



## Full wwPDB EM Validation Report ⓘ

Nov 4, 2024 – 08:44 PM JST

PDB ID : 8WYS  
EMDB ID : EMD-37937  
Title : Local map of human CD5L bound to IgM-Fc/J  
Authors : Wang, Y.X.; Su, C.; Xiao, J.Y.  
Deposited on : 2023-10-31  
Resolution : 3.41 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:

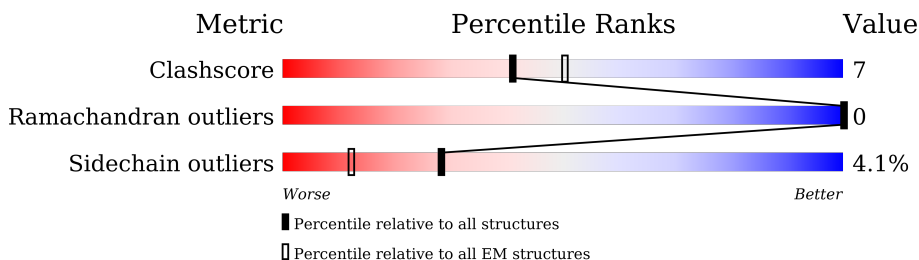
EMDB validation analysis : 0.0.1.dev113  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

# 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 3.41 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  $\geq 3$ , 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	403	
1	L	403	
2	M	359	
3	J	168	
4	B	2	

## 2 Entry composition i

There are 6 unique types of molecules in this entry. The entry contains 6340 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 Interleukin-2,Isoform 1 of Immunoglobulin heavy constant mu.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	232	Total	C	N	O	S	0	0
			1798	1132	304	353	9		
1	L	232	Total	C	N	O	S	0	0
			1798	1132	304	353	9		

There are 68 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	195	SER	-	linker	UNP P60568
A	196	ALA	-	linker	UNP P60568
A	197	TRP	-	linker	UNP P60568
A	198	SER	-	linker	UNP P60568
A	199	HIS	-	linker	UNP P60568
A	200	PRO	-	linker	UNP P60568
A	201	GLN	-	linker	UNP P60568
A	202	PHE	-	linker	UNP P60568
A	203	GLU	-	linker	UNP P60568
A	204	LYS	-	linker	UNP P60568
A	205	GLY	-	linker	UNP P60568
A	206	GLY	-	linker	UNP P60568
A	207	GLY	-	linker	UNP P60568
A	208	SER	-	linker	UNP P60568
A	209	GLY	-	linker	UNP P60568
A	210	GLY	-	linker	UNP P60568
A	211	GLY	-	linker	UNP P60568
A	212	SER	-	linker	UNP P60568
A	213	GLY	-	linker	UNP P60568
A	214	GLY	-	linker	UNP P60568
A	215	SER	-	linker	UNP P60568
A	216	ALA	-	linker	UNP P60568
A	217	TRP	-	linker	UNP P60568
A	218	SER	-	linker	UNP P60568
A	219	HIS	-	linker	UNP P60568
A	220	PRO	-	linker	UNP P60568

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Chain	Residue	Modelled	Actual	Comment	Reference
A	221	GLN	-	linker	UNP P60568
A	222	PHE	-	linker	UNP P60568
A	223	GLU	-	linker	UNP P60568
A	224	LYS	-	linker	UNP P60568
A	225	ILE	-	linker	UNP P60568
A	226	ASP	-	linker	UNP P60568
A	227	THR	-	linker	UNP P60568
A	228	THR	-	linker	UNP P60568
L	195	SER	-	linker	UNP P60568
L	196	ALA	-	linker	UNP P60568
L	197	TRP	-	linker	UNP P60568
L	198	SER	-	linker	UNP P60568
L	199	HIS	-	linker	UNP P60568
L	200	PRO	-	linker	UNP P60568
L	201	GLN	-	linker	UNP P60568
L	202	PHE	-	linker	UNP P60568
L	203	GLU	-	linker	UNP P60568
L	204	LYS	-	linker	UNP P60568
L	205	GLY	-	linker	UNP P60568
L	206	GLY	-	linker	UNP P60568
L	207	GLY	-	linker	UNP P60568
L	208	SER	-	linker	UNP P60568
L	209	GLY	-	linker	UNP P60568
L	210	GLY	-	linker	UNP P60568
L	211	GLY	-	linker	UNP P60568
L	212	SER	-	linker	UNP P60568
L	213	GLY	-	linker	UNP P60568
L	214	GLY	-	linker	UNP P60568
L	215	SER	-	linker	UNP P60568
L	216	ALA	-	linker	UNP P60568
L	217	TRP	-	linker	UNP P60568
L	218	SER	-	linker	UNP P60568
L	219	HIS	-	linker	UNP P60568
L	220	PRO	-	linker	UNP P60568
L	221	GLN	-	linker	UNP P60568
L	222	PHE	-	linker	UNP P60568
L	223	GLU	-	linker	UNP P60568
L	224	LYS	-	linker	UNP P60568
L	225	ILE	-	linker	UNP P60568
L	226	ASP	-	linker	UNP P60568
L	227	THR	-	linker	UNP P60568
L	228	THR	-	linker	UNP P60568

- Molecule 2 is a protein called Interleukin-2,CD5 antigen-like.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	M	213	1669	1026	315	309	19	0	0

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	10	ARG	-	linker	UNP P60568
M	11	ILE	-	linker	UNP P60568
M	12	HIS	-	linker	UNP P60568
M	13	HIS	-	linker	UNP P60568
M	14	HIS	-	linker	UNP P60568
M	15	HIS	-	linker	UNP P60568
M	16	HIS	-	linker	UNP P60568
M	17	HIS	-	linker	UNP P60568
M	18	HIS	-	linker	UNP P60568
M	19	HIS	-	linker	UNP P60568

- Molecule 3 is a protein called Immunoglobulin J chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	J	128	1017	627	177	204	9	0	0

There are 9 discrepancies between the modelled and reference sequences:

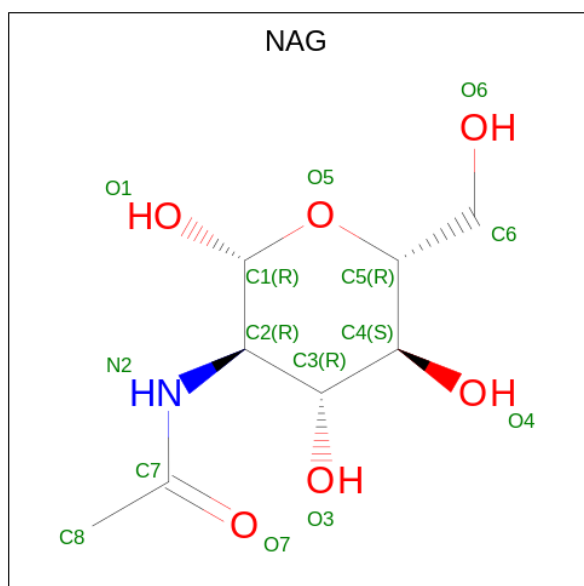
Chain	Residue	Modelled	Actual	Comment	Reference
J	137	TYR	-	expression tag	UNP P01591
J	138	PRO	-	expression tag	UNP P01591
J	139	TYR	-	expression tag	UNP P01591
J	140	ASP	-	expression tag	UNP P01591
J	141	VAL	-	expression tag	UNP P01591
J	142	PRO	-	expression tag	UNP P01591
J	143	ASP	-	expression tag	UNP P01591
J	144	TYR	-	expression tag	UNP P01591
J	145	ALA	-	expression tag	UNP P01591

- Molecule 4 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
4	B	2	28	16	2	10	0	0

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms			AltConf	
			Total	C	N		O
5	A	1	14	8	1	5	0
5	L	1	14	8	1	5	0

- Molecule 6 is CALCIUM ION (three-letter code: CA) (formula: Ca) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
			Total	Ca	
6	M	2	2	2	0

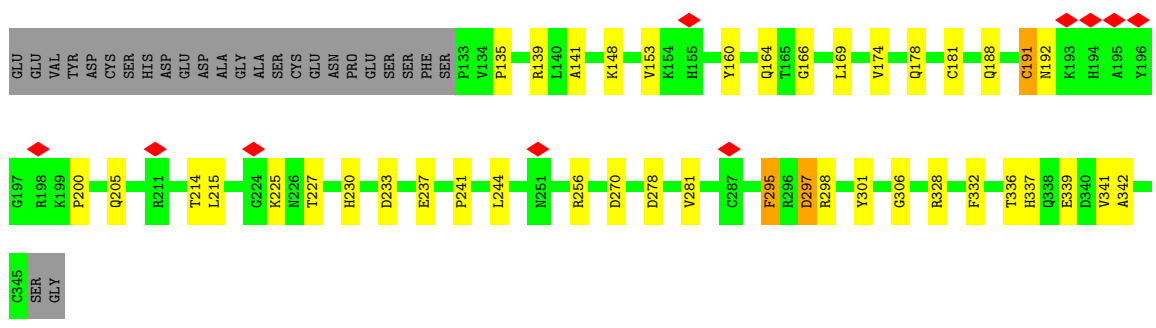




• Molecule 2: Interleukin-2,CD5 antigen-like



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



• Molecule 3: Immunoglobulin J chain



MET	LYS	ASN	HIS	LEU	LEU	PHE	TRP	GLY	VAL	VAL	ALA	VAL	PHE	ILE	LYS	VAL	HIS	VAL	LYS	ALA	GLN	GLU	ASP	E3	R4	C12	K13	T18	S19	R20	E26	D31	N36	I37	P42	L43	P51	S54	L64	I62	S88	C91	D92	GLU	ASP	SER	
ALA	THR	E98	T99	C100	Y101	T102	Y103	D104	M105	LEU	K107	C108	Y109	L115	T126	F135	ASP	TYR	PRO	PRO	TYR	TYR	ASP	VAL	PRO	ASP	TYR	ALA	T18	S19	R20	E26	D31	N36	I37	P42	L43	P51	S54	L64	I62	S88	C91	D92	GLU	ASP	SER

• Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	381470	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	1.5	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.967	Depositor
Minimum map value	-1.405	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.025	Depositor
Recommended contour level	0.15	Depositor
Map size ( $\text{\AA}$ )	332.0, 332.0, 332.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	0.83, 0.83, 0.83	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: NAG, CA

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	0.30	0/1844	0.64	2/2526 (0.1%)
1	L	0.29	0/1844	0.59	0/2526
2	M	0.33	0/1710	0.66	1/2311 (0.0%)
3	J	0.31	0/1031	0.62	1/1402 (0.1%)
All	All	0.31	0/6429	0.63	4/8765 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	M	200	PRO	CA-N-CD	-9.49	98.21	111.50
1	A	570	ASP	CB-CG-OD1	6.93	124.54	118.30
1	A	483	ASP	CB-CG-OD2	6.02	123.72	118.30
3	J	91	CYS	CA-CB-SG	5.51	123.91	114.00

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	1798	0	1752	25	0
1	L	1798	0	1751	26	0
2	M	1669	0	1570	25	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	J	1017	0	1000	17	0
4	B	28	0	25	0	0
5	A	14	0	13	0	0
5	L	14	0	13	0	0
6	M	2	0	0	0	0
All	All	6340	0	6124	84	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 7.

All (84) 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:M:135:PRO:CG	2:M:215:LEU:HB3	2.23	0.69
2:M:270:ASP:HB3	2:M:341:VAL:HB	1.74	0.68
1:A:478:GLY:HA2	1:A:514:ARG:HB3	1.79	0.64
3:J:13:LYS:HG3	3:J:100:CYS:HB2	1.84	0.60
3:J:4:ARG:HB3	3:J:20:ARG:HD2	1.83	0.60
1:A:535:THR:HG22	1:A:551:THR:HG22	1.84	0.59
2:M:192:ASN:ND2	2:M:233:ASP:OD2	2.36	0.58
2:M:297:ASP:N	2:M:297:ASP:OD1	2.36	0.58
1:A:524:SER:HB3	1:A:527:GLU:HG3	1.86	0.56
3:J:42:PRO:HG3	3:J:102:THR:HG22	1.89	0.55
1:L:463:GLN:NE2	1:L:469:SER:O	2.40	0.55
2:M:205:GLN:HB2	2:M:227:THR:HG21	1.88	0.54
1:A:477:THR:HG22	1:A:516:PHE:HB2	1.89	0.54
1:L:525:GLU:OE2	1:L:529:ASN:ND2	2.39	0.54
2:M:306:GLY:O	2:M:337:HIS:NE2	2.40	0.54
3:J:31:ASP:N	3:J:31:ASP:OD1	2.41	0.54
2:M:178:GLN:HG3	2:M:214:THR:HG23	1.89	0.53
1:L:452:PRO:HG3	1:L:479:PHE:HB3	1.91	0.53
1:L:553:ASP:N	1:L:553:ASP:OD1	2.41	0.53
1:A:471:THR:HG23	1:A:520:ILE:HG23	1.92	0.52
1:A:491:ARG:NE	1:A:532:GLU:OE1	2.43	0.52
3:J:18:THR:HG1	3:J:36:ASN:HD22	1.57	0.52
1:A:419:ASN:O	1:A:443:ARG:NH1	2.42	0.51
2:M:336:THR:OG1	2:M:337:HIS:N	2.44	0.51
1:A:423:ARG:HG2	1:A:442:SER:HB2	1.92	0.51
1:A:568:MET:HE3	3:J:64:LEU:HD11	1.93	0.50
1:L:363:THR:OG1	1:L:413:ILE:O	2.29	0.50
1:L:371:ASP:HB2	1:L:404:THR:HB	1.93	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:295:PHE:HA	2:M:298:ARG:HB2	1.93	0.49
1:L:391:LYS:O	2:M:230:HIS:NE2	2.45	0.49
1:L:474:CYS:HB3	1:L:519:SER:HB3	1.95	0.49
2:M:153:VAL:N	2:M:160:TYR:O	2.45	0.49
2:M:135:PRO:HG3	2:M:215:LEU:HB3	1.93	0.48
1:A:365:LEU:HB2	1:A:411:ALA:HB3	1.95	0.48
1:A:461:ARG:HA	1:A:464:LEU:HB2	1.95	0.48
3:J:26:GLU:N	3:J:26:GLU:OE1	2.46	0.48
1:A:481:PRO:HD2	1:A:540:HIS:HE1	1.79	0.48
1:L:364:LYS:HD3	1:L:412:SER:HB2	1.96	0.48
1:L:495:LEU:HD22	1:L:499:LYS:HD2	1.95	0.48
1:L:541:GLU:OE2	1:L:541:GLU:N	2.48	0.47
1:L:563:ASN:HB3	3:J:36:ASN:HA	1.97	0.47
1:L:351:PRO:HA	1:L:441:ILE:HD11	1.97	0.46
1:L:427:THR:O	1:L:427:THR:OG1	2.31	0.46
2:M:164:GLN:NE2	2:M:166:GLY:O	2.48	0.46
1:A:562:TYR:HE2	3:J:43:LEU:HB3	1.79	0.46
1:L:414:CYS:HB3	2:M:191:CYS:HB3	1.76	0.46
2:M:169:LEU:HD21	3:J:82:ILE:HG13	1.98	0.46
2:M:244:LEU:HD21	2:M:281:VAL:HG13	1.97	0.46
2:M:256:ARG:HA	2:M:342:ALA:HA	1.98	0.45
3:J:115:LEU:HD12	3:J:115:LEU:HA	1.89	0.45
1:A:357:ILE:HG12	1:A:363:THR:HG22	1.98	0.44
1:L:383:THR:OG1	1:L:425:THR:O	2.30	0.44
1:L:421:GLY:HA2	1:L:443:ARG:HG2	1.99	0.44
1:L:356:SER:O	1:L:360:THR:OG1	2.35	0.44
1:A:548:THR:HA	3:J:126:THR:HG23	2.00	0.44
1:L:364:LYS:HE2	1:L:364:LYS:HB2	1.87	0.43
1:A:495:LEU:HD12	1:A:495:LEU:HA	1.88	0.43
2:M:135:PRO:HG2	2:M:215:LEU:HB3	1.96	0.43
1:A:383:THR:OG1	1:A:425:THR:O	2.35	0.42
3:J:104:ASP:H	3:J:109:TYR:HE1	1.67	0.42
1:A:457:LEU:HD11	1:A:475:LEU:HD22	2.01	0.42
1:A:425:THR:HG21	1:A:438:LYS:HD3	2.02	0.42
1:L:564:VAL:HG22	3:J:37:ILE:HD12	2.01	0.42
1:A:430:HIS:HE1	1:A:437:LEU:HB2	1.84	0.42
1:L:558:LYS:HA	1:L:559:PRO:HD3	1.92	0.42
2:M:174:VAL:HG12	2:M:215:LEU:HD12	2.00	0.42
3:J:104:ASP:HB3	3:J:107:LYS:HB2	2.02	0.42
1:A:361:LYS:HD3	1:A:361:LYS:HA	1.82	0.42
1:A:467:ARG:HD3	1:A:525:GLU:HG2	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:139:ARG:HD2	2:M:141:ALA:HB2	2.02	0.42
2:M:148:LYS:HB3	2:M:237:GLU:HG2	2.02	0.41
2:M:169:LEU:HD12	2:M:169:LEU:HA	1.94	0.41
1:L:363:THR:OG1	1:L:363:THR:O	2.37	0.41
3:J:92:ASP:OD1	3:J:92:ASP:N	2.54	0.41
1:L:381:SER:OG	1:L:427:THR:OG1	2.38	0.41
2:M:181:CYS:HA	2:M:241:PRO:HG3	2.03	0.41
1:A:363:THR:O	1:A:363:THR:OG1	2.39	0.41
1:A:461:ARG:H	1:A:461:ARG:HG3	1.70	0.41
1:L:361:LYS:HB3	2:M:188:GLN:HG2	2.02	0.41
1:A:372:LEU:HD23	1:A:372:LEU:HA	1.91	0.41
3:J:51:ASP:HB3	3:J:54:SER:HB2	2.03	0.40
2:M:328:ARG:NE	2:M:332:PHE:O	2.52	0.40
1:L:467:ARG:HD2	1:L:467:ARG:HA	1.89	0.40
1:L:490:GLN:HG3	1:L:495:LEU:HD21	2.03	0.40

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	230/403 (57%)	211 (92%)	19 (8%)	0	100	100
1	L	230/403 (57%)	216 (94%)	14 (6%)	0	100	100
2	M	211/359 (59%)	193 (92%)	18 (8%)	0	100	100
3	J	124/168 (74%)	119 (96%)	5 (4%)	0	100	100
All	All	795/1333 (60%)	739 (93%)	56 (7%)	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	206/349 (59%)	200 (97%)	6 (3%)	37	61
1	L	206/349 (59%)	196 (95%)	10 (5%)	21	47
2	M	182/304 (60%)	175 (96%)	7 (4%)	28	53
3	J	121/155 (78%)	115 (95%)	6 (5%)	20	46
All	All	715/1157 (62%)	686 (96%)	29 (4%)	28	51

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	367	CYS
1	A	405	PHE
1	A	423	ARG
1	A	455	TYR
1	A	480	SER
1	A	545	ASN
1	L	350	ILE
1	L	364	LYS
1	L	400	HIS
1	L	417	ASP
1	L	423	ARG
1	L	432	ASP
1	L	483	ASP
1	L	503	SER
1	L	553	ASP
1	L	575	CYS
2	M	191	CYS
2	M	225	LYS
2	M	278	ASP
2	M	295	PHE
2	M	297	ASP
2	M	301	TYR
2	M	339	GLU
3	J	12	CYS

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
3	J	20	ARG
3	J	31	ASP
3	J	54	SER
3	J	88	SER
3	J	106	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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](#)

2 monosaccharides 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	$\# Z  > 2$
4	NAG	B	1	4,3	14,14,15	0.26	0	17,19,21	0.54	0
4	NAG	B	2	4	14,14,15	0.35	0	17,19,21	0.50	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	B	1	4,3	-	0/6/23/26	0/1/1/1

*Continued on next page...*

*Continued from previous page...*

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	B	2	4	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

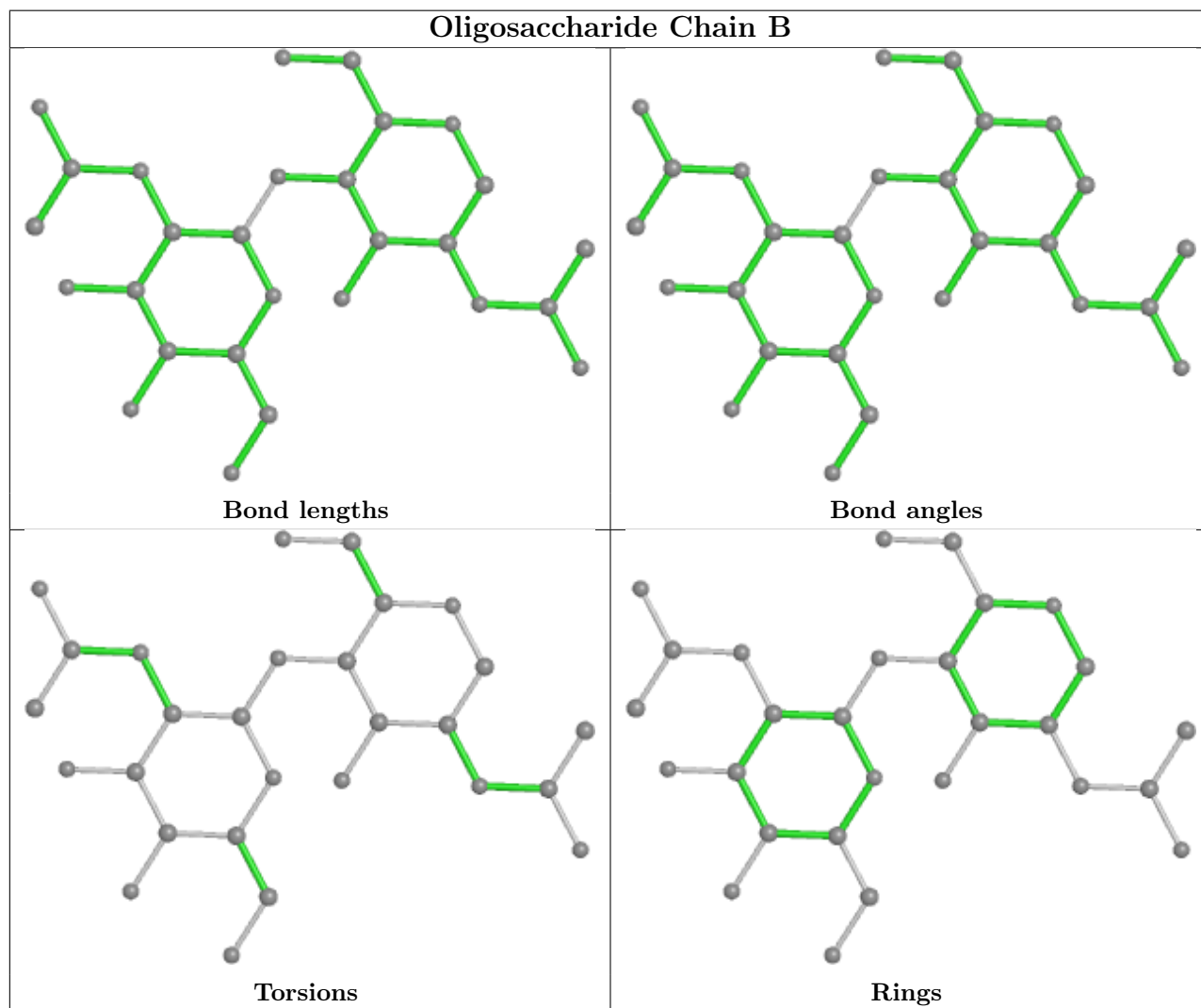
There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.





## 5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 for Mogul analysis.

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
5	NAG	A	601	1	14,14,15	0.36	0	17,19,21	0.53	0
5	NAG	L	601	1	14,14,15	0.33	0	17,19,21	0.41	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	A	601	1	-	2/6/23/26	0/1/1/1
5	NAG	L	601	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	601	NAG	C4-C5-C6-O6
5	A	601	NAG	O5-C5-C6-O6

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

There are no chain breaks in this entry.

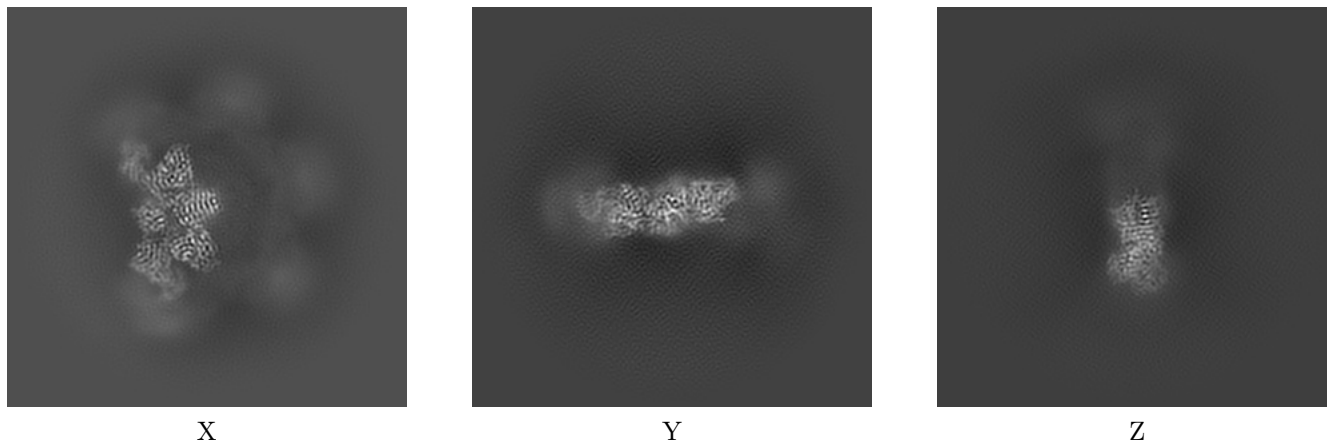
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-37937. These allow visual inspection of the internal detail of the map and identification of artifacts.

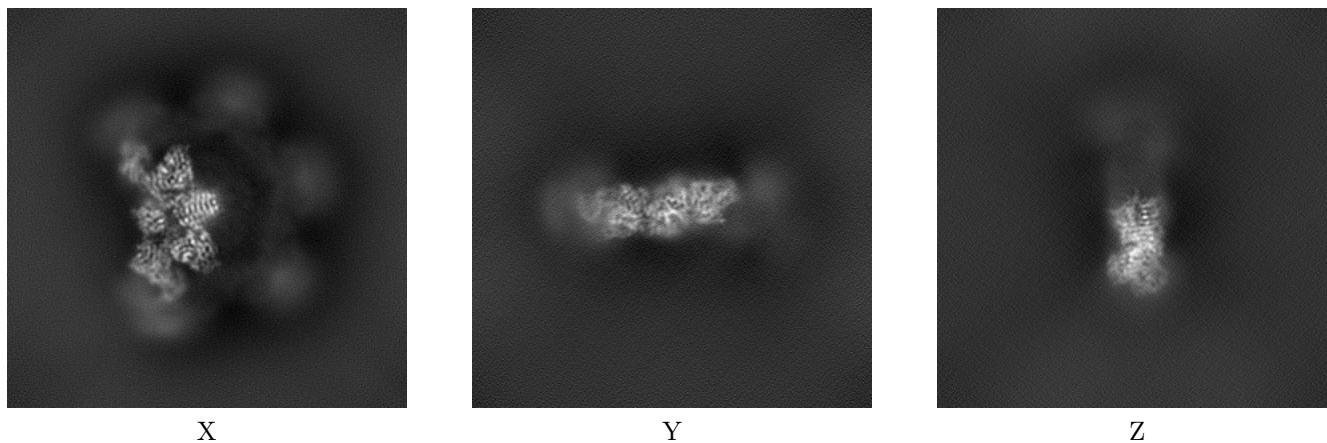
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

#### 6.1.1 Primary map



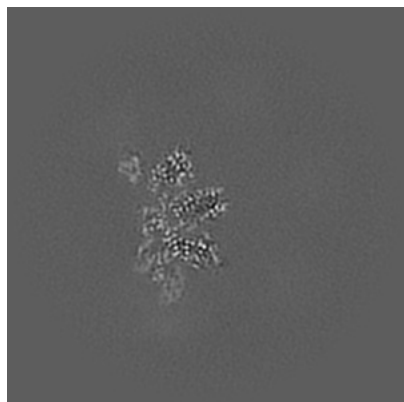
#### 6.1.2 Raw map



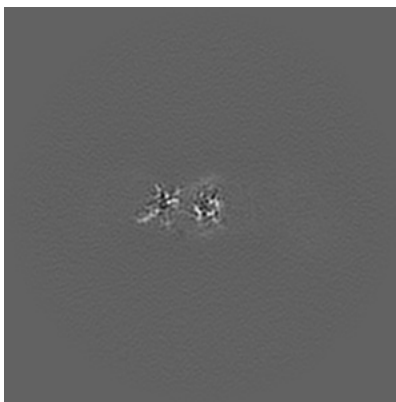
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

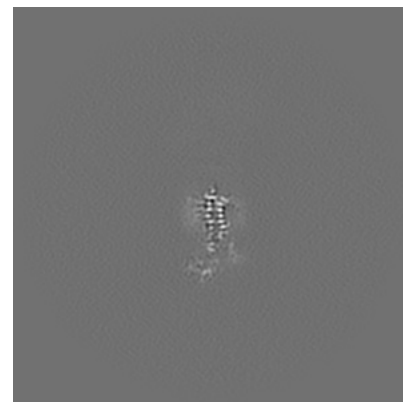
### 6.2.1 Primary map



X Index: 200

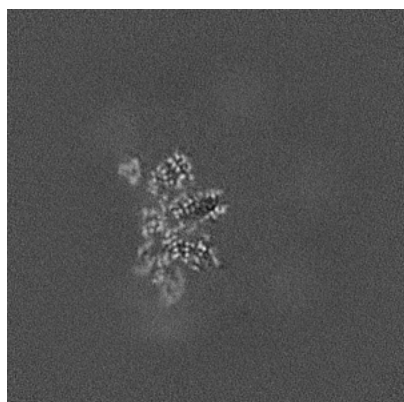


Y Index: 200

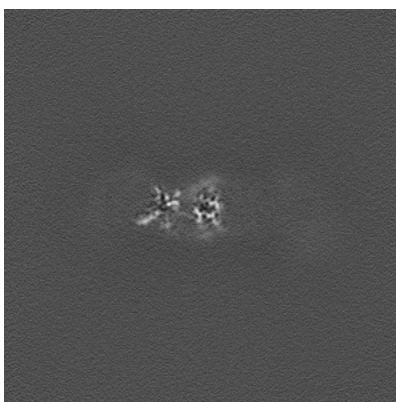


Z Index: 200

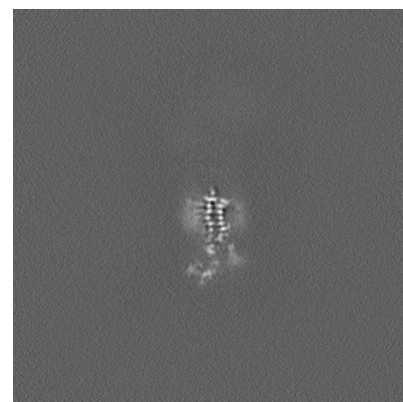
### 6.2.2 Raw map



X Index: 200



Y Index: 200

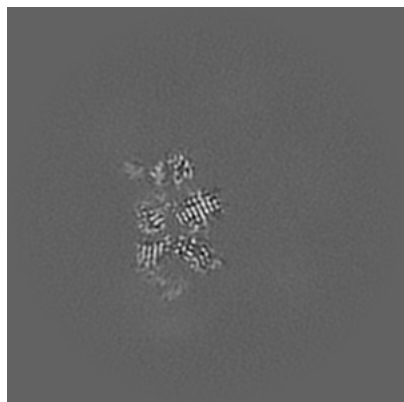


Z Index: 200

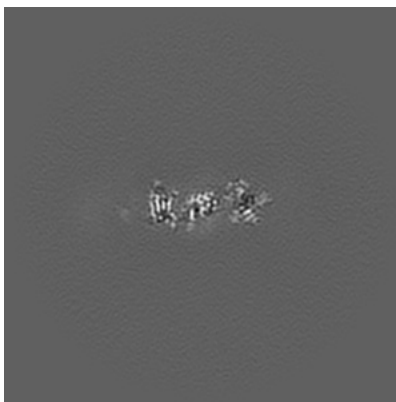
The images above show central slices of the map in three orthogonal directions.

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

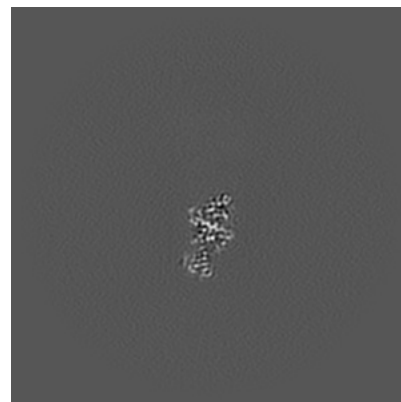
### 6.3.1 Primary map



X Index: 194

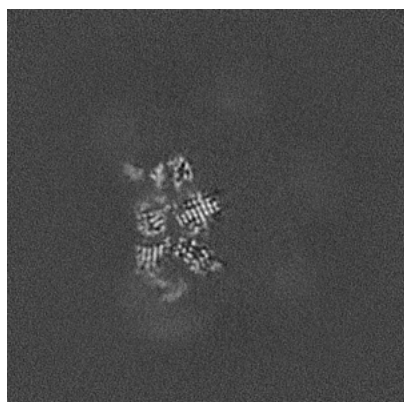


Y Index: 179

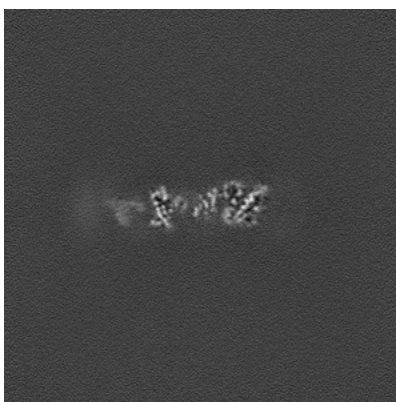


Z Index: 159

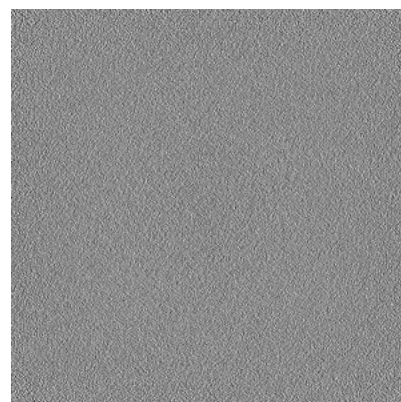
### 6.3.2 Raw map



X Index: 194



Y Index: 170

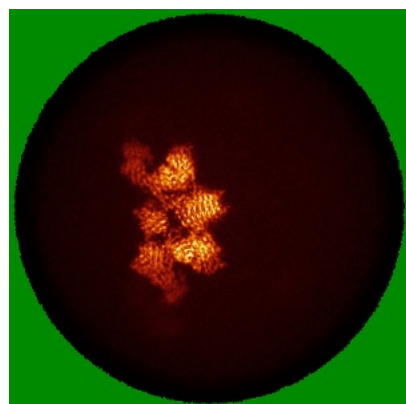


Z Index: 0

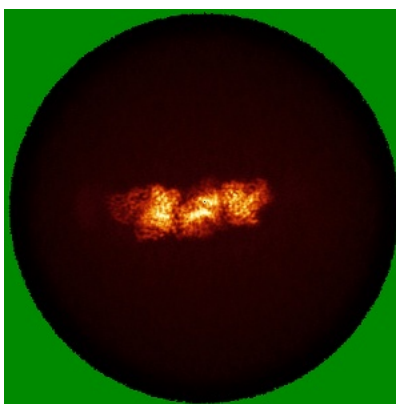
The images above show the largest variance slices of the map in three orthogonal directions.

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

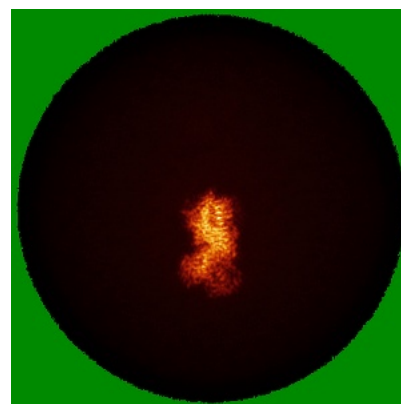
### 6.4.1 Primary map



X

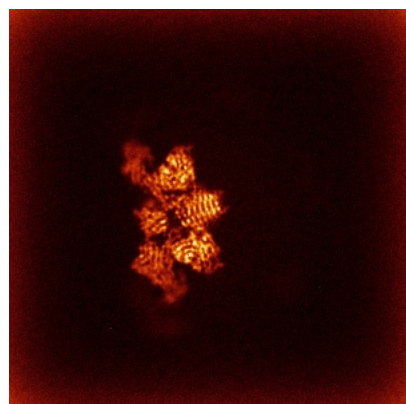


Y

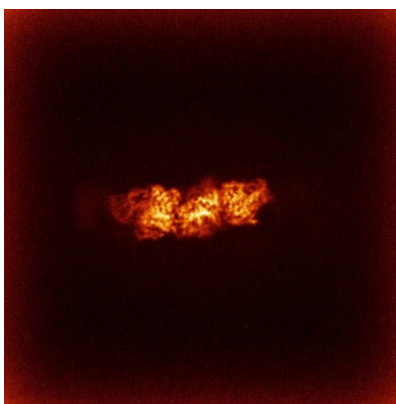


Z

### 6.4.2 Raw map



X



Y

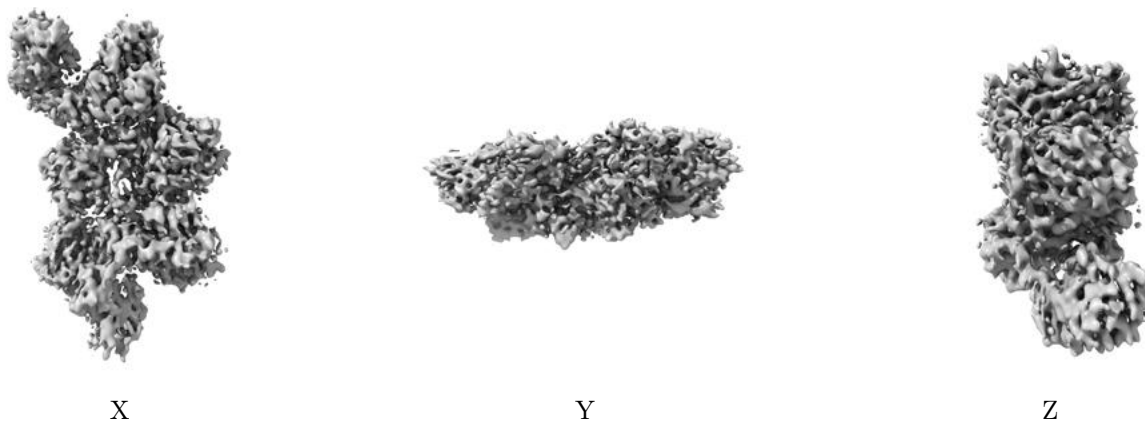


Z

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

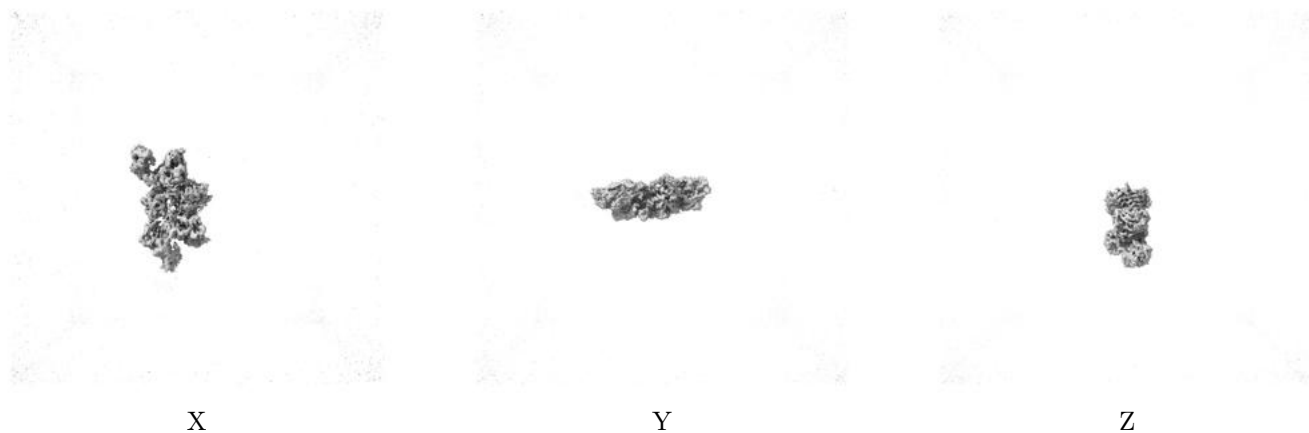
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.15. 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.

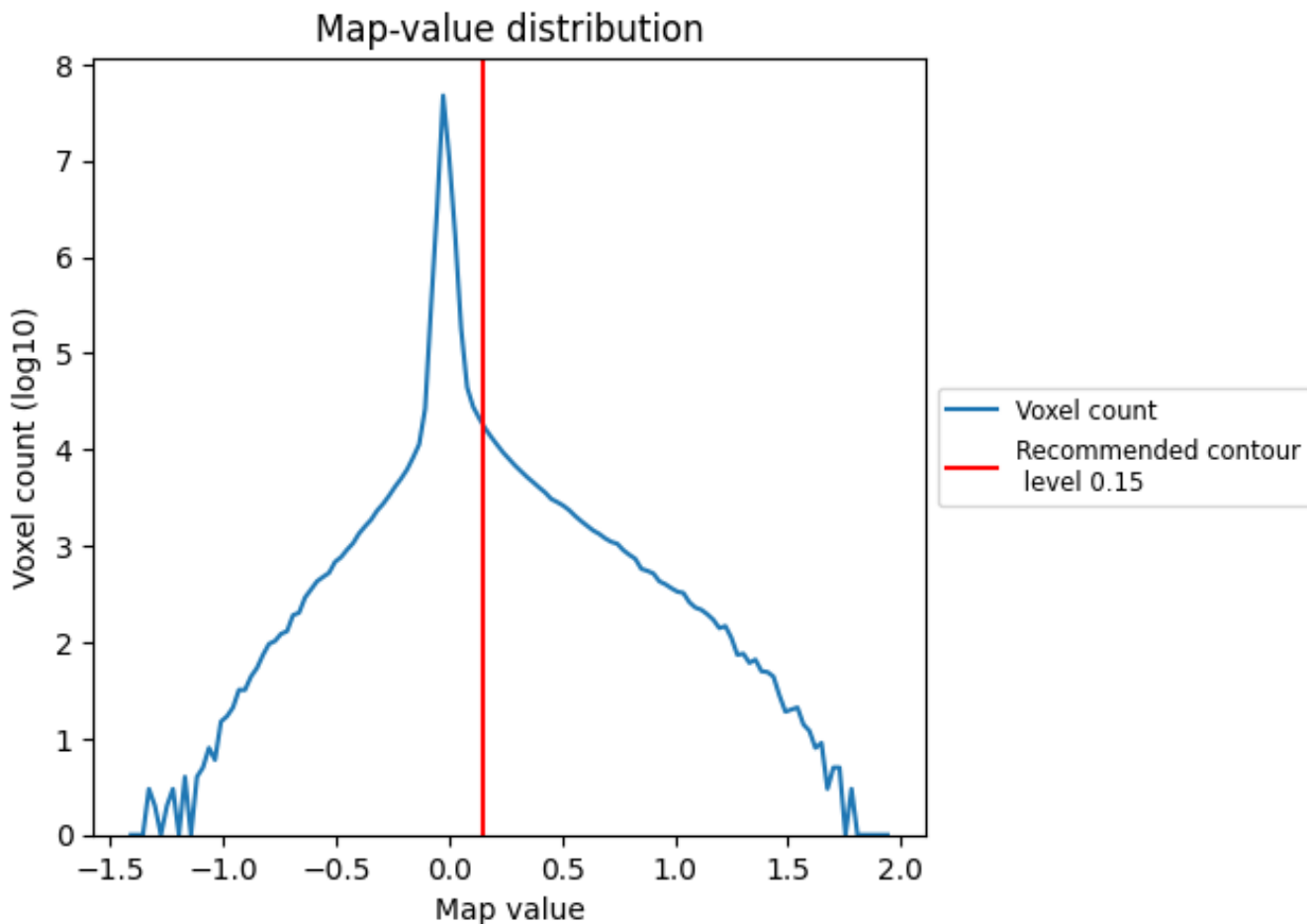
## 6.6 Mask visualisation [i](#)

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.

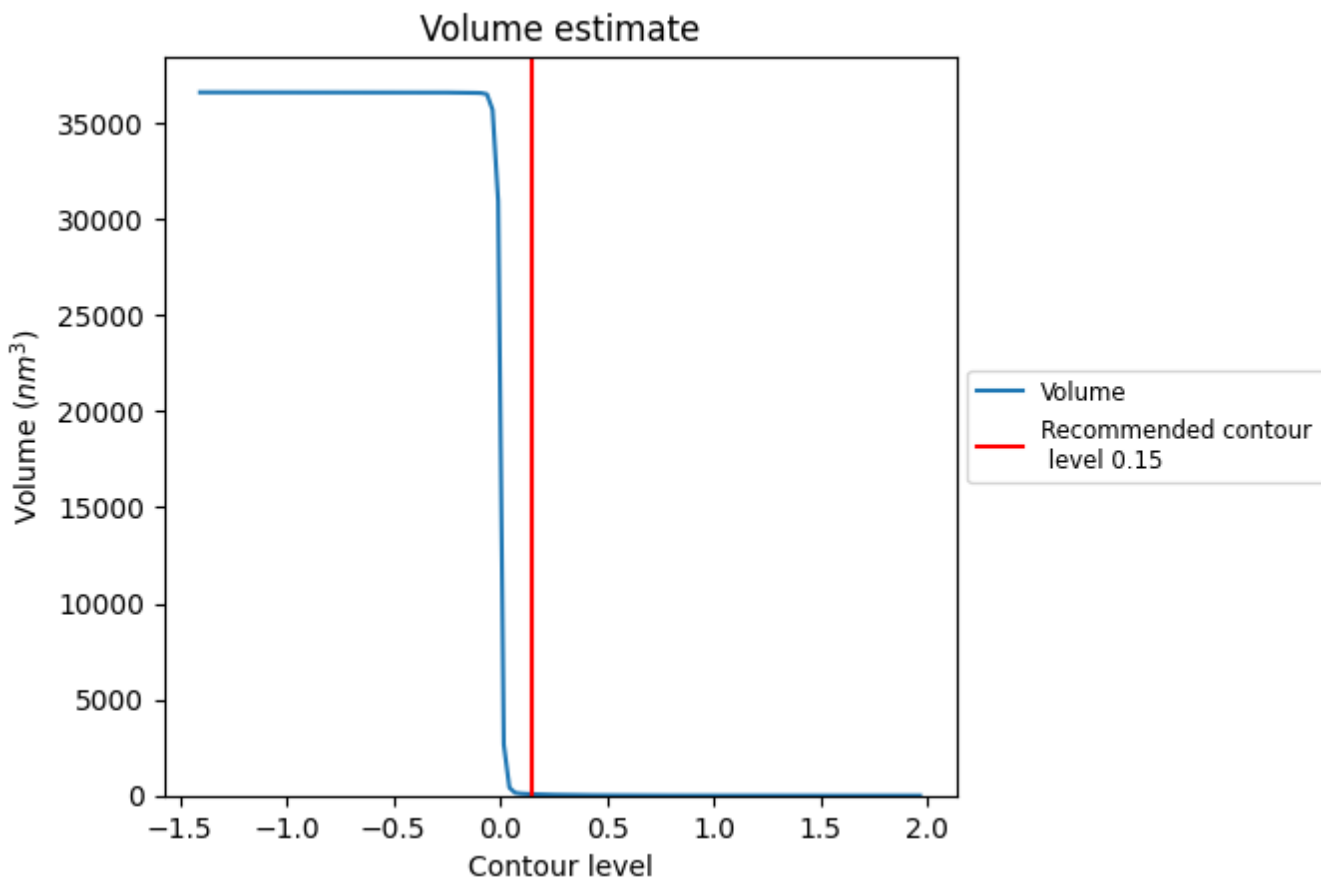
### 7.1 Map-value distribution [i](#)



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.



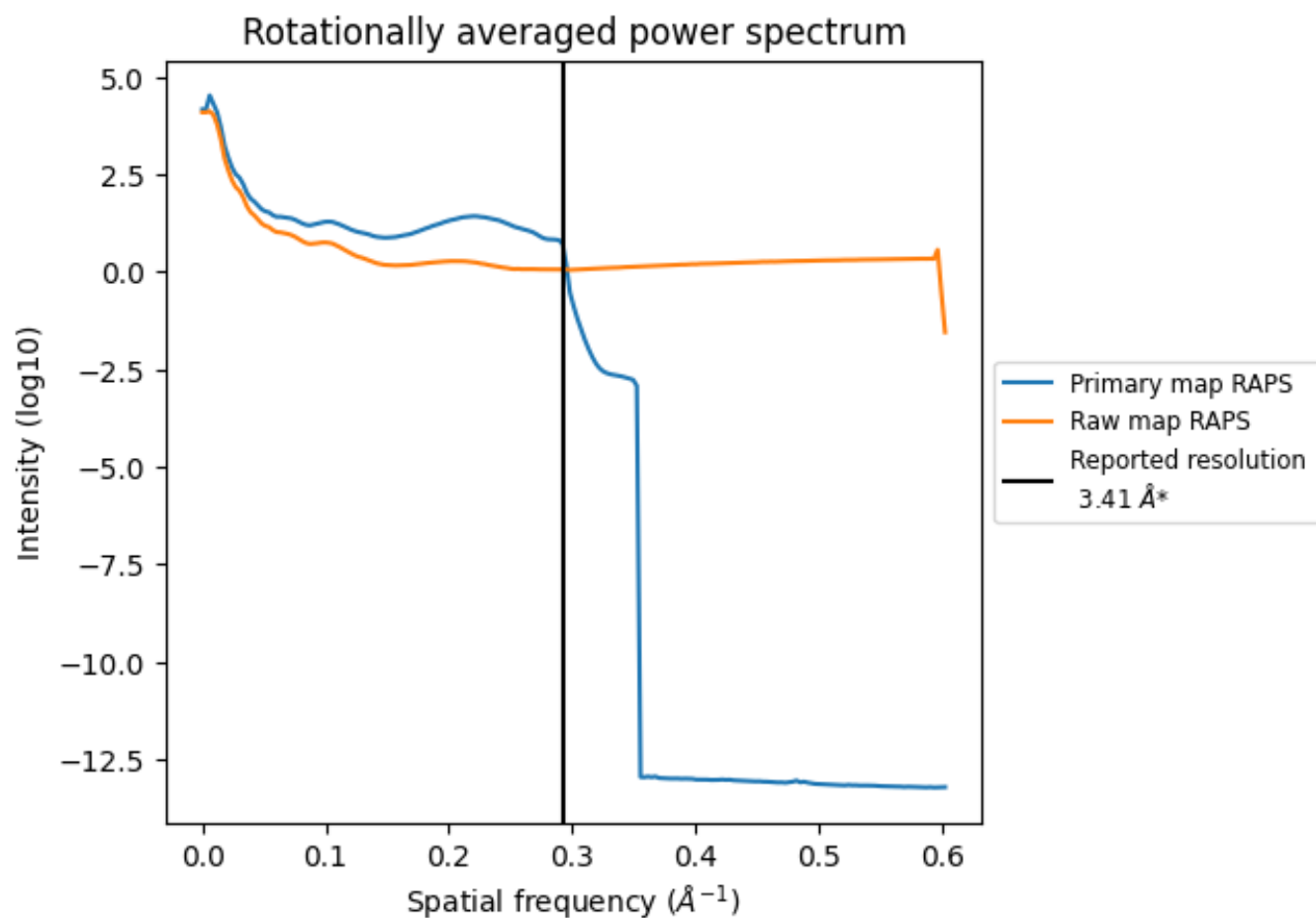
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 73 nm<sup>3</sup>; this corresponds to an approximate mass of 66 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](#)

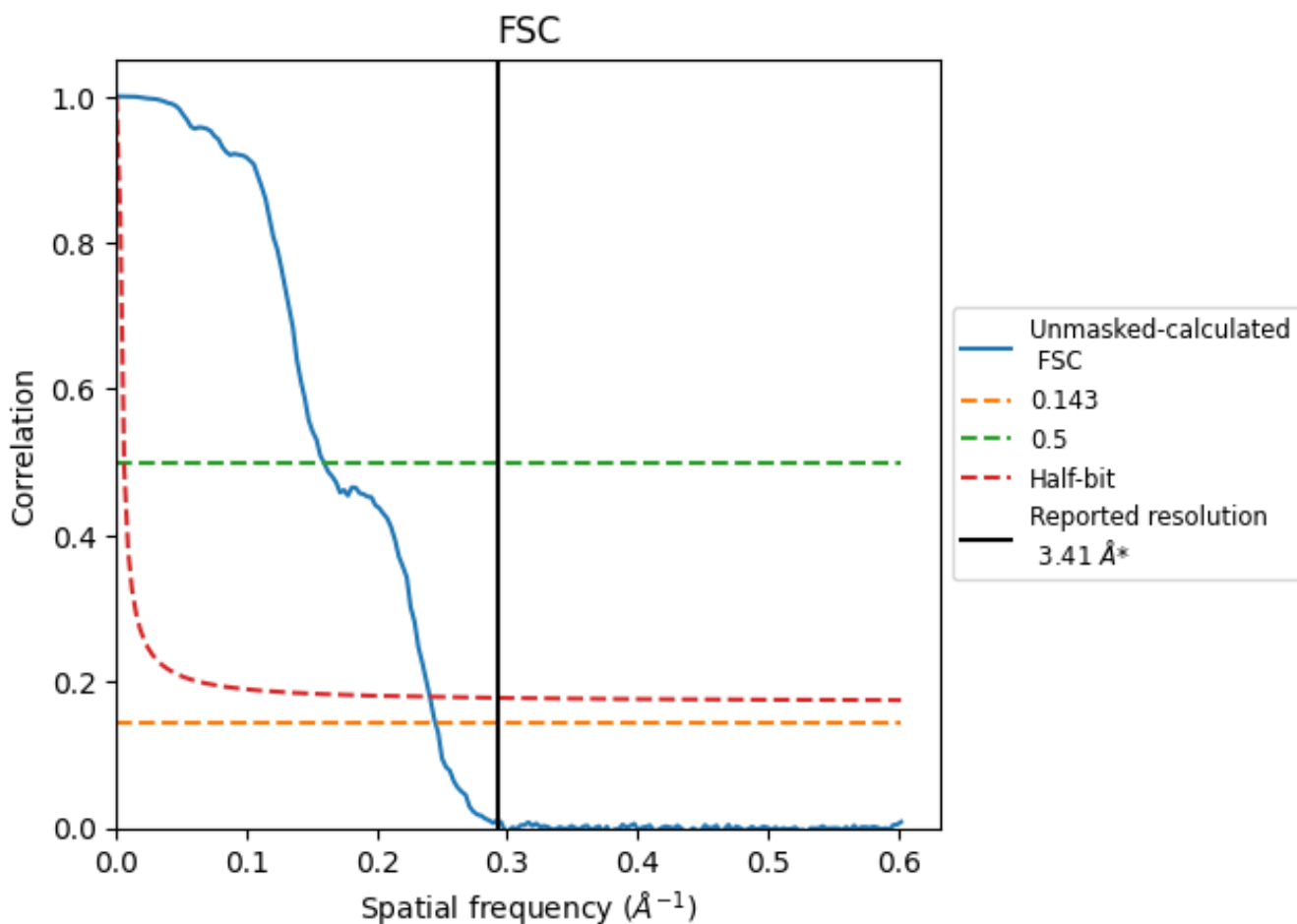


\*Reported resolution corresponds to spatial frequency of 0.293 Å<sup>-1</sup>

## 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 0.293  $\text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

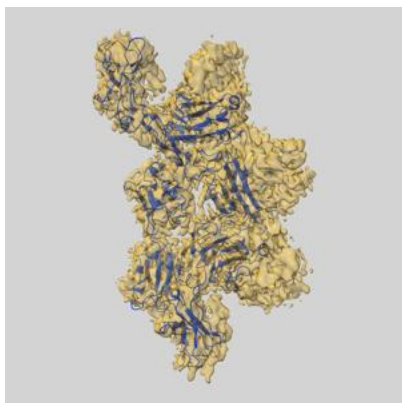
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.41	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.08	6.28	4.16

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.08 differs from the reported value 3.41 by more than 10 %

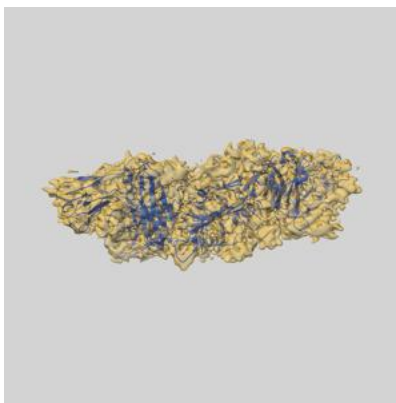
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-37937 and PDB model 8WYS. Per-residue inclusion information can be found in section [3](#) on page [7](#).

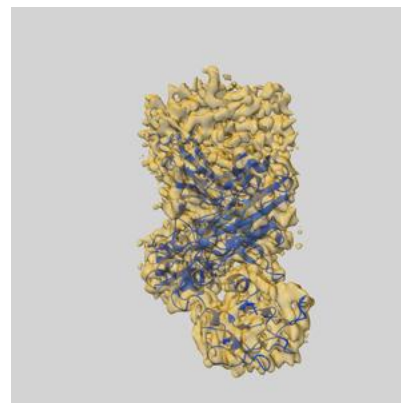
### 9.1 Map-model overlay [i](#)



X



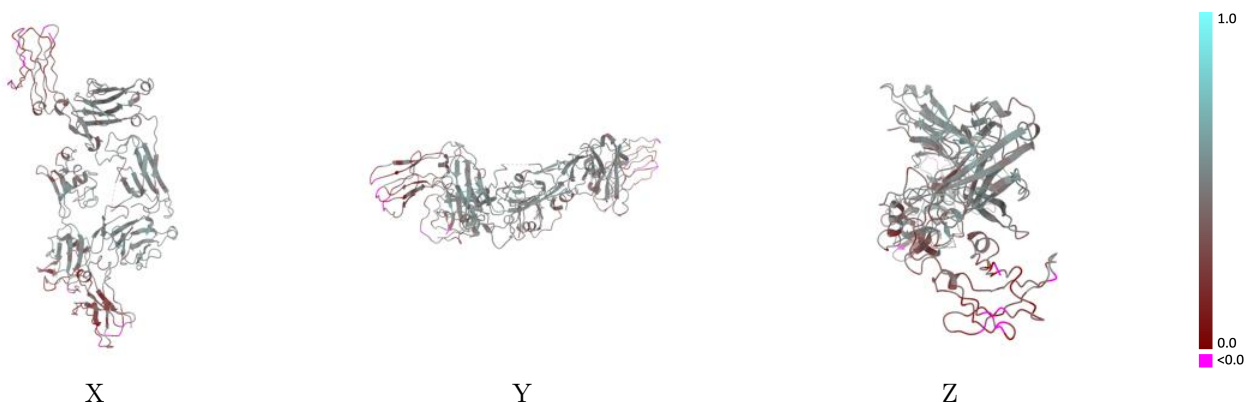
Y



Z

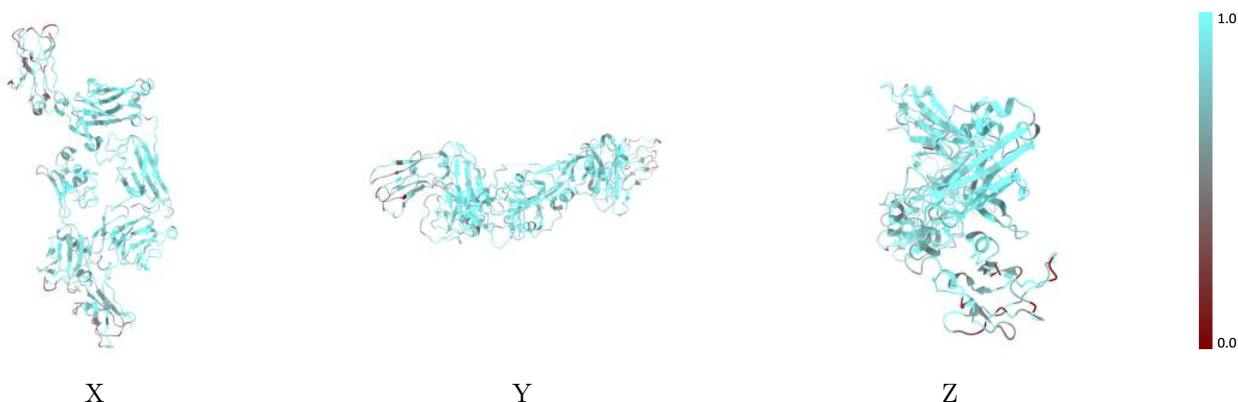
The images above show the 3D surface view of the map at the recommended contour level 0.15 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



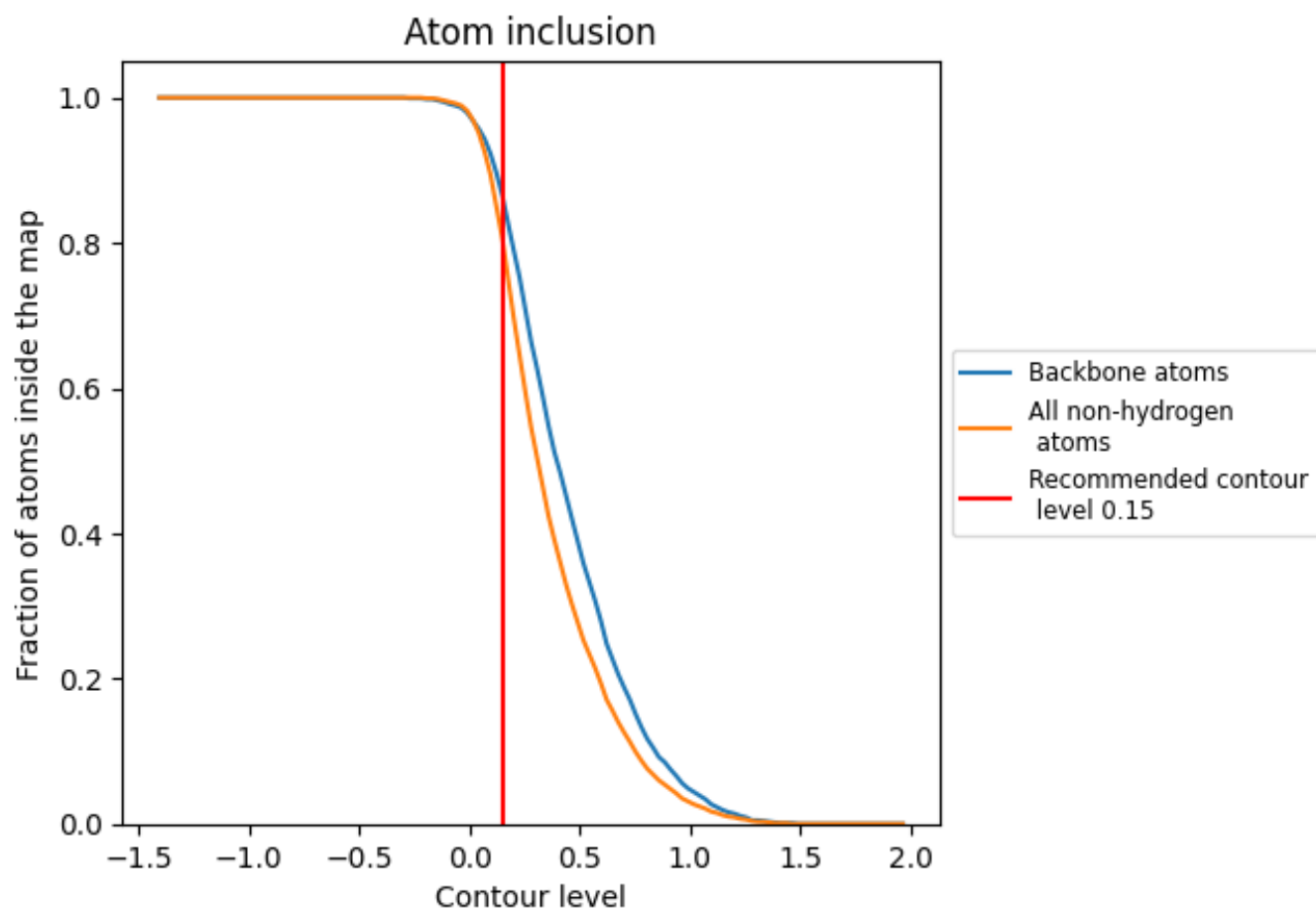
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.15).













## 9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 81% 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 (0.15) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8060	 0.4220
A	 0.7750	 0.3820
B	 0.8570	 0.4640
J	 0.8580	 0.4900
L	 0.7990	 0.4210
M	 0.8150	 0.4230

