



Full wwPDB EM Validation Report ⓘ

Mar 7, 2026 – 03:33 AM UTC

PDB ID : 6UR8 / pdb_00006ur8
EMDB ID : EMD-20857
Title : CryoEM structure of human alpha4beta2 nicotinic acetylcholine receptor in complex with varenicline
Authors : Alvarez, F.J.D.; Mukherjee, S.; Han, S.; Ammirati, M.; Kossiakoff, A.A.
Deposited on : 2019-10-22
Resolution : 3.71 Å(reported)
Based on initial model : 6CNJ

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:

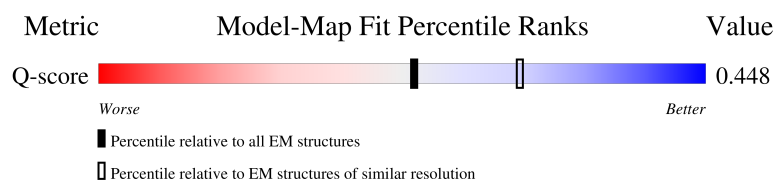
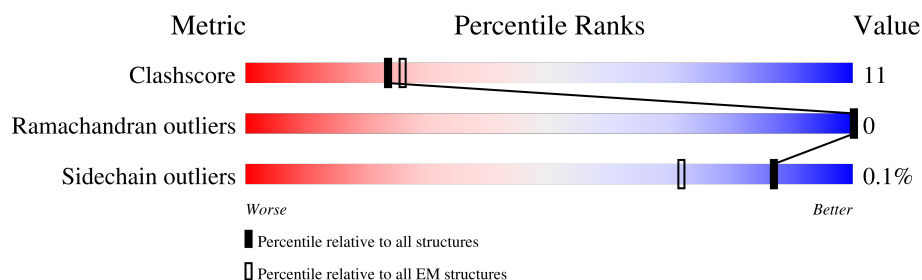
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data 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) : 2.49

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 3.71 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	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	10534 (3.21 - 4.21)

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	A	487	
1	D	487	
2	B	397	
2	C	397	

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Mol	Chain	Length	Quality of chain
2	E	397	67% 22% • 10%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 14880 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 Chimera of soluble cytochrome b562 (BRIL) and neuronal acetylcholine receptor subunit alpha-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	362	Total	C	N	O	S	0	0
			2976	1963	480	515	18		
1	D	362	Total	C	N	O	S	0	0
			2976	1963	480	515	18		

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	453	ASP	-	linker	UNP P43681
A	454	THR	-	linker	UNP P43681
A	455	ASP	-	linker	UNP P43681
A	456	PHE	-	linker	UNP P43681
A	463	TRP	MET	conflict	UNP P0ABE7
A	558	ILE	-	linker	UNP P0ABE7
A	559	GLN	-	linker	UNP P0ABE7
A	560	LYS	-	linker	UNP P0ABE7
A	561	TYR	-	linker	UNP P0ABE7
A	562	LEU	-	linker	UNP P0ABE7
D	453	ASP	-	linker	UNP P43681
D	454	THR	-	linker	UNP P43681
D	455	ASP	-	linker	UNP P43681
D	456	PHE	-	linker	UNP P43681
D	463	TRP	MET	conflict	UNP P0ABE7
D	558	ILE	-	linker	UNP P0ABE7
D	559	GLN	-	linker	UNP P0ABE7
D	560	LYS	-	linker	UNP P0ABE7
D	561	TYR	-	linker	UNP P0ABE7
D	562	LEU	-	linker	UNP P0ABE7

- Molecule 2 is a protein called Neuronal acetylcholine receptor subunit beta-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	358	Total 2917	C 1915	N 461	O 522	S 19	0	0
2	C	358	Total 2917	C 1915	N 461	O 522	S 19	0	0
2	E	358	Total 2917	C 1915	N 461	O 522	S 19	0	0

There are 30 discrepancies between the modelled and reference sequences:

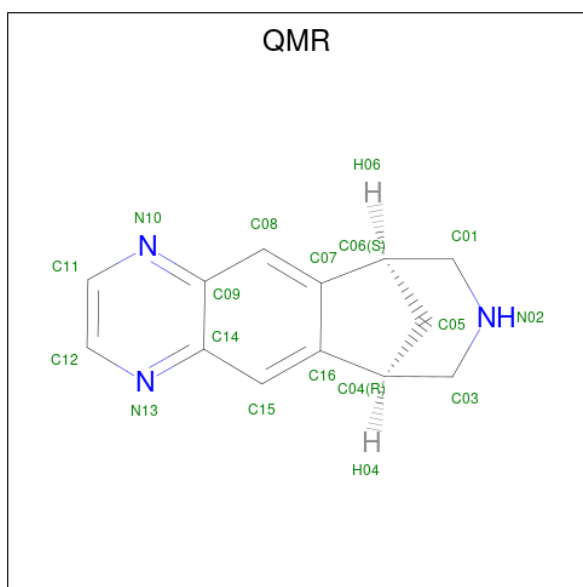
Chain	Residue	Modelled	Actual	Comment	Reference
B	390	SER	-	expression tag	UNP P17787
B	391	ALA	-	expression tag	UNP P17787
B	392	TRP	-	expression tag	UNP P17787
B	393	SER	-	expression tag	UNP P17787
B	394	HIS	-	expression tag	UNP P17787
B	395	PRO	-	expression tag	UNP P17787
B	396	GLN	-	expression tag	UNP P17787
B	397	PHE	-	expression tag	UNP P17787
B	398	GLU	-	expression tag	UNP P17787
B	399	LYS	-	expression tag	UNP P17787
C	390	SER	-	expression tag	UNP P17787
C	391	ALA	-	expression tag	UNP P17787
C	392	TRP	-	expression tag	UNP P17787
C	393	SER	-	expression tag	UNP P17787
C	394	HIS	-	expression tag	UNP P17787
C	395	PRO	-	expression tag	UNP P17787
C	396	GLN	-	expression tag	UNP P17787
C	397	PHE	-	expression tag	UNP P17787
C	398	GLU	-	expression tag	UNP P17787
C	399	LYS	-	expression tag	UNP P17787
E	390	SER	-	expression tag	UNP P17787
E	391	ALA	-	expression tag	UNP P17787
E	392	TRP	-	expression tag	UNP P17787
E	393	SER	-	expression tag	UNP P17787
E	394	HIS	-	expression tag	UNP P17787
E	395	PRO	-	expression tag	UNP P17787
E	396	GLN	-	expression tag	UNP P17787
E	397	PHE	-	expression tag	UNP P17787
E	398	GLU	-	expression tag	UNP P17787
E	399	LYS	-	expression tag	UNP P17787

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



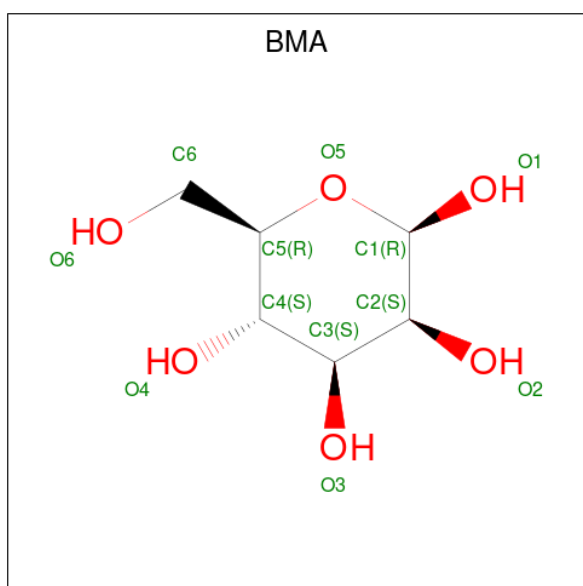
Mol	Chain	Residues	Atoms				AltConf
3	A	1	Total	C	N	O	0
			14	8	1	5	
3	B	1	Total	C	N	O	0
			14	8	1	5	
3	B	1	Total	C	N	O	0
			14	8	1	5	
3	C	1	Total	C	N	O	0
			14	8	1	5	
3	C	1	Total	C	N	O	0
			14	8	1	5	
3	D	1	Total	C	N	O	0
			14	8	1	5	
3	E	1	Total	C	N	O	0
			14	8	1	5	
3	E	1	Total	C	N	O	0
			14	8	1	5	

- Molecule 4 is VARENICLINE (CCD ID: QMR) (formula: $C_{13}H_{13}N_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
4	A	1	Total	C	N	0
			16	13	3	
4	D	1	Total	C	N	0
			16	13	3	

- Molecule 5 is beta-D-mannopyranose (CCD ID: BMA) (formula: $C_6H_{12}O_6$).

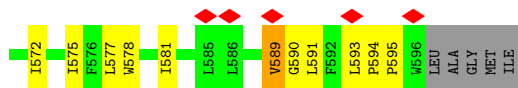


Mol	Chain	Residues	Atoms			AltConf
5	B	1	Total	C	O	0
			11	6	5	
5	C	1	Total	C	O	0
			11	6	5	

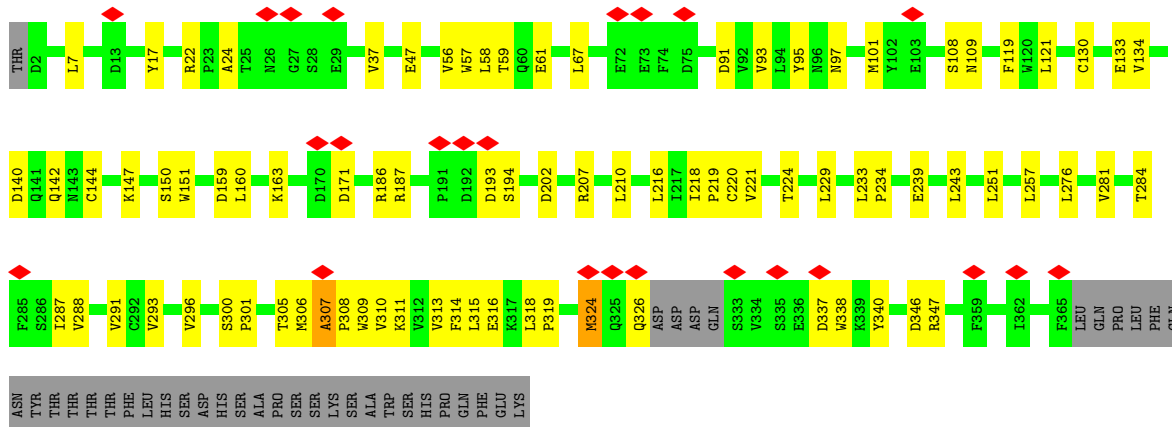
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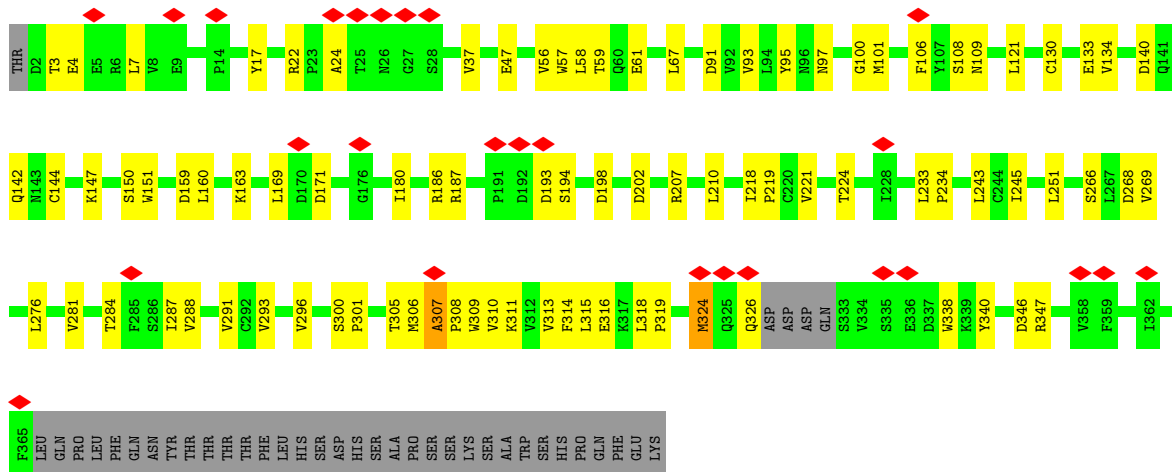
Mol	Chain	Residues	Atoms			AltConf
			Total	C	O	
5	E	1	11	6	5	0



Chain B: 6% 69% 21% 10%

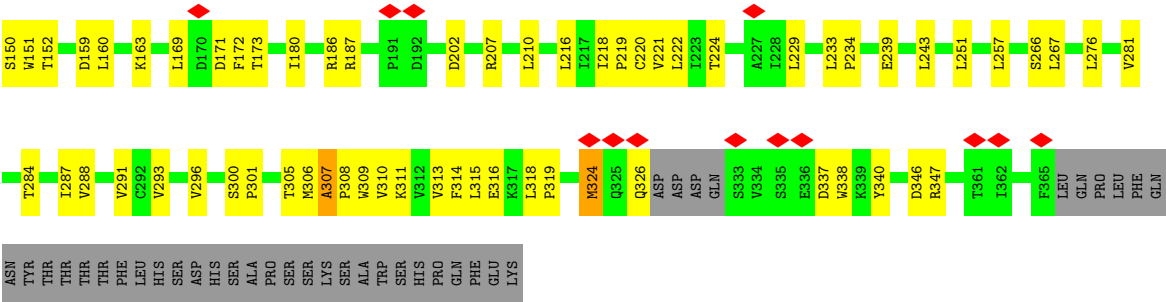


Chain C: 7% 68% 22% 10%



Chain E: 67% 22% 10%





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	226962	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 ($e^-/\text{\AA}^2$)	52	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.195	Depositor
Minimum map value	-0.115	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.022	Depositor
Map size (Å)	352.76797, 352.76797, 352.76797	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.1024, 1.1024, 1.1024	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: BMA, QMR, 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	A	0.30	0/3061	0.46	0/4182
1	D	0.29	0/3061	0.45	2/4182 (0.0%)
2	B	0.26	0/2996	0.43	0/4089
2	C	0.26	0/2996	0.43	0/4089
2	E	0.29	0/2996	0.44	0/4089
All	All	0.28	0/15110	0.44	2/20631 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	B	0	2
2	C	0	2
2	E	0	2
All	All	0	6

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	564	ASP	CA-C-N	6.39	129.37	120.29
1	D	564	ASP	C-N-CA	6.39	129.37	120.29

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	307	ALA	Peptide
2	B	324	MET	Peptide
2	C	307	ALA	Peptide
2	C	324	MET	Peptide
2	E	307	ALA	Peptide
2	E	324	MET	Peptide

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2976	0	3005	73	0
1	D	2976	0	3005	66	0
2	B	2917	0	2940	65	0
2	C	2917	0	2940	68	0
2	E	2917	0	2940	86	0
3	A	14	0	13	0	0
3	B	28	0	26	0	0
3	C	28	0	26	0	0
3	D	14	0	13	0	0
3	E	28	0	26	0	0
4	A	16	0	9	3	0
4	D	16	0	9	1	0
5	B	11	0	10	0	0
5	C	11	0	10	0	0
5	E	11	0	10	0	0
All	All	14880	0	14982	329	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 11.

All (329) 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:A:218:LEU:CD2	1:A:222:ILE:HD12	1.44	1.47
1:A:218:LEU:CD2	1:A:222:ILE:CD1	2.18	1.21
1:A:218:LEU:HD21	1:A:222:ILE:CD1	1.79	1.10

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:315:PRO:HG3	1:A:563:GLU:OE1	1.53	1.06
1:D:565:TRP:O	1:D:568:VAL:HG12	1.59	1.03
1:A:218:LEU:HD23	1:A:222:ILE:HD12	1.02	0.99
2:B:97:ASN:ND2	2:B:101:MET:O	1.97	0.97
2:E:97:ASN:ND2	2:E:101:MET:O	1.97	0.97
2:C:97:ASN:ND2	2:C:101:MET:O	1.97	0.96
2:B:306:MET:O	2:B:311:LYS:NZ	2.08	0.86
2:C:306:MET:O	2:C:311:LYS:NZ	2.08	0.86
2:E:306:MET:O	2:E:311:LYS:NZ	2.09	0.85
1:A:585:LEU:O	1:A:589:VAL:HG23	1.78	0.83
1:A:315:PRO:CG	1:A:563:GLU:OE1	2.26	0.82
1:A:315:PRO:HG3	1:A:563:GLU:CD	2.04	0.82
1:D:299:VAL:HG23	2:E:233:LEU:HD13	1.60	0.82
1:D:52:GLU:OE1	1:D:215:ARG:NH2	2.14	0.81
1:A:52:GLU:OE1	1:A:215:ARG:NH2	2.14	0.80
2:C:268:ASP:OD1	2:C:269:VAL:N	2.16	0.78
2:B:47:GLU:OE2	2:B:207:ARG:NH2	2.16	0.78
2:E:47:GLU:OE2	2:E:207:ARG:NH2	2.16	0.78
2:C:47:GLU:OE2	2:C:207:ARG:NH2	2.16	0.77
1:D:39:ARG:NH1	1:D:66:GLU:OE2	2.18	0.76
1:A:39:ARG:NH1	1:A:66:GLU:OE2	2.18	0.75
1:A:237:LEU:HD21	2:E:291:VAL:HG11	1.67	0.75
1:D:249:ILE:HD11	2:E:239:GLU:HB3	1.69	0.74
1:D:218:LEU:O	1:D:222:ILE:HG22	1.87	0.74
1:D:565:TRP:O	1:D:568:VAL:CG1	2.35	0.74
2:B:346:ASP:OD1	2:B:347:ARG:N	2.22	0.72
2:E:324:MET:O	2:E:340:TYR:OH	2.07	0.72
2:E:346:ASP:OD1	2:E:347:ARG:N	2.22	0.72
2:C:346:ASP:OD1	2:C:347:ARG:N	2.22	0.72
2:C:324:MET:O	2:C:340:TYR:OH	2.07	0.72
2:E:57:TRP:CH2	2:E:171:ASP:OD1	2.43	0.72
2:B:324:MET:O	2:B:340:TYR:OH	2.07	0.70
1:A:249:ILE:HD11	2:B:239:GLU:HB3	1.73	0.70
2:C:291:VAL:HG11	1:D:237:LEU:HD21	1.73	0.70
1:D:299:VAL:HG23	2:E:233:LEU:CD1	2.22	0.70
1:A:157:THR:HG22	4:A:702:QMR:N13	2.06	0.69
2:E:186:ARG:NH2	2:E:202:ASP:OD2	2.26	0.69
2:B:186:ARG:NH2	2:B:202:ASP:OD2	2.26	0.69
2:C:186:ARG:NH2	2:C:202:ASP:OD2	2.26	0.69
1:A:145:ASP:OD2	1:A:147:GLN:NE2	2.28	0.67
1:D:322:PHE:O	1:D:326:VAL:HG13	1.95	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:93:VAL:HG22	2:C:151:TRP:CZ3	2.31	0.66
2:B:93:VAL:HG22	2:B:151:TRP:CZ3	2.31	0.66
1:A:322:PHE:O	1:A:326:VAL:HG13	1.95	0.66
2:E:93:VAL:HG22	2:E:151:TRP:CZ3	2.31	0.66
1:D:145:ASP:OD2	1:D:147:GLN:NE2	2.28	0.66
1:A:218:LEU:HD21	1:A:222:ILE:HD13	1.78	0.64
2:E:169:LEU:HD13	2:E:180:ILE:CD1	2.27	0.64
2:B:93:VAL:HG22	2:B:151:TRP:CE3	2.33	0.64
2:C:93:VAL:HG22	2:C:151:TRP:CE3	2.33	0.64
2:B:61:GLU:OE2	2:B:163:LYS:NZ	2.28	0.64
2:E:93:VAL:HG22	2:E:151:TRP:CE3	2.33	0.64
2:E:57:TRP:HH2	2:E:171:ASP:OD1	1.79	0.63
2:E:22:ARG:NH1	2:E:24:ALA:HB2	2.14	0.63
1:A:326:VAL:HG11	1:A:567:TYR:HE2	1.62	0.62
2:B:140:ASP:OD2	2:B:142:GLN:NE2	2.32	0.62
2:E:140:ASP:OD2	2:E:142:GLN:NE2	2.32	0.62
2:E:172:PHE:CE2	2:E:173:THR:O	2.53	0.62
2:B:22:ARG:NH1	2:B:24:ALA:HB2	2.14	0.62
2:C:140:ASP:OD2	2:C:142:GLN:NE2	2.32	0.62
1:A:264:LEU:HD11	2:B:257:LEU:HD13	1.82	0.62
2:C:291:VAL:HG23	1:D:241:LEU:HD13	1.80	0.62
2:C:95:TYR:OH	2:C:150:SER:O	2.18	0.61
2:C:22:ARG:NH1	2:C:24:ALA:HB2	2.14	0.61
2:C:61:GLU:OE2	2:C:163:LYS:NZ	2.28	0.61
1:D:330:LEU:HD23	1:D:330:LEU:O	2.01	0.61
2:E:61:GLU:OE2	2:E:163:LYS:NZ	2.28	0.61
1:A:299:VAL:HG11	2:B:229:LEU:HD21	1.82	0.61
2:C:134:VAL:O	2:C:134:VAL:HG13	2.01	0.61
2:C:288:VAL:O	2:C:291:VAL:HG12	2.01	0.61
1:D:299:VAL:HG11	2:E:229:LEU:HD21	1.83	0.61
1:A:218:LEU:CG	1:A:222:ILE:CD1	2.79	0.61
2:E:288:VAL:O	2:E:291:VAL:HG12	2.01	0.61
2:B:95:TYR:OH	2:B:150:SER:O	2.18	0.60
2:E:95:TYR:OH	2:E:150:SER:O	2.18	0.60
2:B:134:VAL:O	2:B:134:VAL:HG13	2.01	0.60
2:B:288:VAL:O	2:B:291:VAL:HG12	2.01	0.60
1:D:264:LEU:HD11	2:E:257:LEU:HD13	1.84	0.60
2:B:326:GLN:HA	2:B:340:TYR:CE2	2.37	0.60
1:A:589:VAL:O	1:A:593:LEU:CD1	2.50	0.60
1:D:589:VAL:O	1:D:593:LEU:CD1	2.50	0.59
2:E:134:VAL:O	2:E:134:VAL:HG13	2.01	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:169:LEU:HD13	2:E:180:ILE:HD11	1.83	0.59
2:E:326:GLN:HA	2:E:340:TYR:CE2	2.37	0.59
2:C:326:GLN:HA	2:C:340:TYR:CE2	2.37	0.59
2:E:169:LEU:CD1	2:E:180:ILE:CD1	2.80	0.59
1:A:226:ILE:HG22	1:A:227:PRO:HD3	1.85	0.59
2:E:216:LEU:O	2:E:220:CYS:SG	2.59	0.59
1:D:222:ILE:HG12	1:D:222:ILE:O	2.01	0.59
2:E:267:LEU:HD23	2:E:267:LEU:C	2.27	0.59
1:A:218:LEU:HG	1:A:222:ILE:HD11	1.86	0.58
1:A:51:ASP:OD2	1:A:54:ASN:ND2	2.36	0.58
1:D:51:ASP:OD2	1:D:54:ASN:ND2	2.36	0.58
2:C:307:ALA:HB1	2:C:308:PRO:CD	2.33	0.58
2:E:307:ALA:HB1	2:E:308:PRO:CD	2.33	0.58
2:B:307:ALA:HB1	2:B:308:PRO:CD	2.33	0.57
1:D:226:ILE:HG22	1:D:227:PRO:HD3	1.84	0.57
1:D:292:THR:O	1:D:295:ILE:HG22	2.05	0.56
2:E:284:THR:O	2:E:287:ILE:HG22	2.06	0.56
2:B:210:LEU:C	2:B:210:LEU:HD23	2.31	0.56
1:D:315:PRO:O	1:D:319:ARG:NH1	2.38	0.56
1:A:315:PRO:O	1:A:319:ARG:NH1	2.38	0.56
2:C:284:THR:O	2:C:287:ILE:HG22	2.06	0.56
2:B:216:LEU:O	2:B:220:CYS:SG	2.59	0.56
2:B:284:THR:O	2:B:287:ILE:HG22	2.06	0.56
2:C:210:LEU:C	2:C:210:LEU:HD23	2.31	0.56
1:D:326:VAL:HG11	1:D:567:TYR:HE2	1.69	0.56
1:A:292:THR:O	1:A:295:ILE:HG22	2.05	0.55
2:E:210:LEU:HD23	2:E:210:LEU:C	2.31	0.55
2:B:57:TRP:HH2	2:B:171:ASP:OD2	1.89	0.55
2:B:300:SER:HB2	2:B:301:PRO:HD2	1.88	0.55
2:C:300:SER:HB2	2:C:301:PRO:HD2	1.88	0.54
2:B:310:VAL:HG23	2:B:311:LYS:N	2.22	0.54
2:E:300:SER:HB2	2:E:301:PRO:HD2	1.88	0.54
2:E:39:LEU:HD23	2:E:172:PHE:CD1	2.43	0.54
1:A:165:LEU:HD13	1:A:207:ILE:HD12	1.90	0.54
2:C:310:VAL:HG23	2:C:311:LYS:N	2.22	0.54
2:E:310:VAL:HG23	2:E:311:LYS:N	2.22	0.53
2:E:267:LEU:HD23	2:E:267:LEU:O	2.08	0.53
2:C:306:MET:HB2	2:C:310:VAL:HG21	1.91	0.53
1:D:589:VAL:HG12	1:D:590:GLY:N	2.24	0.53
1:D:165:LEU:HD13	1:D:207:ILE:HD12	1.90	0.52
2:E:306:MET:HB2	2:E:310:VAL:HG21	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:289:ILE:HD13	2:E:222:LEU:CD1	2.40	0.52
2:B:306:MET:HB2	2:B:310:VAL:HG21	1.91	0.52
2:E:95:TYR:HB2	2:E:147:LYS:HD2	1.92	0.51
1:D:249:ILE:CD1	2:E:239:GLU:HB3	2.40	0.51
1:A:241:LEU:HD13	2:E:291:VAL:HG23	1.93	0.51
2:B:95:TYR:HB2	2:B:147:LYS:HD2	1.92	0.51
1:A:34:ASP:OD2	1:A:35:VAL:N	2.44	0.51
2:C:169:LEU:HD13	2:C:180:ILE:CD1	2.41	0.51
1:D:199:CYS:SG	1:D:200:CYS:N	2.84	0.51
1:D:289:ILE:HD13	2:E:222:LEU:HD12	1.92	0.51
2:E:59:THR:HG22	2:E:121:LEU:HD22	1.93	0.51
2:B:221:VAL:HA	2:B:224:THR:HG22	1.93	0.51
1:A:84:SER:HA	1:A:117:LEU:O	2.11	0.51
1:D:296:VAL:O	1:D:299:VAL:HG12	2.11	0.51
1:A:199:CYS:SG	1:A:200:CYS:N	2.84	0.51
1:A:241:LEU:HD12	1:A:242:PRO:HD2	1.92	0.51
1:D:84:SER:HA	1:D:117:LEU:O	2.11	0.51
1:A:296:VAL:O	1:A:299:VAL:HG12	2.11	0.50
2:C:287:ILE:HG21	1:D:234:LEU:HD21	1.93	0.50
1:D:241:LEU:HD12	1:D:242:PRO:HD2	1.92	0.50
2:C:95:TYR:HB2	2:C:147:LYS:HD2	1.92	0.50
2:C:59:THR:HG22	2:C:121:LEU:HD22	1.93	0.50
1:A:218:LEU:HG	1:A:222:ILE:CD1	2.42	0.50
1:A:14:LEU:C	1:A:14:LEU:HD23	2.37	0.50
2:B:346:ASP:OD1	2:B:346:ASP:C	2.55	0.50
1:D:14:LEU:C	1:D:14:LEU:HD23	2.37	0.50
2:B:59:THR:HG22	2:B:121:LEU:HD22	1.93	0.49
1:A:315:PRO:HG3	1:A:563:GLU:OE2	2.13	0.49
2:E:108:SER:OG	2:E:109:ASN:N	2.45	0.49
2:C:221:VAL:HA	2:C:224:THR:HG22	1.93	0.49
2:E:346:ASP:OD1	2:E:346:ASP:C	2.55	0.49
2:B:306:MET:HB3	2:B:338:TRP:CH2	2.48	0.49
2:C:306:MET:HB3	2:C:338:TRP:CH2	2.48	0.49
1:D:249:ILE:HG22	1:D:295:ILE:HD11	1.95	0.49
2:E:221:VAL:HA	2:E:224:THR:HG22	1.93	0.49
1:A:249:ILE:HG22	1:A:295:ILE:HD11	1.95	0.49
2:C:346:ASP:OD1	2:C:346:ASP:C	2.55	0.49
2:E:306:MET:HB3	2:E:338:TRP:CH2	2.48	0.49
2:B:57:TRP:CH2	2:B:171:ASP:OD2	2.66	0.49
2:E:293:VAL:O	2:E:296:VAL:HG12	2.13	0.49
2:C:293:VAL:O	2:C:296:VAL:HG12	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:251:LEU:CD1	2:B:276:LEU:HD22	2.43	0.48
2:B:243:LEU:C	2:B:243:LEU:HD23	2.38	0.48
2:B:293:VAL:O	2:B:296:VAL:HG12	2.13	0.48
2:E:243:LEU:C	2:E:243:LEU:HD23	2.38	0.48
1:A:218:LEU:CG	1:A:222:ILE:HD11	2.44	0.48
1:A:577:LEU:C	1:A:577:LEU:HD23	2.38	0.48
2:E:251:LEU:CD1	2:E:276:LEU:HD22	2.43	0.48
2:C:251:LEU:CD1	2:C:276:LEU:HD22	2.43	0.48
2:C:108:SER:OG	2:C:109:ASN:N	2.45	0.48
2:C:243:LEU:HD23	2:C:243:LEU:C	2.38	0.48
1:D:577:LEU:C	1:D:577:LEU:HD23	2.38	0.48
2:B:108:SER:OG	2:B:109:ASN:N	2.45	0.47
1:D:119:HIS:O	1:D:119:HIS:CG	2.67	0.47
2:B:151:TRP:NE1	2:C:106:PHE:CE2	2.82	0.47
1:A:119:HIS:CG	1:A:119:HIS:O	2.67	0.47
1:A:264:LEU:HD21	2:B:257:LEU:CD1	2.44	0.47
1:A:17:LYS:NZ	1:A:79:TYR:OH	2.34	0.47
2:C:266:SER:HB3	1:D:218:LEU:HB3	1.97	0.47
2:E:160:LEU:O	2:E:187:ARG:NH1	2.49	0.46
2:C:169:LEU:HD13	2:C:180:ILE:HD11	1.96	0.46
1:A:589:VAL:O	1:A:593:LEU:HD13	2.16	0.46
2:C:58:LEU:HD23	2:C:58:LEU:H	1.81	0.46
1:D:313:THR:O	1:D:314:MET:CG	2.64	0.46
1:A:313:THR:O	1:A:314:MET:CG	2.64	0.46
4:A:702:QMR:N10	2:B:119:PHE:HE2	2.14	0.46
2:E:172:PHE:CD2	2:E:173:THR:N	2.84	0.46
2:C:269:VAL:HG21	1:D:222:ILE:CD1	2.45	0.45
1:D:274:SER:HB3	2:E:210:LEU:HB3	1.98	0.45
1:A:572:ILE:HA	1:A:575:ILE:HG22	1.98	0.45
1:A:96:ASP:OD1	1:A:96:ASP:N	2.49	0.45
1:A:216:LEU:CB	2:E:266:SER:HB2	2.46	0.45
2:B:160:LEU:O	2:B:187:ARG:NH1	2.49	0.45
2:E:39:LEU:HD23	2:E:172:PHE:HD1	1.81	0.45
2:B:58:LEU:HD23	2:B:58:LEU:H	1.81	0.45
1:D:589:VAL:O	1:D:593:LEU:HD13	2.16	0.45
2:E:37:VAL:HG23	2:E:56:VAL:HG13	1.99	0.45
2:E:313:VAL:HG13	2:E:314:PHE:N	2.32	0.45
1:A:230:LEU:HD21	2:E:284:THR:HB	1.99	0.45
2:C:160:LEU:O	2:C:187:ARG:NH1	2.49	0.45
1:D:31:ASN:O	1:D:34:ASP:HB2	2.16	0.45
1:A:264:LEU:HD21	2:B:257:LEU:HD11	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:37:VAL:HG23	2:B:56:VAL:HG13	1.99	0.45
2:C:37:VAL:HG23	2:C:56:VAL:HG13	1.99	0.45
2:E:218:ILE:HB	2:E:219:PRO:HD3	1.98	0.45
2:E:316:GLU:O	2:E:319:PRO:HD2	2.17	0.45
1:A:564:ASP:O	1:A:565:TRP:C	2.59	0.45
2:C:313:VAL:HG13	2:C:314:PHE:N	2.32	0.45
1:D:102:ASN:OD1	1:D:103:ALA:N	2.50	0.45
2:E:172:PHE:CD2	2:E:172:PHE:C	2.94	0.45
1:A:102:ASN:OD1	1:A:103:ALA:N	2.50	0.45
2:B:316:GLU:O	2:B:319:PRO:HD2	2.17	0.45
1:D:572:ILE:HA	1:D:575:ILE:HG22	1.98	0.45
1:D:589:VAL:O	1:D:591:LEU:N	2.50	0.45
1:A:216:LEU:HB3	2:E:266:SER:HB2	1.98	0.44
2:B:218:ILE:HB	2:B:219:PRO:HD3	1.98	0.44
2:C:218:ILE:HB	2:C:219:PRO:HD3	1.98	0.44
1:A:589:VAL:O	1:A:591:LEU:N	2.50	0.44
2:C:100:GLY:HA3	1:D:130:ILE:HD12	2.00	0.44
1:D:289:ILE:O	1:D:292:THR:HG22	2.17	0.44
2:B:313:VAL:HG13	2:B:314:PHE:N	2.32	0.44
2:E:58:LEU:HD23	2:E:58:LEU:H	1.81	0.44
1:A:313:THR:O	1:A:314:MET:HG2	2.17	0.44
1:D:224:LEU:C	1:D:224:LEU:HD23	2.43	0.44
1:D:313:THR:O	1:D:314:MET:HG2	2.17	0.44
1:A:237:LEU:HD23	1:A:237:LEU:C	2.42	0.44
1:D:237:LEU:C	1:D:237:LEU:HD23	2.42	0.44
1:A:308:SER:OG	1:A:309:PRO:HD2	2.17	0.44
2:E:309:TRP:O	2:E:313:VAL:HG12	2.18	0.44
2:B:309:TRP:O	2:B:313:VAL:HG12	2.18	0.44
2:C:316:GLU:O	2:C:319:PRO:HD2	2.17	0.44
1:D:308:SER:OG	1:D:309:PRO:HD2	2.17	0.43
1:A:234:LEU:HD21	2:E:287:ILE:HG21	2.00	0.43
1:A:289:ILE:O	1:A:292:THR:HG22	2.17	0.43
1:A:296:VAL:O	1:A:299:VAL:CG1	2.67	0.43
2:B:37:VAL:CG2	2:B:56:VAL:HG13	2.48	0.43
2:C:159:ASP:OD1	2:C:187:ARG:NH2	2.52	0.43
1:D:314:MET:N	1:D:315:PRO:CD	2.81	0.43
1:A:218:LEU:CG	1:A:222:ILE:HD12	2.31	0.43
1:A:288:MET:HA	1:A:291:VAL:HG12	1.99	0.43
2:B:159:ASP:OD1	2:B:187:ARG:NH2	2.52	0.43
2:B:133:GLU:O	2:B:133:GLU:HG3	2.19	0.43
2:B:193:ASP:O	2:B:194:SER:OG	2.34	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:139:VAL:O	1:A:139:VAL:HG12	2.19	0.43
2:C:37:VAL:CG2	2:C:56:VAL:HG13	2.49	0.43
1:D:98:VAL:HG12	1:D:99:LEU:N	2.34	0.43
1:A:224:LEU:HD23	1:A:224:LEU:C	2.43	0.43
2:C:309:TRP:O	2:C:313:VAL:HG12	2.18	0.43
1:D:288:MET:HA	1:D:291:VAL:HG12	1.99	0.43
2:C:133:GLU:HG3	2:C:133:GLU:O	2.19	0.43
1:D:296:VAL:O	1:D:299:VAL:CG1	2.66	0.43
2:E:37:VAL:CG2	2:E:56:VAL:HG13	2.49	0.43
2:E:133:GLU:HG3	2:E:133:GLU:O	2.19	0.43
2:E:159:ASP:OD1	2:E:187:ARG:NH2	2.52	0.43
2:C:307:ALA:CB	2:C:308:PRO:CD	2.97	0.43
1:A:236:VAL:O	1:A:236:VAL:HG22	2.19	0.42
1:D:236:VAL:HG22	1:D:236:VAL:O	2.19	0.42
1:A:44:ILE:HG22	1:A:45:ALA:N	2.34	0.42
2:B:307:ALA:HB1	2:B:308:PRO:HD2	2.01	0.42
1:D:96:ASP:OD1	1:D:96:ASP:N	2.49	0.42
2:E:281:VAL:O	2:E:284:THR:HG22	2.19	0.42
1:A:98:VAL:HG12	1:A:99:LEU:N	2.34	0.42
1:A:314:MET:N	1:A:315:PRO:CD	2.81	0.42
2:C:193:ASP:O	2:C:194:SER:OG	2.34	0.42
1:D:139:VAL:O	1:D:139:VAL:HG12	2.19	0.42
2:E:308:PRO:O	2:E:309:TRP:C	2.63	0.42
2:C:121:LEU:HD12	2:C:121:LEU:O	2.20	0.42
2:B:281:VAL:O	2:B:284:THR:HG22	2.19	0.42
2:C:281:VAL:O	2:C:284:THR:HG22	2.20	0.42
2:E:91:ASP:HB3	2:E:151:TRP:CZ3	2.55	0.42
2:B:233:LEU:HD12	2:B:234:PRO:HD2	2.02	0.42
2:B:305:THR:O	2:B:306:MET:HG3	2.20	0.42
2:C:233:LEU:HD12	2:C:234:PRO:HD2	2.02	0.42
2:E:93:VAL:HG13	2:E:151:TRP:CH2	2.55	0.42
2:C:91:ASP:HB3	2:C:151:TRP:CZ3	2.55	0.42
2:B:93:VAL:HG13	2:B:151:TRP:CH2	2.55	0.41
2:C:245:ILE:HD11	1:D:251:LEU:HD13	2.02	0.41
2:E:233:LEU:HD12	2:E:234:PRO:HD2	2.02	0.41
2:E:307:ALA:CB	2:E:308:PRO:CD	2.97	0.41
2:B:7:LEU:C	2:B:7:LEU:HD23	2.45	0.41
2:B:91:ASP:HB3	2:B:151:TRP:CZ3	2.55	0.41
2:B:17:TYR:CE1	2:B:67:LEU:HD21	2.56	0.41
2:B:121:LEU:O	2:B:121:LEU:HD12	2.19	0.41
2:C:93:VAL:HG13	2:C:151:TRP:CH2	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:313:THR:OG1	1:D:314:MET:N	2.52	0.41
2:E:121:LEU:O	2:E:121:LEU:HD12	2.20	0.41
2:E:169:LEU:HD11	2:E:180:ILE:HD12	2.01	0.41
2:B:308:PRO:O	2:B:309:TRP:C	2.63	0.41
1:D:44:ILE:HG22	1:D:45:ALA:N	2.34	0.41
1:A:315:PRO:CG	1:A:563:GLU:CD	2.86	0.41
1:A:594:PRO:N	1:A:595:PRO:CD	2.84	0.41
2:C:17:TYR:CE1	2:C:67:LEU:HD21	2.56	0.41
2:E:305:THR:O	2:E:306:MET:HG3	2.20	0.41
2:B:315:LEU:HD13	2:B:318:LEU:HD11	2.03	0.41
2:C:57:TRP:CH2	2:C:171:ASP:OD2	2.73	0.41
2:E:315:LEU:HD13	2:E:318:LEU:HD11	2.03	0.41
2:C:307:ALA:HB1	2:C:308:PRO:HD2	2.01	0.41
2:E:307:ALA:HB1	2:E:308:PRO:HD2	2.01	0.41
2:C:305:THR:O	2:C:306:MET:HG3	2.20	0.41
1:A:86:ARG:NE	2:E:152:THR:O	2.54	0.41
2:C:7:LEU:C	2:C:7:LEU:HD23	2.45	0.41
1:D:326:VAL:N	1:D:327:PRO:CD	2.84	0.41
2:E:130:CYS:CB	2:E:144:CYS:HA	2.51	0.41
1:A:578:TRP:O	1:A:581:ILE:HG22	2.21	0.41
2:C:198:ASP:OD1	2:C:198:ASP:N	2.54	0.41
4:D:702:QMR:H11	2:E:111:VAL:CG2	2.51	0.41
2:E:17:TYR:CE1	2:E:67:LEU:HD21	2.56	0.41
2:B:130:CYS:CB	2:B:144:CYS:HA	2.51	0.40
2:C:130:CYS:CB	2:C:144:CYS:HA	2.51	0.40
2:C:315:LEU:HD13	2:C:318:LEU:HD11	2.03	0.40
1:D:589:VAL:CG1	1:D:590:GLY:N	2.83	0.40
2:B:307:ALA:CB	2:B:308:PRO:CD	2.97	0.40
2:C:3:THR:O	2:C:4:GLU:C	2.64	0.40
1:D:594:PRO:N	1:D:595:PRO:CD	2.84	0.40
2:E:7:LEU:C	2:E:7:LEU:HD23	2.45	0.40
2:E:251:LEU:HD11	2:E:276:LEU:HD22	2.03	0.40
1:A:199:CYS:SG	4:A:702:QMR:H08	2.62	0.40
2:C:308:PRO:O	2:C:309:TRP:C	2.62	0.40
1:D:252:CYS:HB2	1:D:295:ILE:HD13	2.04	0.40
1:D:578:TRP:O	1:D:581:ILE:HG22	2.21	0.40
2:E:306:MET:HE1	2:E:337:ASP:OD2	2.22	0.40
1:A:326:VAL:HB	1:A:331:LEU:O	2.21	0.40
2:B:306:MET:HE1	2:B:337:ASP:OD2	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	358/487 (74%)	319 (89%)	39 (11%)	0	100	100
1	D	358/487 (74%)	319 (89%)	39 (11%)	0	100	100
2	B	354/397 (89%)	323 (91%)	31 (9%)	0	100	100
2	C	354/397 (89%)	323 (91%)	31 (9%)	0	100	100
2	E	354/397 (89%)	323 (91%)	31 (9%)	0	100	100
All	All	1778/2165 (82%)	1607 (90%)	171 (10%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	337/440 (77%)	337 (100%)	0	100	100
1	D	337/440 (77%)	336 (100%)	1 (0%)	86	83
2	B	336/373 (90%)	336 (100%)	0	100	100
2	C	336/373 (90%)	336 (100%)	0	100	100
2	E	336/373 (90%)	336 (100%)	0	100	100
All	All	1682/1999 (84%)	1681 (100%)	1 (0%)	87	88

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	589	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	148	ASN
1	A	306	HIS
2	B	109	ASN
2	B	143	ASN
2	C	143	ASN
1	D	148	ASN
2	E	143	ASN

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](#)

13 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	C	402	-	14,14,15	1.84	4 (28%)	17,19,21	1.61	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	BMA	B	403	-	11,11,12	1.71	3 (27%)	15,15,17	0.80	0
3	NAG	B	401	-	14,14,15	1.90	5 (35%)	17,19,21	1.63	5 (29%)
5	BMA	E	403	-	11,11,12	1.69	3 (27%)	15,15,17	0.80	0
3	NAG	D	701	-	14,14,15	1.88	4 (28%)	17,19,21	1.12	2 (11%)
3	NAG	B	402	-	14,14,15	1.84	4 (28%)	17,19,21	1.61	2 (11%)
4	QMR	A	702	-	19,19,19	5.06	13 (68%)	20,28,28	3.20	8 (40%)
3	NAG	C	401	-	14,14,15	1.89	5 (35%)	17,19,21	1.62	5 (29%)
4	QMR	D	702	-	19,19,19	5.06	13 (68%)	20,28,28	3.19	8 (40%)
5	BMA	C	403	-	11,11,12	1.72	3 (27%)	15,15,17	0.80	0
3	NAG	A	701	-	14,14,15	1.88	4 (28%)	17,19,21	1.12	2 (11%)
3	NAG	E	401	-	14,14,15	1.91	5 (35%)	17,19,21	1.62	5 (29%)
3	NAG	E	402	-	14,14,15	1.83	4 (28%)	17,19,21	1.61	2 (11%)

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	C	402	-	-	2/6/23/26	0/1/1/1
5	BMA	B	403	-	-	2/2/19/22	0/1/1/1
3	NAG	B	401	-	-	0/6/23/26	0/1/1/1
5	BMA	E	403	-	-	2/2/19/22	0/1/1/1
3	NAG	D	701	-	-	0/6/23/26	0/1/1/1
3	NAG	B	402	-	-	2/6/23/26	0/1/1/1
4	QMR	A	702	-	-	-	0/5/4/4
3	NAG	C	401	-	-	0/6/23/26	0/1/1/1
4	QMR	D	702	-	-	-	0/5/4/4
5	BMA	C	403	-	-	2/2/19/22	0/1/1/1
3	NAG	A	701	-	-	0/6/23/26	0/1/1/1
3	NAG	E	401	-	-	0/6/23/26	0/1/1/1
3	NAG	E	402	-	-	2/6/23/26	0/1/1/1

All (70) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	702	QMR	C16-C07	11.09	1.59	1.40
4	D	702	QMR	C16-C07	11.04	1.59	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	702	QMR	C05-C06	-8.85	1.22	1.54
4	A	702	QMR	C05-C06	-8.83	1.23	1.54
4	A	702	QMR	C05-C04	-8.74	1.23	1.54
4	D	702	QMR	C05-C04	-8.73	1.23	1.54
4	D	702	QMR	C16-C04	7.70	1.73	1.51
4	A	702	QMR	C16-C04	7.66	1.73	1.51
4	A	702	QMR	C07-C06	7.50	1.72	1.51
4	D	702	QMR	C07-C06	7.50	1.72	1.51
5	C	403	BMA	O5-C1	4.24	1.50	1.43
5	B	403	BMA	O5-C1	4.23	1.50	1.43
4	D	702	QMR	C01-N02	4.22	1.57	1.47
4	A	702	QMR	C01-N02	4.20	1.57	1.47
5	E	403	BMA	O5-C1	4.17	1.50	1.43
4	D	702	QMR	C03-N02	4.15	1.57	1.47
4	A	702	QMR	C03-N02	4.13	1.57	1.47
3	A	701	NAG	O5-C1	3.97	1.50	1.43
3	D	701	NAG	O5-C1	3.96	1.50	1.43
3	C	401	NAG	O5-C1	3.83	1.50	1.43
3	B	402	NAG	O5-C1	3.78	1.50	1.43
3	B	401	NAG	O5-C1	3.77	1.50	1.43
3	E	401	NAG	O5-C1	3.77	1.50	1.43
3	C	402	NAG	O5-C1	3.76	1.50	1.43
3	E	402	NAG	O5-C1	3.76	1.50	1.43
3	C	402	NAG	C7-N2	3.54	1.45	1.34
3	E	402	NAG	C7-N2	3.51	1.45	1.34
3	B	402	NAG	C7-N2	3.50	1.45	1.34
3	D	701	NAG	C7-N2	3.49	1.45	1.34
3	E	401	NAG	C7-N2	3.49	1.45	1.34
3	A	701	NAG	C7-N2	3.48	1.45	1.34
3	B	401	NAG	C7-N2	3.46	1.45	1.34
3	C	401	NAG	C7-N2	3.45	1.45	1.34
4	A	702	QMR	C09-N10	-3.20	1.32	1.37
4	D	702	QMR	C09-N10	-3.16	1.32	1.37
4	A	702	QMR	C14-N13	-2.97	1.32	1.37
4	D	702	QMR	C14-N13	-2.95	1.32	1.37
4	D	702	QMR	C15-C14	2.79	1.46	1.41
4	A	702	QMR	C15-C14	2.76	1.46	1.41
4	D	702	QMR	C08-C09	2.74	1.46	1.41
4	A	702	QMR	C08-C07	-2.73	1.32	1.36
4	A	702	QMR	C08-C09	2.71	1.46	1.41
4	D	702	QMR	C08-C07	-2.69	1.32	1.36
5	C	403	BMA	C2-C3	-2.64	1.48	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	403	BMA	C2-C3	-2.61	1.48	1.52
5	E	403	BMA	C2-C3	-2.60	1.48	1.52
3	E	401	NAG	C3-C2	-2.45	1.47	1.52
3	E	401	NAG	O5-C5	2.41	1.48	1.43
3	B	401	NAG	C3-C2	-2.40	1.47	1.52
3	C	401	NAG	C3-C2	-2.39	1.47	1.52
4	D	702	QMR	C15-C16	-2.36	1.32	1.36
3	B	401	NAG	O5-C5	2.35	1.48	1.43
3	C	401	NAG	O5-C5	2.32	1.47	1.43
4	A	702	QMR	C15-C16	-2.30	1.33	1.36
3	D	701	NAG	O5-C5	2.25	1.47	1.43
3	B	402	NAG	C2-N2	2.24	1.50	1.46
3	A	701	NAG	C2-N2	2.23	1.50	1.46
3	A	701	NAG	O5-C5	2.23	1.47	1.43
3	C	402	NAG	C2-N2	2.23	1.49	1.46
3	D	701	NAG	C2-N2	2.20	1.49	1.46
3	E	402	NAG	C2-N2	2.18	1.49	1.46
5	E	403	BMA	O5-C5	2.17	1.47	1.43
5	C	403	BMA	O5-C5	2.16	1.47	1.43
5	B	403	BMA	O5-C5	2.15	1.47	1.43
3	E	401	NAG	C2-N2	2.15	1.49	1.46
3	B	401	NAG	C2-N2	2.15	1.49	1.46
3	B	402	NAG	O5-C5	2.10	1.47	1.43
3	C	401	NAG	C2-N2	2.10	1.49	1.46
3	C	402	NAG	O5-C5	2.09	1.47	1.43
3	E	402	NAG	O5-C5	2.05	1.47	1.43

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	702	QMR	C06-C05-C04	8.31	113.02	94.17
4	A	702	QMR	C06-C05-C04	8.30	113.02	94.17
4	A	702	QMR	C16-C07-C06	-6.51	97.53	107.37
4	D	702	QMR	C16-C07-C06	-6.49	97.57	107.37
4	D	702	QMR	C07-C16-C04	-6.42	97.68	107.37
4	A	702	QMR	C07-C16-C04	-6.40	97.70	107.37
4	A	702	QMR	C05-C06-C07	3.29	107.37	100.35
4	D	702	QMR	C05-C06-C07	3.27	107.33	100.35
3	C	402	NAG	C3-C4-C5	3.27	116.16	110.23
3	E	402	NAG	C3-C4-C5	3.25	116.13	110.23
3	B	402	NAG	C3-C4-C5	3.23	116.10	110.23
4	A	702	QMR	C05-C04-C16	3.11	106.99	100.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	702	QMR	C05-C04-C16	3.08	106.92	100.35
3	B	401	NAG	C3-C4-C5	3.05	115.76	110.23
3	E	401	NAG	C3-C4-C5	3.04	115.75	110.23
3	C	401	NAG	C3-C4-C5	3.04	115.75	110.23
3	B	402	NAG	C8-C7-N2	2.98	121.06	116.12
3	E	402	NAG	C8-C7-N2	2.97	121.04	116.12
3	C	402	NAG	C8-C7-N2	2.95	121.01	116.12
3	E	401	NAG	C2-N2-C7	-2.90	119.01	122.90
3	B	401	NAG	C2-N2-C7	-2.90	119.02	122.90
3	C	401	NAG	C2-N2-C7	-2.90	119.02	122.90
3	B	401	NAG	C8-C7-N2	2.54	120.33	116.12
3	C	401	NAG	C8-C7-N2	2.54	120.32	116.12
3	E	401	NAG	C8-C7-N2	2.53	120.31	116.12
4	A	702	QMR	C11-N10-C09	2.44	120.63	116.93
3	A	701	NAG	C8-C7-N2	2.43	120.14	116.12
3	D	701	NAG	C8-C7-N2	2.42	120.14	116.12
4	D	702	QMR	C11-N10-C09	2.40	120.57	116.93
3	D	701	NAG	C2-N2-C7	-2.36	119.74	122.90
3	A	701	NAG	C2-N2-C7	-2.35	119.75	122.90
4	A	702	QMR	C12-N13-C14	2.32	120.44	116.93
4	D	702	QMR	C12-N13-C14	2.28	120.39	116.93
3	C	401	NAG	O5-C5-C4	2.23	116.24	110.83
3	B	401	NAG	C6-C5-C4	-2.22	107.56	113.02
3	C	401	NAG	C6-C5-C4	-2.22	107.57	113.02
3	E	401	NAG	C6-C5-C4	-2.22	107.57	113.02
3	B	401	NAG	O5-C5-C4	2.22	116.22	110.83
3	E	401	NAG	O5-C5-C4	2.20	116.18	110.83
4	A	702	QMR	C11-C12-N13	-2.06	119.70	122.76
4	D	702	QMR	C11-C12-N13	-2.04	119.73	122.76

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	402	NAG	C8-C7-N2-C2
3	B	402	NAG	O7-C7-N2-C2
3	C	402	NAG	C8-C7-N2-C2
3	C	402	NAG	O7-C7-N2-C2
3	E	402	NAG	C8-C7-N2-C2
3	E	402	NAG	O7-C7-N2-C2
5	B	403	BMA	C4-C5-C6-O6
5	C	403	BMA	C4-C5-C6-O6

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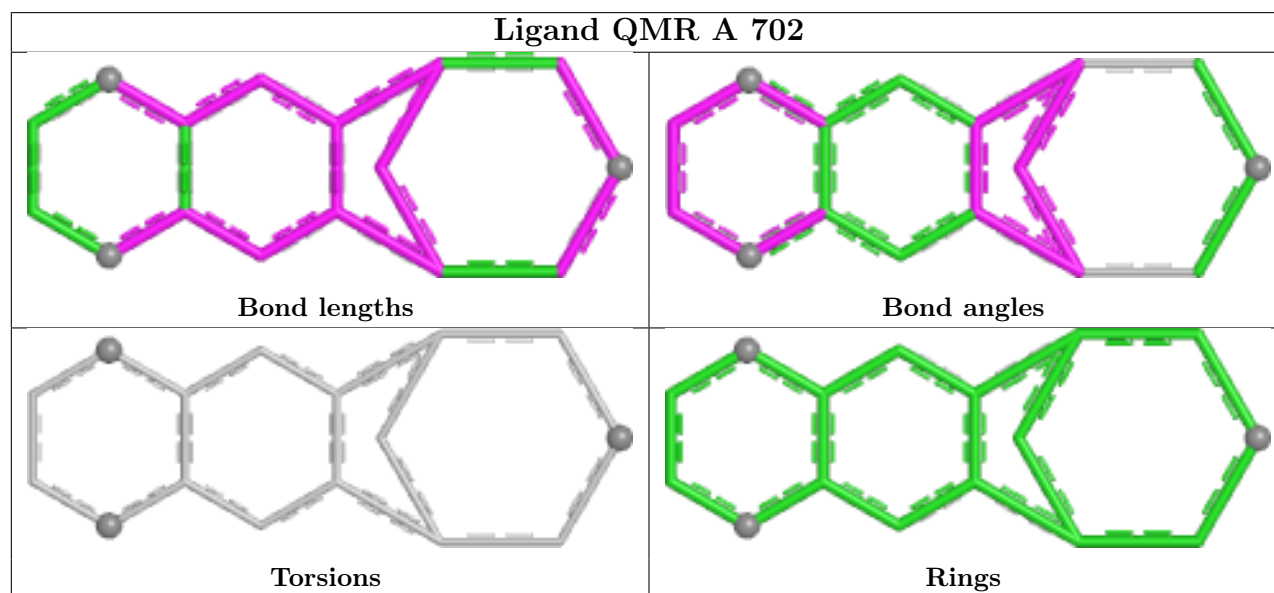
Mol	Chain	Res	Type	Atoms
5	E	403	BMA	C4-C5-C6-O6
5	C	403	BMA	O5-C5-C6-O6
5	B	403	BMA	O5-C5-C6-O6
5	E	403	BMA	O5-C5-C6-O6

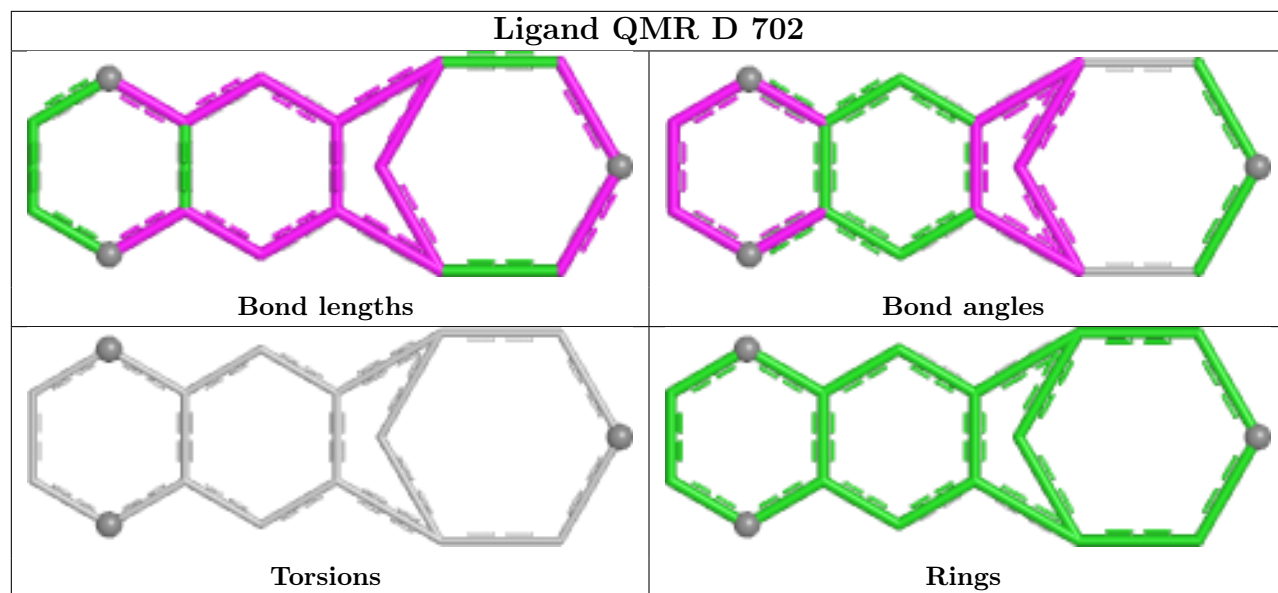
There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	702	QMR	3	0
4	D	702	QMR	1	0

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.

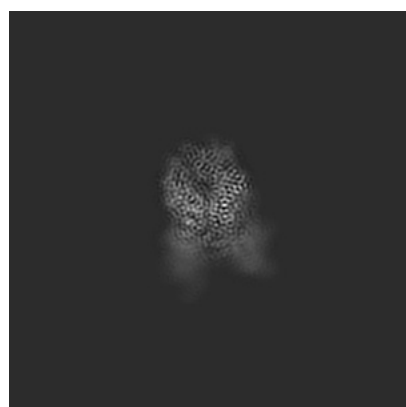
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-20857. These allow visual inspection of the internal detail of the map and identification of artifacts.

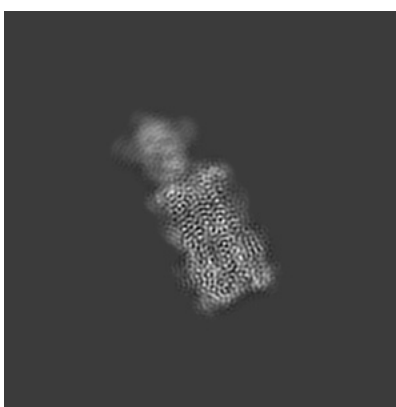
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

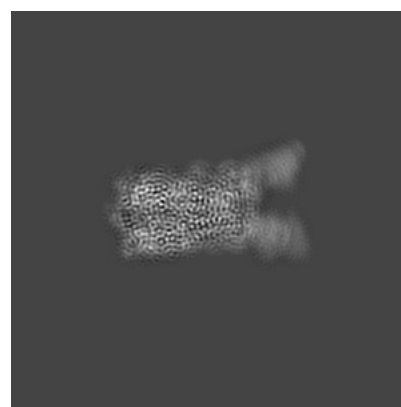
6.1.1 Primary map



X



Y

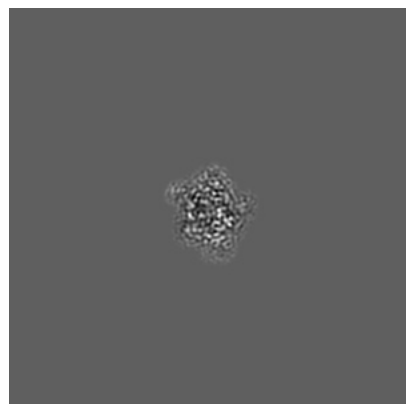


Z

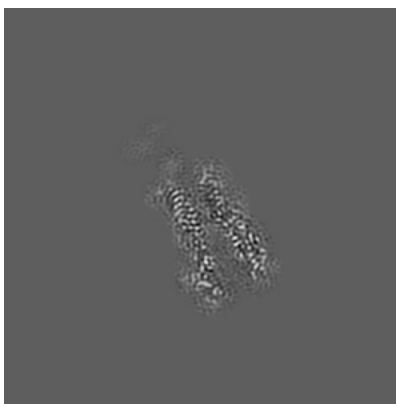
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 160



Y Index: 160

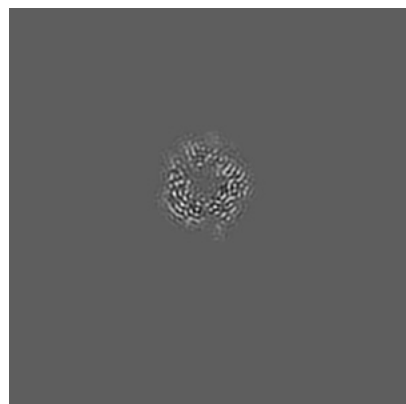


Z Index: 160

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

6.3 Largest variance slices [i](#)

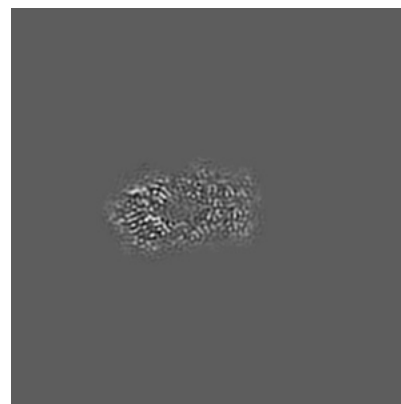
6.3.1 Primary map



X Index: 113



Y Index: 172

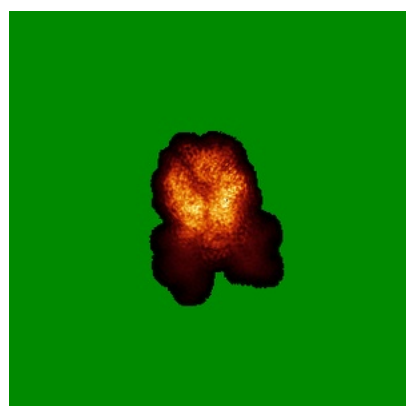


Z Index: 163

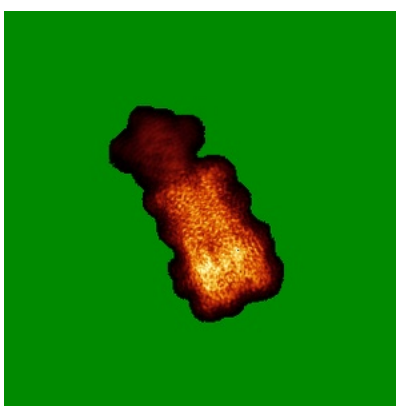
The images above show the largest variance slices of the map in three orthogonal directions.

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

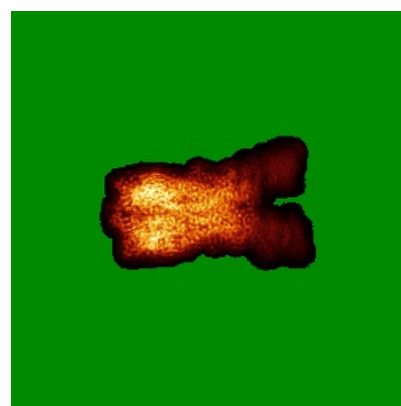
6.4.1 Primary map



X



Y

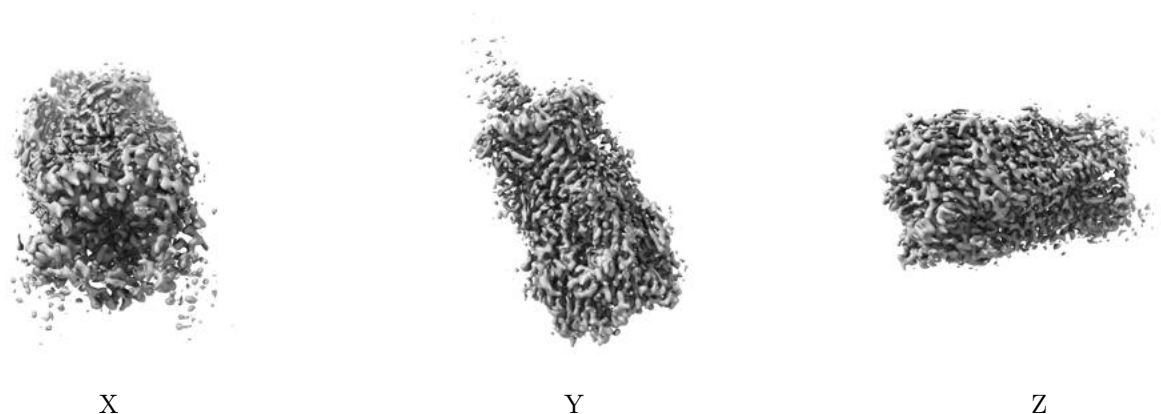


Z

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 0.022. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

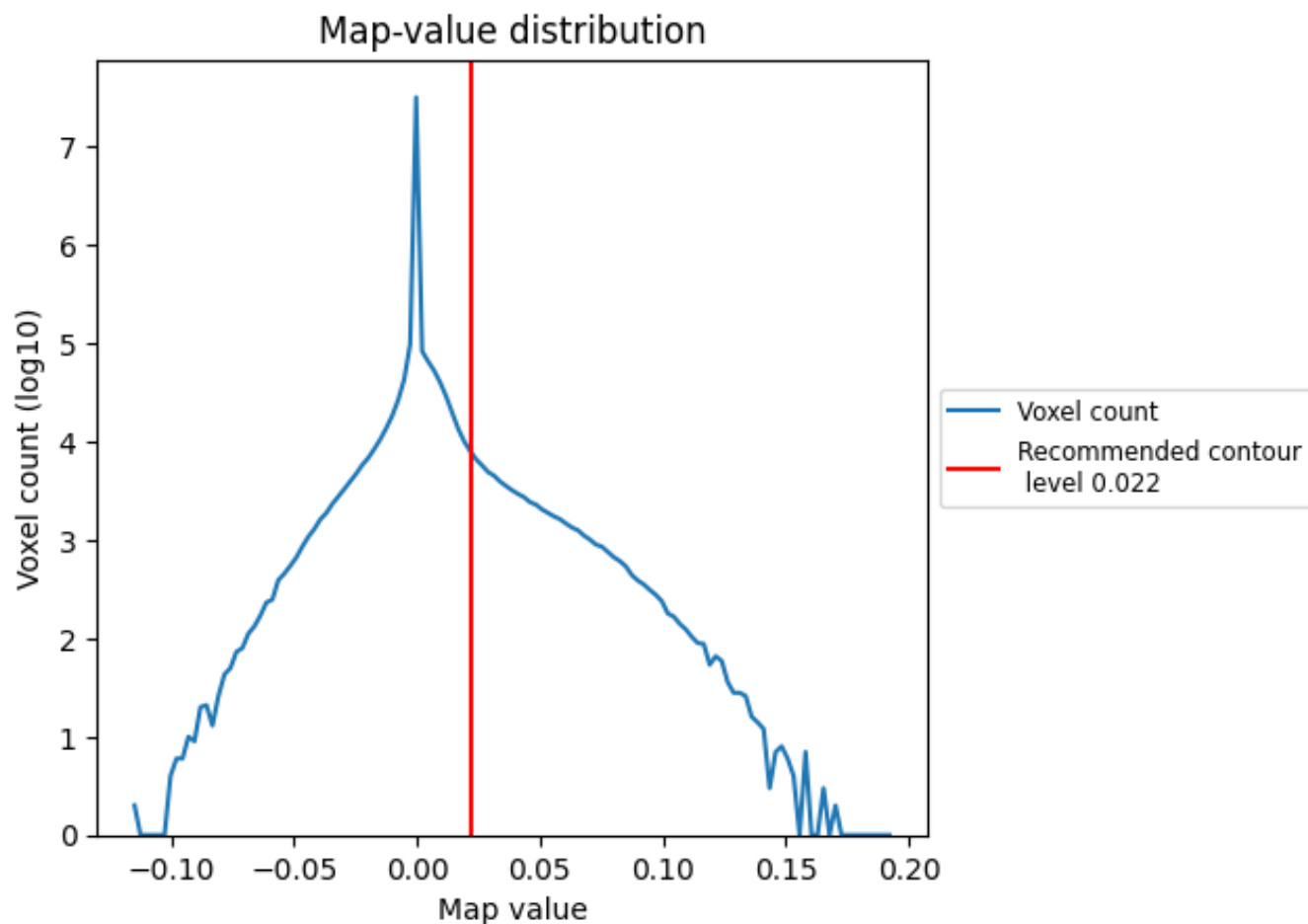
6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

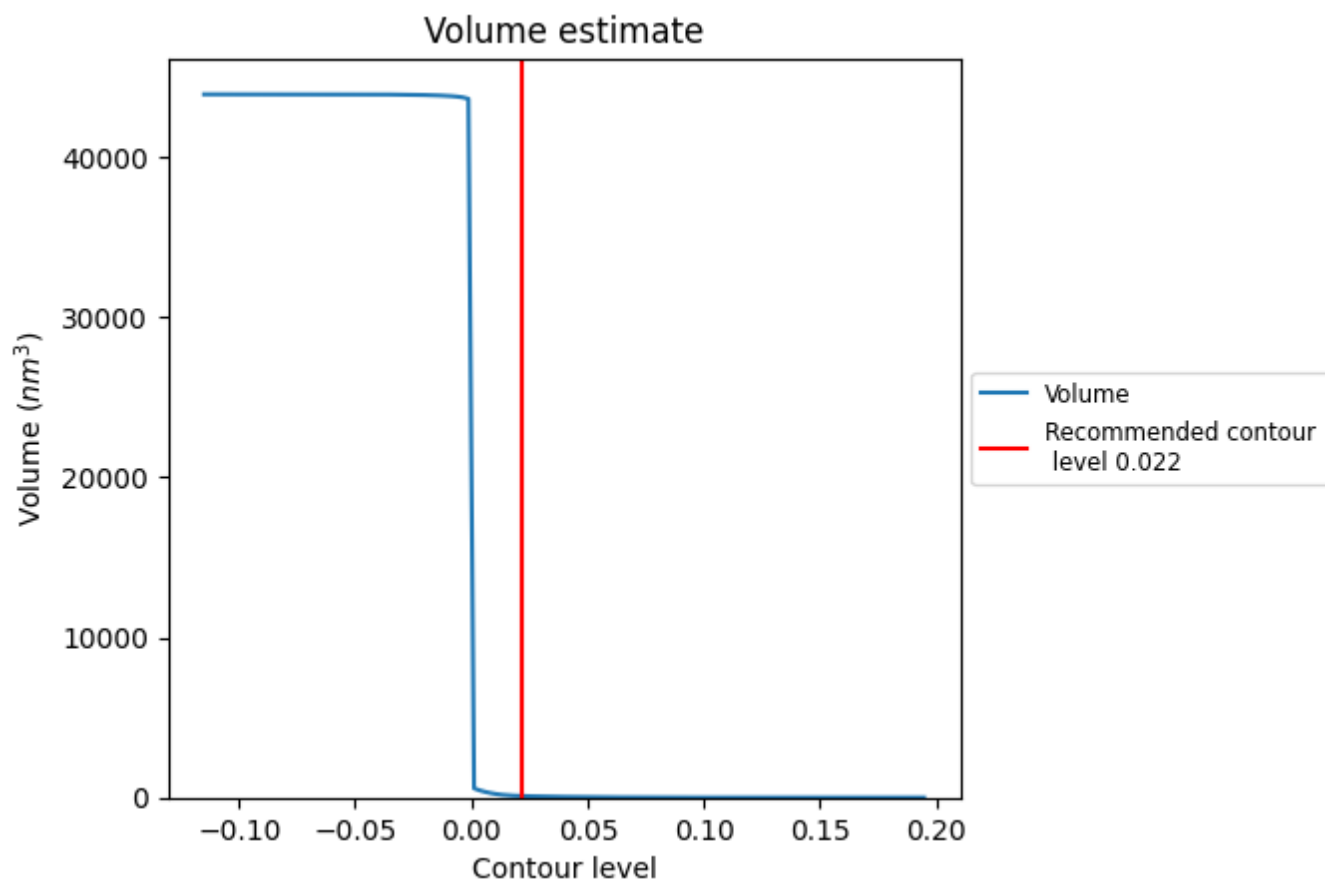
This section contains the results of statistical analysis of the map.

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.

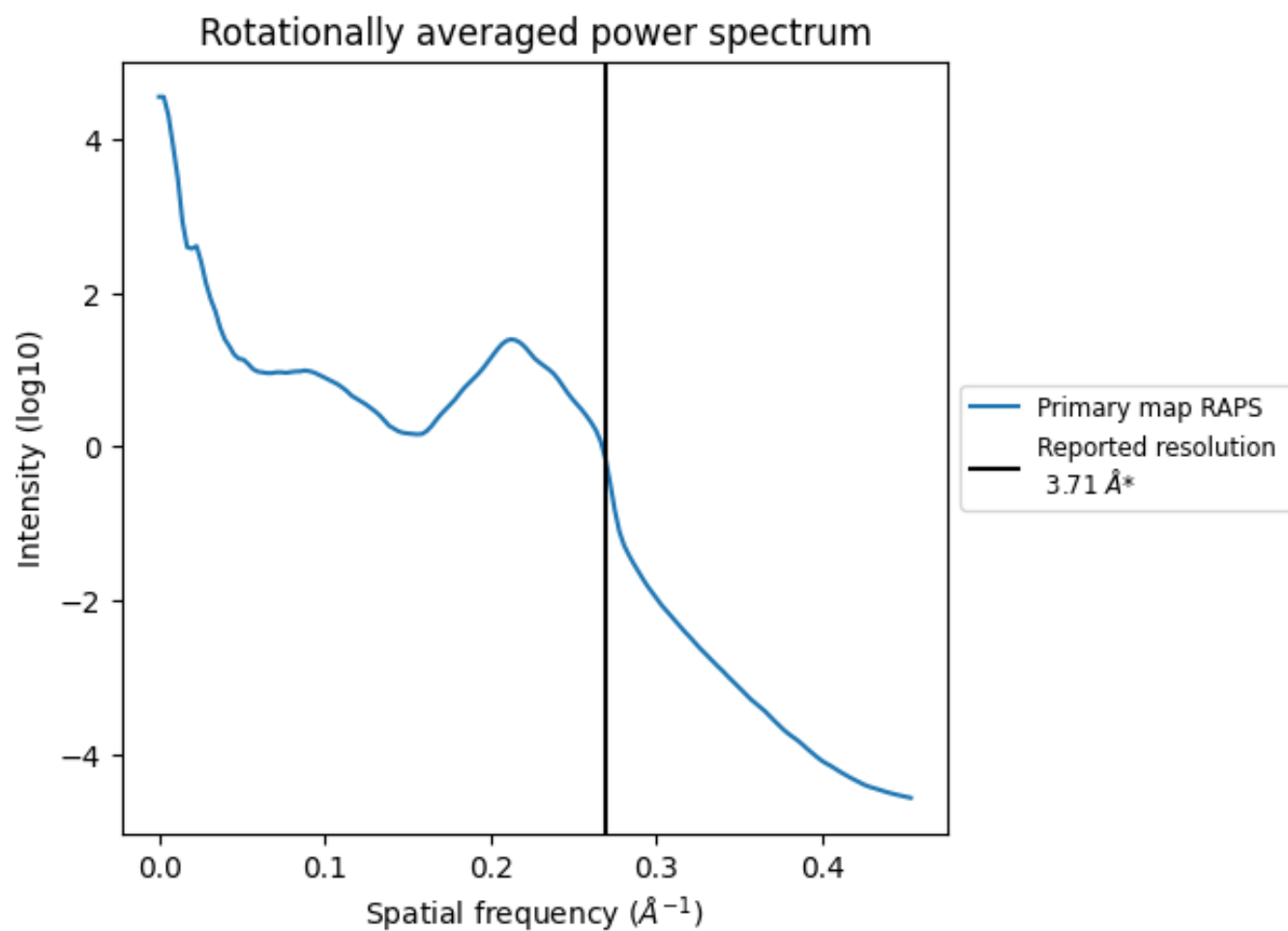
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 95 nm^3 ; this corresponds to an approximate mass of 86 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 ⓘ

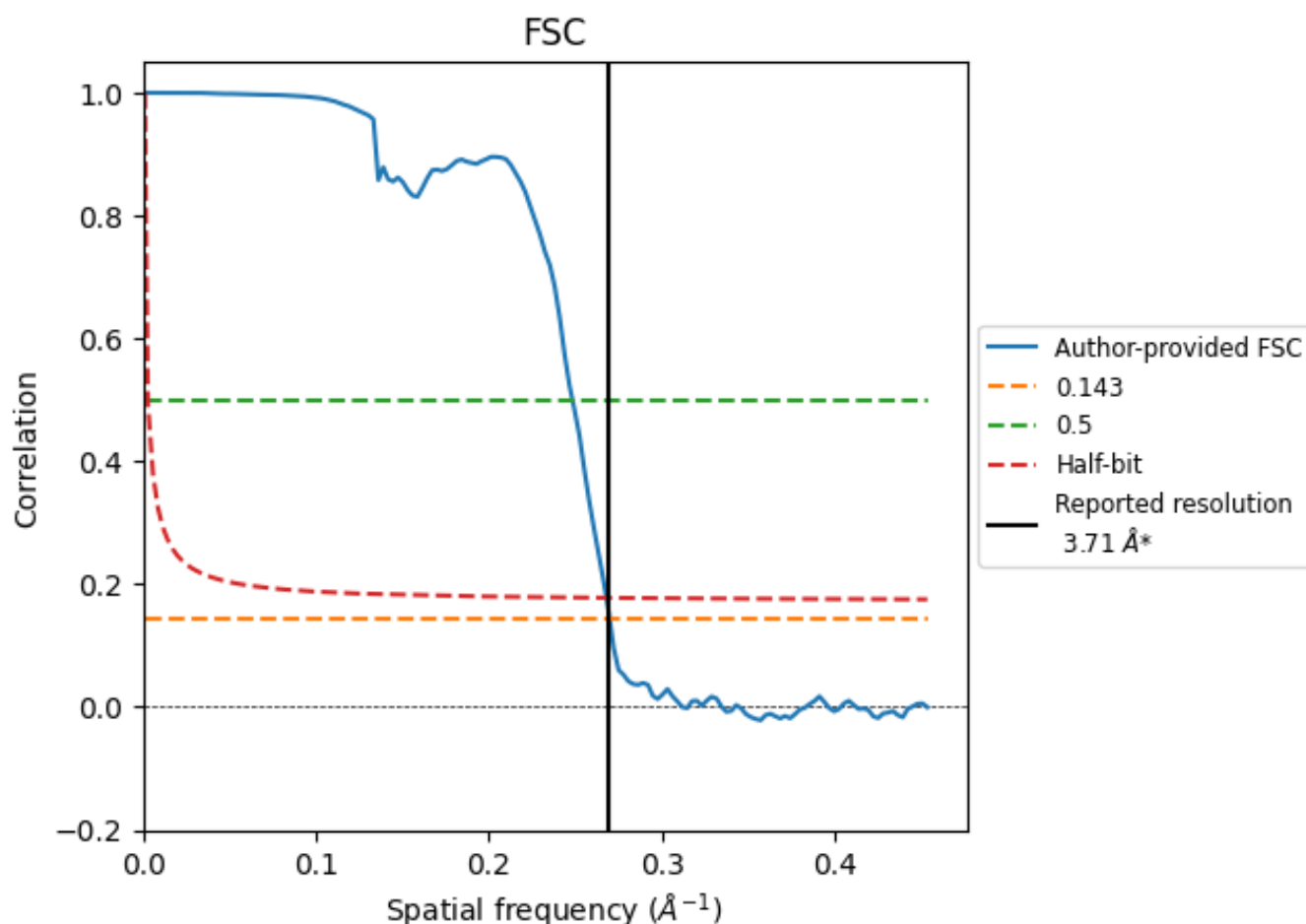


*Reported resolution corresponds to spatial frequency of 0.270 Å⁻¹

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 Å⁻¹

8.2 Resolution estimates [i](#)

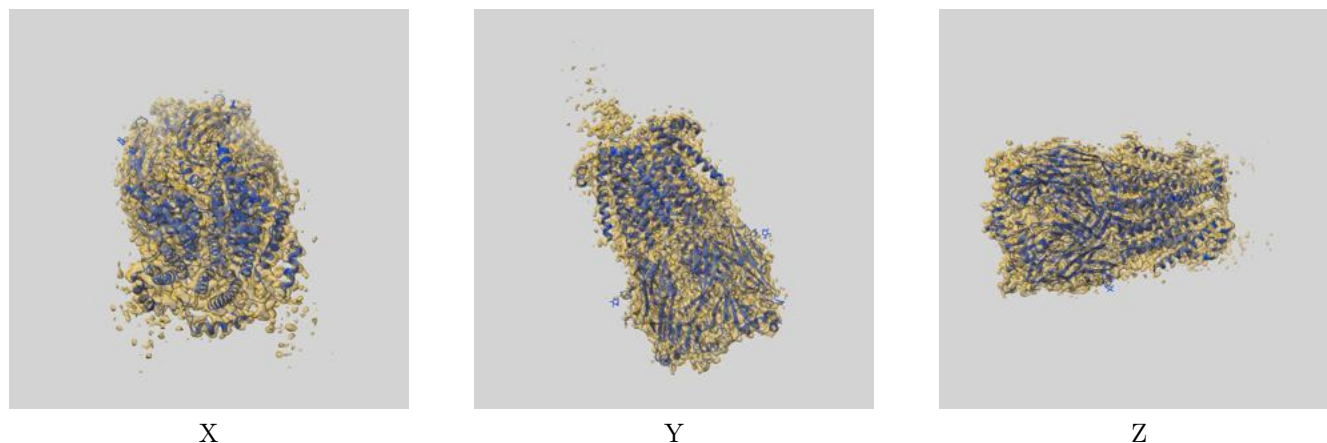
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.71	-	-
Author-provided FSC curve	3.71	4.03	3.73
Unmasked-calculated*	-	-	-

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

9 Map-model fit [i](#)

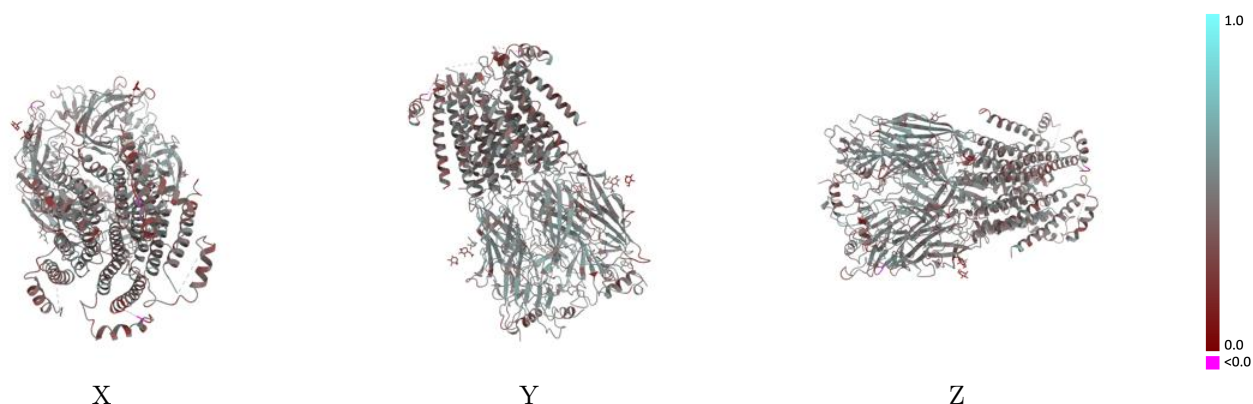
This section contains information regarding the fit between EMDB map EMD-20857 and PDB model 6UR8. Per-residue inclusion information can be found in section [3](#) on page [9](#).

9.1 Map-model overlay [i](#)



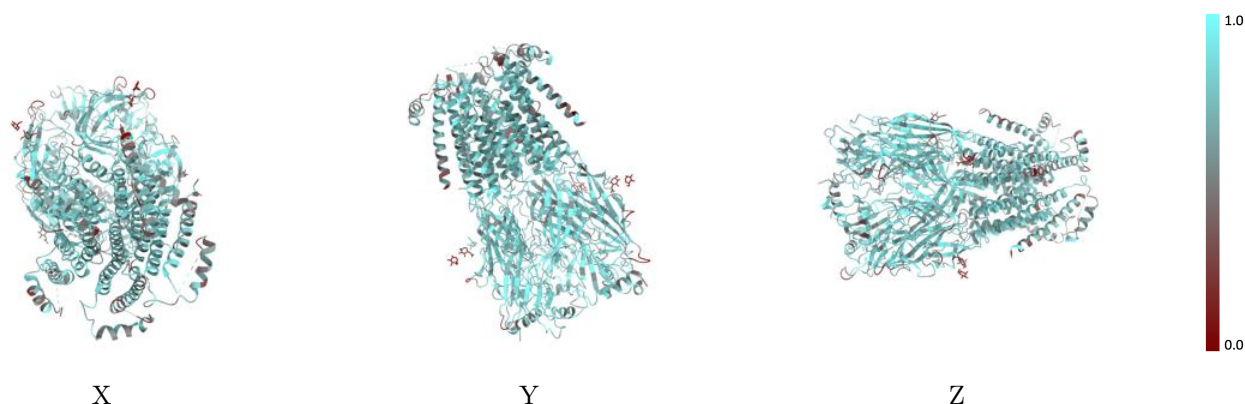
The images above show the 3D surface view of the map at the recommended contour level 0.022 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



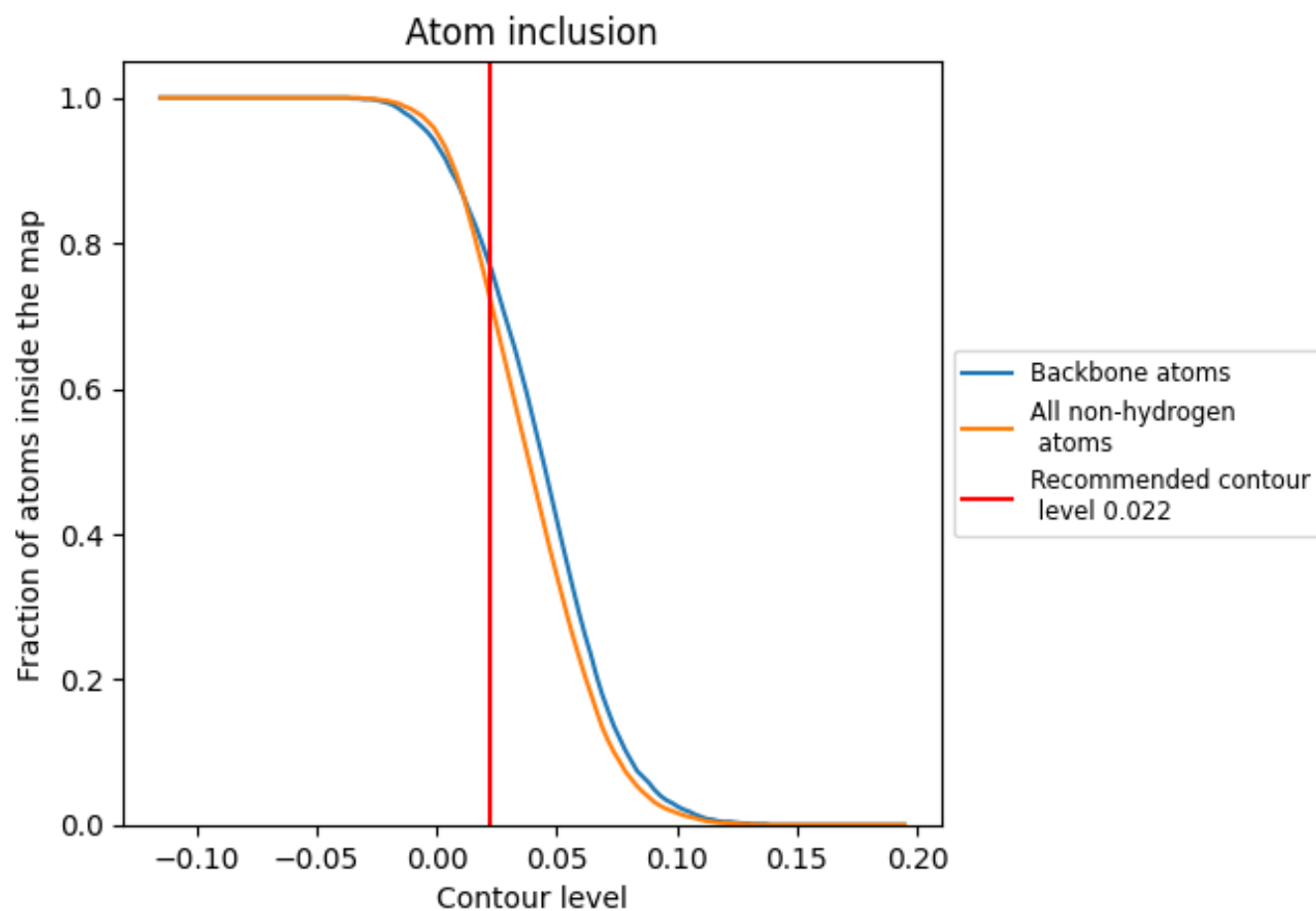
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.022).

9.4 Atom inclusion [i](#)



At the recommended contour level, 77% of all backbone atoms, 73% 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 (0.022) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7270	0.4480
A	0.7440	0.4630
B	0.7100	0.4340
C	0.6930	0.4190
D	0.7540	0.4710
E	0.7320	0.4540

