



## Full wwPDB EM Validation Report ⓘ

Nov 14, 2022 – 01:05 AM EST

PDB ID : 7JTK  
EMDB ID : EMD-22475  
Title : Radial spoke 1 isolated from Chlamydomonas reinhardtii  
Authors : Gui, M.; Ma, M.; Sze-Tu, E.; Wang, X.; Koh, F.; Zhong, E.; Berger, B.; Davis, J.; Dutcher, S.; Zhang, R.; Brown, A.  
Deposited on : 2020-08-17  
Resolution : 3.20 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

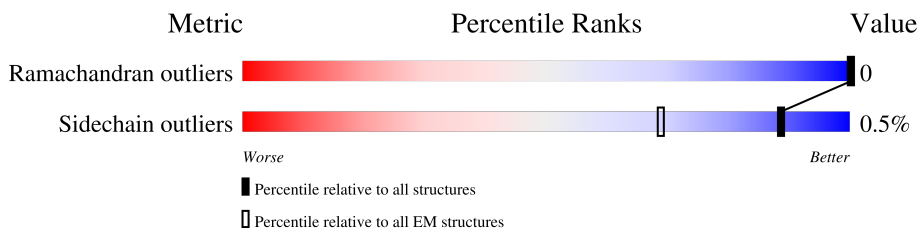
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:  
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.20 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.



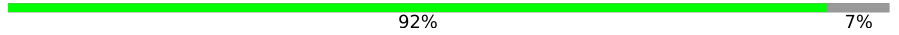
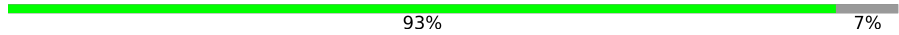
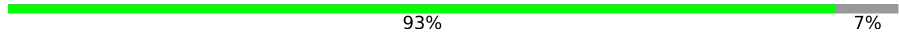


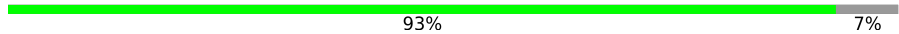
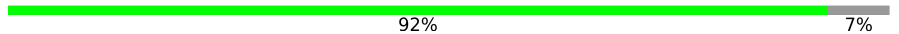
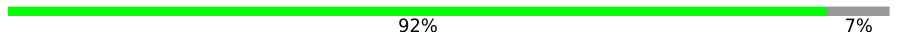
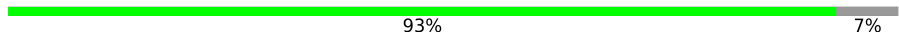
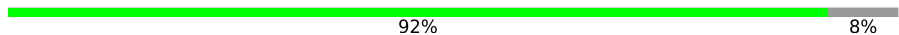
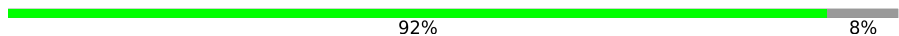



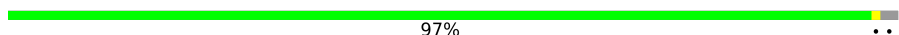








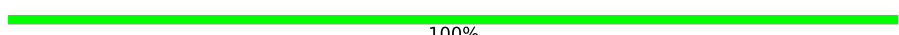

Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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  $\geq 3$ , 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	814	91% 8%
1	B	814	92% 8%
2	C	738	57% 42%
2	D	738	58% 42%
3	E	516	55% 45%
3	F	516	55% 44%
4	G	465	90% 9%
4	H	465	91% 9%
5	I	521	92% 7%


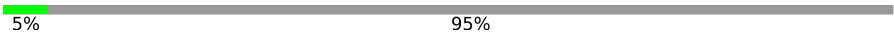


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Mol	Chain	Length	Quality of chain
5	J	521	 92% 7%
6	K	459	 93% 7%
6	L	459	 93% 7%
7	M	500	 9% 91%
7	N	500	 8% 92%
8	O	269	 93% 7%
8	P	269	 92% 7%
8	Q	269	 92% 7%
8	R	269	 93% 7%
9	S	216	 92% 8%
9	T	216	 92% 8%
10	U	204	 24% 76%
10	V	204	 89% 11%
11	W	181	 88% 10%
12	X	387	 97% ..
13	Y	346	 62% 38%
13	Z	346	 62% 38%
13	y	346	 18% 82%
13	z	346	 18% 82%
14	a	91	 92% 8%
14	b	91	 92% 8%
14	c	91	 92% 8%
14	d	91	 92% 8%
15	e	34	 100%
16	i	586	 34% 66%

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Mol	Chain	Length	Quality of chain
16	j	586	 34% 66%
17	k	230	 92% 7%
18	s	682	 5% 95%
19	u	70	 69% 29%
19	v	70	 70% 29%

## 2 Entry composition [i](#)

There are 20 unique types of molecules in this entry. The entry contains 72807 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 Flagellar radial spoke protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	749	Total	C	N	O	S	0	0
			5698	3611	962	1111	14		
1	B	749	Total	C	N	O	S	0	0
			5698	3611	962	1111	14		

- Molecule 2 is a protein called Flagellar radial spoke protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	427	Total	C	N	O	S	0	0
			3248	2048	577	614	9		
2	D	427	Total	C	N	O	S	0	0
			3248	2048	577	614	9		

- Molecule 3 is a protein called Flagellar radial spoke protein 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	E	284	Total	C	N	O	S	0	0
			2216	1378	398	431	9		
3	F	287	Total	C	N	O	S	0	0
			2232	1386	401	436	9		

- Molecule 4 is a protein called Flagellar radial spoke protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	G	421	Total	C	N	O	S	0	0
			3207	2043	535	621	8		
4	H	421	Total	C	N	O	S	0	0
			3207	2043	535	621	8		

- Molecule 5 is a protein called Flagellar radial spoke protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	I	483	Total	C	N	O	S	0	0
			3644	2330	623	679	12		
5	J	483	Total	C	N	O	S	0	0
			3644	2330	623	679	12		

- Molecule 6 is a protein called Flagellar radial spoke protein 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	K	428	Total	C	N	O	S	0	0
			3214	2043	544	614	13		
6	L	428	Total	C	N	O	S	0	0
			3214	2043	544	614	13		

- Molecule 7 is a protein called Flagellar radial spoke protein 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	M	47	Total	C	N	O	S	0	0
			373	243	62	67	1		
7	N	40	Total	C	N	O		0	0
			316	208	53	55			

- Molecule 8 is a protein called Flagellar radial spoke protein 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	O	249	Total	C	N	O	S	0	0
			1930	1233	327	365	5		
8	P	249	Total	C	N	O	S	0	0
			1930	1233	327	365	5		
8	Q	249	Total	C	N	O	S	0	0
			1930	1233	327	365	5		
8	R	249	Total	C	N	O	S	0	0
			1930	1233	327	365	5		

- Molecule 9 is a protein called Flagellar radial spoke protein 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	S	199	Total	C	N	O	S	0	0
			1530	977	257	287	9		
9	T	199	Total	C	N	O	S	0	0
			1530	977	257	287	9		

- Molecule 10 is a protein called Flagellar radial spoke protein 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	U	48	Total	C	N	O	S	0	0
			382	250	64	67	1		
10	V	182	Total	C	N	O	S	0	0
			1055	649	198	206	2		

- Molecule 11 is a protein called Flagellar radial spoke protein 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	W	163	Total	C	N	O	S	0	0
			1241	796	210	231	4		

- Molecule 12 is a protein called Flagellar radial spoke protein 14.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	X	379	Total	C	N	O	S	0	0
			2787	1753	506	518	10		

- Molecule 13 is a protein called Flagellar radial spoke protein 16.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	Y	213	Total	C	N	O	S	0	0
			1693	1092	296	301	4		
13	Z	213	Total	C	N	O	S	0	0
			1693	1092	296	301	4		
13	y	64	Total	C	N	O	S	0	0
			528	335	90	100	3		
13	z	64	Total	C	N	O	S	0	0
			528	335	90	100	3		

- Molecule 14 is a protein called Dynein 8 kDa light chain, flagellar outer arm.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	a	84	Total	C	N	O	S	0	0
			686	442	115	125	4		
14	b	84	Total	C	N	O	S	0	0
			686	442	115	125	4		
14	c	84	Total	C	N	O	S	0	0
			686	442	115	125	4		
14	d	84	Total	C	N	O	S	0	0
			686	442	115	125	4		

- Molecule 15 is a protein called Unknown protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
15	e	34	Total	C	N	O	0	0
			170	102	34	34		

- Molecule 16 is a protein called Flagellar radial spoke protein 23.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	i	201	Total	C	N	O	S	0	0
			1558	1010	267	276	5		
16	j	201	Total	C	N	O	S	0	0
			1558	1010	267	276	5		

- Molecule 17 is a protein called Cytochrome b5 heme-binding domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	k	213	Total	C	N	O	S	0	0
			1756	1130	299	320	7		

- Molecule 18 is a protein called Uncharacterized protein.

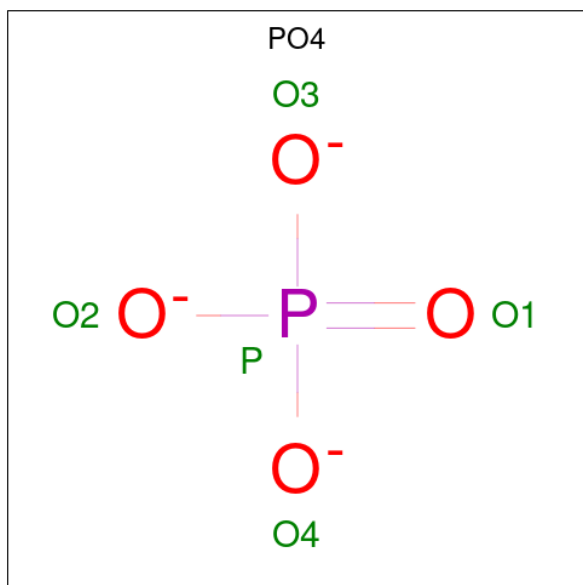
Mol	Chain	Residues	Atoms					AltConf	Trace
18	s	37	Total	C	N	O	S	0	0
			301	183	57	60	1		

- Molecule 19 is a protein called Predicted protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	u	50	Total	C	N	O	S	0	0
			427	273	73	78	3		
19	v	50	Total	C	N	O	S	0	0
			427	273	73	78	3		

- Molecule 20 is PHOSPHATE ION (three-letter code: PO4) (formula: O<sub>4</sub>P).





Mol	Chain	Residues	Atoms			AltConf
20	G	1	Total	O	P	0
			5	4	1	
20	H	1	Total	O	P	0
			5	4	1	
20	K	1	Total	O	P	0
			5	4	1	
20	L	1	Total	O	P	0
			5	4	1	









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

● Molecule 8: Flagellar radial spoke protein 9



MET	V2	E123	GLU	LYS	ASP	PRO	ASN	ALA	PRO	PRO	GLU	PRO	SER	PRO	GLU	GLU	GLU	VAL	LYS	PRO	L143	L269
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● Molecule 8: Flagellar radial spoke protein 9



MET	V2	E123	GLU	LYS	ASP	PRO	ASN	ALA	PRO	GLU	PRO	SER	PRO	GLU	GLU	GLU	VAL	LYS	PRO	L143	F202	L269
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● Molecule 8: Flagellar radial spoke protein 9



MET	V2	L112	E123	GLU	LYS	ASP	PRO	ASN	PRO	ALA	PRO	GLU	PRO	GLU	GLU	GLU	VAL	LYS	PRO	L143	L269
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● Molecule 8: Flagellar radial spoke protein 9



MET	V2	E123	GLU	LYS	ASP	PRO	ASN	ALA	PRO	GLU	PRO	SER	PRO	GLU	GLU	GLU	VAL	LYS	PRO	L143	L269
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● Molecule 9: Flagellar radial spoke protein 10



MET	ALA	ASP	ASP	GLU	LEU	PRO	P8	P33	PRO	MET	GLY	GLU	ASP	ASP	GLU	GLU	K43	K167	V215	ALA
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● Molecule 9: Flagellar radial spoke protein 10



MET	ALA	ASP	ASP	GLU	LEU	PRO	P8	P33	PRO	MET	GLY	GLU	ASP	ASP	GLU	GLU	K43	A173	V215	ALA
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Chain b:  92% 8%

MET ALA SER GLY SER SER K7 S90 GLY

- Molecule 14: Dynein 8 kDa light chain, flagellar outer arm

Chain c:  92% 8%

MET ALA SER GLY SER SER K7 S90 GLY

- Molecule 14: Dynein 8 kDa light chain, flagellar outer arm

Chain d:  92% 8%

MET ALA SER GLY SER SER K7 S90 GLY

- Molecule 15: Unknown protein

Chain e:  100%

There are no outlier residues recorded for this chain.

- Molecule 16: Flagellar radial spoke protein 23

Chain i:  34% 66%

MET ALA L4 K56 K204  
PRO ASP TRP ASP PRO ALA MET GLY VAL ASP ASP  
GLU ASP ASP ASP ASP ASP ASP ASP ASP ASP ASP  
PHE ILE ASN ALA ARG LEU ALA ALA ALA ALA ALA  
THR THR THR THR THR THR THR THR THR THR THR  
SER ASN GLY ASP GLY THR LYS LYS LYS LYS LYS  
LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU  
GLN ASP THR THR THR THR THR THR THR THR THR  
VAL VAL VAL VAL VAL VAL VAL VAL VAL VAL VAL  
GLU LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU  
GLY ASP THR THR THR THR THR THR THR THR THR  
SER ASP TRP ASP PRO ALA MET GLY VAL ASP ASP  
GLU ASP ASP ASP ASP ASP ASP ASP ASP ASP ASP  
PHE ILE ASN ALA ARG LEU ALA ALA ALA ALA ALA  
THR THR THR THR THR THR THR THR THR THR THR  
SER ASN GLY ASP GLY THR LYS LYS LYS LYS LYS  
LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU  
GLN ASP THR THR THR THR THR THR THR THR THR  
VAL VAL VAL VAL VAL VAL VAL VAL VAL VAL VAL  
GLU LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU  
GLY ASP THR THR THR THR THR THR THR THR THR  
SER ASP TRP ASP PRO ALA MET GLY VAL ASP ASP  
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GLU ASP ASP ASP ASP ASP ASP ASP ASP ASP ASP  
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SER ASN GLY ASP GLY THR LYS LYS LYS LYS LYS  
LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU  
GLN ASP THR THR THR THR THR THR THR THR THR  
VAL VAL VAL VAL VAL VAL VAL VAL VAL VAL VAL  
GLU LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU  
GLY ASP THR THR THR THR THR THR THR THR THR  
SER ASP TRP ASP PRO ALA MET GLY VAL ASP ASP

- Molecule 16: Flagellar radial spoke protein 23

Chain j:  34% 66%



THR  
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ASP  
LEU  
ARG  
LEU  
THR  
LYS  
ILE  
ASN  
ALA  
ASN  
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• Molecule 19: Predicted protein



MET  
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PRO  
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HIS  
GLY  
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ALA  
ALA  
Q17  
T18  
R66  
SER  
GLY  
THR  
ALA

• Molecule 19: Predicted protein



MET  
SER  
SER  
GLN  
TYR  
SER  
GLU  
SER  
ARG  
PRO  
LEU  
HIS  
GLY  
SER  
ALA  
ALA  
Q17  
Q38  
R66  
SER  
GLY  
THR  
ALA

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	221836	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	60	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	81000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.077	Depositor
Minimum map value	0.000	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.006	Depositor
Map size (Å)	610.4, 610.4, 610.4	wwPDB
Map dimensions	560, 560, 560	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.09, 1.09, 1.09	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: PO4

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	0.35	0/5844	0.52	0/7949
1	B	0.33	0/5844	0.51	0/7949
2	C	0.36	0/3301	0.48	0/4467
2	D	0.29	0/3301	0.44	0/4467
3	E	0.28	0/2239	0.44	0/3018
3	F	0.36	0/2255	0.47	0/3039
4	G	0.30	0/3289	0.47	0/4493
4	H	0.33	0/3289	0.49	0/4493
5	I	0.29	0/3733	0.44	0/5092
5	J	0.31	0/3733	0.45	0/5092
6	K	0.29	0/3305	0.44	0/4527
6	L	0.29	0/3305	0.45	0/4527
7	M	0.27	0/383	0.42	0/517
7	N	0.27	0/325	0.41	0/439
8	O	0.31	0/1971	0.46	0/2681
8	P	0.30	0/1971	0.46	0/2681
8	Q	0.30	0/1971	0.45	0/2681
8	R	0.29	0/1971	0.47	0/2681
9	S	0.31	0/1585	0.47	0/2140
9	T	0.30	0/1585	0.49	0/2140
10	U	0.27	0/390	0.41	0/530
10	V	0.26	0/1059	0.43	0/1453
11	W	0.33	0/1273	0.51	0/1737
12	X	0.31	0/2830	0.49	0/3851
13	Y	0.26	0/1736	0.43	0/2352
13	Z	0.26	0/1736	0.43	0/2352
13	y	0.26	0/539	0.39	0/726
13	z	0.29	0/539	0.42	0/726
14	a	0.31	0/702	0.50	0/945
14	b	0.32	0/702	0.53	0/945
14	c	0.32	0/702	0.56	0/945
14	d	0.27	0/702	0.52	0/945

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
16	i	0.26	0/1594	0.43	0/2157
16	j	0.31	0/1594	0.46	0/2157
17	k	0.32	0/1813	0.49	0/2482
18	s	0.25	0/305	0.47	0/411
19	u	0.35	0/437	0.46	0/589
19	v	0.32	0/437	0.46	0/589
All	All	0.31	0/74290	0.47	0/100965

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	199	LEU	Mainchain

## 5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 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	741/814 (91%)	710 (96%)	31 (4%)	0	100	100
1	B	741/814 (91%)	713 (96%)	28 (4%)	0	100	100
2	C	421/738 (57%)	417 (99%)	4 (1%)	0	100	100
2	D	421/738 (57%)	411 (98%)	10 (2%)	0	100	100
3	E	278/516 (54%)	276 (99%)	2 (1%)	0	100	100
3	F	281/516 (54%)	278 (99%)	3 (1%)	0	100	100
4	G	417/465 (90%)	396 (95%)	21 (5%)	0	100	100
4	H	417/465 (90%)	400 (96%)	17 (4%)	0	100	100
5	I	477/521 (92%)	466 (98%)	11 (2%)	0	100	100
5	J	477/521 (92%)	464 (97%)	13 (3%)	0	100	100
6	K	422/459 (92%)	413 (98%)	9 (2%)	0	100	100
6	L	422/459 (92%)	415 (98%)	7 (2%)	0	100	100
7	M	45/500 (9%)	42 (93%)	3 (7%)	0	100	100
7	N	38/500 (8%)	37 (97%)	1 (3%)	0	100	100
8	O	245/269 (91%)	237 (97%)	8 (3%)	0	100	100
8	P	245/269 (91%)	238 (97%)	7 (3%)	0	100	100
8	Q	245/269 (91%)	240 (98%)	5 (2%)	0	100	100
8	R	245/269 (91%)	239 (98%)	6 (2%)	0	100	100
9	S	195/216 (90%)	190 (97%)	5 (3%)	0	100	100
9	T	195/216 (90%)	187 (96%)	8 (4%)	0	100	100
10	U	46/204 (22%)	45 (98%)	1 (2%)	0	100	100
10	V	172/204 (84%)	167 (97%)	5 (3%)	0	100	100
11	W	161/181 (89%)	150 (93%)	11 (7%)	0	100	100
12	X	377/387 (97%)	359 (95%)	18 (5%)	0	100	100
13	Y	211/346 (61%)	206 (98%)	5 (2%)	0	100	100
13	Z	211/346 (61%)	206 (98%)	5 (2%)	0	100	100
13	y	62/346 (18%)	62 (100%)	0	0	100	100
13	z	62/346 (18%)	61 (98%)	1 (2%)	0	100	100
14	a	82/91 (90%)	80 (98%)	2 (2%)	0	100	100
14	b	82/91 (90%)	75 (92%)	7 (8%)	0	100	100
14	c	82/91 (90%)	74 (90%)	8 (10%)	0	100	100
14	d	82/91 (90%)	78 (95%)	4 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
16	i	199/586 (34%)	190 (96%)	9 (4%)	0	100	100
16	j	199/586 (34%)	186 (94%)	13 (6%)	0	100	100
17	k	209/230 (91%)	202 (97%)	7 (3%)	0	100	100
18	s	35/682 (5%)	33 (94%)	2 (6%)	0	100	100
19	u	48/70 (69%)	46 (96%)	2 (4%)	0	100	100
19	v	48/70 (69%)	46 (96%)	2 (4%)	0	100	100
All	All	9336/14482 (64%)	9035 (97%)	301 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 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	586/640 (92%)	581 (99%)	5 (1%)	78	91
1	B	586/640 (92%)	583 (100%)	3 (0%)	88	95
2	C	320/517 (62%)	317 (99%)	3 (1%)	78	91
2	D	320/517 (62%)	320 (100%)	0	100	100
3	E	223/406 (55%)	222 (100%)	1 (0%)	91	95
3	F	225/406 (55%)	224 (100%)	1 (0%)	91	95
4	G	342/371 (92%)	341 (100%)	1 (0%)	92	96
4	H	342/371 (92%)	342 (100%)	0	100	100
5	I	376/403 (93%)	373 (99%)	3 (1%)	81	93
5	J	376/403 (93%)	374 (100%)	2 (0%)	88	95
6	K	334/357 (94%)	334 (100%)	0	100	100
6	L	334/357 (94%)	334 (100%)	0	100	100
7	M	39/406 (10%)	39 (100%)	0	100	100
7	N	32/406 (8%)	32 (100%)	0	100	100
8	O	203/221 (92%)	203 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
8	P	203/221 (92%)	202 (100%)	1 (0%)	88	95
8	Q	203/221 (92%)	202 (100%)	1 (0%)	88	95
8	R	203/221 (92%)	203 (100%)	0	100	100
9	S	150/164 (92%)	149 (99%)	1 (1%)	84	94
9	T	150/164 (92%)	150 (100%)	0	100	100
10	U	41/162 (25%)	41 (100%)	0	100	100
10	V	46/162 (28%)	46 (100%)	0	100	100
11	W	136/152 (90%)	132 (97%)	4 (3%)	42	74
12	X	281/288 (98%)	278 (99%)	3 (1%)	73	88
13	Y	189/297 (64%)	189 (100%)	0	100	100
13	Z	189/297 (64%)	189 (100%)	0	100	100
13	y	54/297 (18%)	54 (100%)	0	100	100
13	z	54/297 (18%)	54 (100%)	0	100	100
14	a	72/76 (95%)	72 (100%)	0	100	100
14	b	72/76 (95%)	72 (100%)	0	100	100
14	c	72/76 (95%)	72 (100%)	0	100	100
14	d	72/76 (95%)	72 (100%)	0	100	100
16	i	158/433 (36%)	157 (99%)	1 (1%)	86	94
16	j	158/433 (36%)	157 (99%)	1 (1%)	86	94
17	k	191/204 (94%)	189 (99%)	2 (1%)	76	90
18	s	33/553 (6%)	33 (100%)	0	100	100
19	u	47/62 (76%)	45 (96%)	2 (4%)	29	64
19	v	47/62 (76%)	46 (98%)	1 (2%)	53	79
All	All	7459/11415 (65%)	7423 (100%)	36 (0%)	89	95

All (36) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	199	LEU
1	A	297	ARG
1	A	459	ASP
1	A	470	VAL
1	A	477	ILE
1	B	118	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	B	199	LEU
1	B	297	ARG
2	C	247	LEU
2	C	533	ASP
2	C	535	THR
3	E	187	ARG
3	F	278	PHE
4	G	366	GLU
5	I	101	ARG
5	I	185	TRP
5	I	190	LEU
5	J	265	ARG
5	J	419	LEU
8	P	202	PHE
8	Q	112	LEU
9	S	167	LYS
11	W	126	SER
11	W	131	LEU
11	W	176	ILE
11	W	178	ASN
12	X	32	THR
12	X	205	ILE
12	X	370	PHE
16	i	56	LYS
16	j	161	ILE
17	k	88	MET
17	k	92	ILE
19	u	17	GLN
19	u	18	THR
19	v	38	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	198	GLN
1	A	290	ASN
1	A	479	GLN
1	A	487	GLN
1	B	290	ASN
2	C	302	GLN
2	D	32	GLN
3	E	285	GLN

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Mol	Chain	Res	Type
4	G	329	GLN
5	I	288	GLN
5	I	358	GLN
5	J	183	GLN
5	J	423	ASN
6	K	309	GLN
8	R	183	ASN
9	S	54	HIS
11	W	113	GLN
11	W	178	ASN
12	X	233	HIS
12	X	367	GLN
13	Y	236	HIS
13	Z	216	HIS
14	b	57	HIS
14	d	57	HIS
17	k	45	GLN
19	v	31	ASN
19	v	34	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

### 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

4 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
20	PO4	G	501	-	4,4,4	0.96	0	6,6,6	0.44	0
20	PO4	H	501	-	4,4,4	0.95	0	6,6,6	0.41	0
20	PO4	K	501	-	4,4,4	0.96	0	6,6,6	0.43	0
20	PO4	L	501	-	4,4,4	0.96	0	6,6,6	0.44	0

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 [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

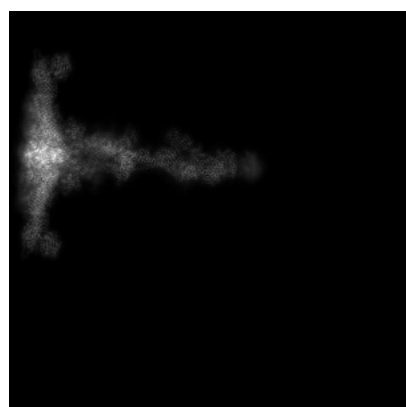
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-22475. These allow visual inspection of the internal detail of the map and identification of artifacts.

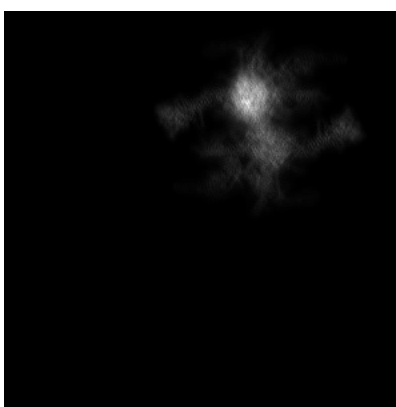
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

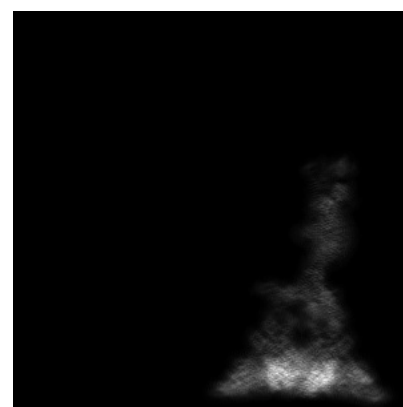
#### 6.1.1 Primary map



X



Y

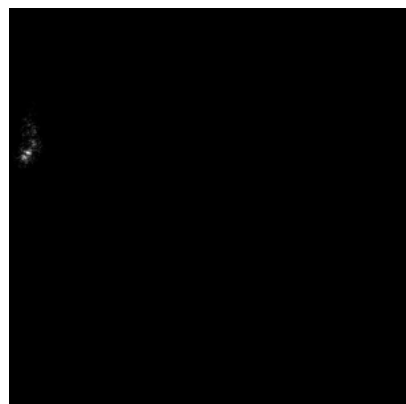


Z

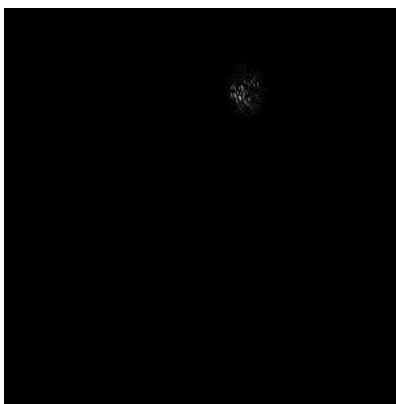
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

#### 6.2.1 Primary map



X Index: 280



Y Index: 280

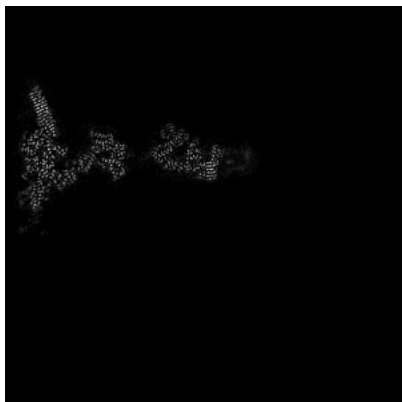


Z Index: 280

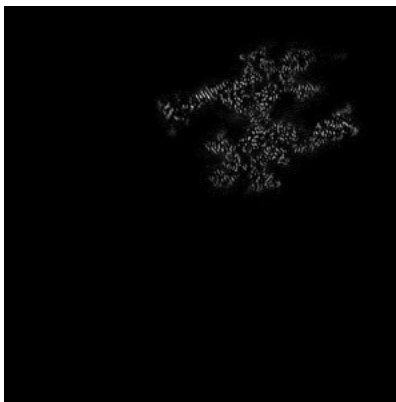
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

### 6.3.1 Primary map



X Index: 443



Y Index: 48

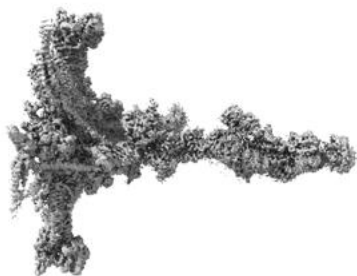


Z Index: 355

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

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.006. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

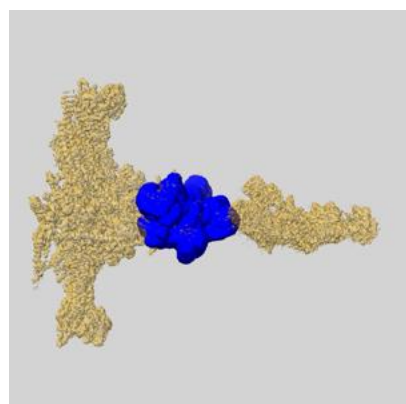
## 6.5 Mask visualisation [i](#)

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

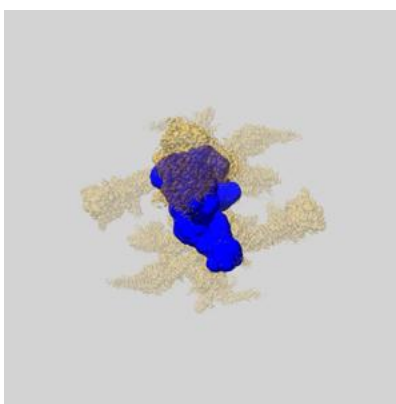
A mask typically either:

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

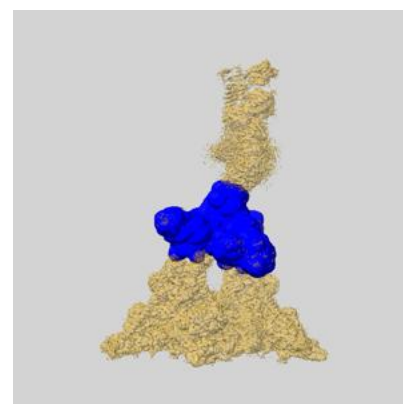
### 6.5.1 emd\_22475\_msk\_3.map [i](#)



X

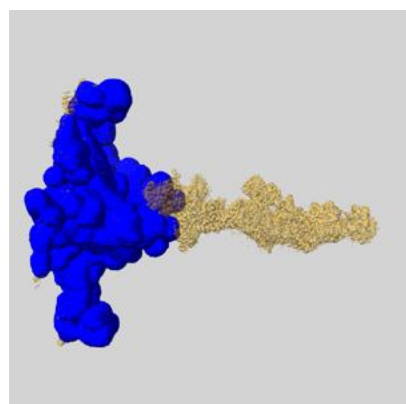


Y

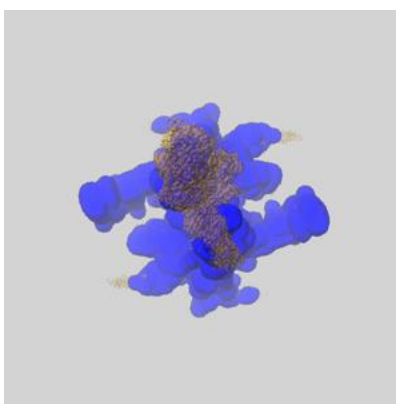


Z

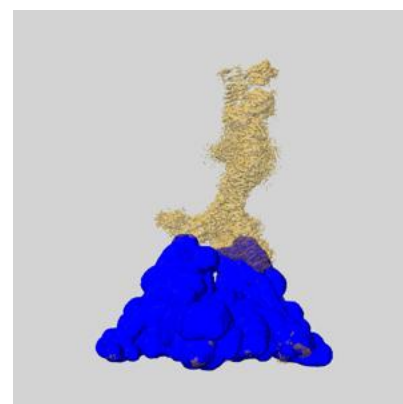
### 6.5.2 emd\_22475\_msk\_2.map [i](#)



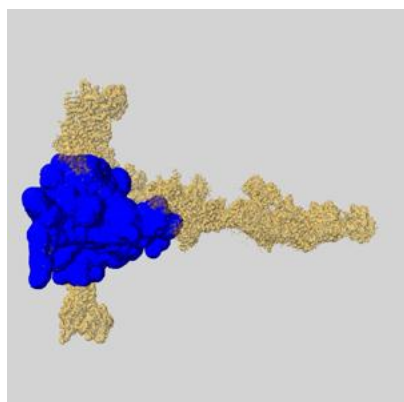
X



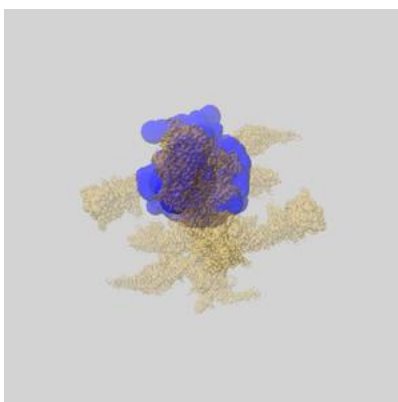
Y



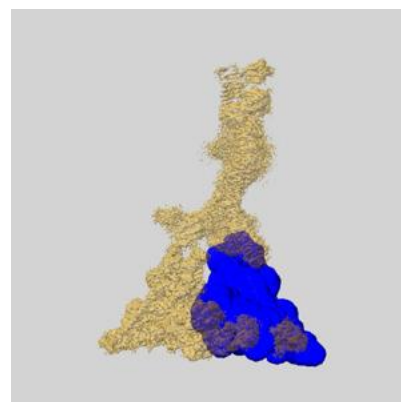
Z

6.5.3 emd\_22475\_msk\_5.map [i](#)

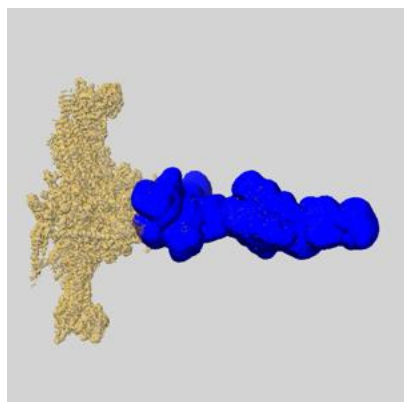
X



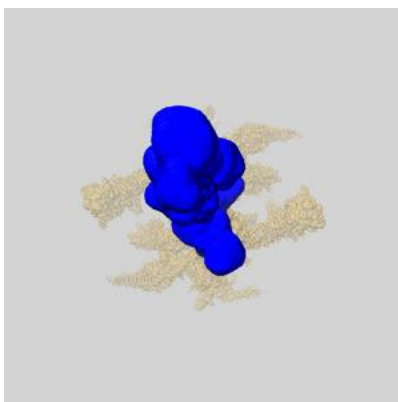
Y



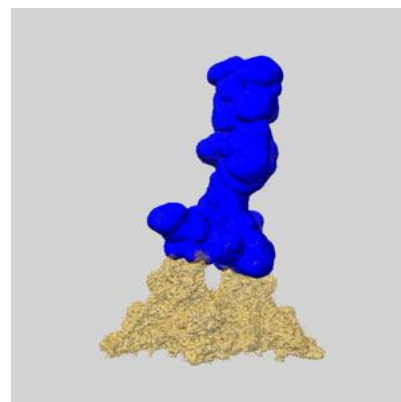
Z

6.5.4 emd\_22475\_msk\_4.map [i](#)

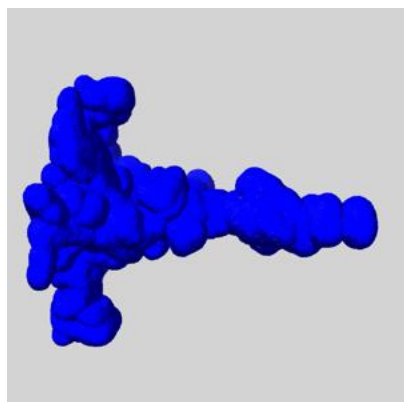
X



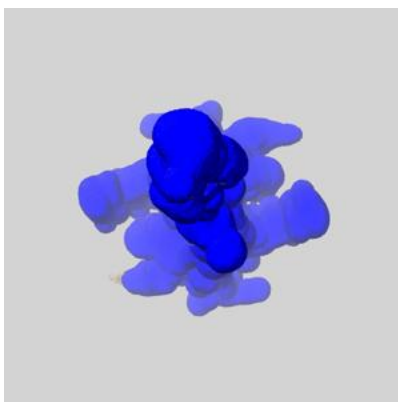
Y



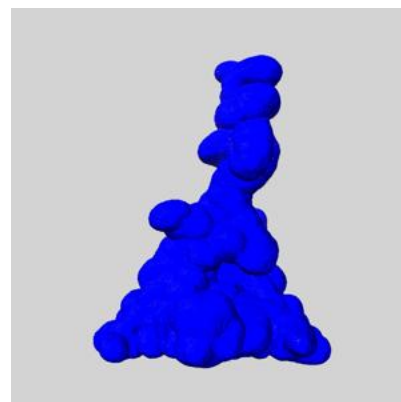
Z

6.5.5 emd\_22475\_msk\_1.map [i](#)

X

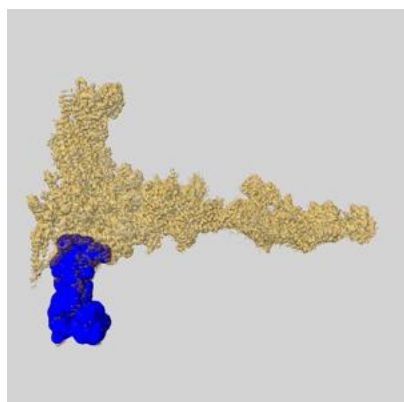


Y

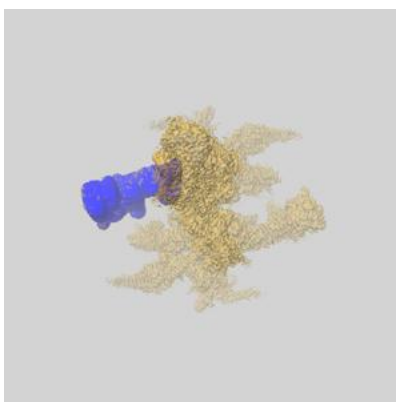


Z

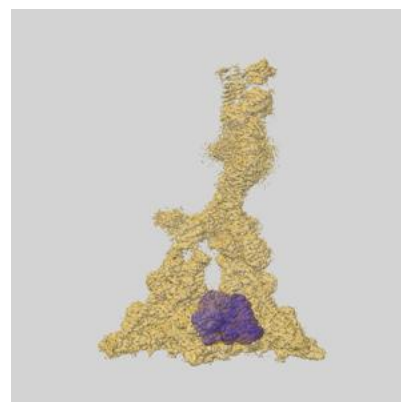


6.5.6 emd\_22475\_msk\_7.map [i](#)

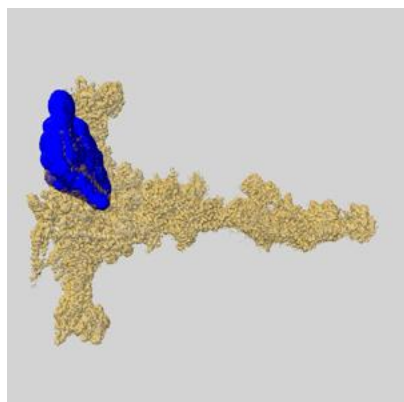
X



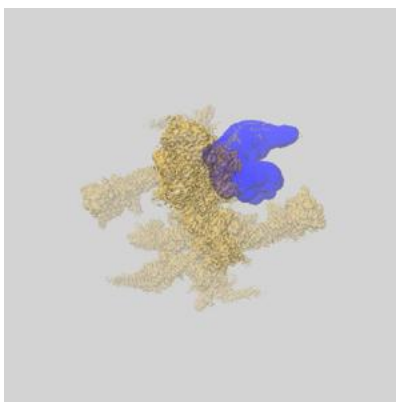
Y



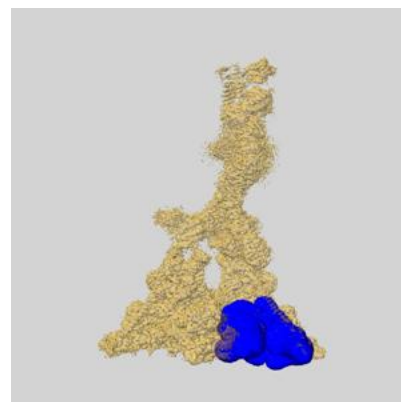
Z

6.5.7 emd\_22475\_msk\_6.map [i](#)

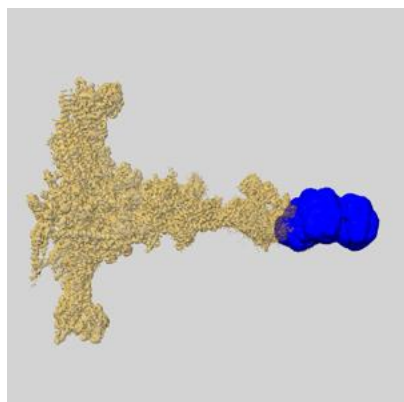
X



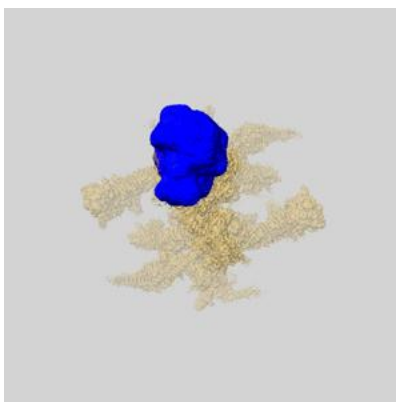
Y



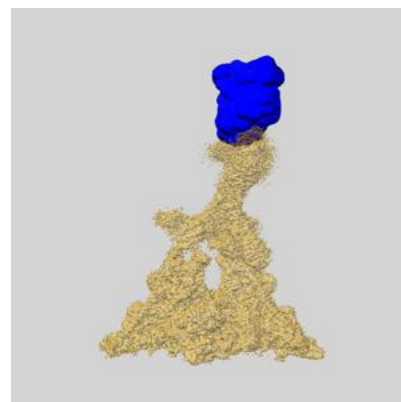
Z

6.5.8 emd\_22475\_msk\_8.map [i](#)

X



Y

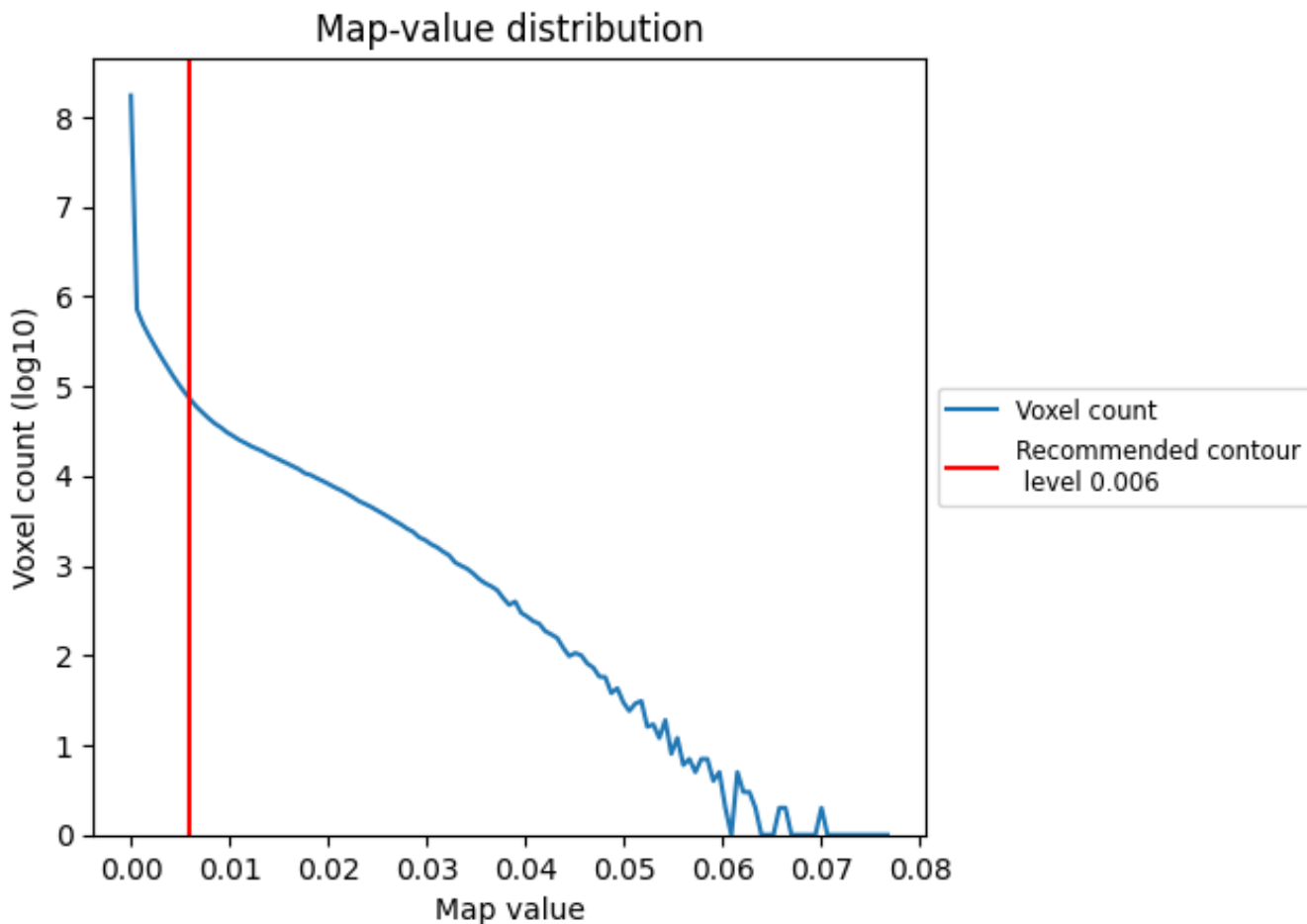


Z

## 7 Map analysis [i](#)

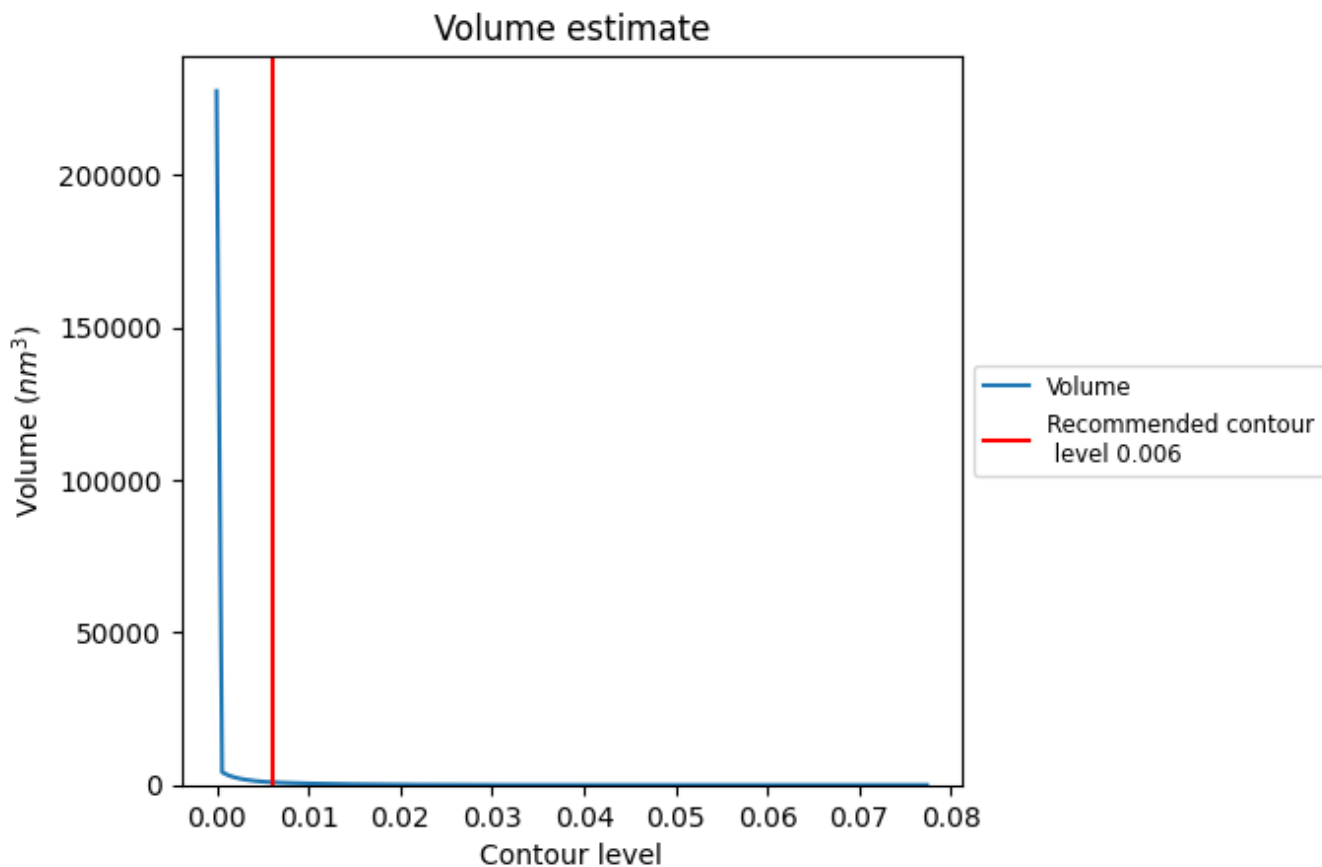
This section contains the results of statistical analysis of the map.

### 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.

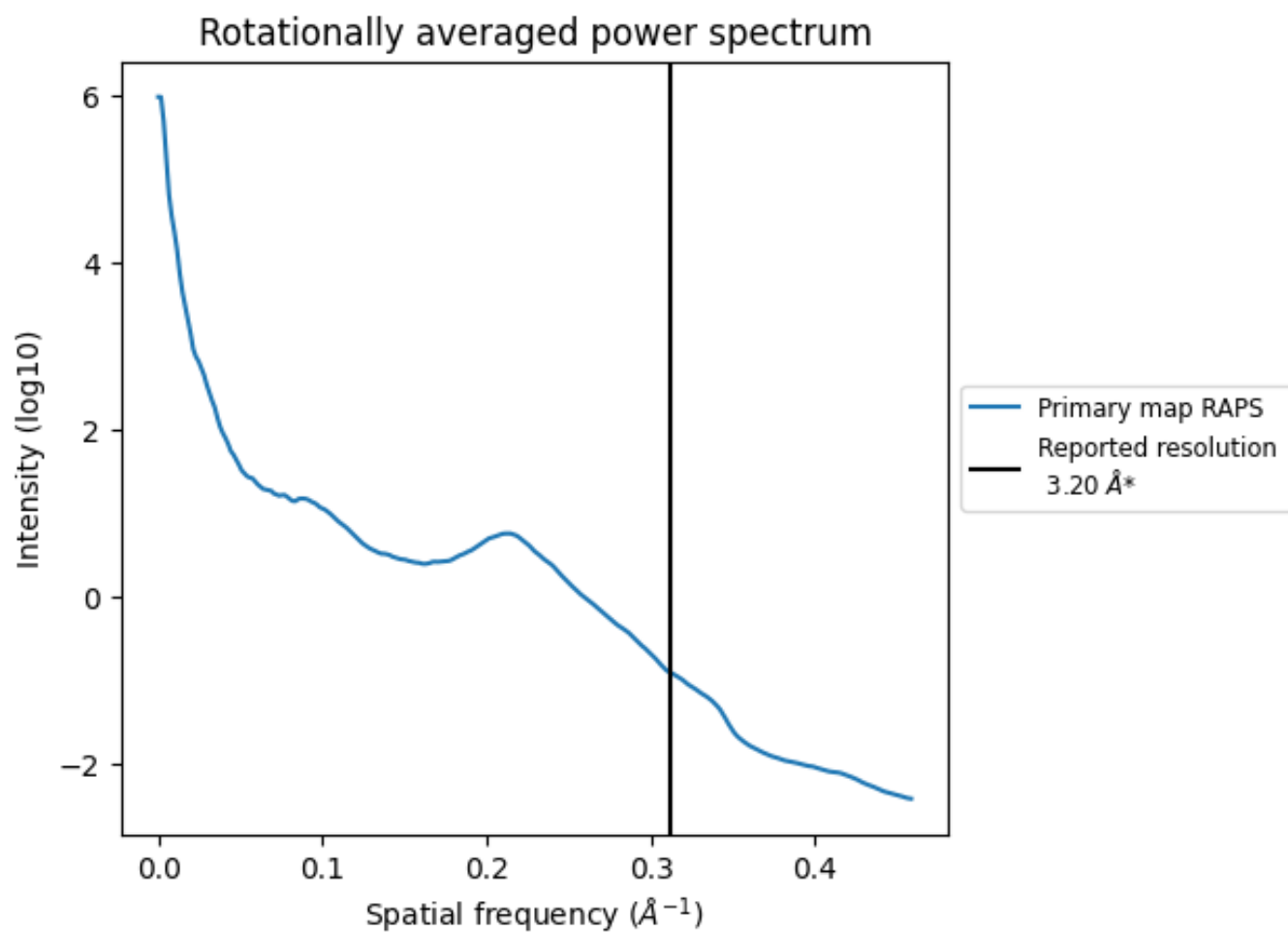
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is  $893 \text{ nm}^3$ ; this corresponds to an approximate mass of 806 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 i



\*Reported resolution corresponds to spatial frequency of 0.312 Å<sup>-1</sup>

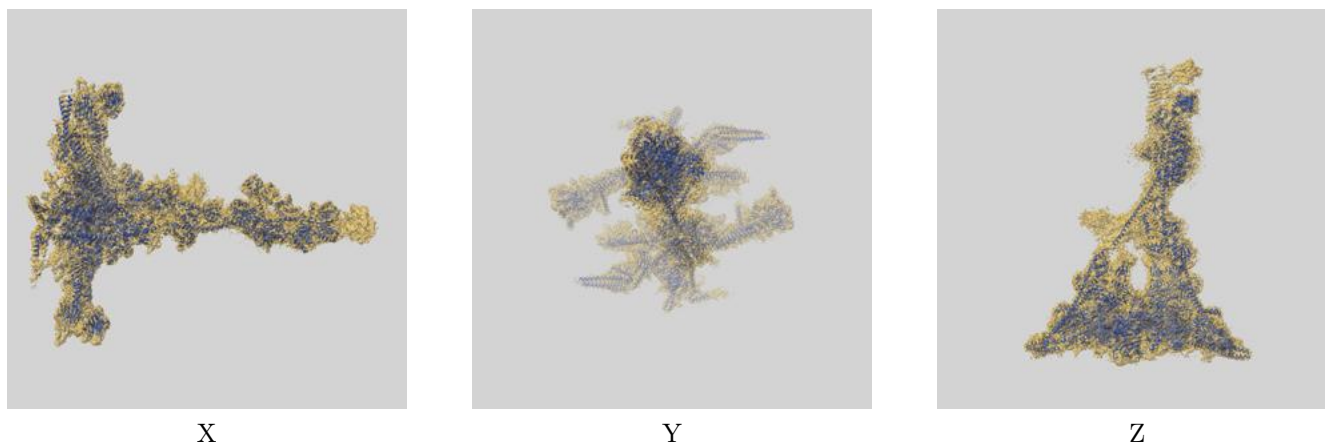
## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit [i](#)

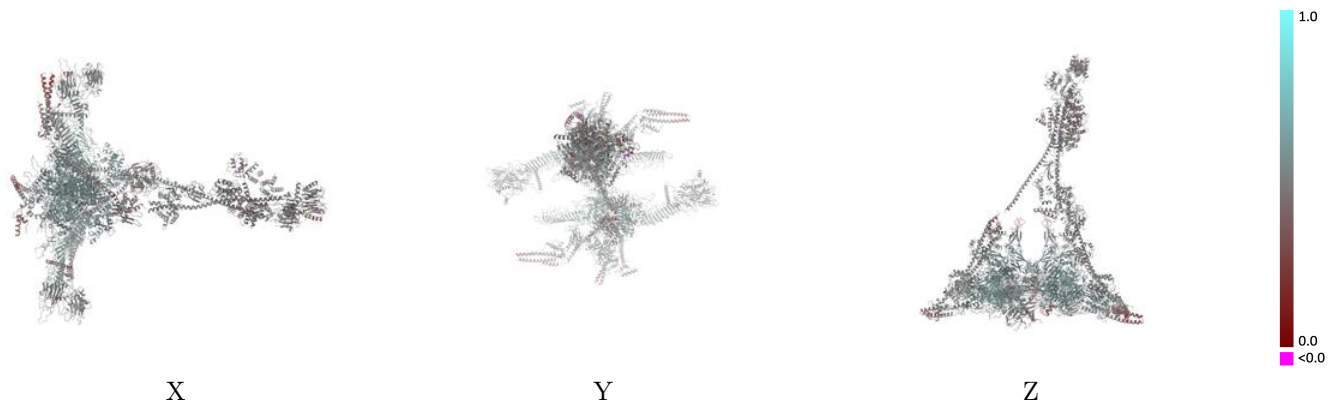
This section contains information regarding the fit between EMDB map EMD-22475 and PDB model 7JTK. Per-residue inclusion information can be found in section 3 on page 10.

### 9.1 Map-model overlay [i](#)



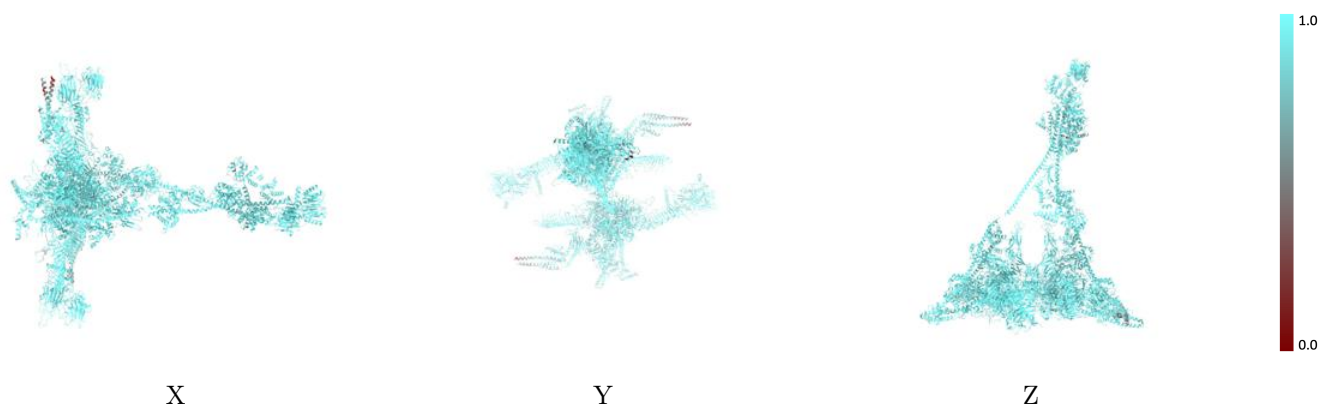
The images above show the 3D surface view of the map at the recommended contour level 0.006 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



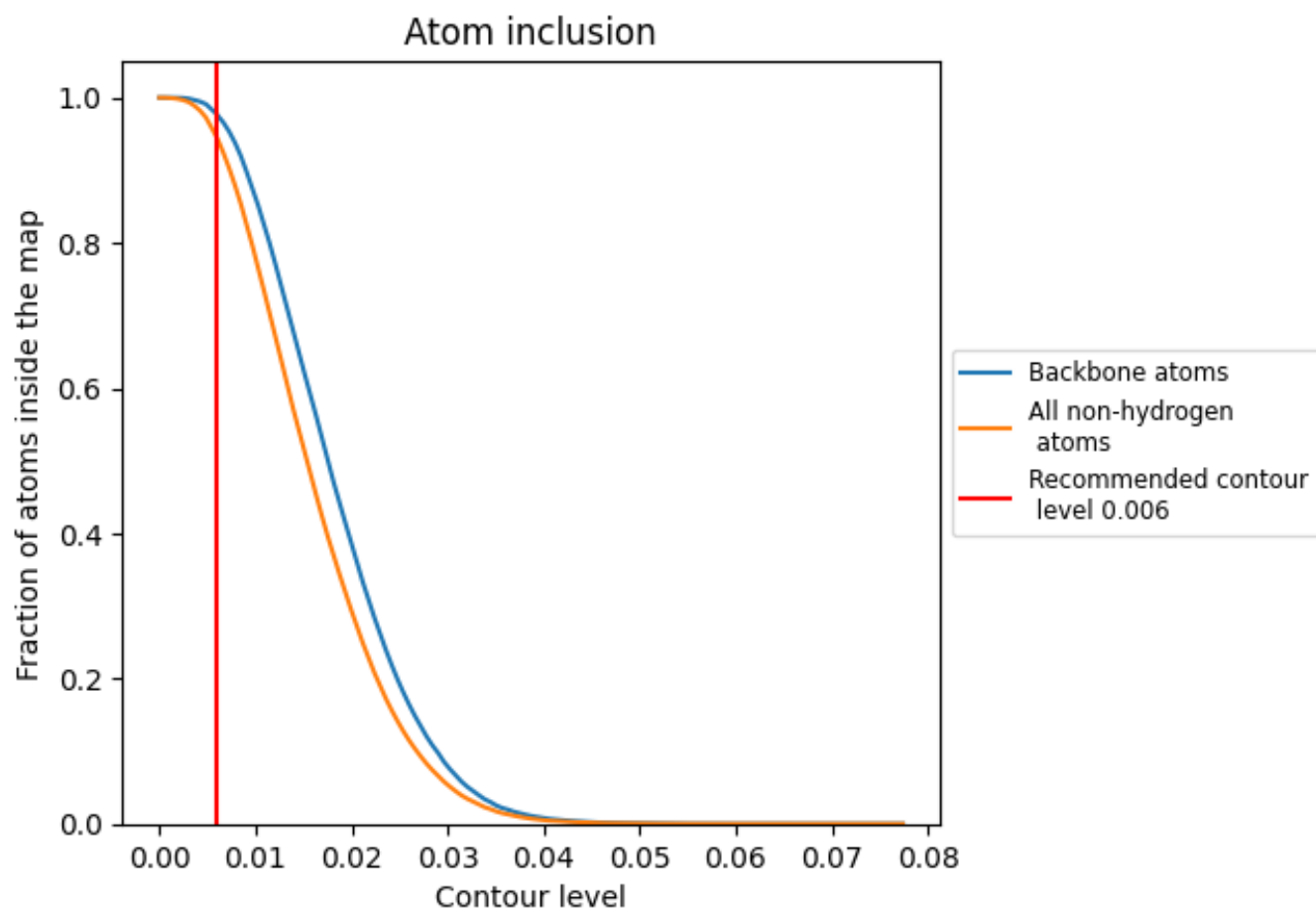
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.006).

## 9.4 Atom inclusion [i](#)









































































At the recommended contour level, 98% of all backbone atoms, 95% 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 (0.006) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9451	 0.5010
A	 0.9441	 0.4840
B	 0.9459	 0.4830
C	 0.8796	 0.4600
D	 0.8818	 0.4630
E	 0.9278	 0.4510
F	 0.9141	 0.4550
G	 0.9469	 0.5350
H	 0.9513	 0.5350
I	 0.9572	 0.5080
J	 0.9603	 0.5090
K	 0.9598	 0.5420
L	 0.9604	 0.5440
M	 0.9231	 0.4580
N	 0.9416	 0.5000
O	 0.9793	 0.5580
P	 0.9788	 0.5580
Q	 0.9815	 0.5600
R	 0.9820	 0.5540
S	 0.9773	 0.5350
T	 0.9740	 0.5280
U	 0.9388	 0.4470
V	 0.8761	 0.4490
W	 0.9273	 0.4640
X	 0.9178	 0.4620
Y	 0.9699	 0.5220
Z	 0.9735	 0.5230
a	 0.9704	 0.4600
b	 0.9364	 0.4650
c	 0.9275	 0.4480
d	 0.8905	 0.4240
e	 0.9000	 0.4650
i	 0.9426	 0.5030
j	 0.9583	 0.5100
k	 0.9697	 0.5060



*Continued on next page...*

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Chain	Atom inclusion	Q-score
s	 0.9078	 0.4380
u	 0.9472	 0.4800
v	 0.9400	 0.4560
y	 0.9686	 0.4370
z	 0.9764	 0.5030