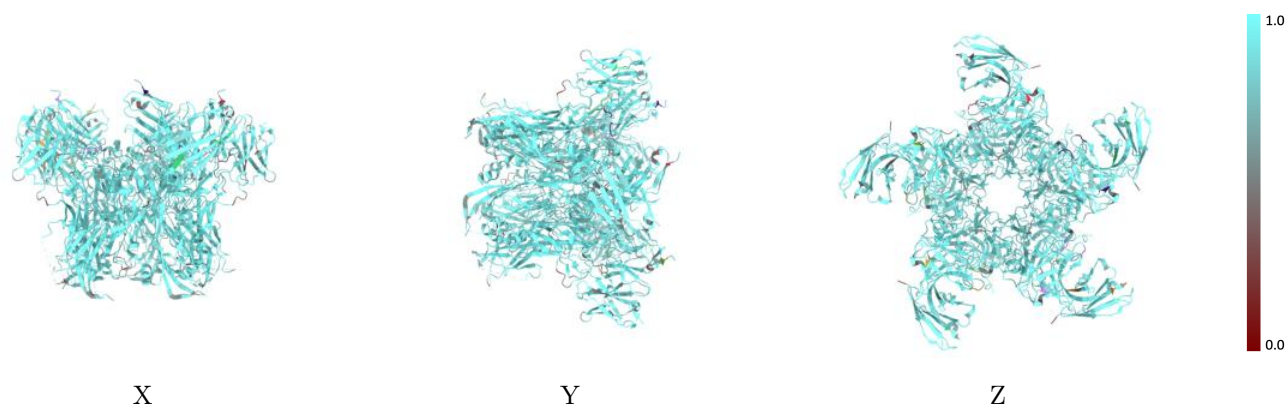
The images above show the 3D surface view of the map at the recommended contour level 1.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



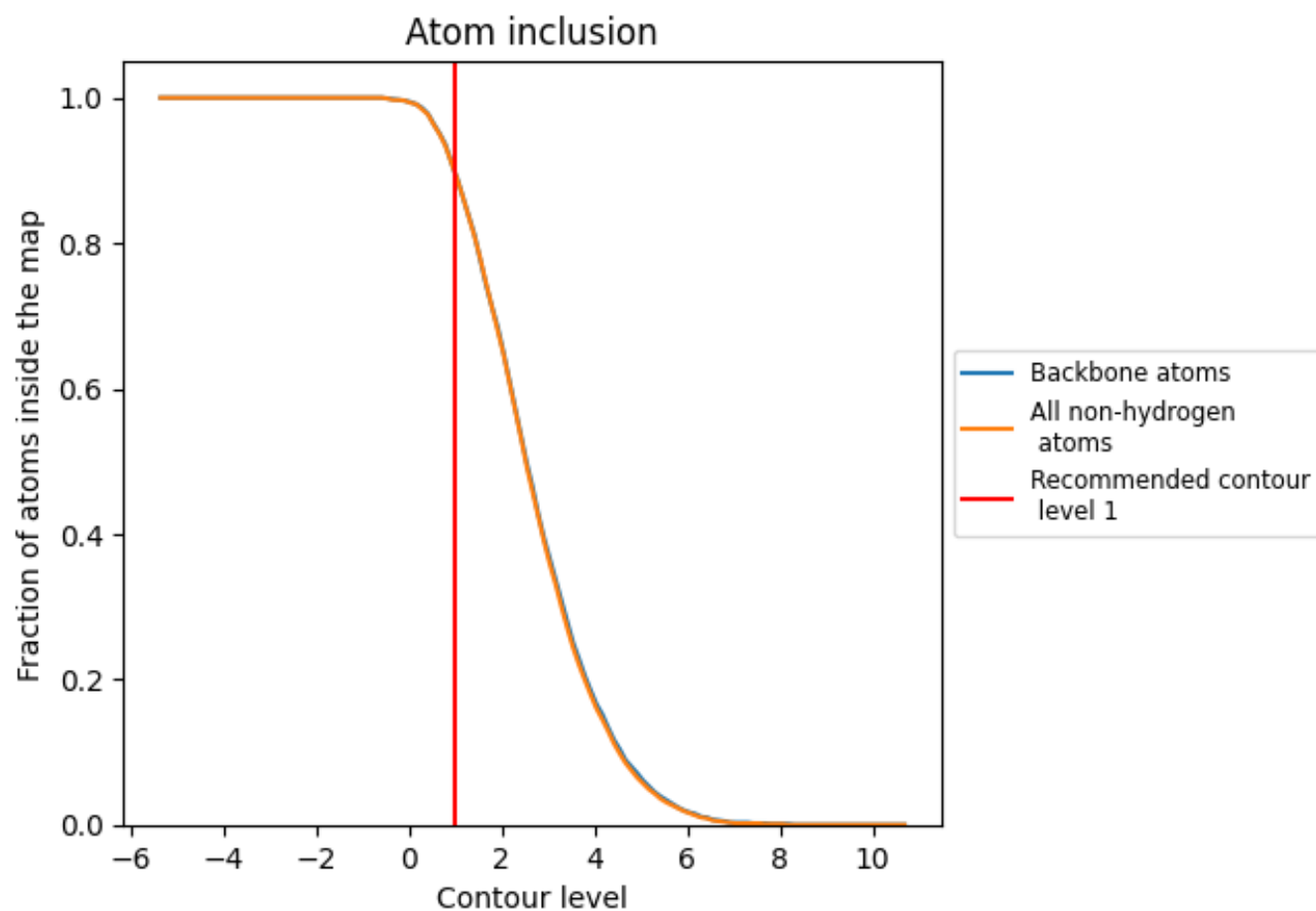
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (1).

9.4 Atom inclusion [i](#)



At the recommended contour level, 89% 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 (1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div><div></div></div> 0.8940	<div><div></div></div> 0.5300
A	<div><div></div></div> 0.8970	<div><div></div></div> 0.5330
B	<div><div></div></div> 0.8950	<div><div></div></div> 0.5300
C	<div><div></div></div> 0.8980	<div><div></div></div> 0.5320
D	<div><div></div></div> 0.8980	<div><div></div></div> 0.5320
E	<div><div></div></div> 0.8940	<div><div></div></div> 0.5310
F	<div><div></div></div> 0.9030	<div><div></div></div> 0.5340
G	<div><div></div></div> 0.8880	<div><div></div></div> 0.5260
H	<div><div></div></div> 0.9000	<div><div></div></div> 0.5300
I	<div><div></div></div> 0.9030	<div><div></div></div> 0.5280
J	<div><div></div></div> 0.8940	<div><div></div></div> 0.5270
L	<div><div></div></div> 0.8890	<div><div></div></div> 0.5260
M	<div><div></div></div> 0.9000	<div><div></div></div> 0.5300
N	<div><div></div></div> 0.9000	<div><div></div></div> 0.5260
O	<div><div></div></div> 0.9020	<div><div></div></div> 0.5320
P	<div><div></div></div> 0.8940	<div><div></div></div> 0.5260

1.0

0.0

<0.0