wwPDB EM Validation Summary Report (i)

Jan 19, 2026 – 10:16 AM EST

PDB ID	:	9CON / pdb_00009con
EMDB ID	:	EMD-45786
Title	:	Human Kv1.3-H451V with A0194009G09 nanobodies conformation 1
Authors	:	Selvakumar, P.; Swartz, K.J.
Deposited on	:	2024-07-17
Resolution	:	3.06 Å(reported)

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 3.06 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	Percentile Ranks	Value
Clashscore		9
Ramachandran outliers		0
Sidechain outliers		2.5%

Worse　　　　　　　　　　　　　　*Better*

■ Percentile relative to all structures

▯ Percentile relative to all EM structures

Metric	Model-Map Fit Percentile Ranks	Value
Q-score		0.541

Worse　　　　　　　　　　　　　　*Better*

■ Percentile relative to all EM structures

▯ Percentile relative to EM structures of similar resolution
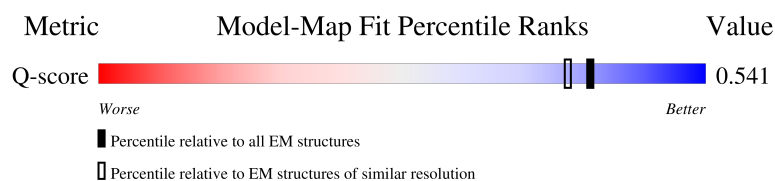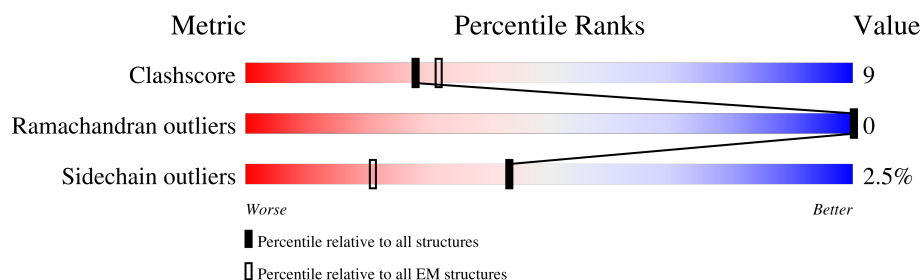
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	13976 (2.56 - 3.56)

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 <=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	856	9% / 34% 8% 58%
1	B	856	9% / 34% 8% 58%
1	C	856	9% / 34% 9% 58%
1	D	856	9% / 34% 8% 58%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	E	126	6% 63% 27% 9%
2	F	126	6% 61% 29% 9%
2	G	126	6% 63% 28% 9%
2	H	126	6% 63% 27% 9%

2   Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 15280 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 Potassium voltage-gated channel subfamily A member 3/mVenus fusion protein,Green fluorescent protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	362	Total	C	N	O	S	0	0
			2934	1926	482	515	11		
1	C	362	Total	C	N	O	S	0	0
			2934	1926	482	515	11		
1	B	362	Total	C	N	O	S	0	0
			2934	1926	482	515	11		
1	D	362	Total	C	N	O	S	0	0
			2934	1926	482	515	11		

There are 224 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	451	VAL	HIS	engineered mutation	UNP P22001
A	576	SER	-	linker	UNP P22001
A	577	LEU	-	linker	UNP P22001
A	578	GLU	-	linker	UNP P22001
A	579	VAL	-	linker	UNP P22001
A	580	LEU	-	linker	UNP P22001
A	581	PHE	-	linker	UNP P22001
A	582	GLN	-	linker	UNP P22001
A	583	GLY	-	linker	UNP P22001
A	584	PRO	-	linker	UNP P22001
A	585	ALA	-	linker	UNP P22001
A	586	ALA	-	linker	UNP P22001
A	587	ALA	-	linker	UNP P22001
A	588	MET	-	linker	UNP P22001
A	589	VAL	-	linker	UNP P22001
A	634	LEU	PHE	engineered mutation	UNP P42212
A	652	LEU	PHE	engineered mutation	UNP P42212
A	653	GLY	SER	engineered mutation	UNP P42212
A	656	LEU	VAL	engineered mutation	UNP P42212
A	660	ALA	SER	engineered mutation	UNP P42212
A	741	THR	MET	engineered mutation	UNP P42212

Continued on next page...

W O R L D W I D E
wwPDB
PROTEIN DATA BANK

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
A	751	ALA	VAL	engineered mutation	UNP P42212
A	763	GLY	SER	engineered mutation	UNP P42212
A	791	TYR	THR	engineered mutation	UNP P42212
A	794	LYS	ALA	engineered mutation	UNP P42212
A	819	LEU	HIS	engineered mutation	UNP P42212
A	827	SER	-	expression tag	UNP P42212
A	828	ALA	-	expression tag	UNP P42212
A	829	TRP	-	expression tag	UNP P42212
A	830	SER	-	expression tag	UNP P42212
A	831	HIS	-	expression tag	UNP P42212
A	832	PRO	-	expression tag	UNP P42212
A	833	GLN	-	expression tag	UNP P42212
A	834	PHE	-	expression tag	UNP P42212
A	835	GLU	-	expression tag	UNP P42212
A	836	LYS	-	expression tag	UNP P42212
A	837	GLY	-	expression tag	UNP P42212
A	838	GLY	-	expression tag	UNP P42212
A	839	GLY	-	expression tag	UNP P42212
A	840	SER	-	expression tag	UNP P42212
A	841	GLY	-	expression tag	UNP P42212
A	842	GLY	-	expression tag	UNP P42212
A	843	GLY	-	expression tag	UNP P42212
A	844	SER	-	expression tag	UNP P42212
A	845	GLY	-	expression tag	UNP P42212
A	846	GLY	-	expression tag	UNP P42212
A	847	GLY	-	expression tag	UNP P42212
A	848	SER	-	expression tag	UNP P42212
A	849	TRP	-	expression tag	UNP P42212
A	850	SER	-	expression tag	UNP P42212
A	851	HIS	-	expression tag	UNP P42212
A	852	PRO	-	expression tag	UNP P42212
A	853	GLN	-	expression tag	UNP P42212
A	854	PHE	-	expression tag	UNP P42212
A	855	GLU	-	expression tag	UNP P42212
A	856	LYS	-	expression tag	UNP P42212
C	451	VAL	HIS	engineered mutation	UNP P22001
C	576	SER	-	linker	UNP P22001
C	577	LEU	-	linker	UNP P22001
C	578	GLU	-	linker	UNP P22001
C	579	VAL	-	linker	UNP P22001
C	580	LEU	-	linker	UNP P22001
C	581	PHE	-	linker	UNP P22001

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
C	582	GLN	-	linker	UNP P22001
C	583	GLY	-	linker	UNP P22001
C	584	PRO	-	linker	UNP P22001
C	585	ALA	-	linker	UNP P22001
C	586	ALA	-	linker	UNP P22001
C	587	ALA	-	linker	UNP P22001
C	588	MET	-	linker	UNP P22001
C	589	VAL	-	linker	UNP P22001
C	634	LEU	PHE	engineered mutation	UNP P42212
C	652	LEU	PHE	engineered mutation	UNP P42212
C	653	GLY	SER	engineered mutation	UNP P42212
C	656	LEU	VAL	engineered mutation	UNP P42212
C	660	ALA	SER	engineered mutation	UNP P42212
C	741	THR	MET	engineered mutation	UNP P42212
C	751	ALA	VAL	engineered mutation	UNP P42212
C	763	GLY	SER	engineered mutation	UNP P42212
C	791	TYR	THR	engineered mutation	UNP P42212
C	794	LYS	ALA	engineered mutation	UNP P42212
C	819	LEU	HIS	engineered mutation	UNP P42212
C	827	SER	-	expression tag	UNP P42212
C	828	ALA	-	expression tag	UNP P42212
C	829	TRP	-	expression tag	UNP P42212
C	830	SER	-	expression tag	UNP P42212
C	831	HIS	-	expression tag	UNP P42212
C	832	PRO	-	expression tag	UNP P42212
C	833	GLN	-	expression tag	UNP P42212
C	834	PHE	-	expression tag	UNP P42212
C	835	GLU	-	expression tag	UNP P42212
C	836	LYS	-	expression tag	UNP P42212
C	837	GLY	-	expression tag	UNP P42212
C	838	GLY	-	expression tag	UNP P42212
C	839	GLY	-	expression tag	UNP P42212
C	840	SER	-	expression tag	UNP P42212
C	841	GLY	-	expression tag	UNP P42212
C	842	GLY	-	expression tag	UNP P42212
C	843	GLY	-	expression tag	UNP P42212
C	844	SER	-	expression tag	UNP P42212
C	845	GLY	-	expression tag	UNP P42212
C	846	GLY	-	expression tag	UNP P42212
C	847	GLY	-	expression tag	UNP P42212
C	848	SER	-	expression tag	UNP P42212
C	849	TRP	-	expression tag	UNP P42212

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
C	850	SER	-	expression tag	UNP P42212
C	851	HIS	-	expression tag	UNP P42212
C	852	PRO	-	expression tag	UNP P42212
C	853	GLN	-	expression tag	UNP P42212
C	854	PHE	-	expression tag	UNP P42212
C	855	GLU	-	expression tag	UNP P42212
C	856	LYS	-	expression tag	UNP P42212
B	451	VAL	HIS	engineered mutation	UNP P22001
B	576	SER	-	linker	UNP P22001
B	577	LEU	-	linker	UNP P22001
B	578	GLU	-	linker	UNP P22001
B	579	VAL	-	linker	UNP P22001
B	580	LEU	-	linker	UNP P22001
B	581	PHE	-	linker	UNP P22001
B	582	GLN	-	linker	UNP P22001
B	583	GLY	-	linker	UNP P22001
B	584	PRO	-	linker	UNP P22001
B	585	ALA	-	linker	UNP P22001
B	586	ALA	-	linker	UNP P22001
B	587	ALA	-	linker	UNP P22001
B	588	MET	-	linker	UNP P22001
B	589	VAL	-	linker	UNP P22001
B	634	LEU	PHE	engineered mutation	UNP P42212
B	652	LEU	PHE	engineered mutation	UNP P42212
B	653	GLY	SER	engineered mutation	UNP P42212
B	656	LEU	VAL	engineered mutation	UNP P42212
B	660	ALA	SER	engineered mutation	UNP P42212
B	741	THR	MET	engineered mutation	UNP P42212
B	751	ALA	VAL	engineered mutation	UNP P42212
B	763	GLY	SER	engineered mutation	UNP P42212
B	791	TYR	THR	engineered mutation	UNP P42212
B	794	LYS	ALA	engineered mutation	UNP P42212
B	819	LEU	HIS	engineered mutation	UNP P42212
B	827	SER	-	expression tag	UNP P42212
B	828	ALA	-	expression tag	UNP P42212
B	829	TRP	-	expression tag	UNP P42212
B	830	SER	-	expression tag	UNP P42212
B	831	HIS	-	expression tag	UNP P42212
B	832	PRO	-	expression tag	UNP P42212
B	833	GLN	-	expression tag	UNP P42212
B	834	PHE	-	expression tag	UNP P42212
B	835	GLU	-	expression tag	UNP P42212

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
B	836	LYS	-	expression tag	UNP P42212
B	837	GLY	-	expression tag	UNP P42212
B	838	GLY	-	expression tag	UNP P42212
B	839	GLY	-	expression tag	UNP P42212
B	840	SER	-	expression tag	UNP P42212
B	841	GLY	-	expression tag	UNP P42212
B	842	GLY	-	expression tag	UNP P42212
B	843	GLY	-	expression tag	UNP P42212
B	844	SER	-	expression tag	UNP P42212
B	845	GLY	-	expression tag	UNP P42212
B	846	GLY	-	expression tag	UNP P42212
B	847	GLY	-	expression tag	UNP P42212
B	848	SER	-	expression tag	UNP P42212
B	849	TRP	-	expression tag	UNP P42212
B	850	SER	-	expression tag	UNP P42212
B	851	HIS	-	expression tag	UNP P42212
B	852	PRO	-	expression tag	UNP P42212
B	853	GLN	-	expression tag	UNP P42212
B	854	PHE	-	expression tag	UNP P42212
B	855	GLU	-	expression tag	UNP P42212
B	856	LYS	-	expression tag	UNP P42212
D	451	VAL	HIS	engineered mutation	UNP P22001
D	576	SER	-	linker	UNP P22001
D	577	LEU	-	linker	UNP P22001
D	578	GLU	-	linker	UNP P22001
D	579	VAL	-	linker	UNP P22001
D	580	LEU	-	linker	UNP P22001
D	581	PHE	-	linker	UNP P22001
D	582	GLN	-	linker	UNP P22001
D	583	GLY	-	linker	UNP P22001
D	584	PRO	-	linker	UNP P22001
D	585	ALA	-	linker	UNP P22001
D	586	ALA	-	linker	UNP P22001
D	587	ALA	-	linker	UNP P22001
D	588	MET	-	linker	UNP P22001
D	589	VAL	-	linker	UNP P22001
D	634	LEU	PHE	engineered mutation	UNP P42212
D	652	LEU	PHE	engineered mutation	UNP P42212
D	653	GLY	SER	engineered mutation	UNP P42212
D	656	LEU	VAL	engineered mutation	UNP P42212
D	660	ALA	SER	engineered mutation	UNP P42212
D	741	THR	MET	engineered mutation	UNP P42212

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
D	751	ALA	VAL	engineered mutation	UNP P42212
D	763	GLY	SER	engineered mutation	UNP P42212
D	791	TYR	THR	engineered mutation	UNP P42212
D	794	LYS	ALA	engineered mutation	UNP P42212
D	819	LEU	HIS	engineered mutation	UNP P42212
D	827	SER	-	expression tag	UNP P42212
D	828	ALA	-	expression tag	UNP P42212
D	829	TRP	-	expression tag	UNP P42212
D	830	SER	-	expression tag	UNP P42212
D	831	HIS	-	expression tag	UNP P42212
D	832	PRO	-	expression tag	UNP P42212
D	833	GLN	-	expression tag	UNP P42212
D	834	PHE	-	expression tag	UNP P42212
D	835	GLU	-	expression tag	UNP P42212
D	836	LYS	-	expression tag	UNP P42212
D	837	GLY	-	expression tag	UNP P42212
D	838	GLY	-	expression tag	UNP P42212
D	839	GLY	-	expression tag	UNP P42212
D	840	SER	-	expression tag	UNP P42212
D	841	GLY	-	expression tag	UNP P42212
D	842	GLY	-	expression tag	UNP P42212
D	843	GLY	-	expression tag	UNP P42212
D	844	SER	-	expression tag	UNP P42212
D	845	GLY	-	expression tag	UNP P42212
D	846	GLY	-	expression tag	UNP P42212
D	847	GLY	-	expression tag	UNP P42212
D	848	SER	-	expression tag	UNP P42212
D	849	TRP	-	expression tag	UNP P42212
D	850	SER	-	expression tag	UNP P42212
D	851	HIS	-	expression tag	UNP P42212
D	852	PRO	-	expression tag	UNP P42212
D	853	GLN	-	expression tag	UNP P42212
D	854	PHE	-	expression tag	UNP P42212
D	855	GLU	-	expression tag	UNP P42212
D	856	LYS	-	expression tag	UNP P42212

- Molecule 2 is a protein called A0194009G09 nanobody.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	115	Total	C	N	O	S	0	0
			885	555	157	169	4		
2	F	115	Total	C	N	O	S	0	0
			885	555	157	169	4		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf	Trace
2	G	115	Total	C	N	O	S	0	0
			885	555	157	169	4		
2	H	115	Total	C	N	O	S	0	0
			885	555	157	169	4		

- Molecule 3 is POTASSIUM ION (CCD ID: K) (formula: K).

Mol	Chain	Residues	Atoms		AltConf
3	A	4	Total	K	0
			4	4	

3 Residue-property plots ⓘ

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

• Molecule 1: Potassium voltage-gated channel subfamily A member 3/mVenus fusion protein,Green fluorescent protein
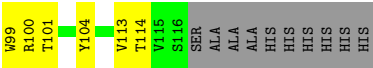
TYR LYS SER ALA TRP SER HIS PRO GLN PHE GLU LYS GLY GLY GLY SER GLY GLY GLY SER TRP SER HIS PRO GLN PHE GLU LYS

• Molecule 1: Potassium voltage-gated channel subfamily A member 3/mVenus fusion protein,Green fluorescent protein

Chain C:

9%
34% 9% 58%

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

LEU LEU GLU GLU PRO GLU VAL ALA ASP GLY GLY ALA PRO PRO GLN GLY GLY CYS GLY GLY GLY ASP ARG TYR GLU LEU PRO SER LEU PRO ALA ALA GLY GLN ASP CYS CYS G103 E104 R105 V106 V107 I108 N109 I110 L113 R114 F115 E116 T117 Q118 L119 K120 T121

L122 C123 Q124 F125 P126 E127 T128 G131 D132 P133 K134 R135 R136 M137 R138 Y139 F140 D141 P142 L143 R144 N145 E146 Y147 F148 R151 N152 R153 F156 D157 Y161 G166 G167 R168 P172 V175 P176 I177 D178 I179 E183 I184 R185 F186 Y187 Q188 L189 G190 E191 E192 A193 M194

E195 K196 F197 R198 E199 D200 E201 G202 F203 L204 R205 E206 E207 E208 R209 P210 R213 R214 D215 R218 Q219 L222 L223 Y226 P227 E228 P232 S247 P257 E258 F259 R260 D261 E262 K263 D264 Y265 P266 T269 SER GLN ASP SER PHE GLU ALA ALA GLY ASN SER THR SER

GLY SER ARG ALA G287 A288 F291 S292 I303 F306 A321 R325 D332 I336 Y339 E346 L347 A348 E349 ARG GLN GLY ASN GLY GLN GLN ALA MET S359 L360 A361 I362 L363 R373 R379 K382 G383 L384 T390 S394 M395 I410 P424

P432 F435 W436 W437 T443 T444 D449 M450 G461 A465 V469 L474 P475 V476 P477 V480 E490 THR GLY GLY GLU GLU GLN GLN SER GLN SER GLY GLN TYR MET HIS VAL GLY SER CYS GLN HIS LEU LEU SER SER ALA GLU GLU LEU ARG LYS ALA ARG SER ASN SER THR LEU

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

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

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

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

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

TYR LYS SER ALA TRP SER HIS PRO GLN PHE GLU LYS GLY GLY GLY SER GLY GLY GLY SER GLY GLY GLY SER TRP SER HIS PRO GLN PHE GLU LYS

• Molecule 1: Potassium voltage-gated channel subfamily A member 3/mVenus fusion protein,Green fluorescent protein

Chain B:

9%
34% 8% 58%

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

• Molecule 1: Potassium voltage-gated channel subfamily A member 3/mVenus fusion protein,Green fluorescent protein

Chain D:

9%

34%　　8%　　58%

THR SER GLY SER ARG ALA G287 A288 S289 S290 F291 S292 I303 F306 A321 R325 D332 I336 Y339 E346 L347 A348 E349 ARG GLN GLY ASN GLY GLN ALA MET S359 L360 A361 I362 L363 R373 R379 K382 T390 S394 L398 G399 L400

I410 P424 P432 F435 W436 W437 T443 T444 D449 M450 G461 A465 V469 L474 P475 V476 P477 V480 E490 THR GLU GLY GLU GLN SER GLN TYR MET HIS VAL GLY SER CYS VAL GLN HIS LEU SER SER SER ALA GLU GLU LEU ARG LYS ALA ARG SER

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

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

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

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

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

MET ASP GLU LEU TYR LYS SER ALA TRP SER HIS PRO GLN PHE GLU LYS GLY GLY GLY SER GLY GLY GLY SER GLY GLY SER TRP SER HIS PRO GLN PHE GLU LYS

• Molecule 2: A0194009G09 nanobody

Chain E:

6%
63% 27% • 9%

MET E2 L12 V13 Q14 S18 A25 L28 L29 F30 S31 R32 N33 Y38 A41 K44 Q45 R46 E47 F48 V49 A50 R51 I52 R53 M54 I58 N59 Y60 A61 D62 T63 V64 R67 F68 T69 I70 D73 N74 A75 L81 L86 D90 T91 S98 W99

R100 T101 Y104 V113 T114 V115 S116 SER ALA ALA HIS HIS HIS HIS HIS HIS

• Molecule 2: A0194009G09 nanobody

Chain F:

6%
61% 29% • 9%

MET E2 L12 V13 Q14 S18 A25 L28 L29 F30 S31 R32 N33 Y38 A41 K44 Q45 R46 E47 F48 V49 A50 R51 I52 R53 M54 I58 N59 Y60 A61 D62 T63 V64 R67 F68 T69 I70 S71 R72 D73 N74 A75 K76 N77 L81 L86 D90 T91

S98 W99 R100 T101 Y104 V113 T114 V115 S116 SER ALA ALA HIS HIS HIS HIS HIS HIS

• Molecule 2: A0194009G09 nanobody

Chain G:

6%
63% 28% • 9%

MET E2 L12 V13 Q14 S18 A25 L28 L29 F30 S31 R32 N33 Y38 A41 K44 Q45 R46 E47 F48 V49 A50 R51 I52 R53 M54 I58 N59 Y60 A61 D62 T63 V64 R67 F68 T69 I70 S71 R72 D73 N74 A75 L81 L86 D90 T91 S98

W99 R100 T101 Y104 V113 T114 V115 S116 SER ALA ALA HIS HIS HIS HIS HIS HIS

• Molecule 2: A0194009G09 nanobody

6%

Chain H: 63%   27%   •   9%

MET E2 L12 V13 Q14 S18 A25 F30 S31 R32 N33 Y38 A41 K44 Q45 R46 E47 F48 V49 A50 R51 I52 R53 M54 I58 N59 Y60 A61 D62 T63 V64 R67 F68 T69 I70 S71 R72 D73 N74 A75 L81 L86 D90 T91 S98 W99 R100

T101 Y104 V113 T114 V115 S116 SER ALA ALA HIS HIS HIS HIS HIS HIS

4   Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C4	Depositor
Number of particles used	115627	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 $(e^-/\text{Å}^2)$	52.16	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	2.770	Depositor
Minimum map value	-1.854	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.040	Depositor
Recommended contour level	0.3	Depositor
Map size (Å)	343.19998, 343.19998, 343.19998	wwPDB
Map dimensions	416, 416, 416	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8249999, 0.8249999, 0.8249999	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: K

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	0.46	0/3008	0.66	0/4076
1	B	0.47	0/3008	0.67	0/4076
1	C	0.47	0/3008	0.66	0/4076
1	D	0.47	0/3008	0.67	0/4076
2	E	0.86	0/903	1.13	0/1219
2	F	0.86	0/903	1.13	0/1219
2	G	0.86	0/903	1.13	0/1219
2	H	0.86	0/903	1.13	0/1219
All	All	0.58	0/15644	0.80	0/21180

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 ⓘ

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	2934	0	2956	55	0
1	B	2934	0	2956	61	0
1	C	2934	0	2956	61	0
1	D	2934	0	2956	60	0
2	E	885	0	856	23	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	F	885	0	856	24	0
2	G	885	0	856	23	0
2	H	885	0	856	24	0
3	A	4	0	0	0	0
All	All	15280	0	15248	286	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 286 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:E:48:PHE:HE1	2:E:51:ARG:HB2	1.57	0.70
2:F:48:PHE:HE1	2:F:51:ARG:HB2	1.57	0.70
2:H:48:PHE:HE1	2:H:51:ARG:HB2	1.57	0.69
2:G:48:PHE:HE1	2:G:51:ARG:HB2	1.57	0.69
1:C:204:LEU:HD23	1:C:204:LEU:H	1.59	0.68

There are no symmetry-related clashes.

5.3　Torsion angles ⓘ

5.3.1　Protein backbone ⓘ

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	356/856 (42%)	343 (96%)	13 (4%)	0	100	100
1	B	356/856 (42%)	343 (96%)	13 (4%)	0	100	100
1	C	356/856 (42%)	343 (96%)	13 (4%)	0	100	100
1	D	356/856 (42%)	343 (96%)	13 (4%)	0	100	100
2	E	113/126 (90%)	107 (95%)	6 (5%)	0	100	100
2	F	113/126 (90%)	107 (95%)	6 (5%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	G	113/126 (90%)	107 (95%)	6 (5%)	0	100	100
2	H	113/126 (90%)	107 (95%)	6 (5%)	0	100	100
All	All	1876/3928 (48%)	1800 (96%)	76 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2   Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	320/724 (44%)	317 (99%)	3 (1%)	75	86
1	B	320/724 (44%)	317 (99%)	3 (1%)	75	86
1	C	320/724 (44%)	316 (99%)	4 (1%)	65	80
1	D	320/724 (44%)	317 (99%)	3 (1%)	75	86
2	E	92/100 (92%)	85 (92%)	7 (8%)	11	32
2	F	92/100 (92%)	85 (92%)	7 (8%)	11	32
2	G	92/100 (92%)	85 (92%)	7 (8%)	11	32
2	H	92/100 (92%)	85 (92%)	7 (8%)	11	32
All	All	1648/3296 (50%)	1607 (98%)	41 (2%)	43	66

5 of 41 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	G	46	ARG
2	H	46	ARG
2	G	47	GLU
2	G	64	VAL
2	H	59	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
2	E	59	ASN
2	F	59	ASN
2	G	59	ASN
2	H	59	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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 4 ligands modelled in this entry, 4 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-45786. 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 ⓘ
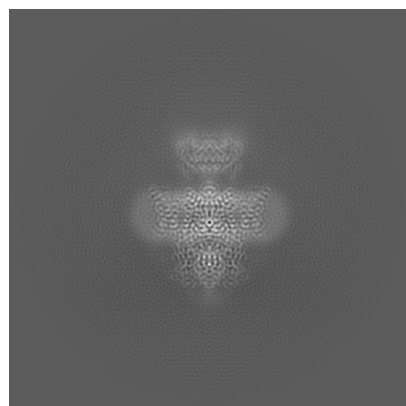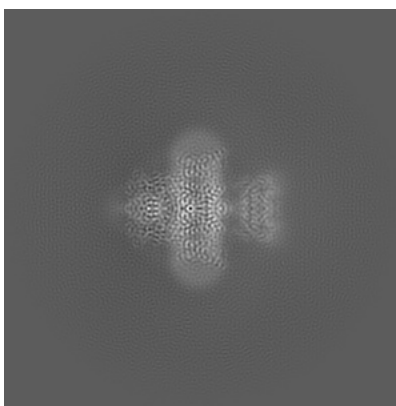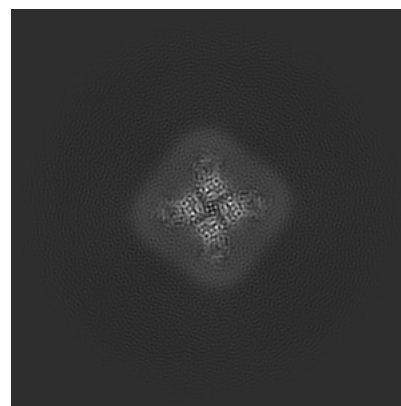
6.1.1 Primary map

X   Y   Z

6.1.2 Raw map

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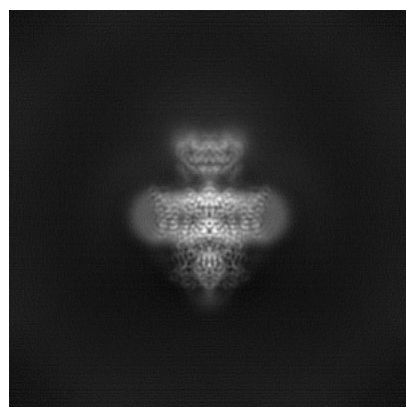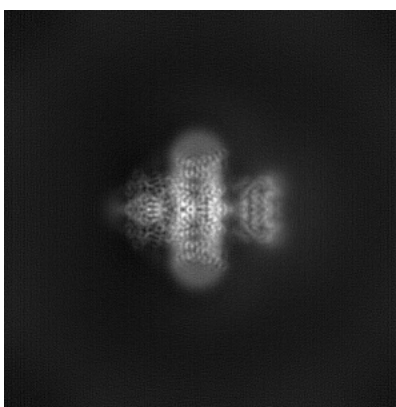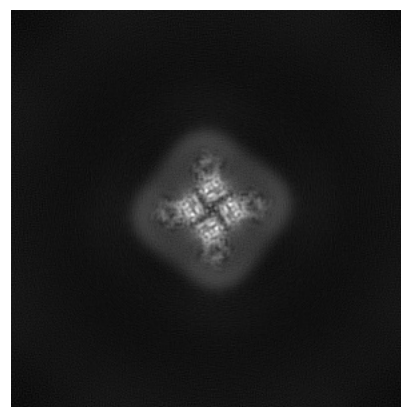
The images above show the map projected in three orthogonal directions.

6.2   Central slices ⓘ
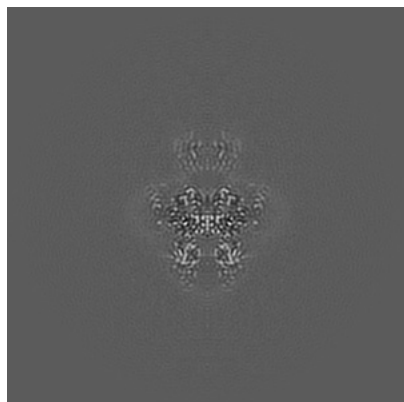
6.2.1   Primary map
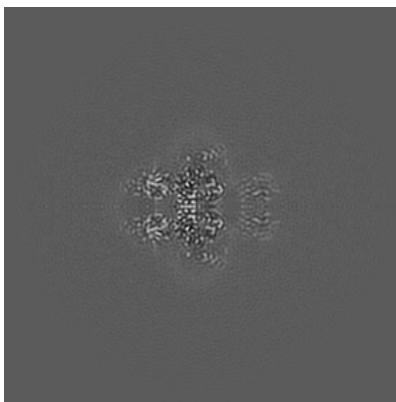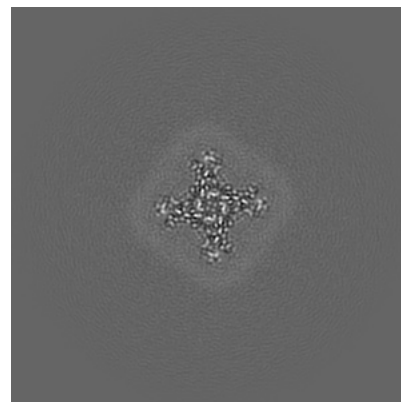
| X Index: 208 | Y Index: 208 | Z Index: 208 |

6.2.2   Raw map
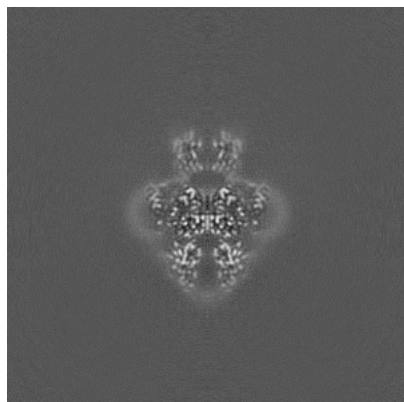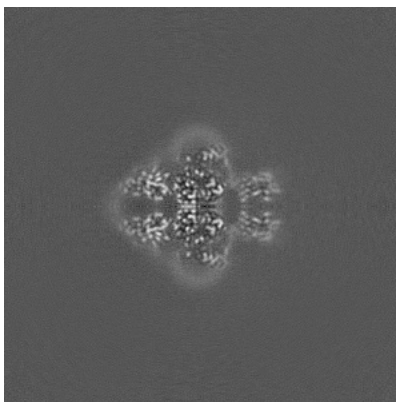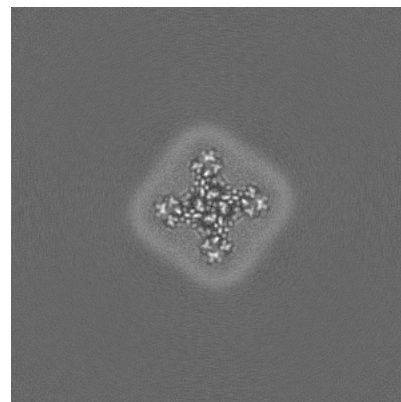
| X Index: 208 | Y Index: 208 | Z Index: 208 |

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

6.3 Largest variance slices ⓘ

6.3.1 Primary map
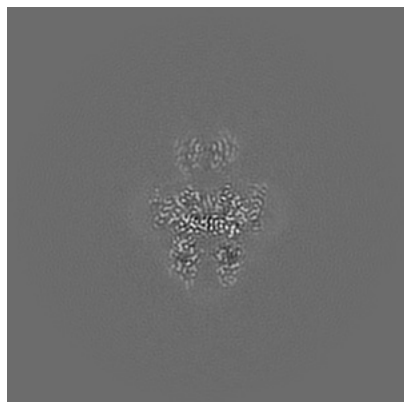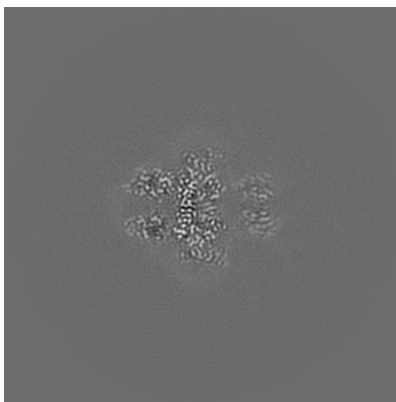
| X Index: 205 | Y Index: 205 | Z Index: 186 |
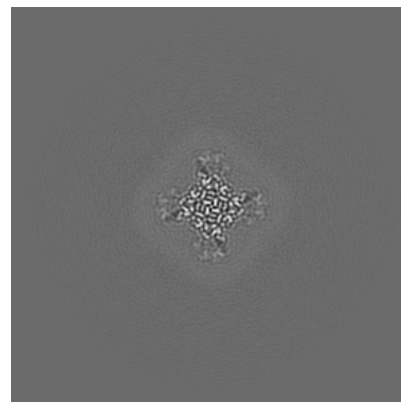
6.3.2 Raw map
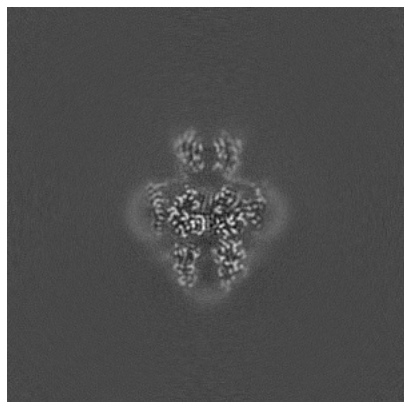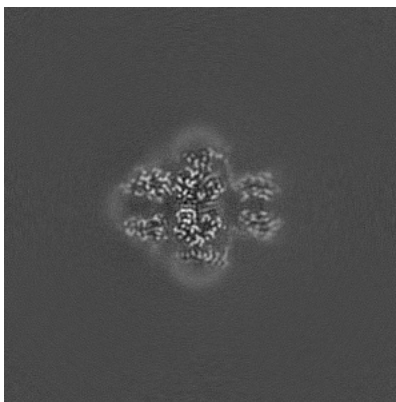
| X Index: 210 | Y Index: 206 | Z Index: 185 |
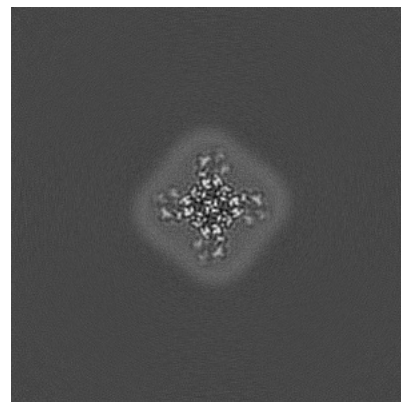
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map
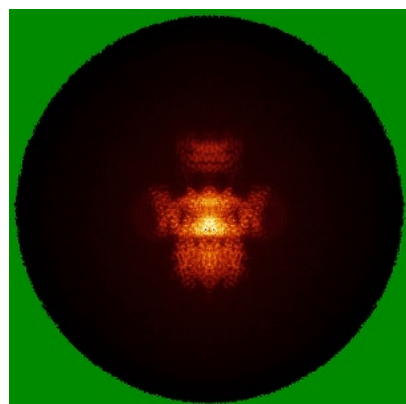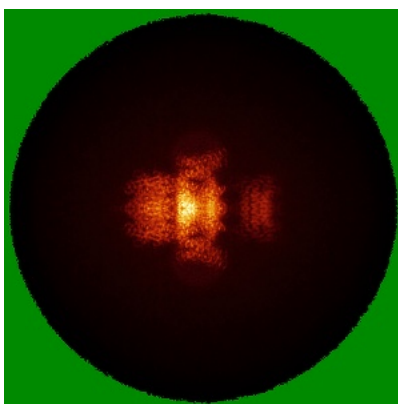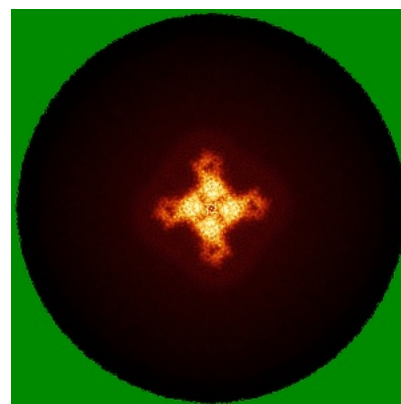
| X | Y | Z |

6.4.2 Raw map

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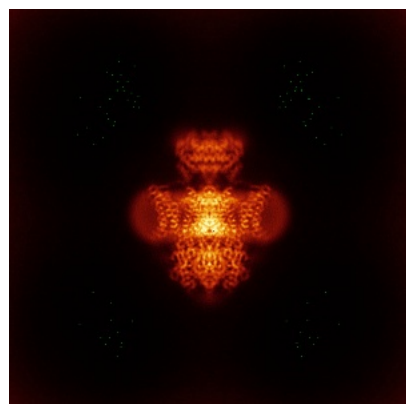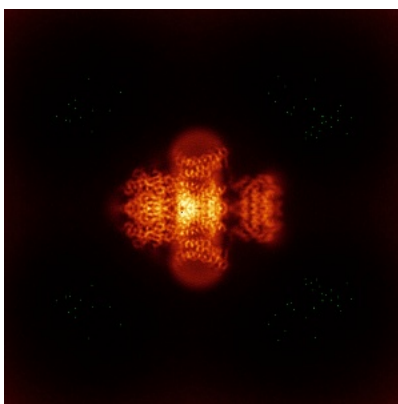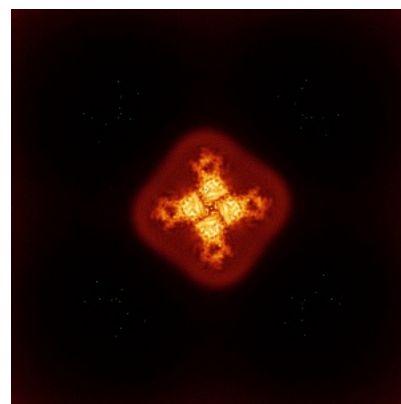
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5   Orthogonal surface views (i)

6.5.1   Primary map

| X | Y | Z |
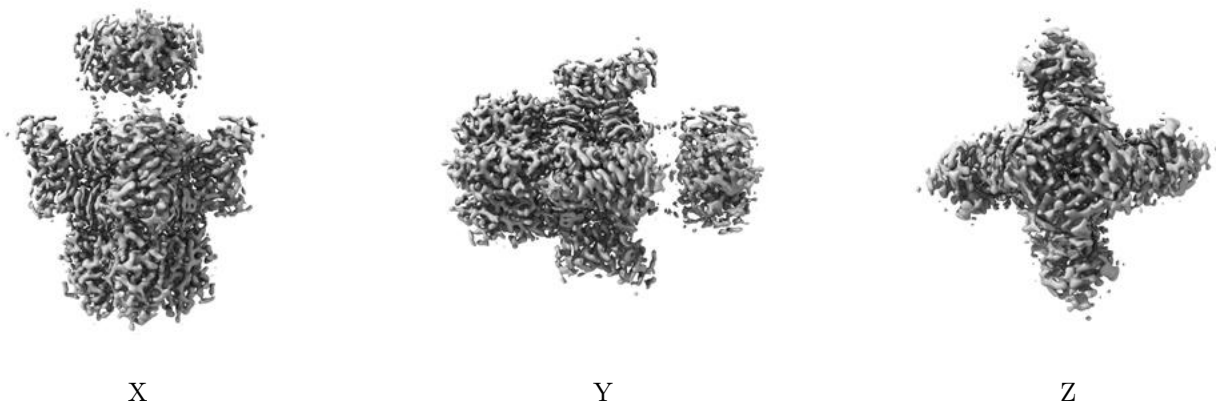
The images above show the 3D surface view of the map at the recommended contour level 0.3. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2   Raw map

| X | Y | Z |
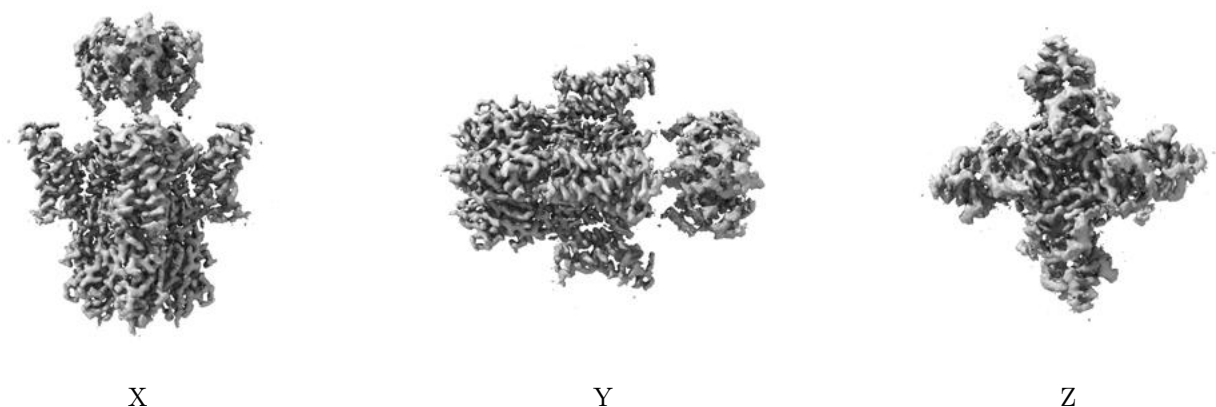
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6   Mask visualisation ⓘ

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_45786_msk_1.map ⓘ

X   Y   Z
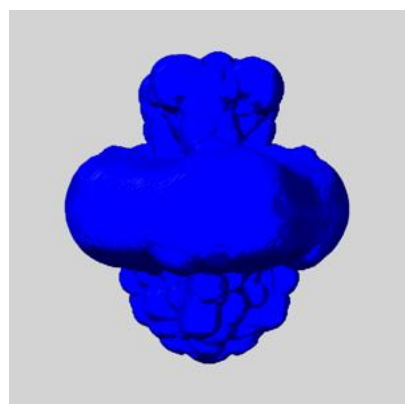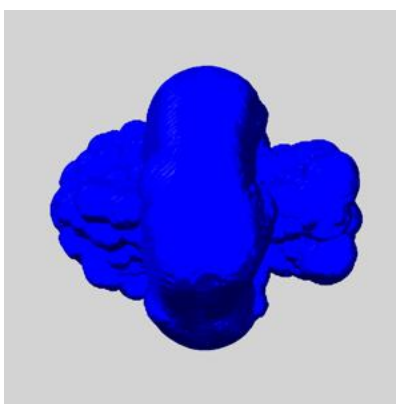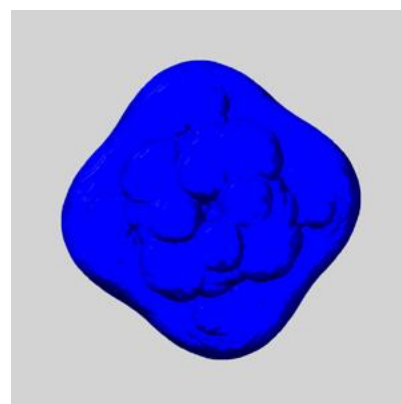
7   Map analysis ⓘ

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

7.1   Map-value distribution ⓘ

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)
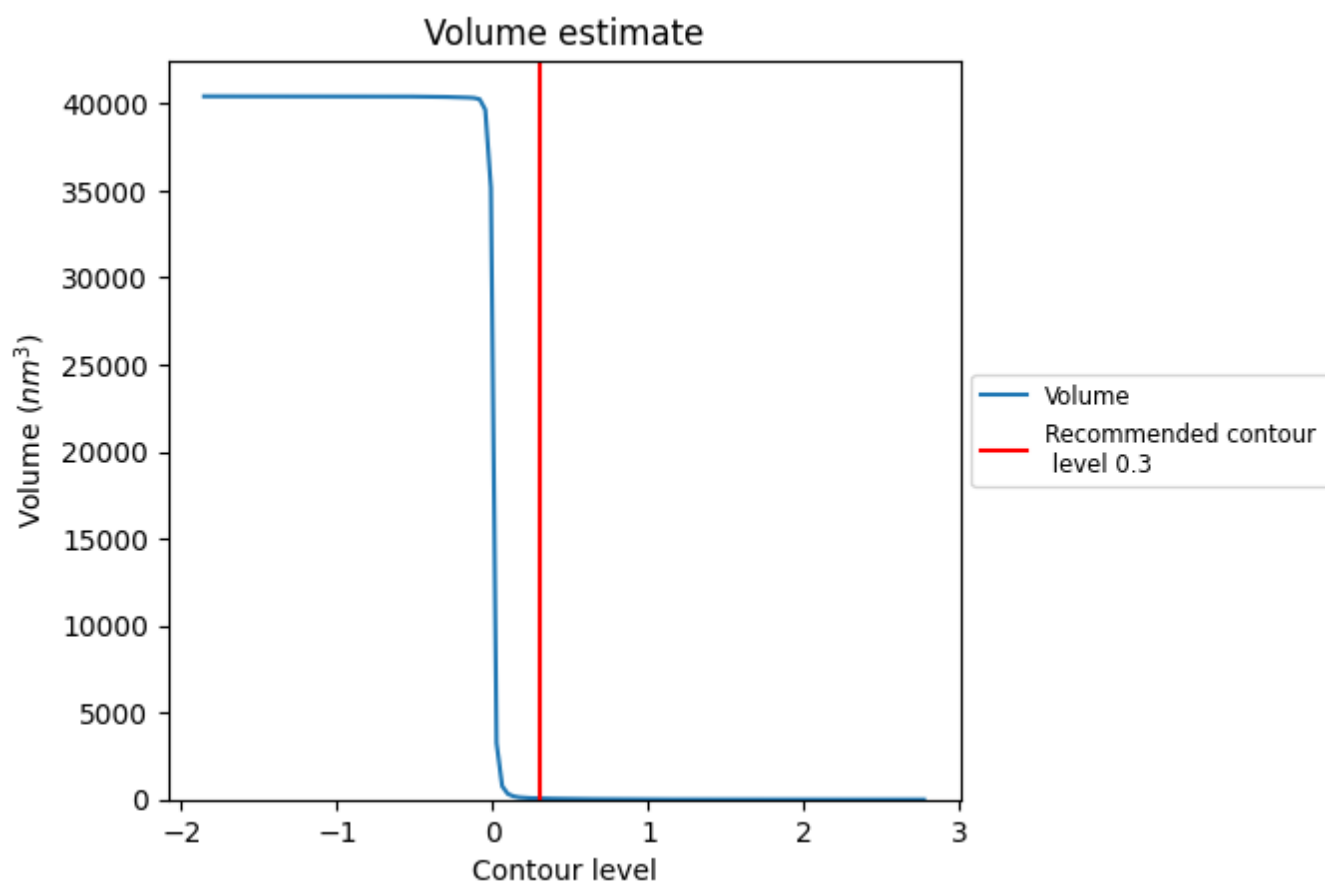
The volume at the recommended contour level is 67 nm^3; this corresponds to an approximate mass of 60 kDa.

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 ⓘ
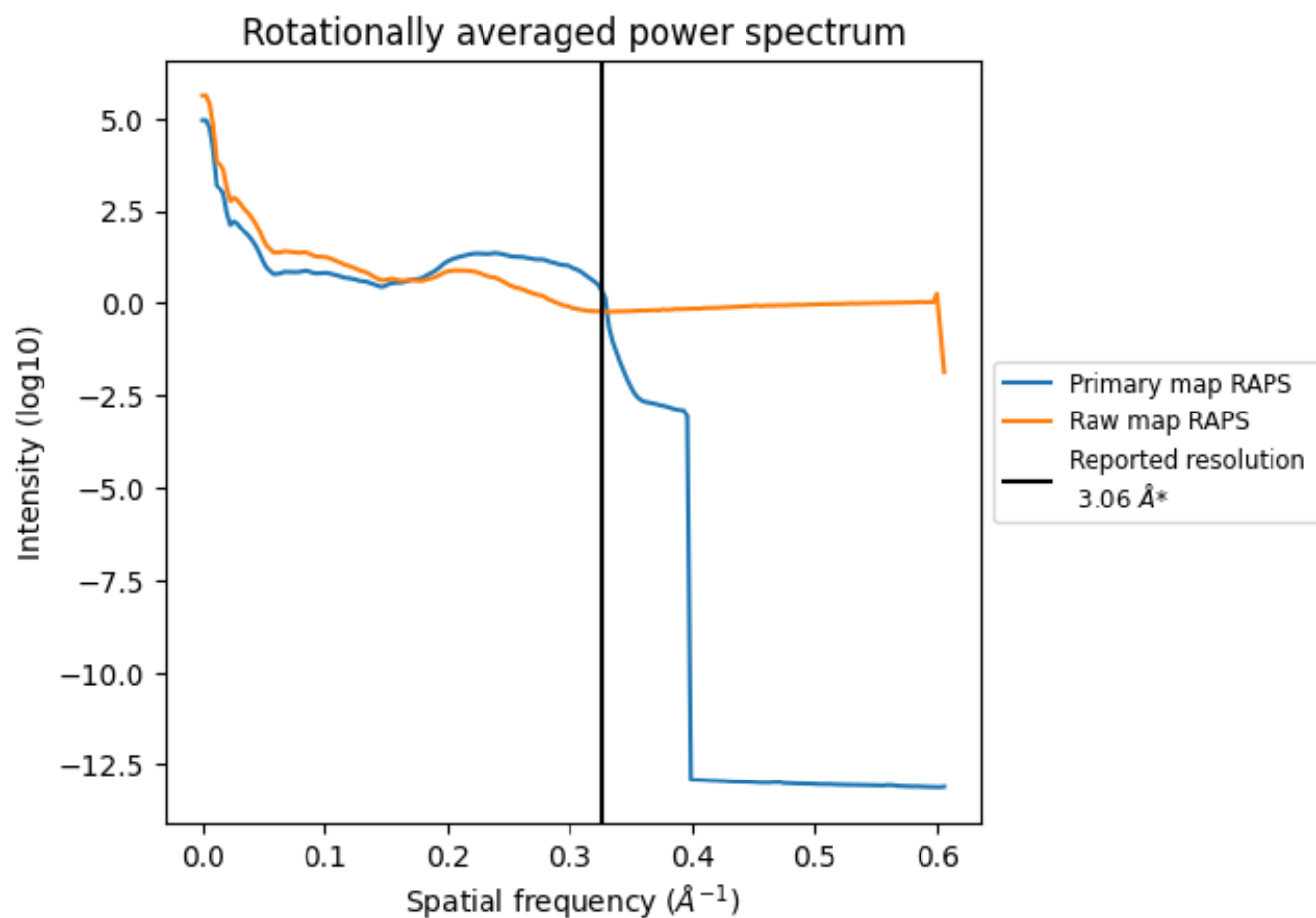
*Reported resolution corresponds to spatial frequency of 0.327 Å^{-1}

8 Fourier-Shell correlation ⓘ

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 ⓘ
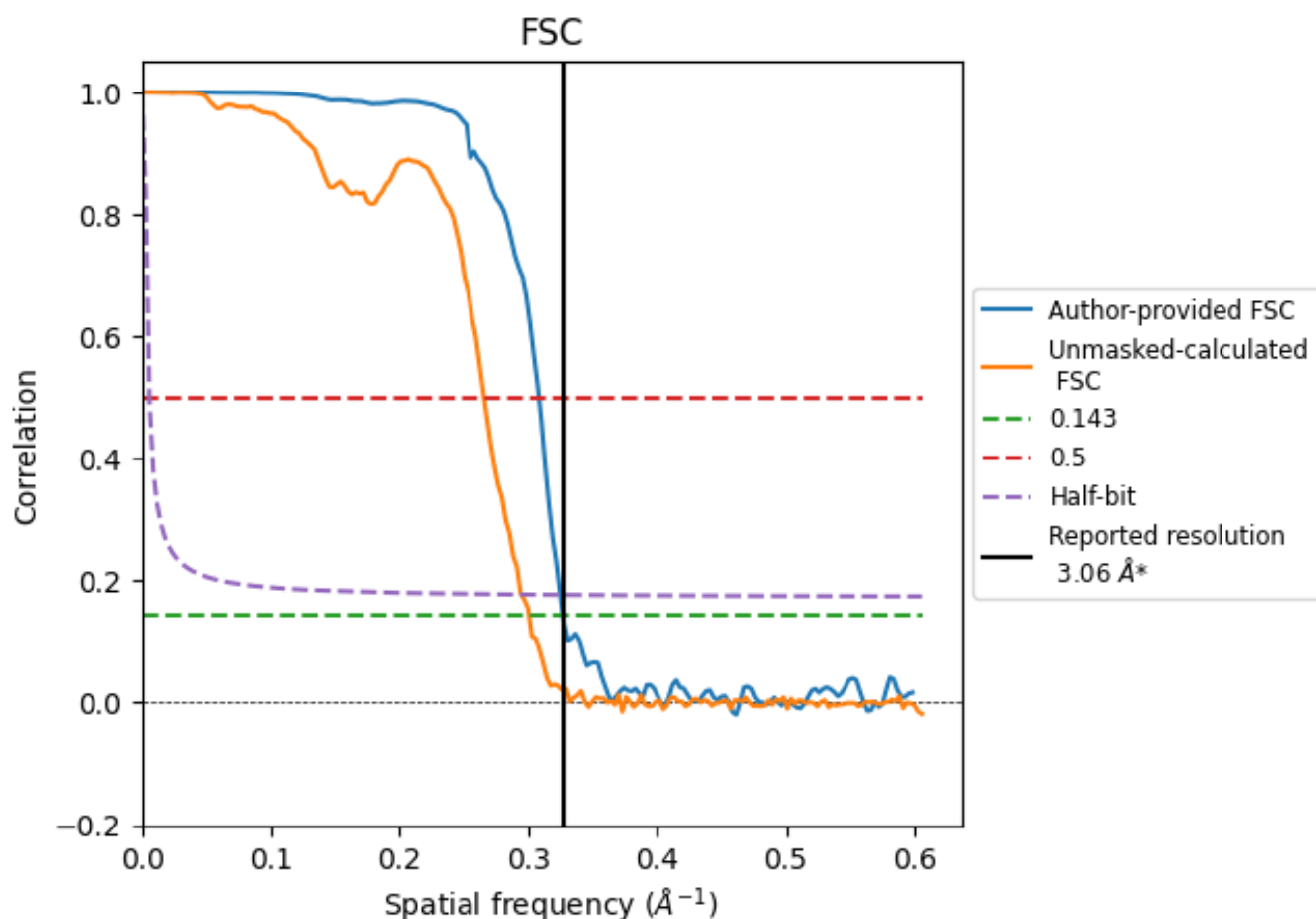
*Reported resolution corresponds to spatial frequency of 0.327 Å^{-1}

8.2   Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.06	-	-
Author-provided FSC curve	3.06	3.24	3.08
Unmasked-calculated*	3.32	3.76	3.39

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

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-45786 and PDB model 9CON. Per-residue inclusion information can be found in section 3 on page 11.

9.1 Map-model overlay ⓘ
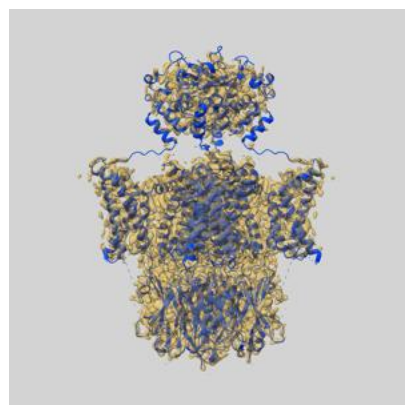
| X | Y | Z |
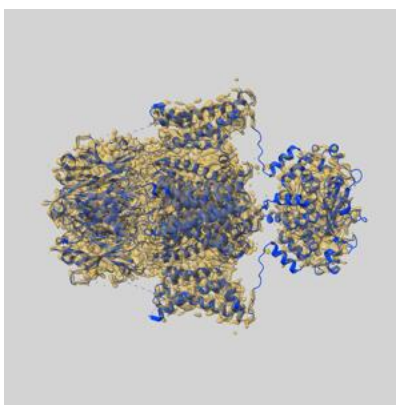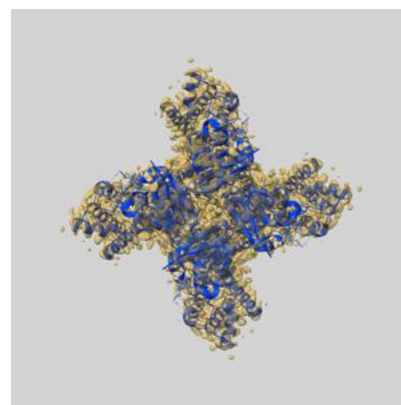
The images above show the 3D surface view of the map at the recommended contour level 0.3 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ

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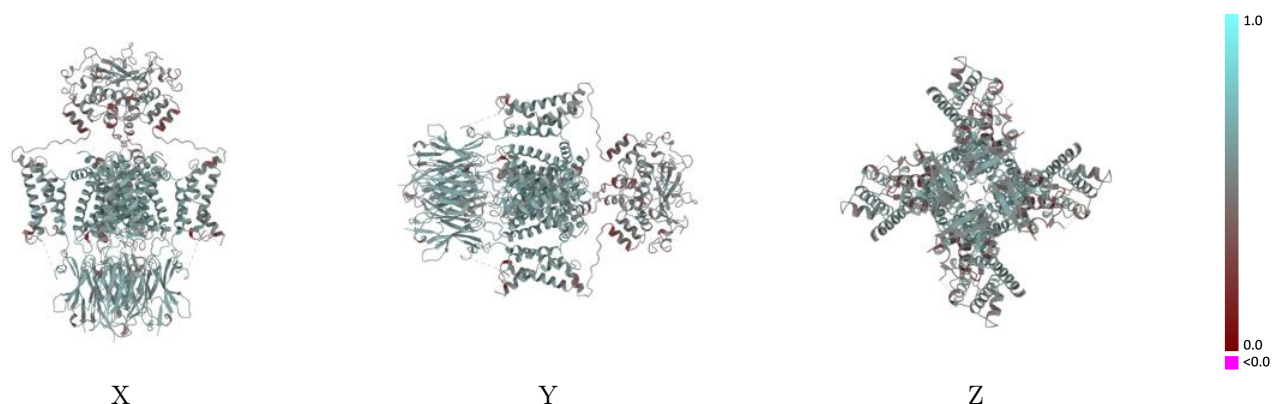
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

X   Y   Z
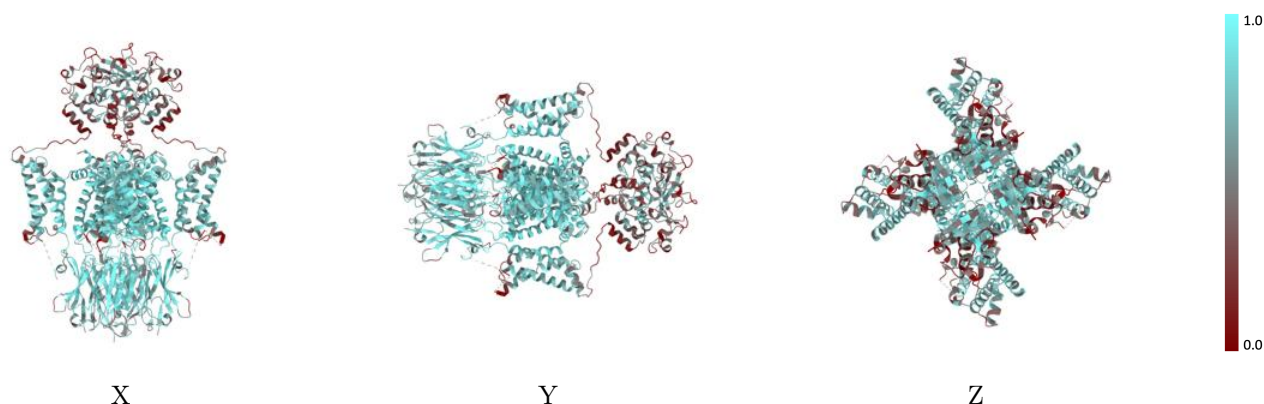
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.3).

9.4 Atom inclusion ⓘ
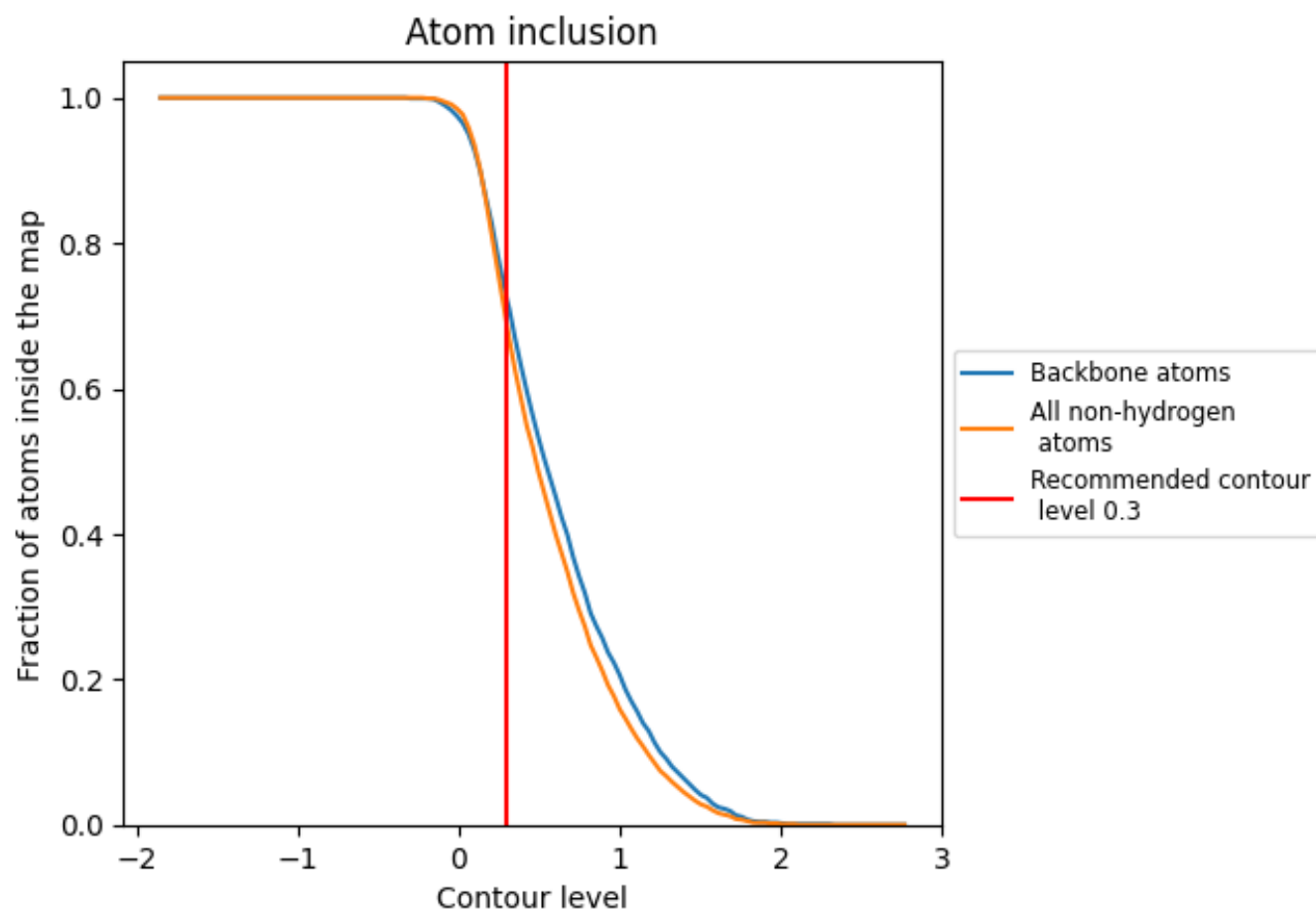
At the recommended contour level, 72% of all backbone atoms, 68% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.3) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6840	0.5410
A	0.6540	0.5320
B	0.6540	0.5320
C	0.6550	0.5310
D	0.6540	0.5300
E	0.7820	0.5720
F	0.7820	0.5720
G	0.7810	0.5740
H	0.7820	0.5720

1.0

0.0
<0.0