



Full wwPDB EM Validation Report ⓘ

Nov 18, 2025 – 12:18 pm GMT

PDB ID : 8OXZ / pdb_00008oxz
EMDB ID : EMD-17269
Title : Rat alpha5beta1 integrin, headpiece
Authors : Roderer, D.; Dransart, E.; Shafaq-Zadah, M.; Bartels, R.; Johannes, L.
Deposited on : 2023-05-03
Resolution : 3.70 Å(reported)
Based on initial model : .

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

EMDB validation analysis : 0.0.1.dev129
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.46

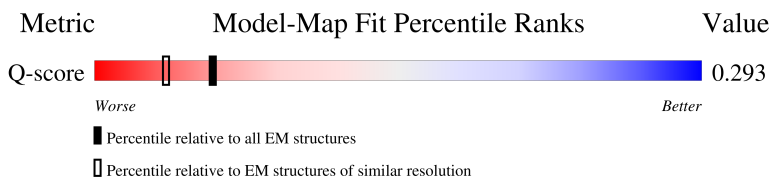
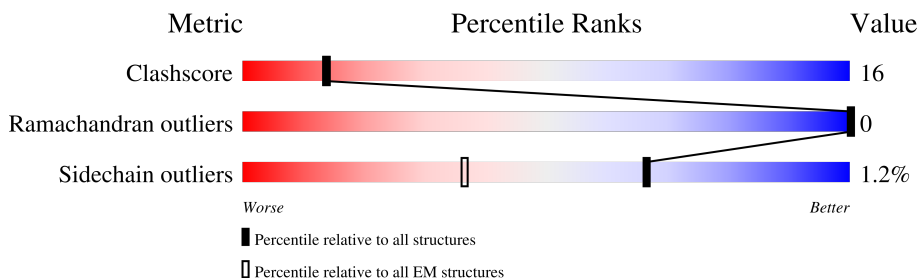
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.70 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	11569 (3.20 - 4.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	P	1099	5% 39% 16% 46%
2	Q	799	7% 39% 20% 40%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 8324 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 Integrin subunit alpha 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	P	598	Total	C	N	O	S	0	0
			4542	2871	769	887	15		

There are 67 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
P	170	SER	-	insertion	UNP A0A0G2K1E2
P	172	ILE	LEU	conflict	UNP A0A0G2K1E2
P	173	LEU	LYS	conflict	UNP A0A0G2K1E2
P	175	SER	-	insertion	UNP A0A0G2K1E2
P	176	SER	-	insertion	UNP A0A0G2K1E2
P	177	LEU	-	insertion	UNP A0A0G2K1E2
P	178	TYR	PHE	conflict	UNP A0A0G2K1E2
P	179	SER	LYS	conflict	UNP A0A0G2K1E2
P	181	GLU	GLY	conflict	UNP A0A0G2K1E2
P	183	VAL	-	insertion	UNP A0A0G2K1E2
P	184	GLU	-	insertion	UNP A0A0G2K1E2
P	185	TYR	-	insertion	UNP A0A0G2K1E2
P	186	LYS	SER	conflict	UNP A0A0G2K1E2
P	187	SER	ILE	conflict	UNP A0A0G2K1E2
P	188	LEU	SER	conflict	UNP A0A0G2K1E2
P	189	GLN	GLY	conflict	UNP A0A0G2K1E2
P	191	PHE	VAL	conflict	UNP A0A0G2K1E2
P	193	ALA	LEU	conflict	UNP A0A0G2K1E2
P	194	THR	GLN	conflict	UNP A0A0G2K1E2
P	?	-	PHE	deletion	UNP A0A0G2K1E2
P	?	-	GLY	deletion	UNP A0A0G2K1E2
P	198	HIS	TRP	conflict	UNP A0A0G2K1E2
P	201	SER	CYS	conflict	UNP A0A0G2K1E2
P	202	ILE	CYS	conflict	UNP A0A0G2K1E2
P	203	LEU	GLU	conflict	UNP A0A0G2K1E2
P	?	-	GLY	deletion	UNP A0A0G2K1E2
P	?	-	CYS	deletion	UNP A0A0G2K1E2
P	?	-	SER	deletion	UNP A0A0G2K1E2

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Chain	Residue	Modelled	Actual	Comment	Reference
P	?	-	PRO	deletion	UNP A0A0G2K1E2
P	323	TYR	ARG	conflict	UNP A0A0G2K1E2
P	324	SER	GLN	conflict	UNP A0A0G2K1E2
P	325	VAL	ALA	conflict	UNP A0A0G2K1E2
P	326	ALA	GLY	conflict	UNP A0A0G2K1E2
P	327	VAL	ARG	conflict	UNP A0A0G2K1E2
P	328	GLY	GLU	conflict	UNP A0A0G2K1E2
P	329	GLU	ARG	conflict	UNP A0A0G2K1E2
P	330	PHE	MET	conflict	UNP A0A0G2K1E2
P	331	SER	GLY	conflict	UNP A0A0G2K1E2
P	333	ASP	GLU	conflict	UNP A0A0G2K1E2
P	334	ASP	-	insertion	UNP A0A0G2K1E2
P	335	THR	-	insertion	UNP A0A0G2K1E2
P	336	GLU	-	insertion	UNP A0A0G2K1E2
P	337	ASP	-	insertion	UNP A0A0G2K1E2
P	338	PHE	-	insertion	UNP A0A0G2K1E2
P	339	VAL	-	insertion	UNP A0A0G2K1E2
P	340	ALA	-	insertion	UNP A0A0G2K1E2
P	341	GLY	-	insertion	UNP A0A0G2K1E2
P	342	VAL	-	insertion	UNP A0A0G2K1E2
P	343	PRO	-	insertion	UNP A0A0G2K1E2
P	344	LYS	ILE	conflict	UNP A0A0G2K1E2
P	346	ASN	GLY	conflict	UNP A0A0G2K1E2
P	348	THR	TYR	conflict	UNP A0A0G2K1E2
P	349	TYR	PRO	conflict	UNP A0A0G2K1E2
P	350	GLY	HIS	conflict	UNP A0A0G2K1E2
P	351	TYR	SER	conflict	UNP A0A0G2K1E2
P	569	VAL	GLY	conflict	UNP A0A0G2K1E2
P	570	SER	GLY	conflict	UNP A0A0G2K1E2
P	?	-	VAL	deletion	UNP A0A0G2K1E2
P	?	-	CYS	deletion	UNP A0A0G2K1E2
P	?	-	LEU	deletion	UNP A0A0G2K1E2
P	?	-	ARG	deletion	UNP A0A0G2K1E2
P	?	-	LYS	deletion	UNP A0A0G2K1E2
P	?	-	GLY	deletion	UNP A0A0G2K1E2
P	?	-	GLN	deletion	UNP A0A0G2K1E2
P	?	-	ALA	deletion	UNP A0A0G2K1E2
P	?	-	GLY	deletion	UNP A0A0G2K1E2
P	?	-	ILE	deletion	UNP A0A0G2K1E2

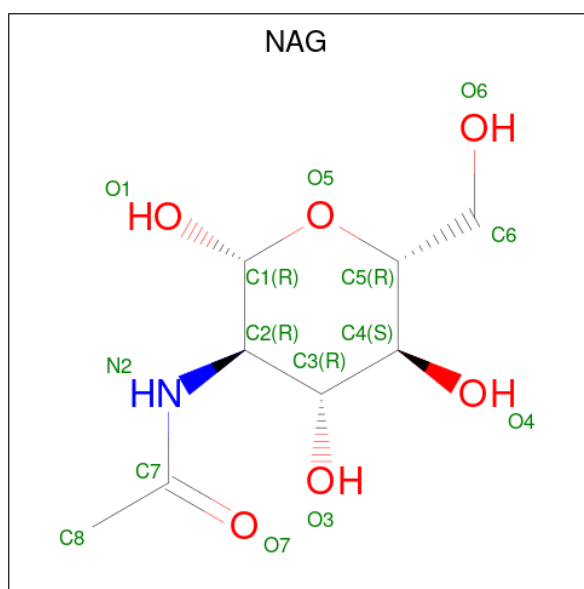
- Molecule 2 is a protein called Integrin beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	Q	480	Total	C	N	O	S	0	0
			3670	2283	640	715	32		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Q	319	ALA	ILE	conflict	UNP P49134
Q	320	ILE	ALA	conflict	UNP P49134

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
3	P	1	Total	C	N	O	0
			14	8	1	5	
3	P	1	Total	C	N	O	0
			14	8	1	5	
3	P	1	Total	C	N	O	0
			14	8	1	5	
3	P	1	Total	C	N	O	0
			14	8	1	5	
3	Q	1	Total	C	N	O	0
			14	8	1	5	
3	Q	1	Total	C	N	O	0
			14	8	1	5	

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Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	Q	1	14	8	1	5	0

- Molecule 2: Integrin beta-1

[illegible]

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	101740	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 ($e^-/\text{\AA}^2$)	42	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	96000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	2.056	Depositor
Minimum map value	-0.002	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.025	Depositor
Recommended contour level	0.085	Depositor
Map size (Å)	266.24, 266.24, 266.24	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.83199996, 0.83199996, 0.83199996	Depositor

5 Model quality

5.1 Standard geometry

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

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	P	0.21	0/4655	0.41	0/6330
2	Q	0.21	0/3736	0.48	0/5049
All	All	0.21	0/8391	0.44	0/11379

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	P	4542	0	4349	129	0
2	Q	3670	0	3562	134	0
3	P	70	0	65	0	0
3	Q	42	0	39	0	0
All	All	8324	0	8015	254	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 16.

All (254) 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)
1:P:339:VAL:HG21	1:P:392:LEU:HD21	1.58	0.86
2:Q:441:GLU:HG3	2:Q:458:VAL:HG23	1.63	0.81
2:Q:275:VAL:HA	2:Q:334:ILE:HG22	1.62	0.81
1:P:276:TYR:HB3	1:P:279:GLN:HE21	1.46	0.80
1:P:416:ILE:HD11	1:P:484:LEU:HD12	1.65	0.77
1:P:258:PHE:HZ	2:Q:289:LYS:HG2	1.49	0.77
1:P:257:GLY:HA2	1:P:270:LEU:HD11	1.67	0.76
2:Q:130:LYS:NZ	2:Q:427:GLU:OE2	2.17	0.74
2:Q:267:TRP:HZ3	2:Q:272:ARG:HB2	1.50	0.74
2:Q:55:GLN:HB3	2:Q:58:MET:HG2	1.70	0.73
1:P:333:ASP:OD2	1:P:334:ASP:N	2.21	0.73
2:Q:277:SER:HA	2:Q:336:ALA:HB3	1.71	0.72
1:P:383:ASP:O	1:P:457:ASN:ND2	2.22	0.72
1:P:503:ASP:HA	1:P:529:GLY:HA3	1.72	0.72
1:P:400:MET:HE3	1:P:400:MET:HA	1.71	0.71
1:P:597:LEU:HD11	1:P:638:ILE:HD11	1.73	0.71
2:Q:66:ASP:OD2	2:Q:67:LEU:N	2.24	0.70
2:Q:83:PRO:HD2	2:Q:124:ARG:NH2	2.07	0.70
2:Q:298:ASP:HB2	2:Q:314:TYR:CE2	2.27	0.69
1:P:321:LEU:HD13	1:P:342:VAL:HG22	1.74	0.68
2:Q:63:ARG:HH12	2:Q:489:ALA:HB3	1.57	0.68
2:Q:298:ASP:HB2	2:Q:314:TYR:HE2	1.59	0.68
1:P:171:ARG:NH1	1:P:209:TYR:OH	2.26	0.68
2:Q:267:TRP:CZ3	2:Q:272:ARG:HB2	2.29	0.67
1:P:120:ARG:NH2	1:P:231:ASN:OD1	2.27	0.67
2:Q:167:THR:O	2:Q:171:ASN:ND2	2.26	0.67
2:Q:145:LEU:HB3	2:Q:182:ILE:HG22	1.77	0.65
1:P:209:TYR:HB3	1:P:223:GLY:HA2	1.79	0.63
1:P:400:MET:SD	2:Q:320:ILE:HG13	2.39	0.63
2:Q:265:ILE:HB	2:Q:267:TRP:HD1	1.64	0.62
1:P:110:SER:HB2	1:P:135:ALA:HA	1.80	0.62
1:P:472:GLY:HA3	1:P:505:PHE:HB3	1.82	0.62
2:Q:334:ILE:HD11	2:Q:374:ALA:HB1	1.81	0.62
1:P:212:ARG:HH21	1:P:217:PRO:HD3	1.64	0.61
2:Q:93:LYS:HB3	2:Q:117:GLN:HE22	1.65	0.61
1:P:97:ASP:HB2	1:P:539:ARG:HD2	1.81	0.61
1:P:414:VAL:HG11	1:P:461:ILE:HD13	1.81	0.61
1:P:266:GLY:O	1:P:287:GLN:NE2	2.34	0.61
2:Q:67:LEU:HD11	2:Q:82:ASN:HD22	1.65	0.61
1:P:195:VAL:O	1:P:196:ARG:NH1	2.34	0.60
2:Q:119:LEU:HD21	2:Q:457:VAL:HG12	1.82	0.60
1:P:598:ASP:O	1:P:607:ARG:NH1	2.34	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:Q:82:ASN:HD21	2:Q:84:ARG:HH11	1.47	0.60
2:Q:153:TYR:HB2	2:Q:244:ASN:H	1.65	0.60
1:P:194:THR:OG1	1:P:257:GLY:O	2.19	0.60
2:Q:82:ASN:OD1	2:Q:124:ARG:NH1	2.34	0.59
2:Q:123:LEU:HD23	2:Q:432:ALA:HB2	1.84	0.59
1:P:670:HIS:HB2	1:P:672:LEU:HD23	1.84	0.59
1:P:227:LEU:O	1:P:236:LEU:N	2.32	0.59
2:Q:384:LEU:HD11	2:Q:426:PHE:CD1	2.38	0.59
1:P:117:GLU:N	1:P:117:GLU:OE1	2.36	0.58
2:Q:145:LEU:HD12	2:Q:146:TYR:H	1.68	0.58
2:Q:181:ARG:HH22	2:Q:268:ARG:HB3	1.68	0.58
2:Q:56:GLU:HA	2:Q:499:ARG:HH11	1.68	0.58
1:P:598:ASP:OD1	1:P:608:ARG:NH2	2.35	0.57
2:Q:195:TYR:OH	2:Q:287:ASP:O	2.22	0.57
1:P:346:ASN:OD1	1:P:349:TYR:HB2	2.04	0.57
2:Q:383:ILE:HG13	2:Q:414:LYS:HG2	1.85	0.57
1:P:117:GLU:OE2	1:P:195:VAL:HB	2.04	0.57
2:Q:170:MET:HA	2:Q:170:MET:HE2	1.86	0.57
2:Q:115:GLN:HB3	2:Q:116:PRO:HD3	1.86	0.57
2:Q:45:CYS:HB3	2:Q:64:CYS:SG	2.46	0.56
2:Q:323:VAL:HG22	2:Q:352:ILE:HG12	1.85	0.56
1:P:397:PRO:HB3	1:P:440:ARG:HB3	1.88	0.56
1:P:350:GLY:O	1:P:368:GLY:N	2.38	0.56
2:Q:430:ILE:HG21	2:Q:459:LEU:HD11	1.88	0.56
2:Q:198:THR:HG22	2:Q:245:LEU:HA	1.87	0.56
1:P:259:SER:OG	1:P:323:TYR:O	2.24	0.56
1:P:369:GLU:OE2	1:P:369:GLU:N	2.39	0.55
2:Q:332:GLN:HE21	2:Q:354:LYS:HD2	1.71	0.55
1:P:539:ARG:HE	1:P:675:VAL:CG2	2.20	0.55
2:Q:354:LYS:HD3	2:Q:378:LEU:HD22	1.89	0.55
1:P:344:LYS:NZ	2:Q:287:ASP:OD2	2.37	0.55
1:P:212:ARG:NH1	1:P:213:THR:O	2.40	0.55
2:Q:150:ASP:OD2	2:Q:150:ASP:N	2.34	0.55
1:P:348:THR:HG22	1:P:372:ALA:H	1.72	0.55
2:Q:402:LYS:HG2	2:Q:403:ASN:H	1.72	0.55
1:P:112:PHE:CE2	1:P:130:VAL:HG21	2.42	0.54
1:P:436:ASP:OD2	1:P:467:GLY:N	2.22	0.54
1:P:440:ARG:O	1:P:443:SER:OG	2.25	0.54
2:Q:141:TYR:HD1	2:Q:142:PRO:HD2	1.70	0.54
2:Q:280:ALA:HA	2:Q:341:PHE:CG	2.42	0.54
2:Q:245:LEU:HB2	2:Q:248:PRO:HG3	1.88	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:Q:255:ILE:HD11	2:Q:322:LEU:HD21	1.90	0.54
1:P:341:GLY:HA2	1:P:352:VAL:HA	1.88	0.54
2:Q:401:CYS:HA	2:Q:424:VAL:HG23	1.88	0.54
2:Q:496:ARG:HD3	2:Q:504:SER:HA	1.89	0.54
1:P:539:ARG:HE	1:P:675:VAL:HG22	1.72	0.54
1:P:276:TYR:O	1:P:279:GLN:HG2	2.08	0.53
1:P:312:ALA:HB1	1:P:316:TYR:HD2	1.74	0.53
1:P:608:ARG:NH1	1:P:651:SER:O	2.36	0.53
2:Q:479:HIS:CG	2:Q:502:GLU:HA	2.43	0.53
2:Q:161:ASN:O	2:Q:164:SER:OG	2.25	0.53
1:P:164:GLN:NE2	1:P:167:SER:HB3	2.24	0.53
1:P:96:LEU:HD23	1:P:96:LEU:O	2.09	0.53
1:P:212:ARG:HG3	1:P:217:PRO:HA	1.91	0.52
1:P:221:PRO:HG3	2:Q:193:MET:HE3	1.91	0.52
1:P:103:VAL:HG23	1:P:534:LEU:HD23	1.90	0.52
2:Q:190:LYS:NZ	2:Q:311:SER:O	2.42	0.52
1:P:377:TYR:CD2	1:P:397:PRO:HG2	2.45	0.52
2:Q:256:MET:HE1	2:Q:321:HIS:CD2	2.44	0.52
1:P:198:HIS:HE1	1:P:287:GLN:HE22	1.58	0.52
2:Q:181:ARG:HH12	2:Q:268:ARG:HB2	1.75	0.51
1:P:354:VAL:HG22	1:P:364:TYR:O	2.10	0.51
2:Q:32:ALA:HA	2:Q:37:GLU:HG3	1.93	0.51
2:Q:88:THR:HB	2:Q:120:LEU:HG	1.93	0.50
1:P:405:ASP:CG	1:P:407:ARG:HG3	2.37	0.50
1:P:611:PHE:HA	1:P:638:ILE:HD12	1.93	0.50
2:Q:246:ASP:OD2	2:Q:246:ASP:N	2.44	0.50
2:Q:468:GLN:NE2	2:Q:486:GLU:OE2	2.44	0.50
1:P:348:THR:HG23	2:Q:284:PHE:CZ	2.46	0.50
1:P:446:THR:HG21	1:P:509:LEU:O	2.11	0.50
1:P:242:ARG:NE	1:P:299:LEU:O	2.42	0.50
2:Q:47:TRP:CD1	2:Q:48:CYS:H	2.29	0.50
1:P:267:ARG:HA	1:P:286:THR:HA	1.95	0.49
1:P:539:ARG:CG	1:P:672:LEU:HD12	2.42	0.49
2:Q:214:THR:HG22	2:Q:215:SER:H	1.77	0.49
2:Q:80:ILE:HD12	2:Q:81:GLU:H	1.77	0.49
2:Q:149:MET:HE2	2:Q:151:LEU:HD23	1.95	0.49
1:P:425:GLU:OE2	1:P:425:GLU:N	2.45	0.49
2:Q:168:ASP:HA	2:Q:171:ASN:HD22	1.77	0.49
1:P:317:ASP:OD1	1:P:318:ASP:N	2.45	0.49
2:Q:368:ILE:O	2:Q:372:ILE:HG12	2.13	0.49
1:P:399:LEU:HD22	1:P:413:ARG:HG2	1.95	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:236:LEU:HD13	1:P:290:ILE:HG12	1.95	0.48
1:P:416:ILE:HB	1:P:430:LEU:HB3	1.95	0.48
2:Q:65:ASP:OD2	2:Q:73:LYS:NZ	2.36	0.48
2:Q:232:PHE:CE1	2:Q:236:VAL:HG21	2.48	0.48
2:Q:272:ARG:NH2	2:Q:330:ASN:HB2	2.28	0.48
1:P:248:ALA:HB3	2:Q:199:THR:HG22	1.95	0.48
2:Q:82:ASN:ND2	2:Q:84:ARG:HH11	2.10	0.48
1:P:133:PRO:HB3	1:P:192:GLY:H	1.79	0.48
2:Q:280:ALA:HA	2:Q:341:PHE:CD1	2.49	0.48
1:P:401:GLU:OE2	1:P:413:ARG:NH2	2.47	0.48
2:Q:223:LEU:HD21	2:Q:231:PHE:HB3	1.96	0.48
2:Q:121:LEU:HD21	2:Q:457:VAL:HB	1.96	0.48
2:Q:305:ASN:O	2:Q:307:VAL:N	2.47	0.48
2:Q:207:CYS:SG	2:Q:208:THR:N	2.87	0.47
1:P:458:ASP:OD2	1:P:478:PRO:HA	2.14	0.47
2:Q:65:ASP:OD1	2:Q:70:LEU:HG	2.14	0.47
1:P:216:ASP:O	1:P:218:GLN:HG2	2.14	0.47
1:P:142:VAL:HG11	1:P:186:LYS:HD3	1.96	0.47
1:P:211:TRP:CZ2	1:P:213:THR:HA	2.49	0.47
1:P:346:ASN:OD1	1:P:346:ASN:O	2.32	0.47
2:Q:27:CYS:HB2	2:Q:65:ASP:HA	1.95	0.47
2:Q:120:LEU:HA	2:Q:458:VAL:HG13	1.97	0.47
1:P:113:GLY:HA2	1:P:130:VAL:HG23	1.97	0.47
2:Q:83:PRO:HD2	2:Q:124:ARG:HH21	1.78	0.47
2:Q:123:LEU:HD21	2:Q:430:ILE:HG22	1.96	0.47
2:Q:368:ILE:HD12	2:Q:368:ILE:H	1.80	0.47
2:Q:141:TYR:CD1	2:Q:142:PRO:HD2	2.50	0.47
2:Q:196:ILE:HD11	2:Q:216:PRO:HG2	1.97	0.47
1:P:258:PHE:CZ	2:Q:289:LYS:HG2	2.40	0.46
1:P:516:ASP:OD1	1:P:516:ASP:N	2.47	0.46
2:Q:86:SER:HB3	2:Q:122:LYS:HZ1	1.80	0.46
1:P:95:ASN:OD1	1:P:541:ILE:HG12	2.15	0.46
2:Q:165:LEU:HD22	2:Q:368:ILE:HD11	1.98	0.46
2:Q:342:GLN:NE2	2:Q:359:THR:OG1	2.36	0.46
1:P:551:PHE:C	1:P:551:PHE:CD1	2.93	0.46
1:P:240:PRO:HG2	1:P:283:LEU:HD13	1.97	0.46
1:P:354:VAL:O	1:P:363:LEU:HB2	2.16	0.46
2:Q:60:THR:O	2:Q:63:ARG:HG3	2.16	0.45
2:Q:147:TYR:CE1	2:Q:275:VAL:HG11	2.51	0.45
1:P:539:ARG:HG3	1:P:672:LEU:HD12	1.98	0.45
1:P:153:TRP:CH2	1:P:516:ASP:HA	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:203:LEU:HD23	1:P:262:PHE:CE2	2.51	0.45
2:Q:65:ASP:OD1	2:Q:65:ASP:C	2.60	0.45
2:Q:195:TYR:OH	2:Q:287:ASP:OD1	2.33	0.45
2:Q:457:VAL:HG23	2:Q:457:VAL:O	2.17	0.45
2:Q:143:ILE:HG21	2:Q:375:TYR:HE2	1.82	0.45
1:P:222:VAL:HG11	1:P:242:ARG:HB2	1.98	0.45
1:P:101:PRO:HB3	1:P:534:LEU:HD22	1.99	0.44
2:Q:72:LYS:HE3	2:Q:72:LYS:HB2	1.60	0.44
2:Q:380:SER:O	2:Q:416:SER:HA	2.17	0.44
1:P:282:ILE:O	1:P:308:GLN:HA	2.17	0.44
2:Q:70:LEU:CD1	2:Q:80:ILE:HD13	2.48	0.44
2:Q:123:LEU:O	2:Q:462:ILE:HG12	2.17	0.44
1:P:339:VAL:HG23	1:P:354:VAL:HG12	1.99	0.44
1:P:562:CYS:O	1:P:569:VAL:N	2.26	0.44
2:Q:115:GLN:OE1	2:Q:134:LYS:HD3	2.18	0.44
1:P:392:LEU:HD23	1:P:392:LEU:HA	1.81	0.44
1:P:399:LEU:HG	1:P:400:MET:H	1.83	0.44
1:P:545:SER:N	1:P:579:ASN:O	2.39	0.44
2:Q:82:ASN:HD21	2:Q:84:ARG:NH1	2.14	0.44
2:Q:67:LEU:HD11	2:Q:82:ASN:ND2	2.30	0.44
2:Q:251:GLY:O	2:Q:255:ILE:HG23	2.18	0.44
1:P:253:TYR:OH	2:Q:197:SER:HB3	2.17	0.43
1:P:95:ASN:O	1:P:95:ASN:ND2	2.51	0.43
1:P:139:GLN:HB3	1:P:142:VAL:HG22	2.00	0.43
2:Q:397:TYR:CE1	2:Q:428:ILE:HD11	2.54	0.43
1:P:492:LEU:HD22	1:P:536:TYR:CE2	2.53	0.43
2:Q:76:HIS:HB2	2:Q:79:ASP:CG	2.43	0.43
2:Q:80:ILE:HD12	2:Q:81:GLU:N	2.33	0.43
2:Q:219:TYR:HB3	2:Q:308:TYR:HB2	2.00	0.43
2:Q:151:LEU:HD12	2:Q:217:PHE:HZ	1.83	0.43
1:P:165:PHE:CZ	1:P:202:ILE:HD11	2.54	0.43
1:P:236:LEU:HD11	1:P:291:SER:HA	2.00	0.43
2:Q:63:ARG:HH22	2:Q:489:ALA:HB3	1.83	0.43
2:Q:301:CYS:SG	2:Q:303:LEU:HD23	2.58	0.43
2:Q:334:ILE:HD12	2:Q:334:ILE:HA	1.89	0.43
1:P:433:THR:OG1	1:P:434:GLY:N	2.52	0.43
1:P:496:TRP:CD2	1:P:532:LYS:HD3	2.54	0.43
2:Q:428:ILE:HA	2:Q:428:ILE:HD13	1.80	0.43
2:Q:485:PHE:CE1	2:Q:489:ALA:HA	2.54	0.43
2:Q:371:ILE:HD13	2:Q:371:ILE:HA	1.95	0.43
1:P:354:VAL:C	1:P:355:LEU:HD23	2.44	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:525:VAL:HG22	1:P:534:LEU:HB2	2.00	0.42
1:P:554:MET:HE3	1:P:554:MET:HB3	1.93	0.42
1:P:209:TYR:CG	1:P:224:THR:HG23	2.54	0.42
2:Q:79:ASP:OD1	2:Q:79:ASP:N	2.52	0.42
2:Q:124:ARG:HB3	2:Q:127:GLU:HB2	2.01	0.42
2:Q:167:THR:O	2:Q:170:MET:HB3	2.18	0.42
1:P:478:PRO:HG2	1:P:485:ASN:HB2	2.01	0.42
1:P:589:ILE:HD13	1:P:589:ILE:HA	1.91	0.42
2:Q:335:PHE:HB2	2:Q:357:VAL:HA	2.01	0.42
1:P:525:VAL:CG2	1:P:534:LEU:HB2	2.50	0.42
1:P:512:GLY:O	1:P:521:PRO:HB3	2.20	0.42
1:P:655:ILE:N	1:P:686:ASP:O	2.28	0.42
1:P:344:LYS:HD3	2:Q:284:PHE:CE2	2.55	0.42
2:Q:267:TRP:CE3	2:Q:272:ARG:HD2	2.55	0.42
1:P:205:CYS:HA	1:P:225:CYS:HA	2.02	0.42
2:Q:214:THR:HG22	2:Q:215:SER:N	2.34	0.42
1:P:576:PHE:CE1	1:P:634:ARG:HB2	2.55	0.41
1:P:468:GLU:H	1:P:468:GLU:HG3	1.60	0.41
2:Q:320:ILE:HA	2:Q:320:ILE:HD13	1.71	0.41
1:P:151:CYS:O	1:P:153:TRP:N	2.53	0.41
1:P:208:LEU:HD12	1:P:208:LEU:HA	1.91	0.41
1:P:186:LYS:HG2	1:P:186:LYS:O	2.20	0.41
1:P:490:GLN:HE21	1:P:490:GLN:HB3	1.67	0.41
1:P:551:PHE:C	1:P:551:PHE:HD1	2.28	0.41
2:Q:453:GLU:OE2	2:Q:453:GLU:N	2.49	0.41
1:P:469:ALA:C	1:P:470:GLN:HG2	2.45	0.41
1:P:496:TRP:CE2	1:P:532:LYS:HD3	2.56	0.41
2:Q:252:PHE:HB3	2:Q:317:PRO:HG2	2.03	0.41
2:Q:305:ASN:O	2:Q:305:ASN:OD1	2.39	0.41
1:P:405:ASP:OD1	1:P:406:GLY:N	2.54	0.41
2:Q:35:CYS:SG	2:Q:465:CYS:N	2.94	0.41
2:Q:63:ARG:HH12	2:Q:489:ALA:CB	2.30	0.41
2:Q:93:LYS:CB	2:Q:117:GLN:HE22	2.33	0.41
2:Q:226:THR:HG22	2:Q:228:ARG:H	1.85	0.41
1:P:683:ARG:O	1:P:684:ILE:HD13	2.21	0.40
2:Q:130:LYS:HZ3	2:Q:429:SER:HB3	1.85	0.40
2:Q:143:ILE:O	2:Q:180:PHE:HB2	2.22	0.40
2:Q:443:GLN:HA	2:Q:443:GLN:NE2	2.36	0.40
2:Q:135:PHE:O	2:Q:424:VAL:HG12	2.21	0.40
1:P:159:GLN:H	1:P:159:GLN:HG3	1.65	0.40
1:P:413:ARG:HG3	1:P:415:TYR:CE1	2.57	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:524:ILE:HG13	1:P:535:VAL:HA	2.03	0.40
2:Q:67:LEU:HD21	2:Q:82:ASN:ND2	2.36	0.40
1:P:112:PHE:HE1	1:P:149:TYR:CD2	2.39	0.40
1:P:450:ASP:H	1:P:457:ASN:HA	1.86	0.40
2:Q:84:ARG:HH21	2:Q:127:GLU:CD	2.29	0.40
1:P:203:LEU:HD22	1:P:268:VAL:HG23	2.03	0.40
1:P:661:LEU:HD11	1:P:674:PRO:HB2	2.04	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	P	596/1099 (54%)	558 (94%)	38 (6%)	0	100	100
2	Q	478/799 (60%)	441 (92%)	37 (8%)	0	100	100
All	All	1074/1898 (57%)	999 (93%)	75 (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	P	485/913 (53%)	480 (99%)	5 (1%)	73	82

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	Q	411/703 (58%)	405 (98%)	6 (2%)	60	75
All	All	896/1616 (55%)	885 (99%)	11 (1%)	66	79

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	P	164	GLN
1	P	188	LEU
1	P	233	THR
1	P	490	GLN
1	P	531	ASP
2	Q	63	ARG
2	Q	80	ILE
2	Q	114	ILE
2	Q	294	VAL
2	Q	303	LEU
2	Q	334	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	P	164	GLN
1	P	279	GLN
1	P	287	GLN
1	P	306	GLN
1	P	658	ASN
2	Q	40	GLN
2	Q	92	ASN
2	Q	117	GLN
2	Q	171	ASN
2	Q	239	GLN
2	Q	244	ASN
2	Q	321	HIS
2	Q	332	GLN
2	Q	500	HIS

5.3.3 RNA ⓘ

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](#)

8 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$
3	NAG	P	1102	1	14,14,15	0.70	1 (7%)	17,19,21	0.81	1 (5%)
3	NAG	Q	800	2	14,14,15	0.16	0	17,19,21	0.38	0
3	NAG	Q	802	-	14,14,15	0.22	0	19,19,21	0.30	0
3	NAG	P	1103	1	14,14,15	0.31	0	17,19,21	0.43	0
3	NAG	P	1105	1	14,14,15	0.83	1 (7%)	17,19,21	0.97	1 (5%)
3	NAG	Q	801	2	14,14,15	0.34	0	17,19,21	0.41	0
3	NAG	P	1101	1	14,14,15	0.26	0	17,19,21	0.34	0
3	NAG	P	1104	1	14,14,15	0.79	1 (7%)	17,19,21	0.58	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
3	NAG	P	1102	1	-	3/6/23/26	0/1/1/1
3	NAG	Q	800	2	-	2/6/23/26	0/1/1/1
3	NAG	Q	802	-	-	0/6/22/26	0/1/1/1
3	NAG	P	1103	1	-	2/6/23/26	0/1/1/1
3	NAG	P	1105	1	-	3/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	Q	801	2	-	2/6/23/26	0/1/1/1
3	NAG	P	1101	1	-	2/6/23/26	0/1/1/1
3	NAG	P	1104	1	-	2/6/23/26	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	P	1104	NAG	C1-C2	2.73	1.56	1.52
3	P	1105	NAG	C1-C2	2.54	1.56	1.52
3	P	1102	NAG	O5-C1	-2.44	1.39	1.43

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	P	1105	NAG	C1-O5-C5	3.47	116.90	112.19
3	P	1102	NAG	C3-C4-C5	2.17	114.11	110.24

There are no chirality outliers.

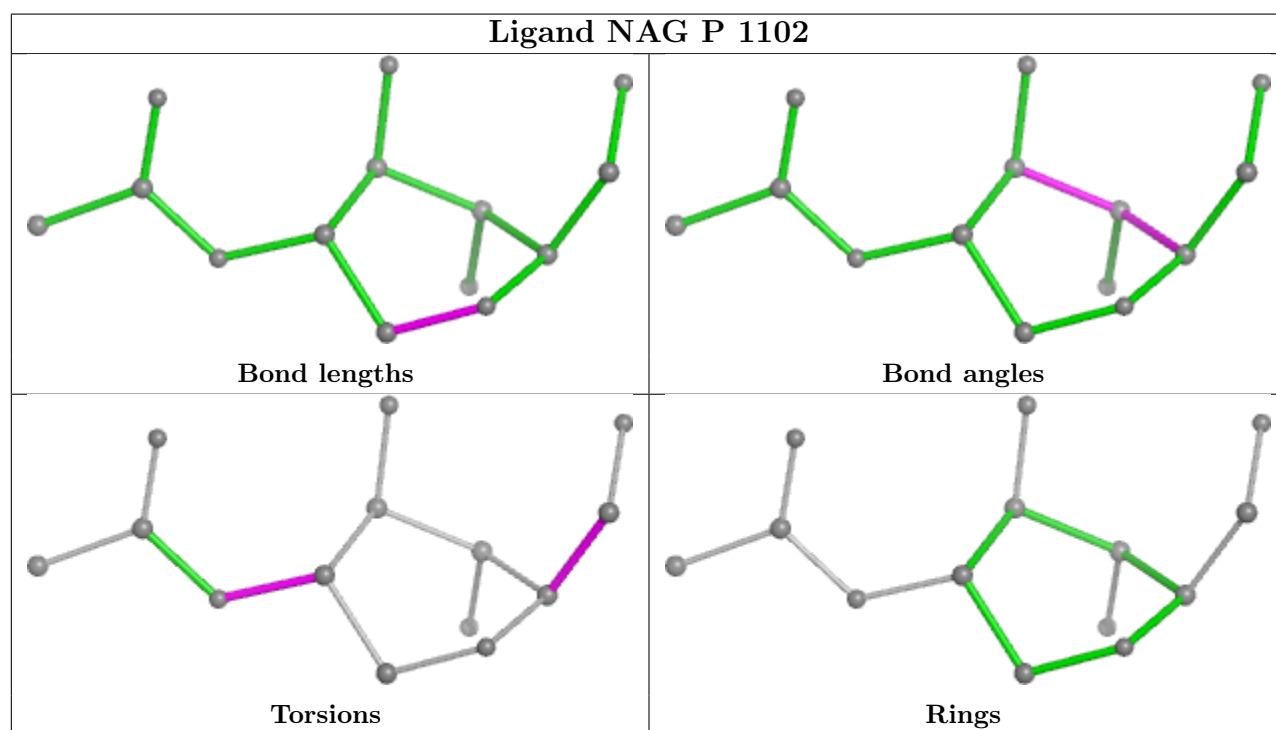
All (16) torsion outliers are listed below:

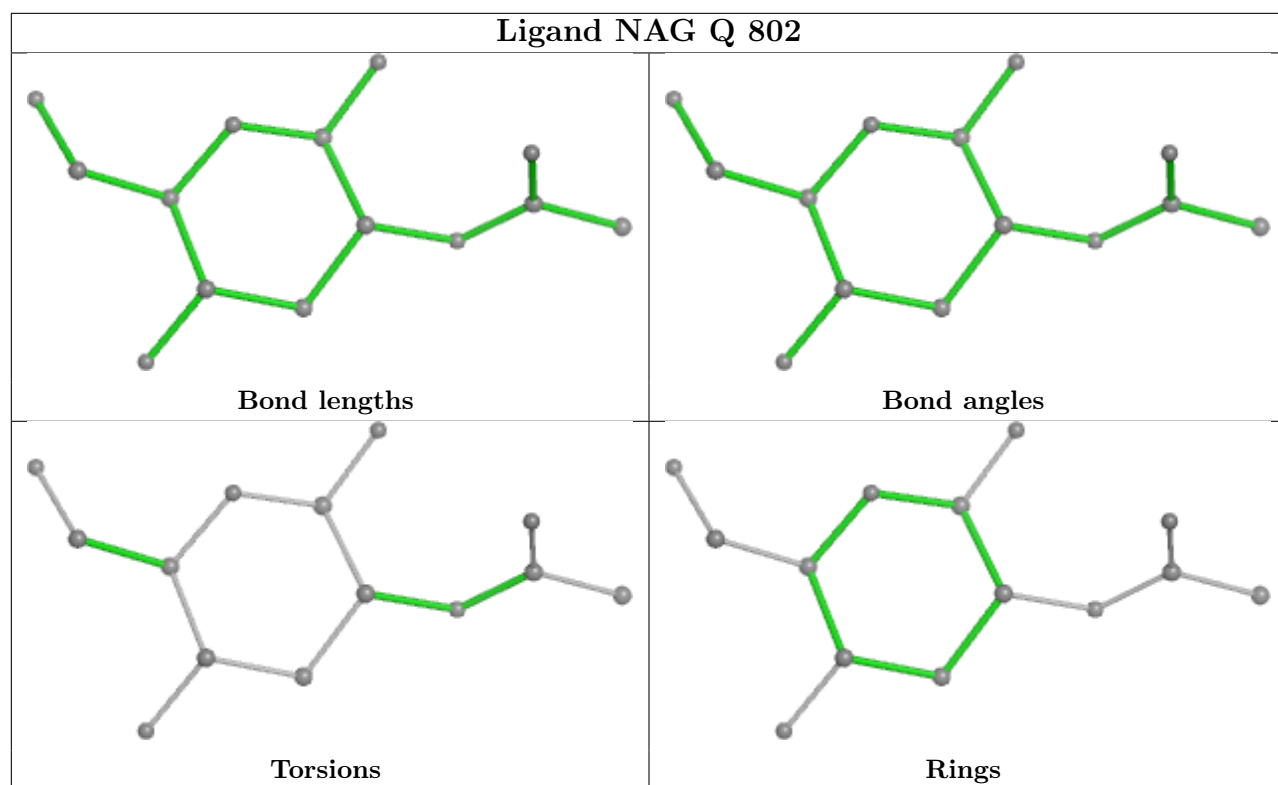
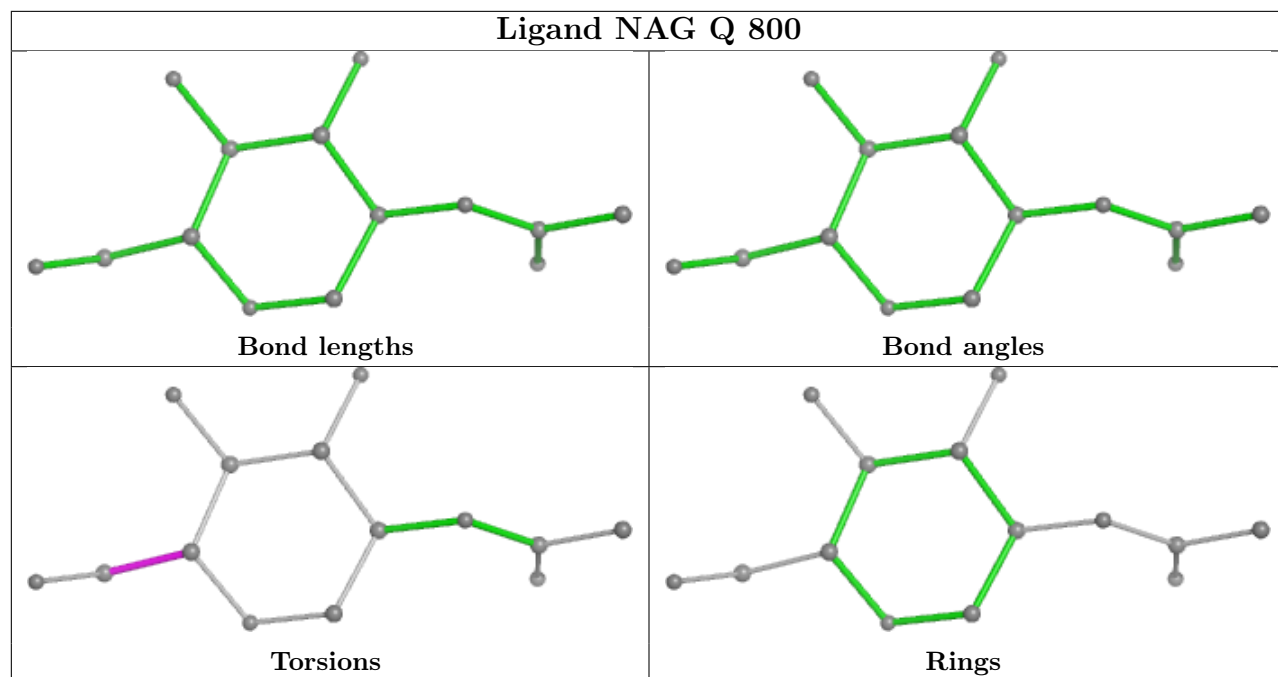
Mol	Chain	Res	Type	Atoms
3	Q	800	NAG	O5-C5-C6-O6
3	P	1102	NAG	O5-C5-C6-O6
3	P	1102	NAG	C4-C5-C6-O6
3	Q	800	NAG	C4-C5-C6-O6
3	P	1103	NAG	C4-C5-C6-O6
3	P	1104	NAG	C8-C7-N2-C2
3	P	1104	NAG	O7-C7-N2-C2
3	P	1103	NAG	O5-C5-C6-O6
3	Q	801	NAG	C4-C5-C6-O6
3	P	1101	NAG	O5-C5-C6-O6
3	P	1105	NAG	C1-C2-N2-C7
3	Q	801	NAG	O5-C5-C6-O6
3	P	1102	NAG	C1-C2-N2-C7
3	P	1105	NAG	O5-C5-C6-O6
3	P	1101	NAG	C4-C5-C6-O6
3	P	1105	NAG	C3-C2-N2-C7

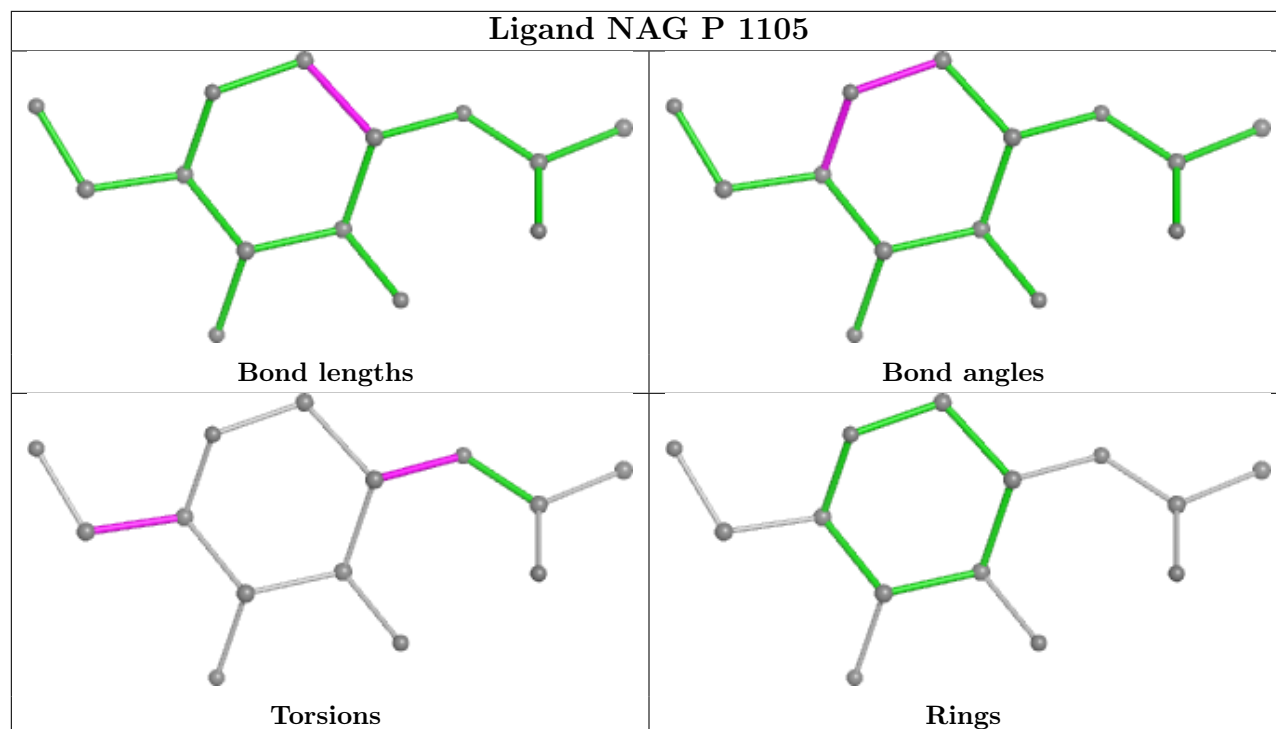
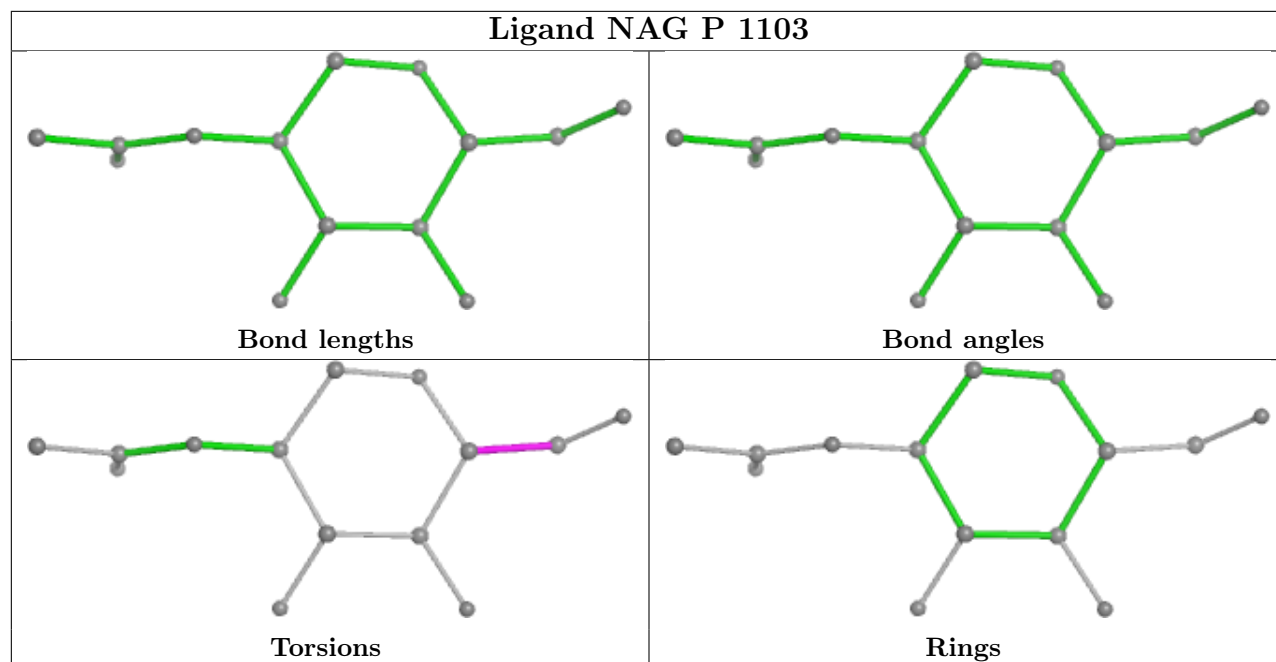
There are no ring outliers.

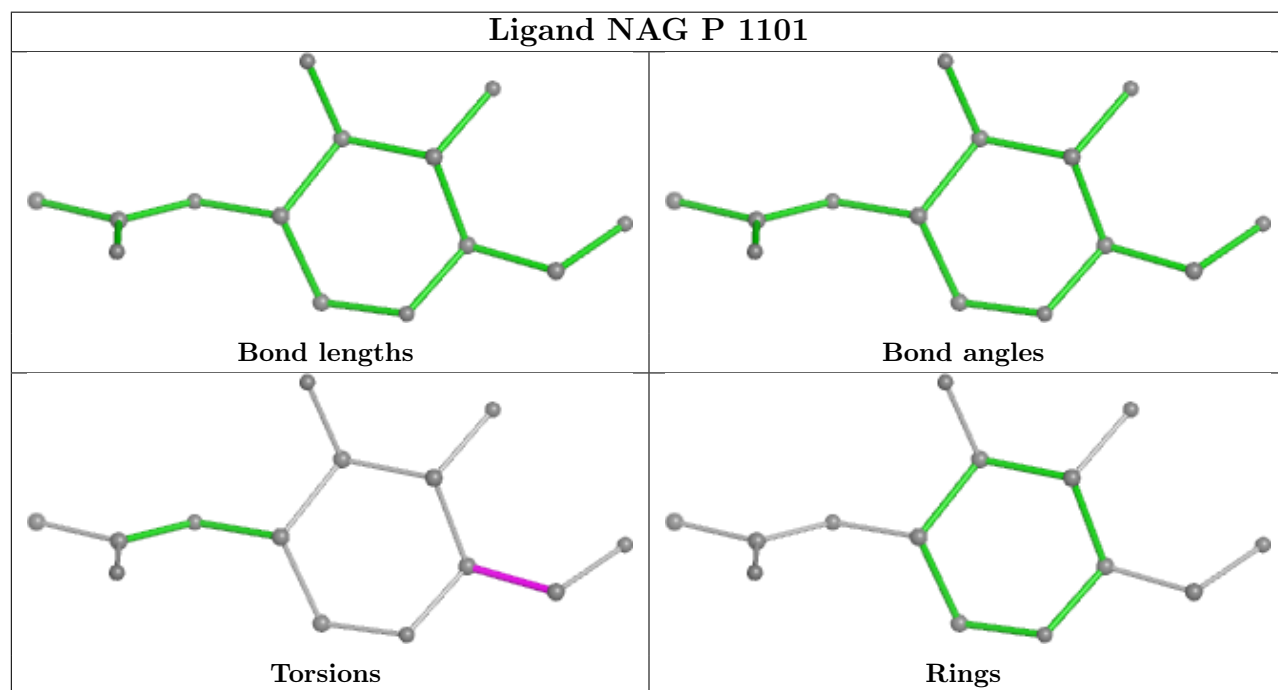
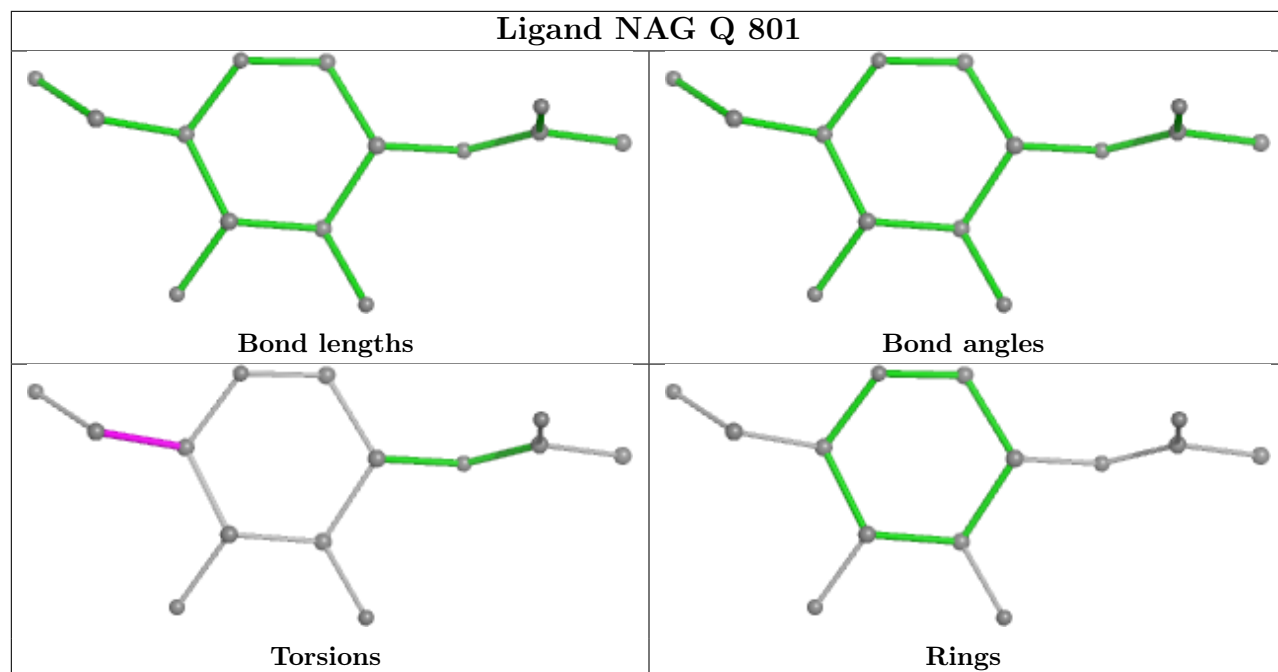
No monomer is involved in short contacts.

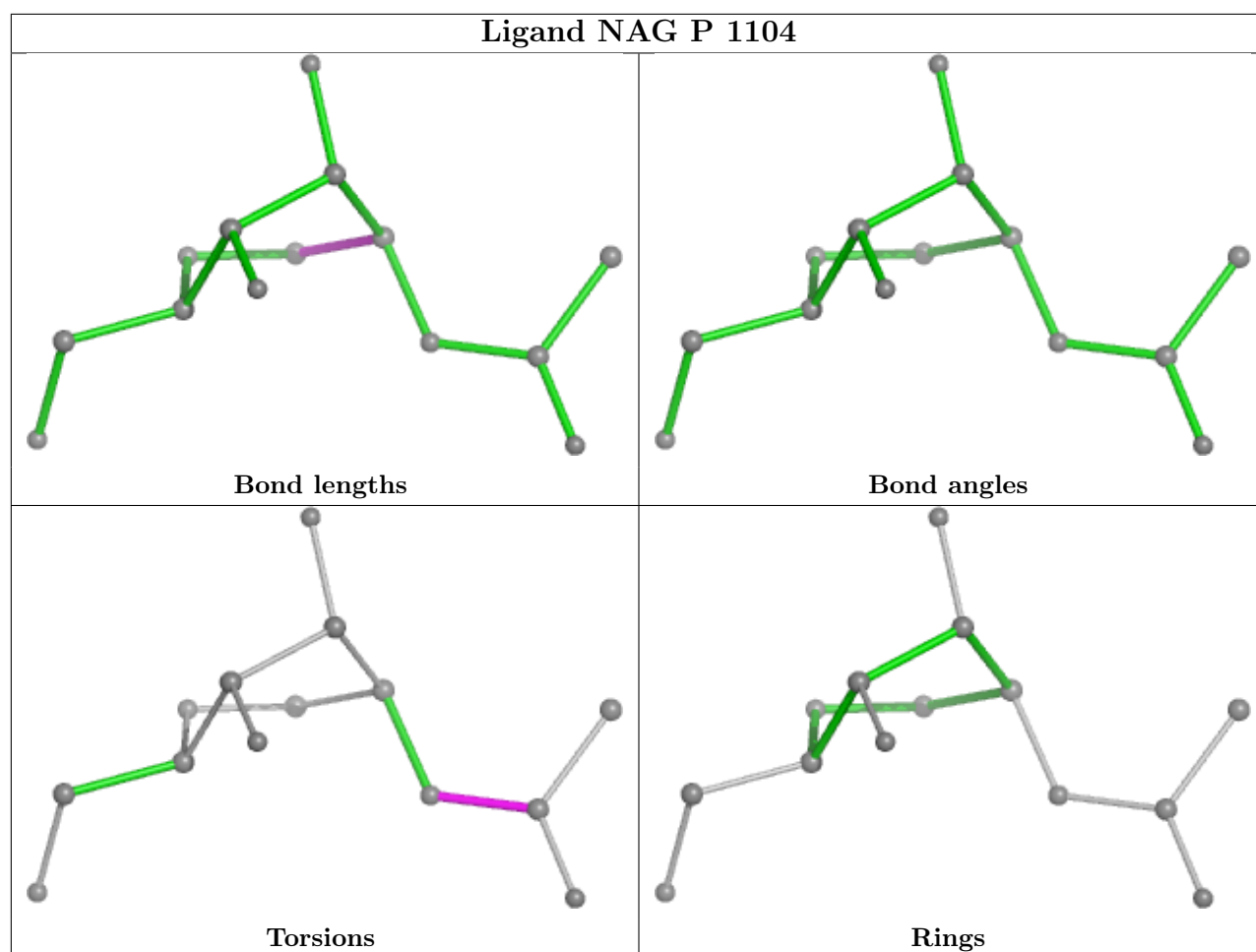
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.











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.

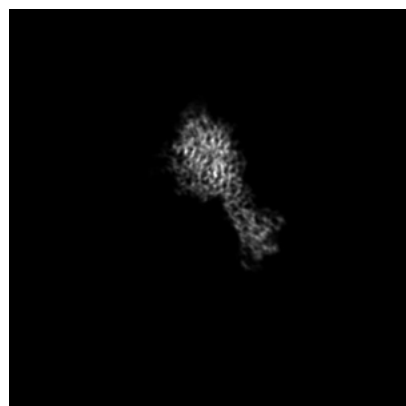
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-17269. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

6.1 Orthogonal projections [i](#)

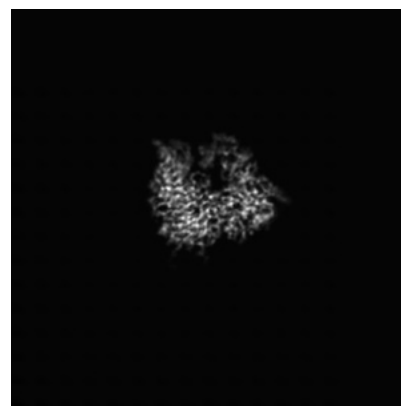
6.1.1 Primary map



X

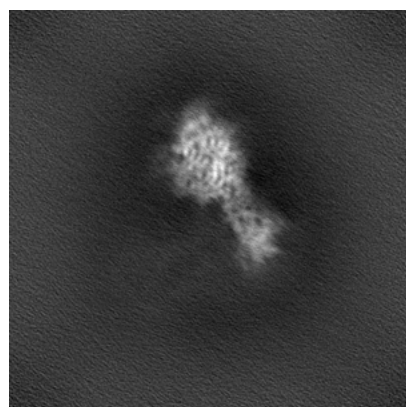


Y

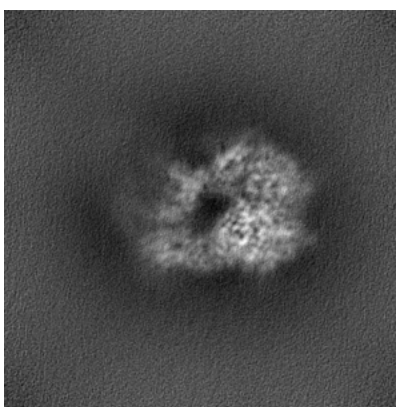


Z

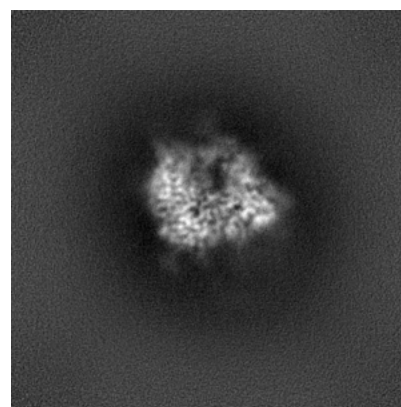
6.1.2 Raw map



X



Y



Z

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

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 160

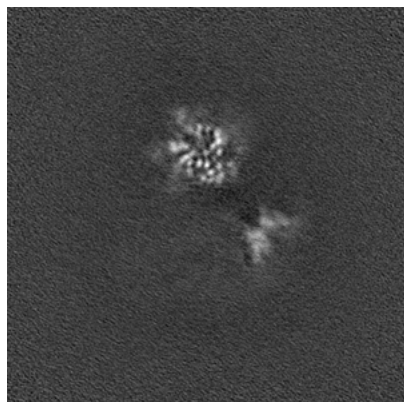


Y Index: 160

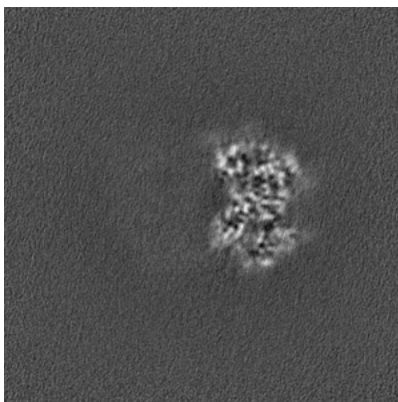


Z Index: 160

6.2.2 Raw map



X Index: 160



Y Index: 160



Z Index: 160

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

6.3 Largest variance slices [i](#)

6.3.1 Primary map



X Index: 142

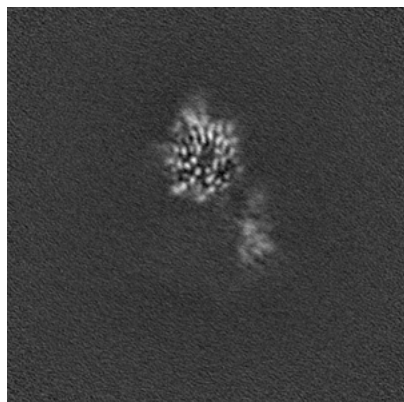


Y Index: 164

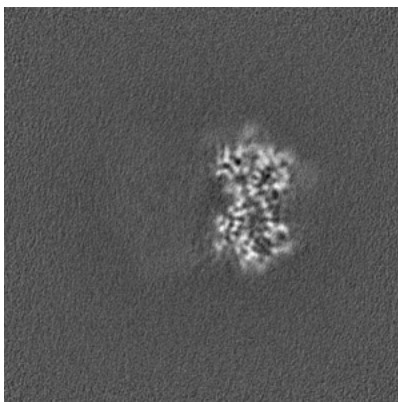


Z Index: 193

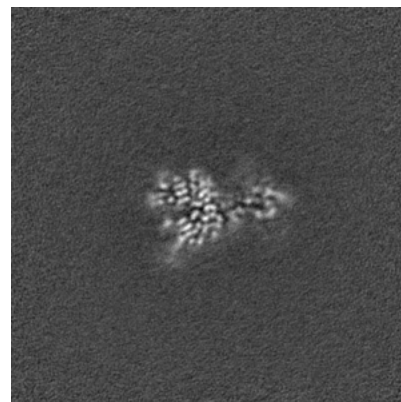
6.3.2 Raw map



X Index: 141



Y Index: 164

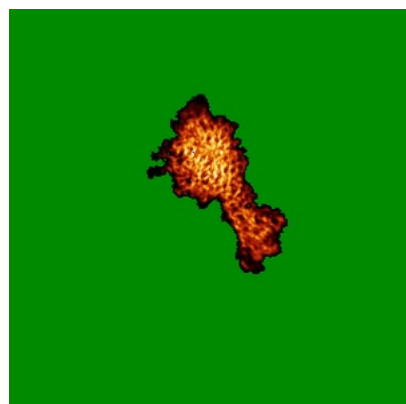


Z Index: 193

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

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

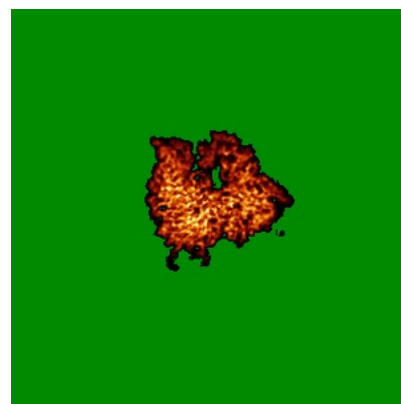
6.4.1 Primary map



X

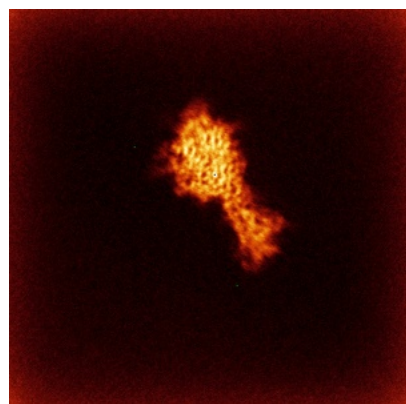


Y

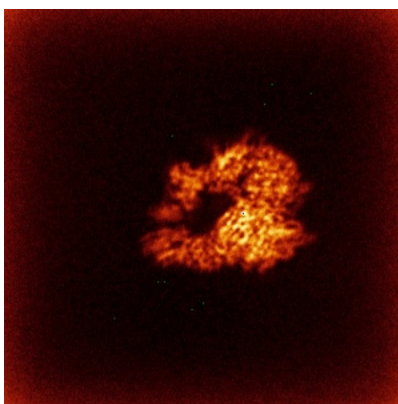


Z

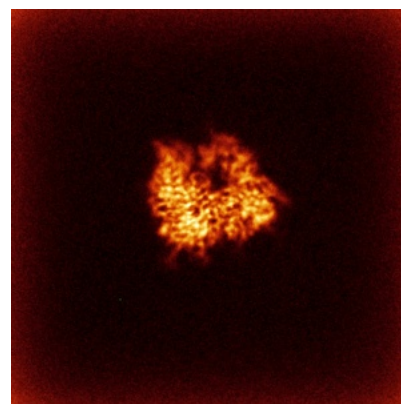
6.4.2 Raw map



X



Y

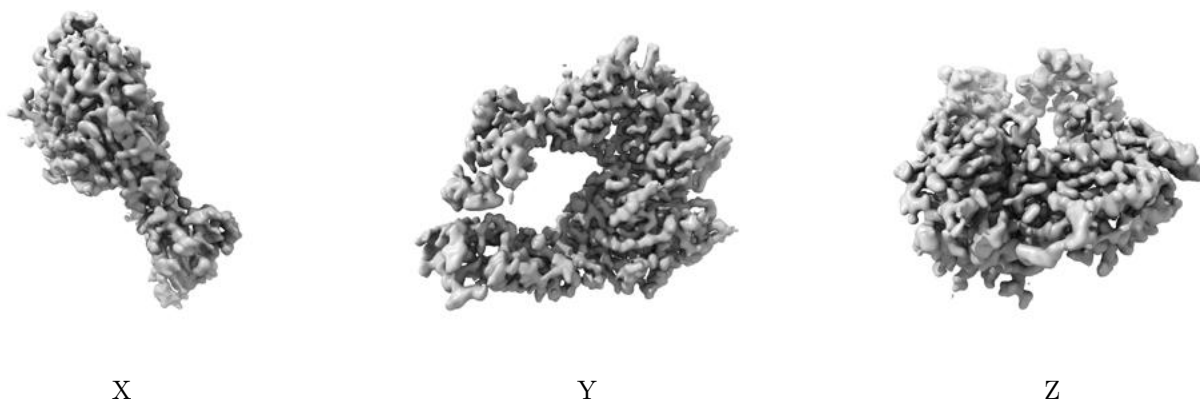


Z

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.

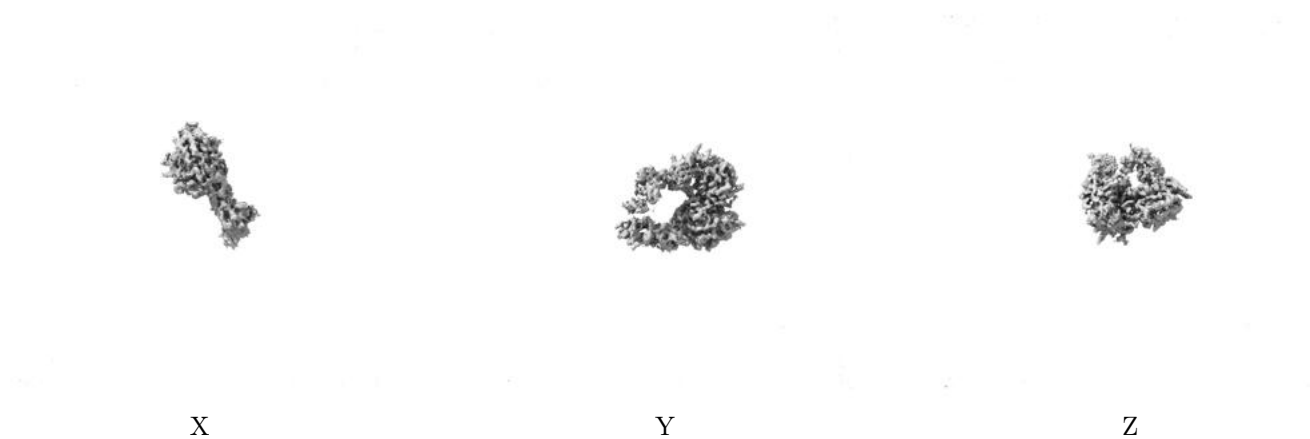
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.085. 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.

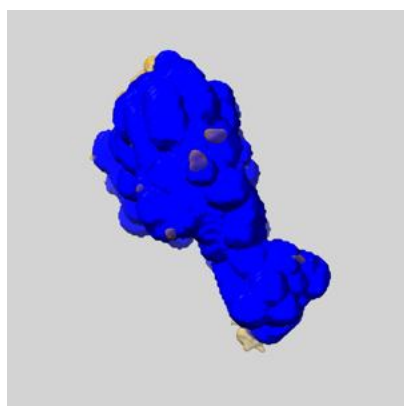
6.6 Mask visualisation [i](#)

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

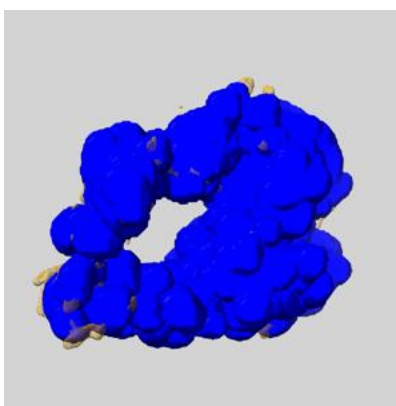
A mask typically either:

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

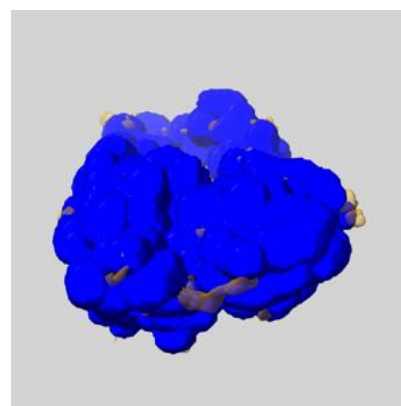
6.6.1 emd_17269_msk_1.map [i](#)



X



Y

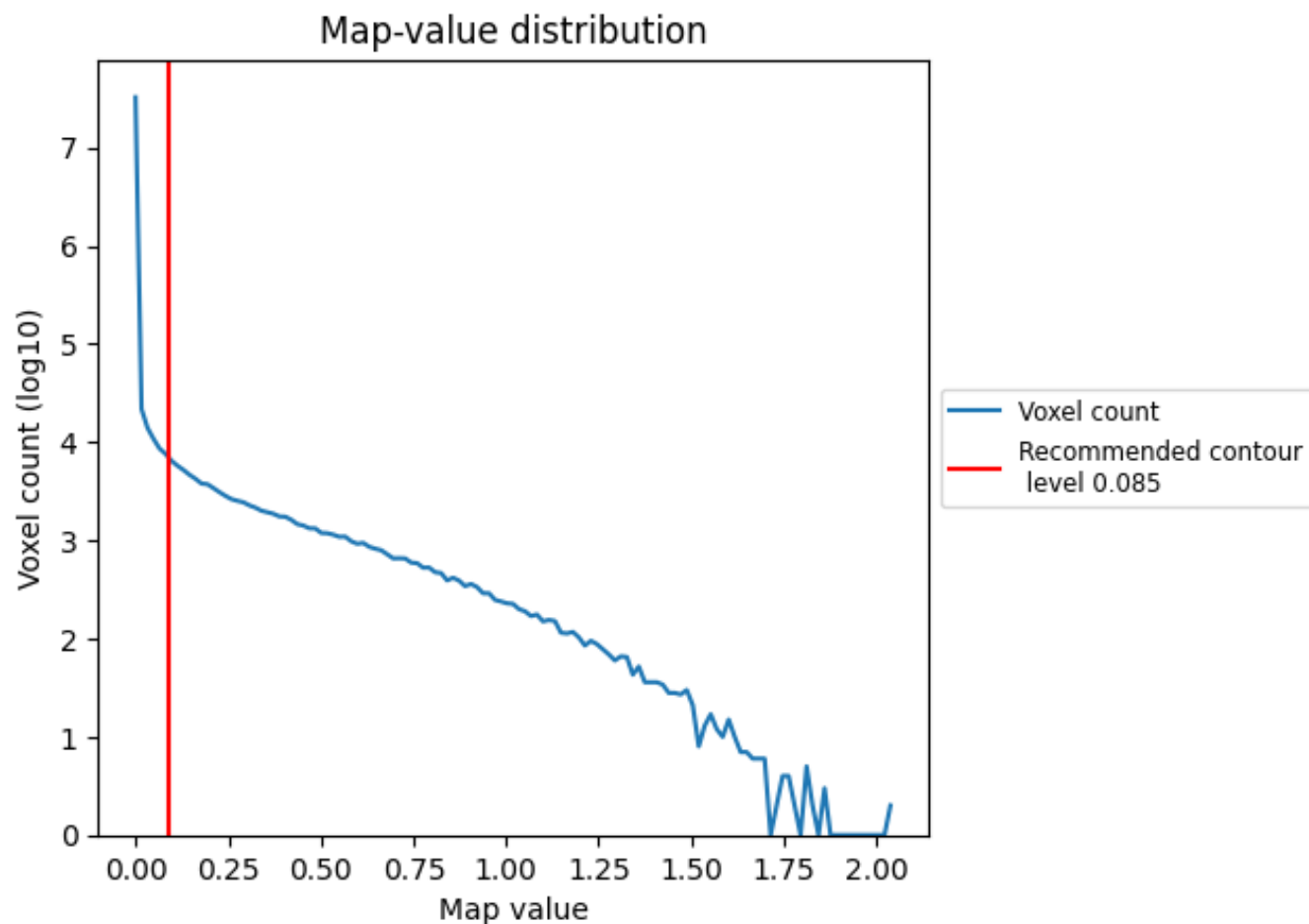


Z

7 Map analysis [i](#)

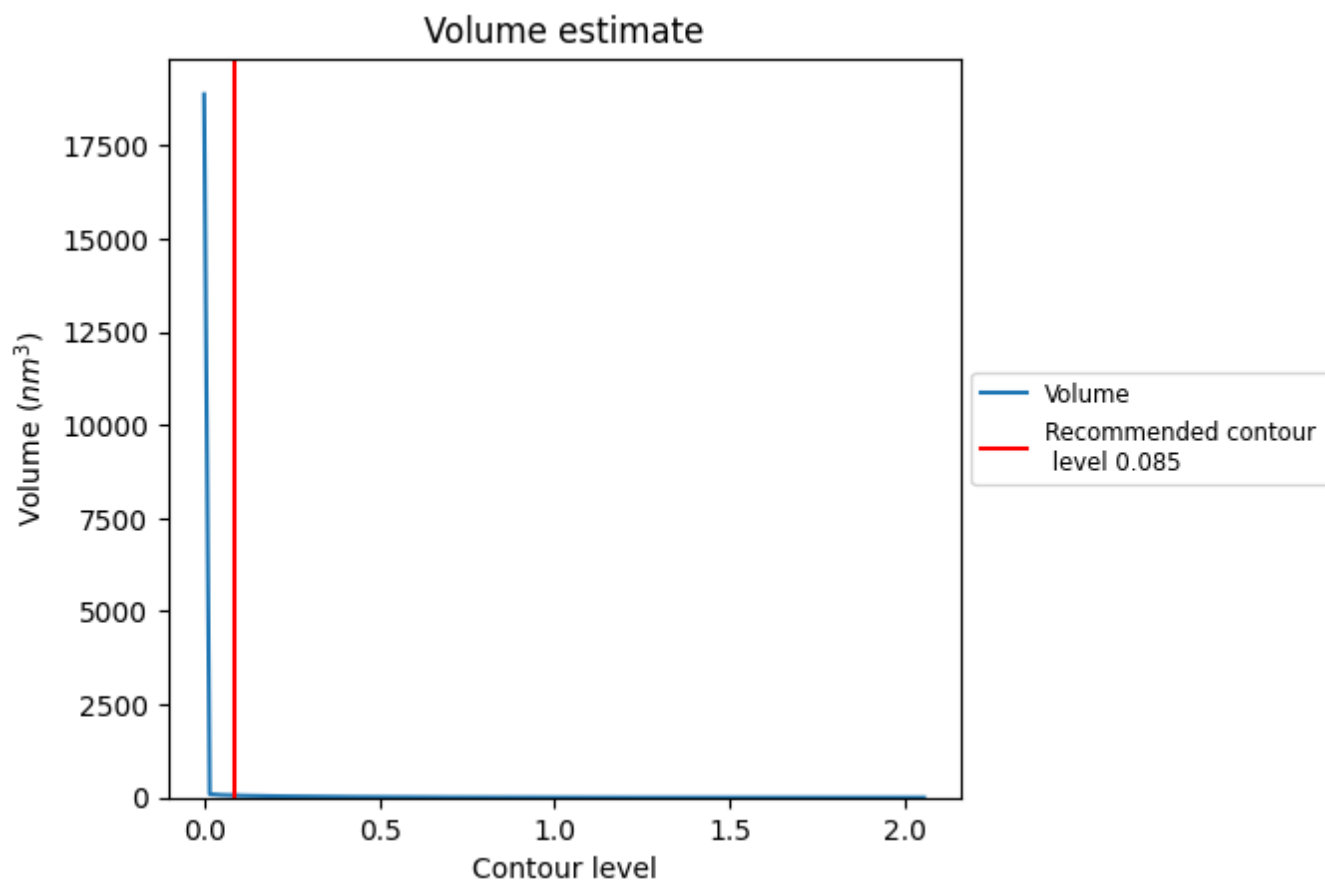
This section contains the results of statistical analysis of the map.

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.

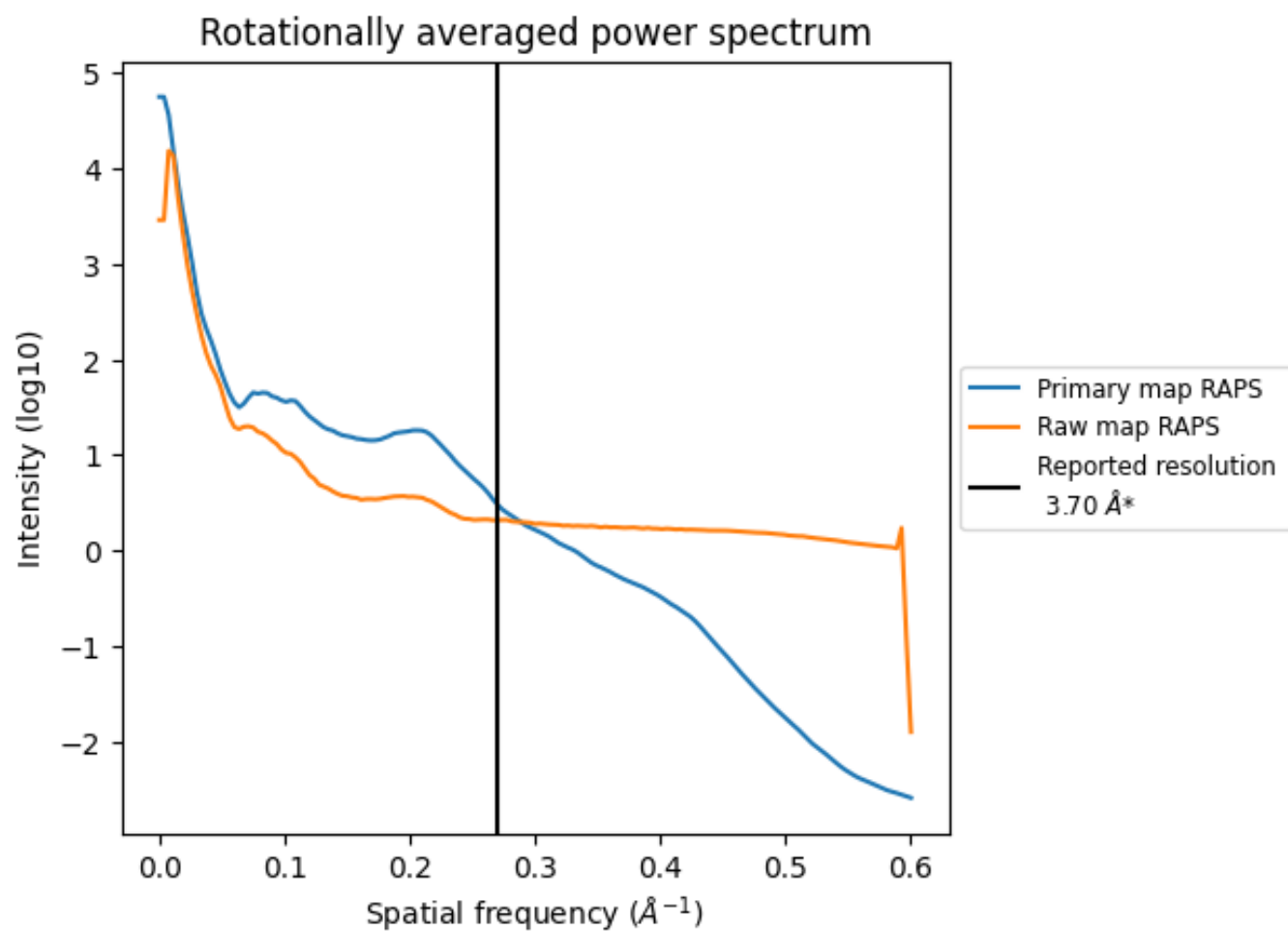
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 58 nm³; this corresponds to an approximate mass of 52 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ

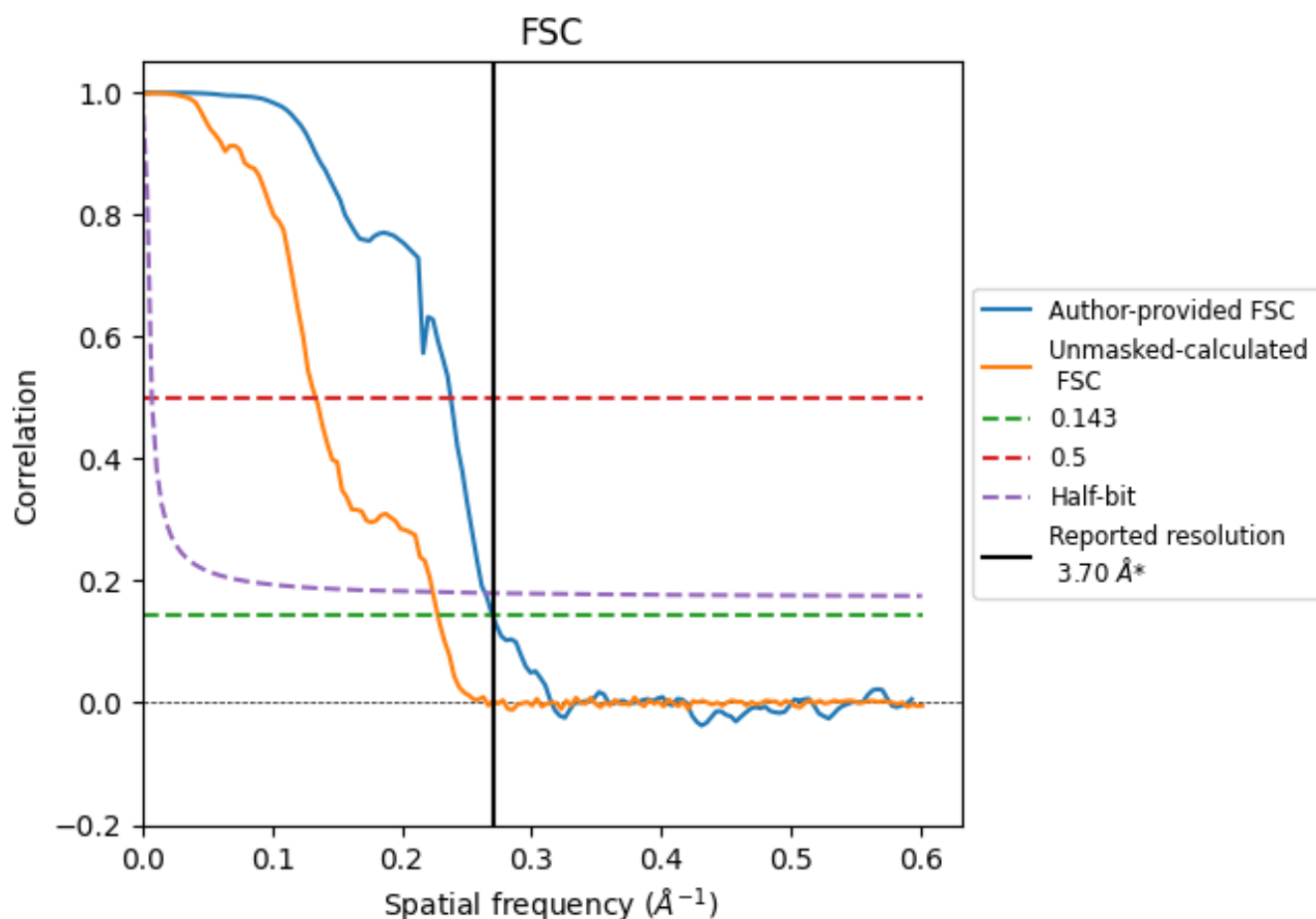


*Reported resolution corresponds to spatial frequency of 0.270 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.270 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

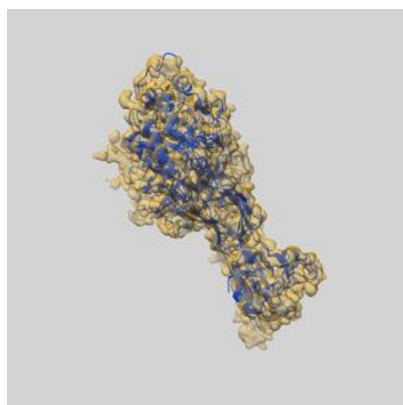
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.70	-	-
Author-provided FSC curve	3.70	4.21	3.78
Unmasked-calculated*	4.39	7.48	4.47

*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 4.39 differs from the reported value 3.7 by more than 10 %

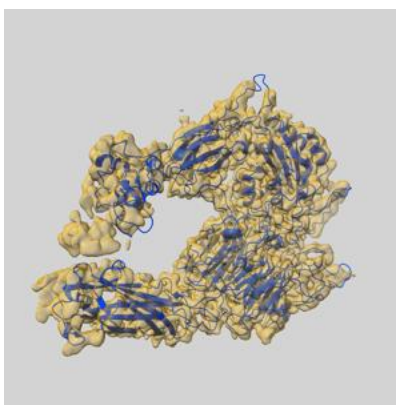
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-17269 and PDB model 8OXZ. Per-residue inclusion information can be found in section 3 on page 7.

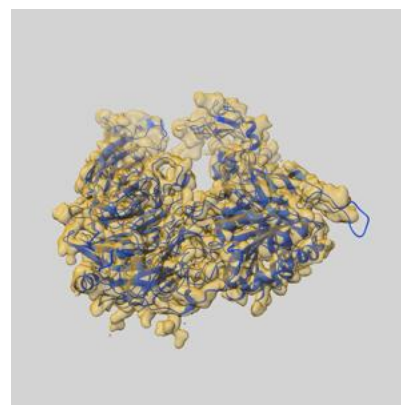
9.1 Map-model overlay [i](#)



X



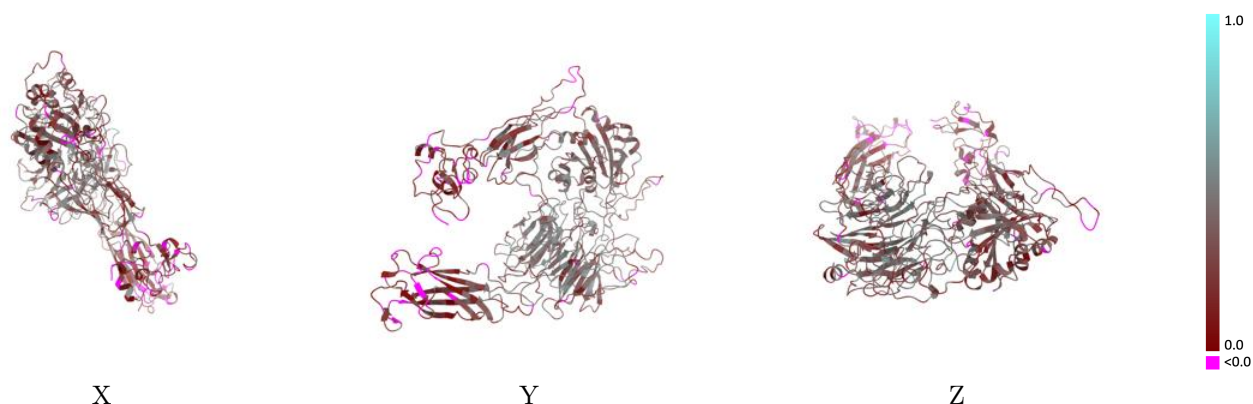
Y



Z

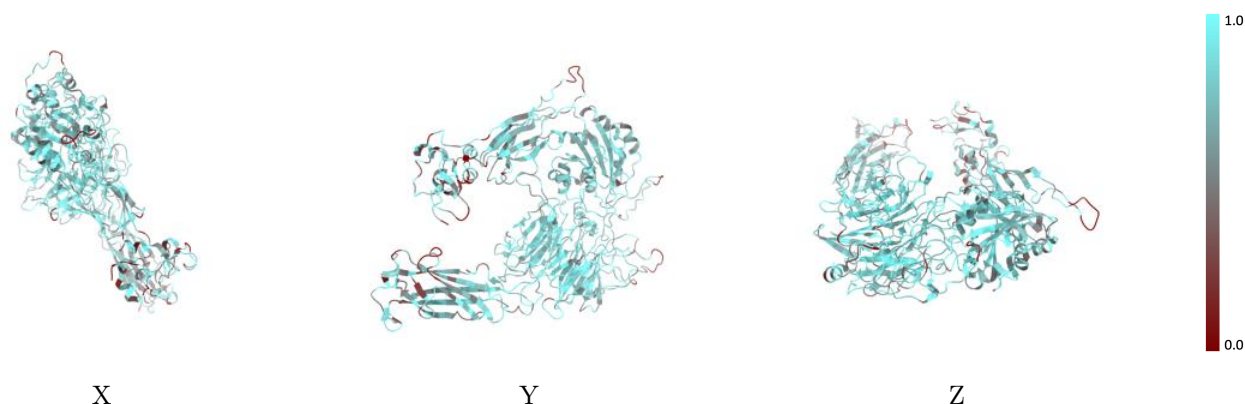
The images above show the 3D surface view of the map at the recommended contour level 0.085 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



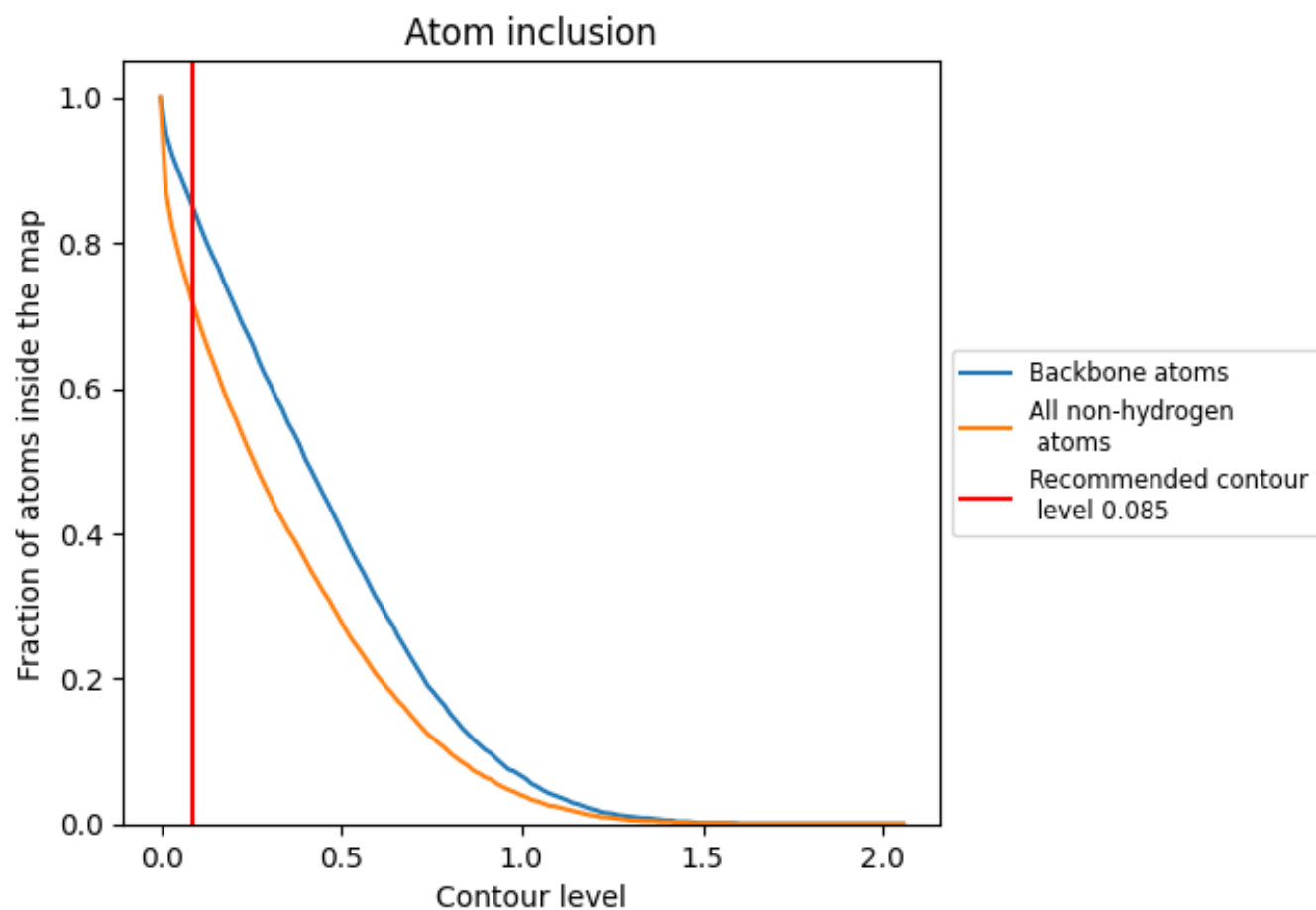
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.085).

9.4 Atom inclusion [i](#)



At the recommended contour level, 85% of all backbone atoms, 72% 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 (0.085) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7220	0.2930
P	0.7400	0.3100
Q	0.7000	0.2720

