



## Full wwPDB EM Validation Report ⓘ

Sep 4, 2024 – 05:28 pm BST

PDB ID : 8RN5  
EMDB ID : EMD-19387  
Title : Pseudo-symmetrical influenza B polymerase apo-dimer, ENDO(R) moiety  
(from "Influenza B polymerase pseudo-symmetrical dimer" | Local refinement)  
Authors : Arragain, B.; Cusack, S.  
Deposited on : 2024-01-09  
Resolution : 2.88 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.dev112  
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) : 2.38.2

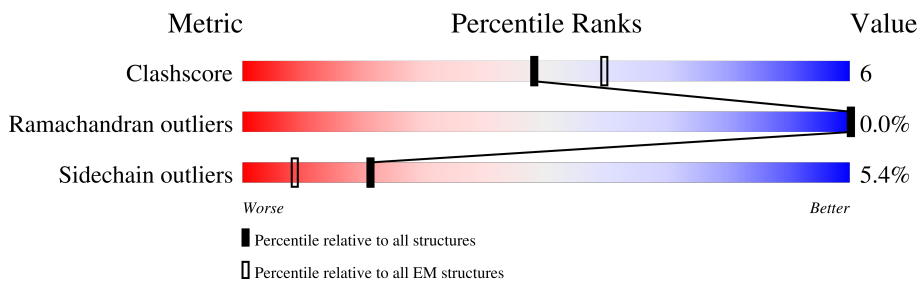
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.88 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	726	
1	E	726	
2	B	752	
2	D	752	
3	C	799	

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 33083 atoms, of which 16596 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 Polymerase acidic protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	A	705	Total	C	H	N	O	S	0	0
			11308	3602	5644	949	1073	40		
1	E	29	Total	C	H	N	O	S	0	0
			446	143	218	35	47	3		

- Molecule 2 is a protein called RNA-directed RNA polymerase catalytic subunit.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
2	B	713	Total	C	H	N	O	S	0	0
			11167	3534	5570	961	1052	50		
2	D	23	Total	C	H	N	O	S	0	0
			379	118	198	31	30	2		

- Molecule 3 is a protein called Polymerase basic protein 2.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
3	C	604	Total	C	H	N	O	S	0	0
			9782	3041	4966	856	887	32		

There are 29 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	771	GLY	-	expression tag	UNP Q5V8X3
C	772	TRP	-	expression tag	UNP Q5V8X3
C	773	SER	-	expression tag	UNP Q5V8X3
C	774	HIS	-	expression tag	UNP Q5V8X3
C	775	PRO	-	expression tag	UNP Q5V8X3
C	776	GLN	-	expression tag	UNP Q5V8X3
C	777	PHE	-	expression tag	UNP Q5V8X3
C	778	GLU	-	expression tag	UNP Q5V8X3
C	779	LYS	-	expression tag	UNP Q5V8X3
C	780	GLY	-	expression tag	UNP Q5V8X3
C	781	GLY	-	expression tag	UNP Q5V8X3

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Chain	Residue	Modelled	Actual	Comment	Reference
C	782	GLY	-	expression tag	UNP Q5V8X3
C	783	SER	-	expression tag	UNP Q5V8X3
C	784	GLY	-	expression tag	UNP Q5V8X3
C	785	GLY	-	expression tag	UNP Q5V8X3
C	786	GLY	-	expression tag	UNP Q5V8X3
C	787	SER	-	expression tag	UNP Q5V8X3
C	788	GLY	-	expression tag	UNP Q5V8X3
C	789	GLY	-	expression tag	UNP Q5V8X3
C	790	SER	-	expression tag	UNP Q5V8X3
C	791	ALA	-	expression tag	UNP Q5V8X3
C	792	TRP	-	expression tag	UNP Q5V8X3
C	793	SER	-	expression tag	UNP Q5V8X3
C	794	HIS	-	expression tag	UNP Q5V8X3
C	795	PRO	-	expression tag	UNP Q5V8X3
C	796	GLN	-	expression tag	UNP Q5V8X3
C	797	PHE	-	expression tag	UNP Q5V8X3
C	798	GLU	-	expression tag	UNP Q5V8X3
C	799	LYS	-	expression tag	UNP Q5V8X3

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

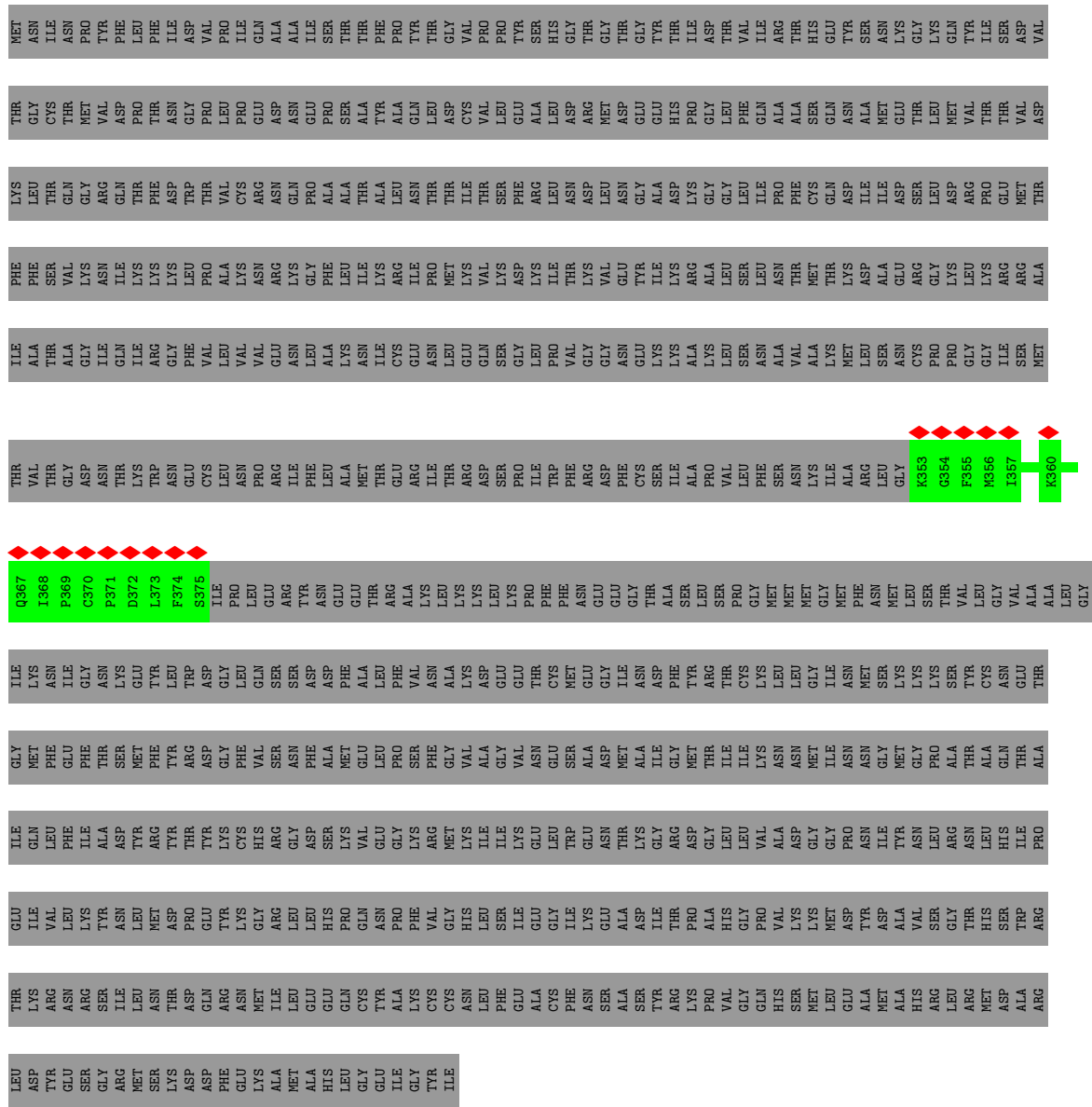
Mol	Chain	Residues	Atoms	AltConf
4	B	1	Total Mg 1 1	0



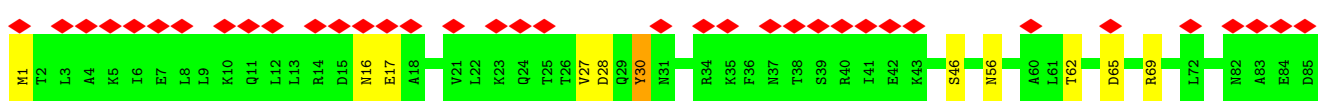




• Molecule 2: RNA-directed RNA polymerase catalytic subunit



• Molecule 3: Polymerase basic protein 2



I86	K189	A275	I335	D395	E455	G515	TRP	TYR	L695	I755
G87	E190	S276	S336	M396	S456	A516	ASP	GLN	A696	K756
T88	K191	M277	G337	R397	P457	M517	ALA	PHE	G697	R757
K89	R192	P278	R338	D398	K458	D518	GLU	LEU	F698	Q758
M82	E193	L279	G339	L399	A459	V519	ALA	LEU	L699	R759
C93	K196	E280	F940	I400	S460	E521	PHE	VAL	V700	M760
S94	G197	L281	K341	I401	E461	L522	GLU	LEU	S701	T761
A97	G198	A282	D942	L402	L462	L523	SER	GLY	G702	V762
W100	M199	V283	D943	C403	H463	E524	ILE	GLY	K703	E763
Y104	I200	E284	E944	M404	G464	S524	PRO	GLU	Y704	S764
G105	T201	I285	E345	V405	I465	Q525	GLN	ASN	D705	M765
P202	I203	A286	F346	F406	M466	A526	MET	PHE	P706	G766
E111	Y207	M287	L347	S407	E467	Q527	ALA	ILE	D707	TRP
S119	R211	K288	I348	Q408	S468	L528	GLN	GLU	L708	ALA
K124	T289	T290	G349	D409	M469	L529	TYR	VAL	G709	SER
M125	V290	I291	N350	T410	M470	I530	GLY	ARG	D710	GLY
R134	A215	L292	G351	R411	A471	T531	SER	LYS	F711	TRP
V140	R216	T293	T352	M412	S472	T532	ALA	PRO	K712	SER
R144	R217	E294	I353	F413	D473	D533	ARG	LEU	T713	HIS
K145	R218	P295	Q354	Q414	Y474	TRR	ALA	PHE	I714	PRO
R146	F219	K297	K355	G415	T475	PRO	VAL	SER	E715	PHE
V147	L220	K297	I356	V416	L476	LYS	LEU	TYR	F716	GLU
K154	L221	C299	G357	R417	K477	T480	GLN	ASN	E717	SER
E155	V222	L300	G359	G418	G478	V479	MET	TRP	L717	GLY
M156	A223	A301	D360	E419	V479	V480	ARG	GLY	T718	GLY
P157	G224	A302	D361	I420	V481	V481	ASP	GLU	K719	SER
P158	Q238	A303	E362	M421	V481	T482	GLU	THR	L720	GLY
D159	R243	I303	E363	F422	T482	L483	VAL	THR	K721	GLY
V164	G249	D304	E364	L423	T483	M484	LYS	ILE	P722	SER
I165	GLY	G305	E365	L424	M484	V485	GLU	CYS	G723	GLY
I168	ASN	G306	F365	N424	V485	I486	VAL	THR	E724	GLY
P171	LYS	G307	H966	R425	I486	D487	GLN	ASN	K725	SER
K172	THR	D307	V367	A426	D487	D488	THR	THR	A726	ALA
E173	LEU	A309	R368	G427	D488	F489	ILE	LEU	M727	TRP
A174	GLU	C310	C369	Q428	D488	S490	LYS	LEU	I728	SER
G175	S256	D311	G370	L429	F489	S490	LEU	LYS	L729	HIS
I176	R257	I312	E371	L430	S491	S491	VAL	LYS	L730	PRO
I177	R259	I313	C372	L431	T492	T492	LEU	ILE	Y731	GLN
R178	Q259	I313	R373	M433	E493	E493	PHE	GLU	Q732	PHE
E179	S260	R314	G374	M433	T494	T494	PHE	ASP	K733	GLU
W182	M261	A315	I375	Q435	E495	K496	PRO	LEU	G734	LYS
K267	I262	A316	L376	L436	E497	V497	THR	ASN	P735	ARG
I183	R266	A317	L377	L437	V498	S498	ALA	GLN	V736	ASN
H184	R266	G318	K377	Q437	S498	I499	THR	ASN	K737	GLN
R185	I269	G318	K378	R438	I499	T500	PHE	GLY	V738	PRO
R186	R270	L319	N381	F440	K501	K501	LEU	LEU	T739	GLY
E186	R271	G320	K382	F440	L502	M502	LEU	LEU	K740	LEU
	S272	I321	L382	L441	N503	L503	LYS	GLY	R741	ARG
	I273	Q323	E384	N442	S504	L504	ASP	PRO	K742	ASN
	V274	R324	K385	R443	M504	I506	MET	GLU	R743	GLN
		Q325	L387	S444	L505	I506	PHE	GLU	Y744	ALA
		R326	I388	N445	K507	K507	GLN	PRO	A746	GLY
		G328	N389	D446	R508	R508	TRP	ASN	L747	LEU
		R329	S390	F448	T509	T509	ASP	GLY	N749	ASP
		L330	A391	D449	G510	G510	LYS	GLU	D750	TRP
		E331	K392	Q450	E511	E511	LEU	LEU	I751	HIS
		L332	K393	W451	V512	V512	LEU	LEU	S752	GLY
		K333	E594	G452	I513	I513	PRO	PRO	Q753	GLY
		R534	E454	Y453	M514	M514	PRO	PRO	G754	LYS



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	92684	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	40	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	4.488	Depositor
Minimum map value	-3.325	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.094	Depositor
Recommended contour level	0.6	Depositor
Map size (Å)	403.19998, 403.19998, 403.19998	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.84, 0.84, 0.84	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: MG

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	0.25	0/5780	0.46	0/7794
1	E	0.24	0/231	0.41	0/311
2	B	0.25	0/5704	0.48	1/7685 (0.0%)
2	D	0.24	0/184	0.49	0/244
3	C	0.25	0/4888	0.51	0/6565
All	All	0.25	0/16787	0.48	1/22599 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	444	ASP	CB-CG-OD1	5.21	122.99	118.30

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	5664	5644	5643	59	0
1	E	228	218	218	0	0
2	B	5597	5570	5591	91	0
2	D	181	198	198	0	0
3	C	4816	4966	4965	62	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	1	0	0	0	0
All	All	16487	16596	16615	187	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 6.

All (187) 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:B:267:GLU:O	2:B:281:LYS:NZ	2.09	0.85
2:B:521:ASP:OD2	2:B:558:TYR:OH	1.95	0.83
2:B:613:ASN:OD1	3:C:124:LYS:NZ	2.15	0.79
3:C:371:GLU:O	3:C:373:ARG:NH1	2.15	0.79
2:B:696:GLU:OE2	3:C:30:TYR:OH	2.00	0.79
1:A:459:VAL:O	1:A:463:THR:HG23	1.83	0.79
2:B:299:SER:OG	2:B:451:ASN:OD1	2.01	0.79
2:B:233:ARG:NH1	2:B:507:GLU:OE1	2.17	0.77
3:C:144:ARG:NH2	3:C:488:ASP:O	2.17	0.77
2:B:271:LEU:HD12	2:B:272:PRO:HD2	1.69	0.73
1:A:427:ASP:N	1:A:427:ASP:OD1	2.22	0.72
2:B:306:ASN:ND2	2:B:444:ASP:O	2.23	0.72
3:C:285:ILE:O	3:C:289:THR:OG1	2.06	0.71
3:C:728:ILE:HD12	3:C:738:VAL:HG21	1.73	0.71
1:A:507:LEU:HD13	1:A:512:ASP:HB2	1.72	0.71
2:B:718:ALA:HB1	2:B:746:LEU:HD11	1.74	0.70
3:C:453:TYR:OH	3:C:467:GLU:OE1	2.09	0.70
3:C:323:GLN:N	3:C:323:GLN:OE1	2.24	0.69
2:B:292:ASN:O	2:B:292:ASN:ND2	2.26	0.69
3:C:700:VAL:HA	3:C:738:VAL:HG12	1.74	0.69
3:C:266:ARG:NH1	3:C:520:SER:OG	2.28	0.67
2:B:444:ASP:O	2:B:444:ASP:OD1	2.13	0.67
3:C:329:ARG:NH2	3:C:398:ASP:OD2	2.29	0.65
1:A:505:SER:OG	1:A:505:SER:O	2.14	0.64
2:B:636:ILE:HG23	2:B:639:ILE:HD12	1.80	0.63
3:C:221:PRO:O	3:C:238:GLN:NE2	2.30	0.63
1:A:242:ASN:ND2	2:B:87:CYS:SG	2.72	0.63
2:B:59:ASP:OD1	2:B:60:VAL:N	2.31	0.63
1:A:46:TYR:CE1	1:A:79:VAL:HG11	2.34	0.63
2:B:531:ASN:O	2:B:535:ASN:ND2	2.32	0.62
2:B:67:ASP:OD1	2:B:69:THR:OG1	2.17	0.62
2:B:24:TYR:CD1	2:B:233:ARG:HD3	2.35	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:565:SER:O	2:B:576:LYS:NZ	2.26	0.62
1:A:164:GLU:OE2	1:A:167:LYS:NZ	2.25	0.62
2:B:622:ARG:NH1	3:C:105:GLY:O	2.33	0.62
1:A:36:PHE:O	1:A:40:VAL:HG23	2.00	0.61
1:A:77:TYR:OH	1:A:161:SER:O	2.19	0.60
3:C:389:ASN:ND2	3:C:484:ASN:O	2.34	0.60
1:A:488:GLU:OE1	1:A:488:GLU:N	2.33	0.60
2:B:224:LEU:HD12	2:B:347:LYS:HB2	1.85	0.59
3:C:698:PHE:O	3:C:741:ARG:NH2	2.35	0.59
1:A:607:ASP:OD1	1:A:610:ASN:N	2.37	0.58
2:B:571:ARG:NH1	2:B:591:ALA:O	2.36	0.58
1:A:576:CYS:HG	2:B:25:THR:HG1	1.49	0.58
3:C:529:MET:SD	3:C:529:MET:N	2.76	0.57
2:B:597:ILE:CD1	2:B:610:LEU:HD23	2.35	0.57
1:A:430:PRO:O	1:A:434:VAL:HG13	2.05	0.57
2:B:435:TYR:OH	2:B:464:ASP:OD2	2.21	0.56
3:C:713:THR:HG22	3:C:714:ILE:H	1.71	0.56
3:C:419:GLU:OE2	3:C:421:ASN:ND2	2.38	0.56
2:B:502:SER:O	2:B:502:SER:OG	2.20	0.56
2:B:535:ASN:OD1	3:C:218:ARG:NH2	2.38	0.56
3:C:500:THR:HG22	3:C:504:SER:O	2.07	0.55
1:A:576:CYS:SG	2:B:25:THR:OG1	2.56	0.55
2:B:719:HIS:HB3	3:C:729:LEU:HD21	1.88	0.55
2:B:633:HIS:HA	2:B:636:ILE:HD12	1.90	0.54
3:C:257:ARG:NH2	3:C:299:CYS:SG	2.80	0.54
3:C:515:GLY:N	3:C:518:ASP:OD2	2.38	0.54
2:B:124:GLN:O	2:B:249:ARG:NH2	2.41	0.54
2:B:342:VAL:O	2:B:346:ASN:ND2	2.40	0.54
2:B:86:ASP:OD1	2:B:86:ASP:N	2.39	0.54
2:B:282:LEU:O	2:B:286:VAL:HG23	2.07	0.54
1:A:212:ARG:NH1	2:B:335:ASP:OD1	2.40	0.53
2:B:454:ASP:N	2:B:454:ASP:OD1	2.41	0.53
2:B:532:ASN:OD1	2:B:536:ASN:ND2	2.40	0.53
2:B:429:ASN:OD1	2:B:430:ILE:N	2.41	0.53
3:C:272:SER:OG	3:C:278:PRO:O	2.26	0.53
1:A:234:ASP:O	1:A:234:ASP:OD1	2.27	0.53
2:B:685:GLU:OE1	2:B:686:GLN:N	2.42	0.53
3:C:525:GLN:O	3:C:526:ALA:CB	2.56	0.53
2:B:46:THR:HG21	2:B:404:LEU:HD11	1.92	0.52
2:B:518:GLU:OE2	2:B:571:ARG:NH2	2.43	0.52
2:B:291:SER:OG	3:C:387:LEU:HD13	2.10	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:317:ILE:O	2:B:321:MET:HG3	2.09	0.52
2:B:58:SER:O	2:B:62:GLY:N	2.38	0.51
1:A:678:ASP:OD1	1:A:678:ASP:O	2.29	0.51
3:C:190:GLU:OE2	3:C:190:GLU:HA	2.09	0.51
1:A:222:ASN:OD1	1:A:222:ASN:N	2.44	0.51
2:B:636:ILE:HD13	3:C:203:ILE:HG23	1.93	0.50
2:B:636:ILE:HD11	3:C:201:THR:HG21	1.93	0.50
2:B:24:TYR:CE1	2:B:233:ARG:HD3	2.47	0.50
1:A:569:TRP:HB2	2:B:27:VAL:HG12	1.93	0.50
3:C:379:SER:OG	3:C:380:LYS:N	2.44	0.50
3:C:65:ASP:N	3:C:65:ASP:OD1	2.45	0.50
2:B:636:ILE:HG21	3:C:203:ILE:HG23	1.94	0.50
2:B:511:PHE:CE2	2:B:546:ALA:HB1	2.47	0.49
3:C:27:VAL:HG11	3:C:732:GLN:HB3	1.93	0.49
2:B:636:ILE:CD1	3:C:201:THR:HG21	2.41	0.49
2:B:706:LYS:NZ	3:C:28:ASP:O	2.45	0.49
1:A:8:ASN:O	1:A:173:ARG:NH2	2.45	0.49
1:A:51:MET:SD	1:A:169:ARG:NH2	2.86	0.49
2:B:338:SER:O	2:B:342:VAL:HG23	2.13	0.48
3:C:179:GLU:OE2	3:C:179:GLU:O	2.31	0.48
1:A:136:LYS:O	1:A:140:GLY:N	2.46	0.48
3:C:100:TRP:O	3:C:104:TYR:N	2.41	0.48
3:C:140:VAL:HG11	3:C:243:ARG:HB2	1.96	0.47
2:B:511:PHE:CD2	2:B:546:ALA:HB1	2.49	0.47
3:C:728:ILE:CD1	3:C:738:VAL:HG21	2.43	0.47
1:A:277:VAL:HG23	1:A:398:ARG:O	2.15	0.47
2:B:76:ASP:N	2:B:76:ASP:OD1	2.48	0.47
1:A:380:ALA:HB1	2:B:357:ILE:HD11	1.96	0.47
3:C:713:THR:HG22	3:C:714:ILE:N	2.29	0.47
2:B:264:GLU:HA	2:B:271:LEU:HA	1.96	0.47
2:B:659:VAL:HG12	2:B:660:SER:N	2.30	0.47
3:C:467:GLU:OE1	3:C:467:GLU:N	2.46	0.47
1:A:200:ILE:HD12	1:A:200:ILE:N	2.31	0.46
1:A:507:LEU:HD22	1:A:512:ASP:O	2.16	0.46
1:A:86:THR:O	1:A:90:MET:HG3	2.16	0.46
1:A:359:THR:HG22	1:A:359:THR:O	2.15	0.46
2:B:266:LEU:O	2:B:270:GLY:N	2.47	0.46
2:B:577:GLU:OE1	3:C:104:TYR:OH	2.33	0.46
3:C:517:ASN:O	3:C:517:ASN:ND2	2.40	0.46
2:B:533:MET:SD	2:B:600:LEU:HD22	2.56	0.46
3:C:164:VAL:O	3:C:168:ILE:HD12	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:93:CYS:SG	3:C:97:ALA:HB3	2.56	0.45
1:A:584:MET:HB3	1:A:633:LEU:HD11	1.98	0.45
1:A:163:ASP:N	1:A:163:ASP:OD1	2.49	0.45
1:A:192:GLY:O	1:A:196:VAL:N	2.49	0.45
3:C:306:GLY:O	3:C:324:ARG:NH2	2.49	0.45
1:A:146:MET:SD	1:A:146:MET:N	2.90	0.45
2:B:24:TYR:HD1	2:B:233:ARG:HD3	1.79	0.45
1:A:584:MET:CB	1:A:633:LEU:HD11	2.47	0.45
3:C:412:MET:HG3	3:C:413:PHE:N	2.32	0.45
1:A:465:LEU:HD12	1:A:479:ILE:HD13	1.98	0.45
3:C:349:GLY:N	3:C:413:PHE:O	2.46	0.45
1:A:525:ASP:HB3	1:A:528:VAL:HG23	1.99	0.45
2:B:415:MET:O	2:B:419:VAL:HG23	2.16	0.45
3:C:308:VAL:HG23	3:C:519:VAL:HG12	1.98	0.45
3:C:183:ILE:HG23	3:C:294:GLU:HB3	2.00	0.44
3:C:186:GLU:OE1	3:C:186:GLU:N	2.42	0.44
1:A:43:GLU:OE2	1:A:173:ARG:NE	2.43	0.44
2:B:264:GLU:HB2	2:B:271:LEU:HD13	2.00	0.44
1:A:507:LEU:HD13	1:A:512:ASP:CB	2.43	0.44
1:A:581:MET:O	1:A:584:MET:HG3	2.17	0.44
1:A:246:MET:HE2	2:B:471:LEU:HD21	2.00	0.44
1:A:43:GLU:O	1:A:47:VAL:HG23	2.18	0.43
3:C:147:VAL:HG11	3:C:222:VAL:HG21	2.00	0.43
2:B:718:ALA:CB	2:B:746:LEU:HD11	2.47	0.43
1:A:211:LEU:HD21	2:B:60:VAL:HG11	1.99	0.43
2:B:636:ILE:HG22	2:B:636:ILE:O	2.18	0.43
3:C:16:ASN:OD1	3:C:17:GLU:N	2.52	0.43
1:A:505:SER:O	1:A:507:LEU:N	2.52	0.43
1:A:568:LYS:O	1:A:568:LYS:HD3	2.18	0.43
1:A:575:ARG:NH2	2:B:508:LEU:O	2.52	0.43
2:B:636:ILE:HD13	3:C:203:ILE:CG2	2.49	0.43
3:C:525:GLN:O	3:C:526:ALA:HB2	2.17	0.43
1:A:377:LYS:O	1:A:381:ILE:HG12	2.19	0.43
2:B:184:VAL:O	2:B:184:VAL:HG23	2.19	0.42
1:A:112:ASP:O	1:A:116:LYS:N	2.52	0.42
1:A:343:CYS:SG	1:A:501:VAL:HG23	2.59	0.42
2:B:130:ASP:O	2:B:134:CYS:N	2.51	0.42
2:B:210:ASP:OD1	2:B:211:LYS:N	2.51	0.42
1:A:476:TYR:CD2	1:A:503:GLY:HA2	2.55	0.42
2:B:262:ILE:HD11	2:B:325:ILE:CG2	2.50	0.42
2:B:747:GLY:HA3	2:B:752:ILE:HD12	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:383:ASP:O	2:B:380:ARG:NH2	2.53	0.42
1:A:455:MET:HB2	1:A:641:LEU:HD13	2.00	0.42
1:A:540:ARG:NH1	1:A:542:GLY:O	2.52	0.42
3:C:405:VAL:HA	3:C:412:MET:HE3	2.01	0.42
2:B:27:VAL:O	2:B:27:VAL:HG23	2.19	0.42
2:B:340:ALA:HB3	2:B:341:PRO:HD3	2.02	0.42
2:B:509:PRO:O	2:B:511:PHE:CD1	2.73	0.42
3:C:708:LEU:HG	3:C:725:LYS:HZ2	1.84	0.42
1:A:325:ILE:HG21	1:A:526:PRO:HG2	2.02	0.41
1:A:29:GLU:OE1	3:C:496:LYS:NZ	2.50	0.41
3:C:348:ILE:HG22	3:C:349:GLY:N	2.34	0.41
2:B:82:TYR:O	2:B:84:GLN:NE2	2.51	0.41
1:A:343:CYS:SG	1:A:478:VAL:HG13	2.60	0.41
2:B:347:LYS:NZ	2:B:405:SER:O	2.53	0.41
2:B:517:ASN:N	2:B:517:ASN:OD1	2.53	0.41
1:A:465:LEU:HD12	1:A:479:ILE:CD1	2.49	0.41
1:A:546:VAL:HG23	1:A:547:SER:N	2.36	0.41
2:B:571:ARG:HG2	2:B:575:ILE:HD12	2.02	0.41
2:B:443:SER:O	2:B:444:ASP:HB3	2.21	0.41
1:A:428:VAL:HG22	2:B:601:ARG:HD3	2.03	0.41
2:B:94:ARG:O	2:B:98:GLU:HG2	2.21	0.41
2:B:25:THR:OG1	2:B:25:THR:O	2.39	0.41
3:C:305:GLY:O	3:C:314:ARG:NH2	2.54	0.41
2:B:258:LEU:HD21	2:B:325:ILE:HG21	2.03	0.40
2:B:511:PHE:CD1	2:B:511:PHE:N	2.90	0.40
2:B:266:LEU:HD13	2:B:422:VAL:HG11	2.04	0.40
3:C:291:ILE:HD13	3:C:530:ILE:HD12	2.03	0.40
3:C:728:ILE:HG22	3:C:729:LEU:N	2.35	0.40
1:A:51:MET:O	1:A:62:THR:HG23	2.21	0.40
1:A:418:ALA:HB2	1:A:485:VAL:HG22	2.04	0.40
2:B:130:ASP:OD1	2:B:132:THR:OG1	2.38	0.40
2:B:424:ALA:HB2	2:B:472:LEU:CD1	2.52	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	701/726 (97%)	676 (96%)	25 (4%)	0	100	100
1	E	27/726 (4%)	27 (100%)	0	0	100	100
2	B	703/752 (94%)	680 (97%)	23 (3%)	0	100	100
2	D	21/752 (3%)	21 (100%)	0	0	100	100
3	C	598/799 (75%)	567 (95%)	30 (5%)	1 (0%)	44	71
All	All	2050/3755 (55%)	1971 (96%)	78 (4%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	526	ALA

### 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	627/645 (97%)	596 (95%)	31 (5%)	21	50
1	E	24/645 (4%)	23 (96%)	1 (4%)	25	56
2	B	612/645 (95%)	577 (94%)	35 (6%)	17	43
2	D	21/645 (3%)	21 (100%)	0	100	100
3	C	527/693 (76%)	496 (94%)	31 (6%)	16	42
All	All	1811/3273 (55%)	1713 (95%)	98 (5%)	21	46

All (98) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	99	HIS
1	A	105	LYS
1	A	143	MET

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	149	SER
1	A	203	LYS
1	A	245	ARG
1	A	272	HIS
1	A	286	SER
1	A	299	SER
1	A	332	ASN
1	A	333	GLU
1	A	343	CYS
1	A	392	LYS
1	A	427	ASP
1	A	434	VAL
1	A	449	CYS
1	A	470	ASN
1	A	475	LYS
1	A	492	SER
1	A	495	MET
1	A	505	SER
1	A	506	HIS
1	A	527	ARG
1	A	568	LYS
1	A	581	MET
1	A	595	GLN
1	A	605	LYS
1	A	611	SER
1	A	629	PHE
1	A	644	TYR
1	A	671	ARG
2	B	25	THR
2	B	41	ASP
2	B	50	SER
2	B	55	GLN
2	B	69	THR
2	B	93	ASP
2	B	120	ASP
2	B	159	ASP
2	B	183	SER
2	B	209	LYS
2	B	227	MET
2	B	263	CYS
2	B	291	SER
2	B	292	ASN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	B	305	ASP
2	B	306	ASN
2	B	309	TRP
2	B	360	LYS
2	B	367	GLN
2	B	393	LYS
2	B	437	TRP
2	B	477	SER
2	B	484	ASN
2	B	490	GLU
2	B	502	SER
2	B	503	ASN
2	B	506	MET
2	B	510	SER
2	B	571	ARG
2	B	586	ASP
2	B	588	LEU
2	B	657	ASP
2	B	665	TRP
2	B	726	ARG
2	B	741	LYS
3	C	1	MET
3	C	30	TYR
3	C	46	SER
3	C	56	ASN
3	C	62	THR
3	C	69	ARG
3	C	92	MET
3	C	94	SER
3	C	111	GLU
3	C	119	SER
3	C	125	MET
3	C	134	ARG
3	C	146	ARG
3	C	156	MET
3	C	178	ARG
3	C	179	GLU
3	C	185	ARG
3	C	186	GLU
3	C	199	MET
3	C	261	MET
3	C	338	ARG

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Mol	Chain	Res	Type
3	C	369	CYS
3	C	373	ARG
3	C	384	GLU
3	C	456	SER
3	C	468	SER
3	C	517	ASN
3	C	695	LEU
3	C	718	GLU
3	C	732	GLN
3	C	760	MET
1	E	360	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](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 1 ligands modelled in this entry, 1 is 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 [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

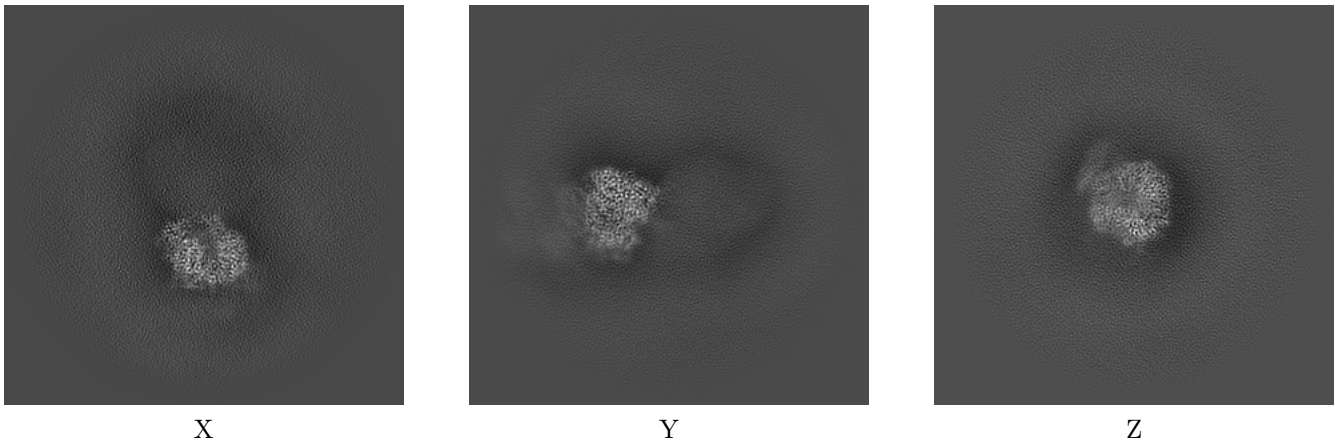
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-19387. These allow visual inspection of the internal detail of the map and identification of artifacts.

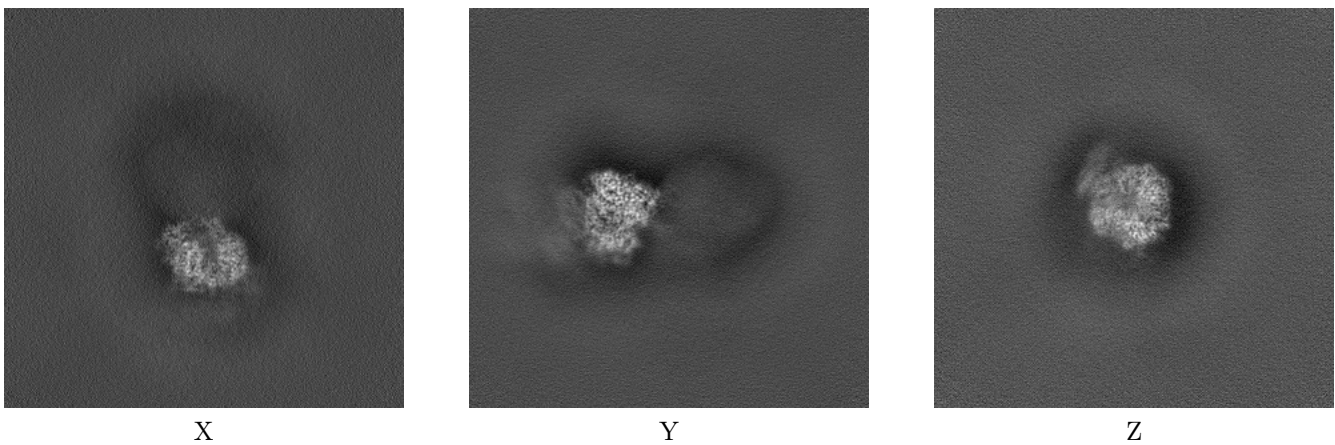
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

#### 6.1.1 Primary map



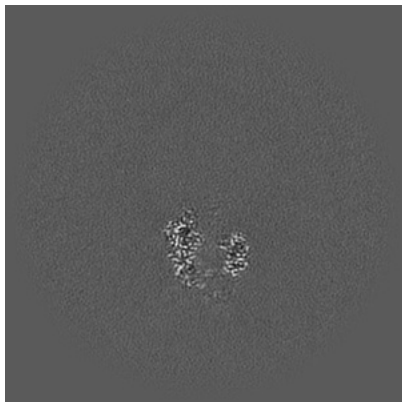
#### 6.1.2 Raw map



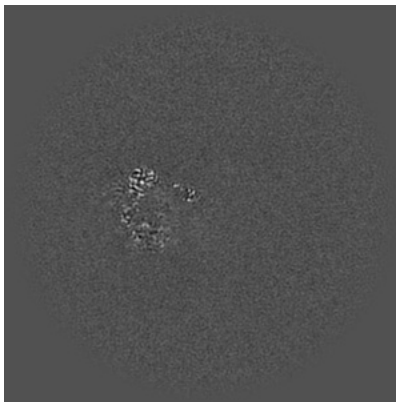
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

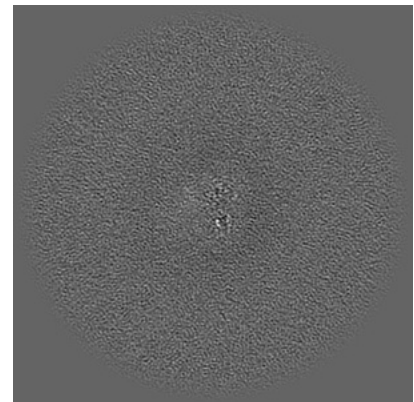
### 6.2.1 Primary map



X Index: 240

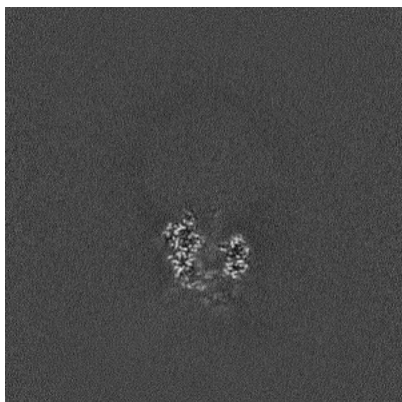


Y Index: 240

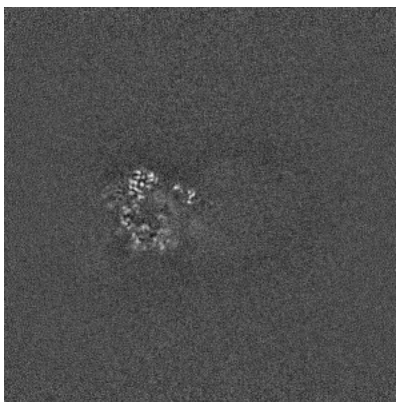


Z Index: 240

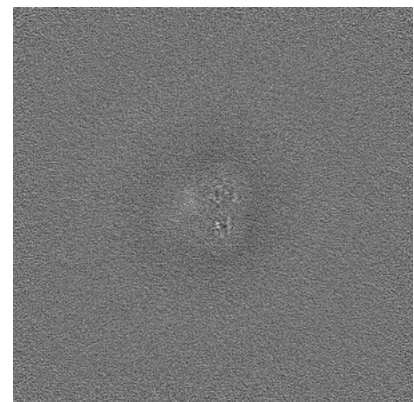
### 6.2.2 Raw map



X Index: 240



Y Index: 240

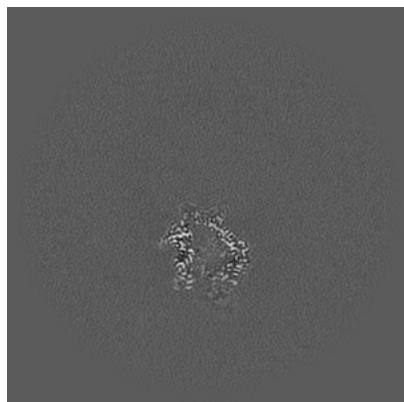


Z Index: 240

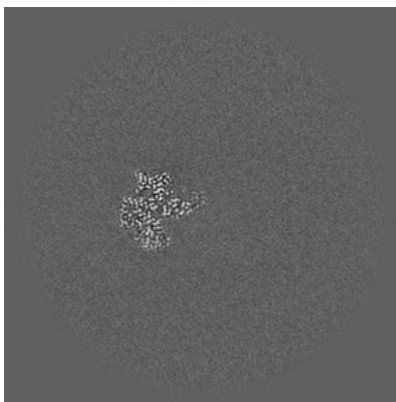
The images above show central slices of the map in three orthogonal directions.

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

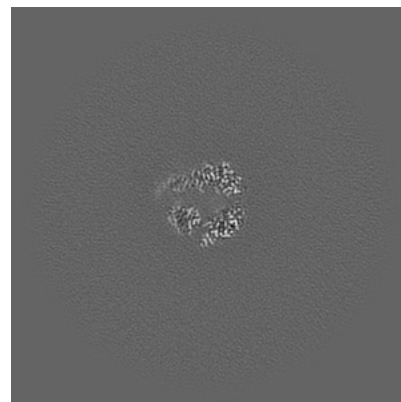
### 6.3.1 Primary map



X Index: 249

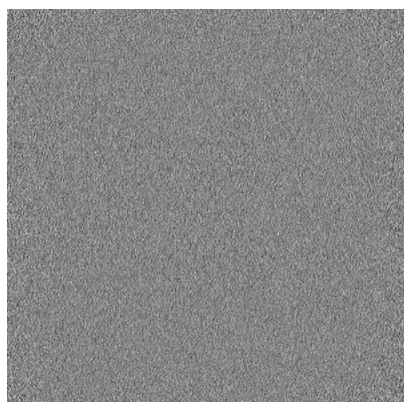


Y Index: 221

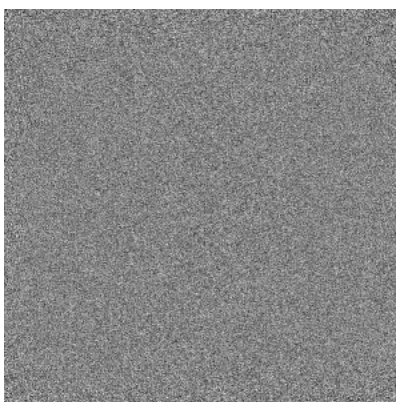


Z Index: 180

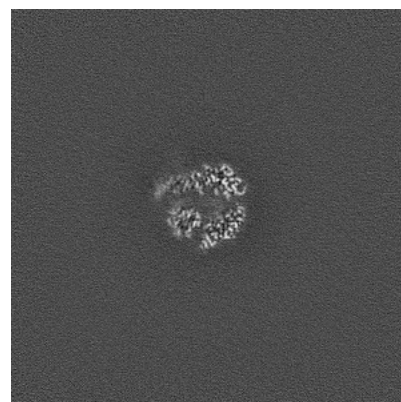
### 6.3.2 Raw map



X Index: 0



Y Index: 0

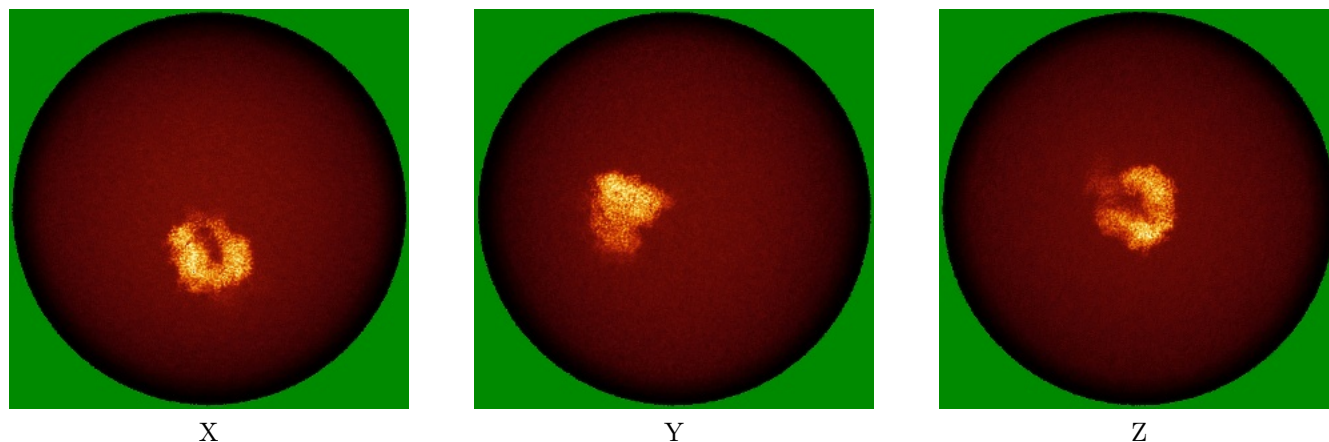


Z Index: 179

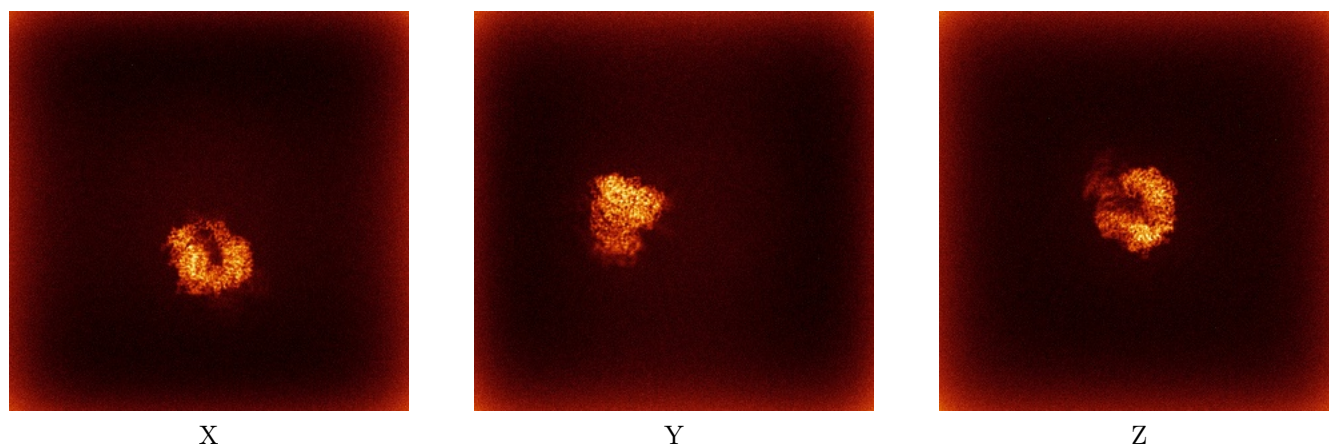
The images above show the largest variance slices of the map in three orthogonal directions.

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

### 6.4.1 Primary map



### 6.4.2 Raw map



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](#)

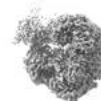
### 6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.6. 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.

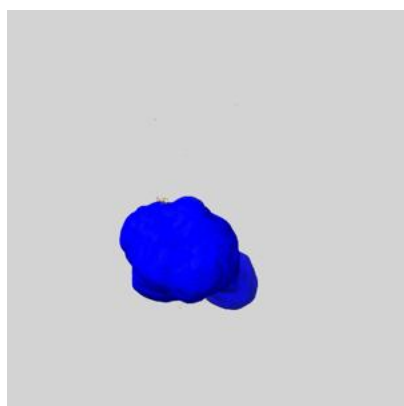
## 6.6 Mask visualisation [i](#)

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

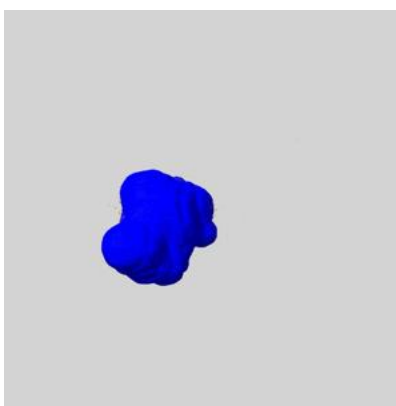
A mask typically either:

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

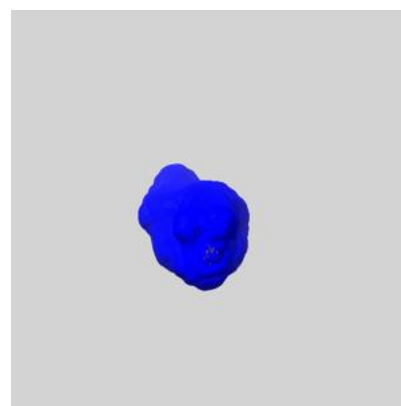
### 6.6.1 emd\_19387\_msk\_1.map [i](#)



X



Y

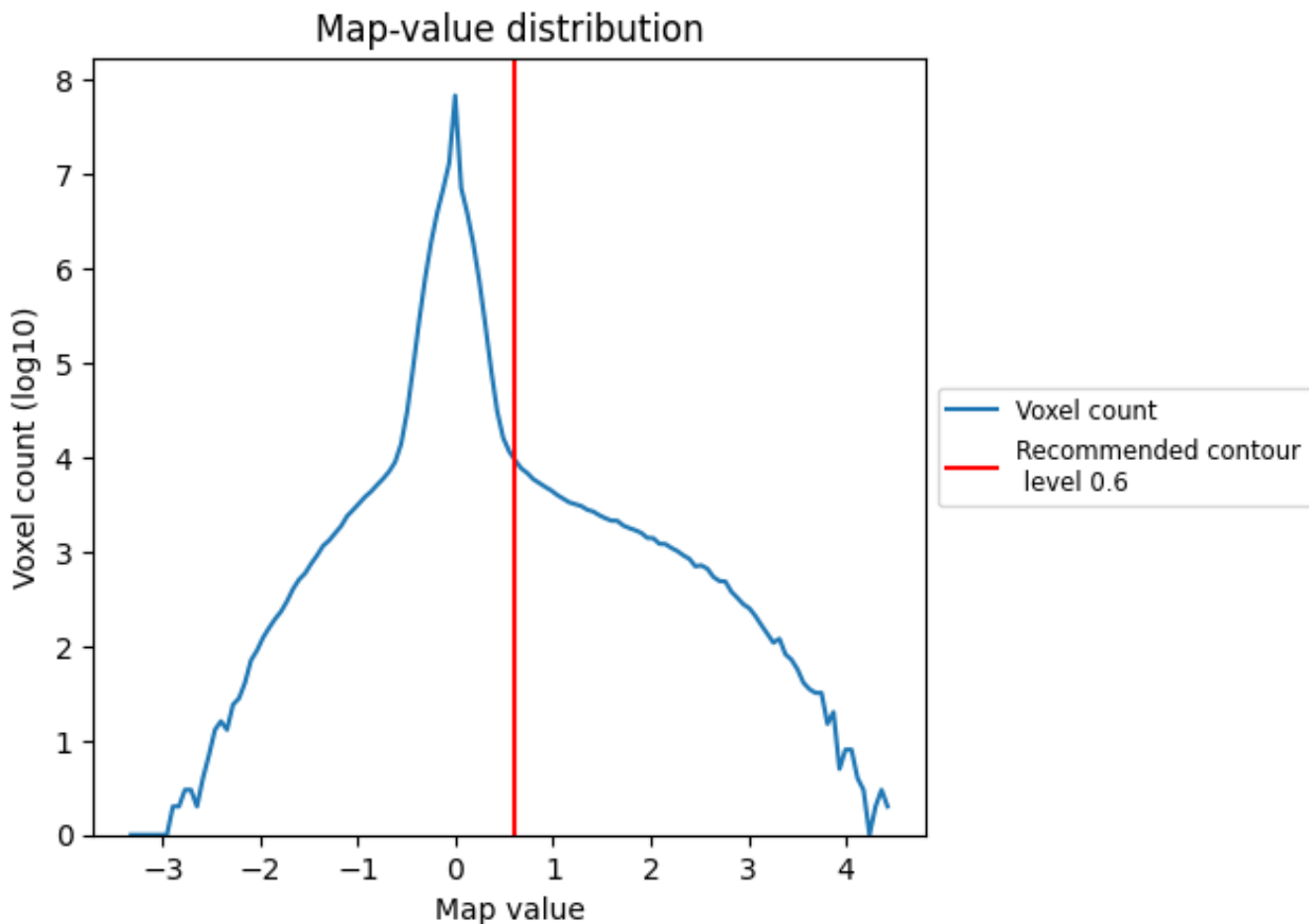


Z

## 7 Map analysis [i](#)

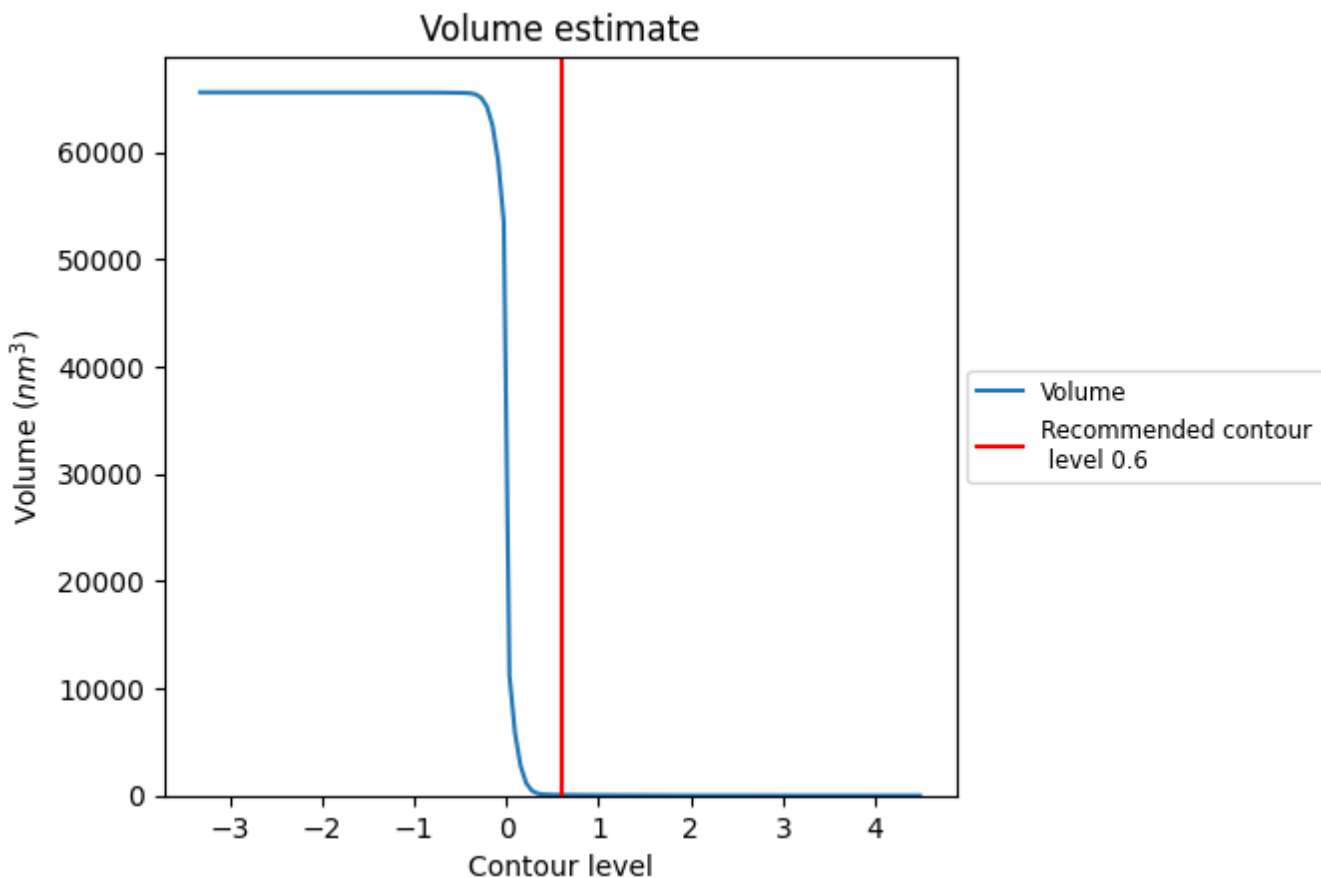
This section contains the results of statistical analysis of the map.

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



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

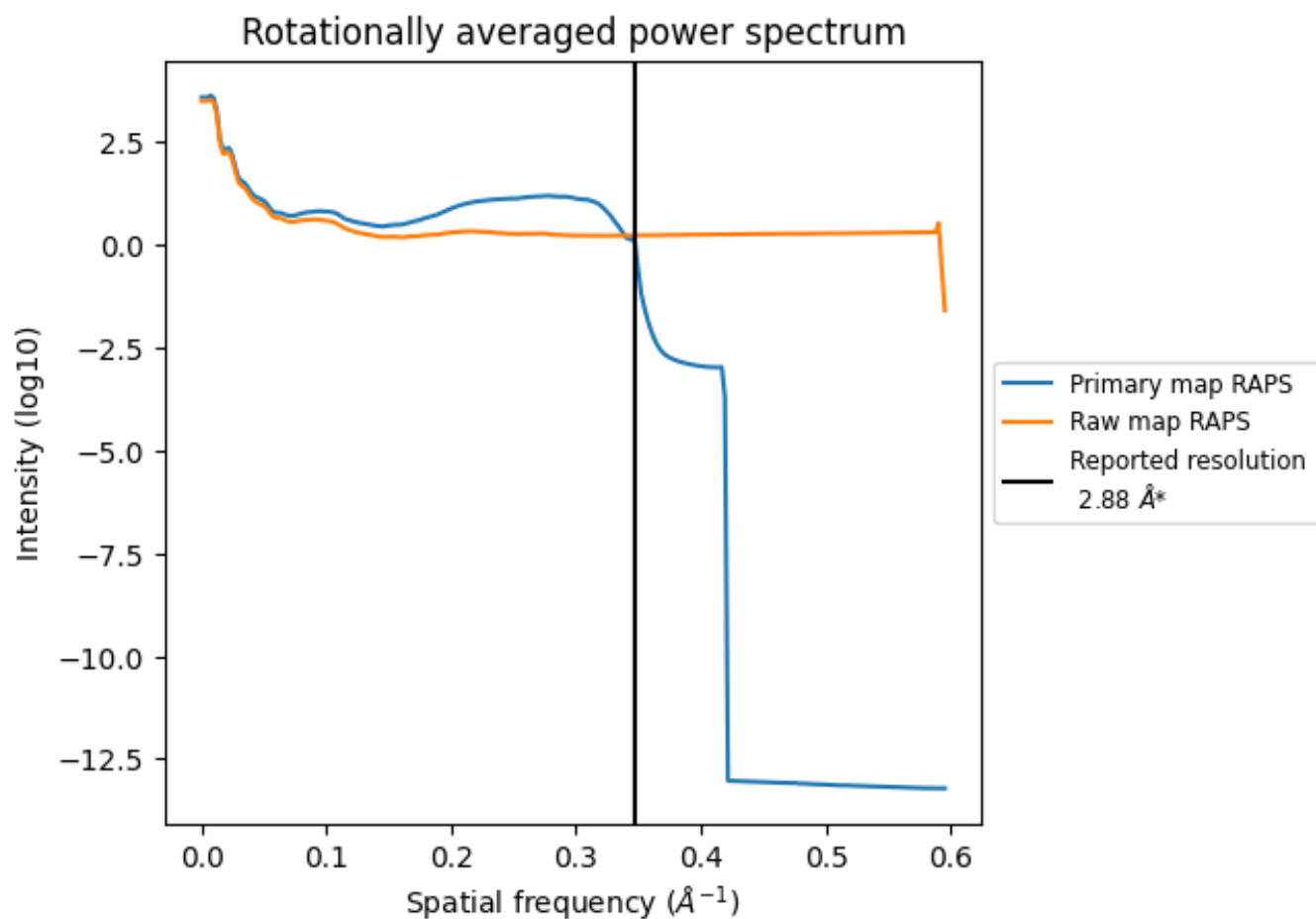
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 60 nm<sup>3</sup>; this corresponds to an approximate mass of 54 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](#)

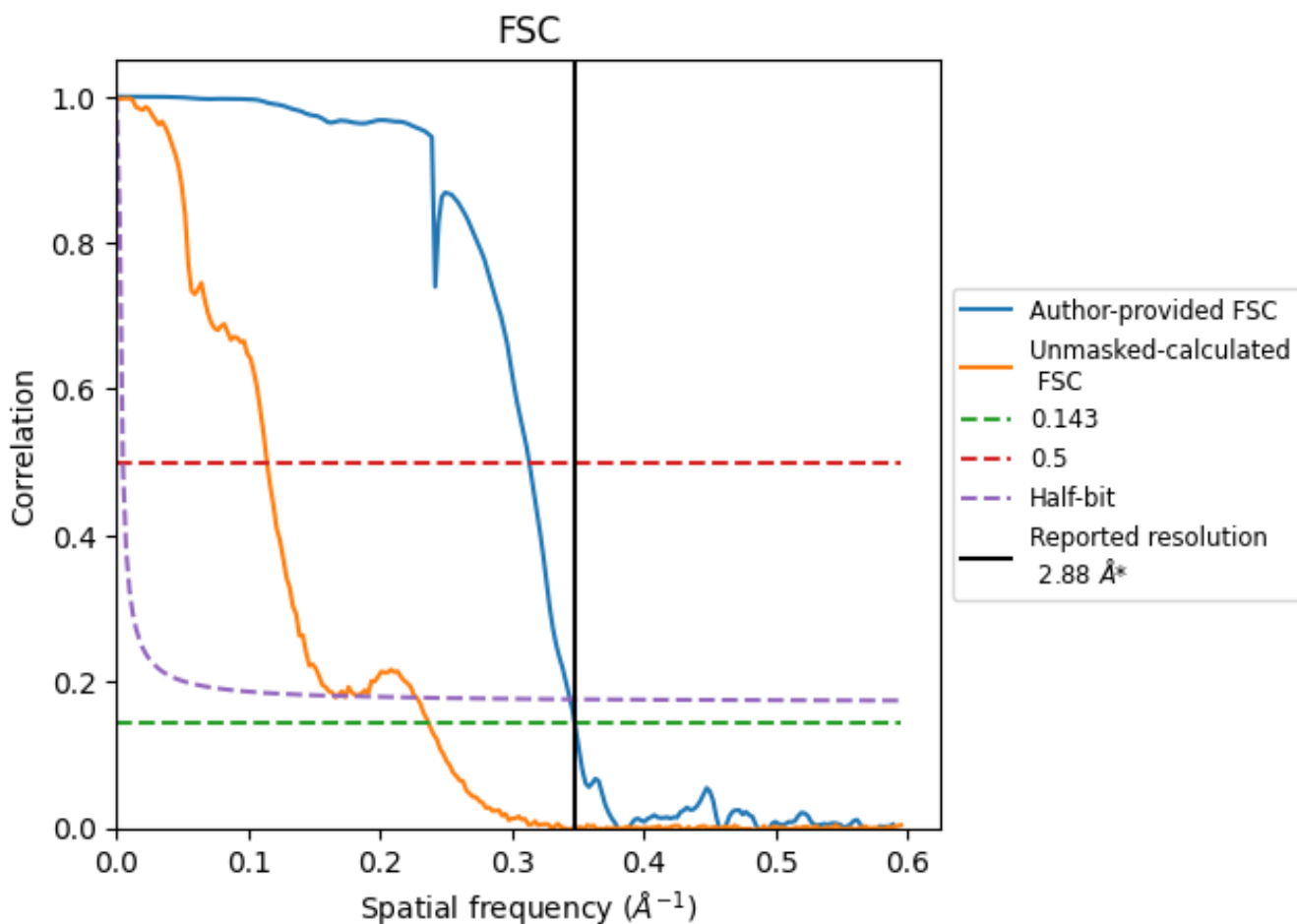


\*Reported resolution corresponds to spatial frequency of 0.347 Å<sup>-1</sup>

## 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 0.347 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

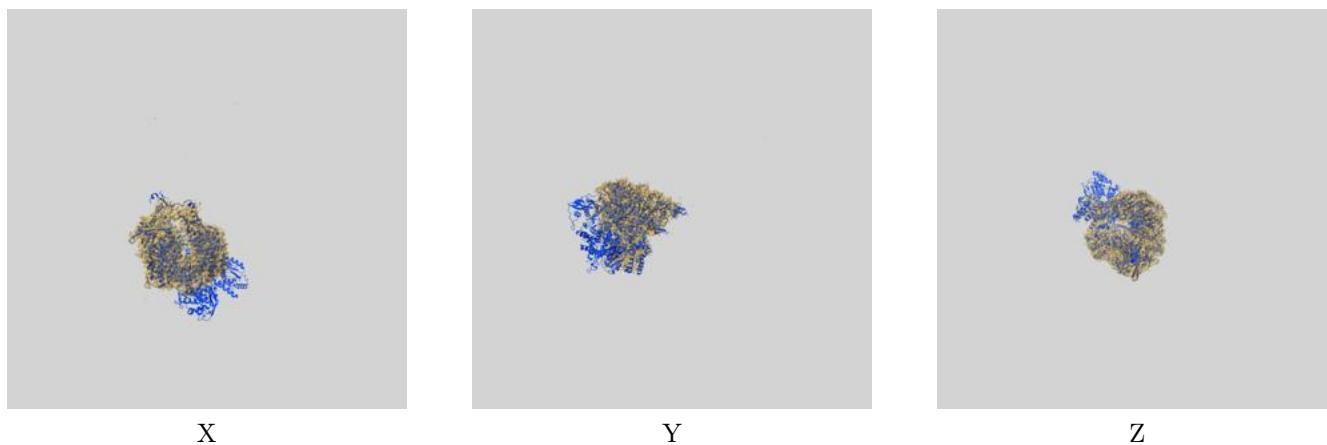
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.88	-	-
Author-provided FSC curve	2.88	3.19	2.91
Unmasked-calculated*	4.22	8.76	6.05

\*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 4.22 differs from the reported value 2.88 by more than 10 %

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

This section contains information regarding the fit between EMDB map EMD-19387 and PDB model 8RN5. Per-residue inclusion information can be found in section 3 on page 5.

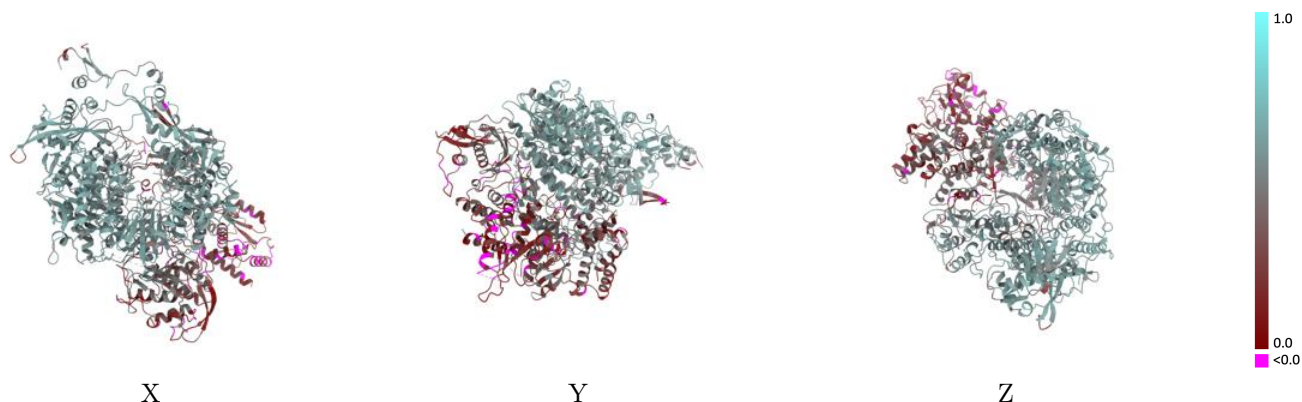
### 9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.6 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.

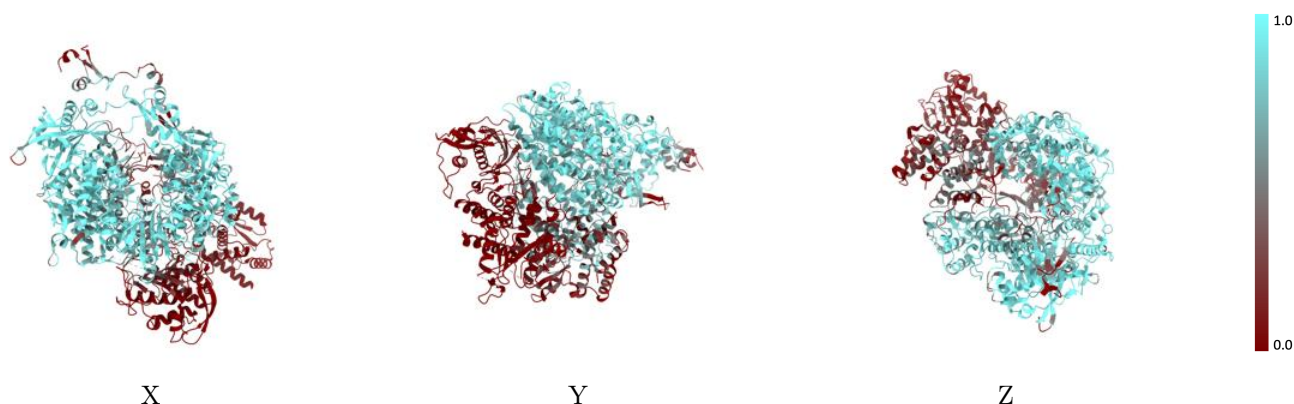


## 9.2 Q-score mapped to coordinate model [i](#)



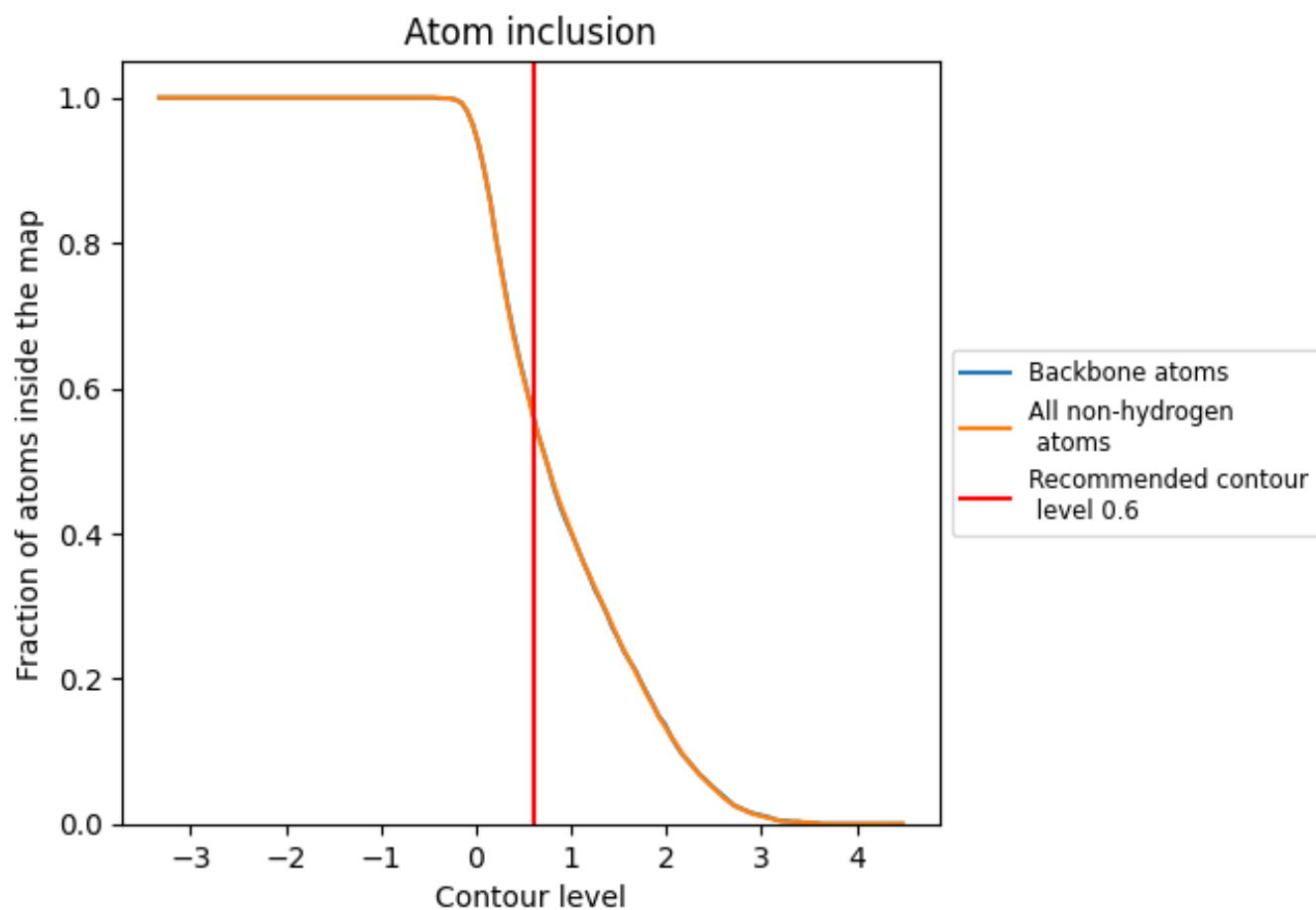
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.6).













## 9.4 Atom inclusion [i](#)



At the recommended contour level, 56% of all backbone atoms, 56% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.6) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5620	 0.4620
A	 0.6240	 0.4730
B	 0.7530	 0.5350
C	 0.2780	 0.3620
D	 0.3130	 0.4810
E	 0.4530	 0.5330

