WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB EM Validation Report ⓘ

Mar 3, 2026 – 03:29 pm GMT

PDB ID	:	9R6T / pdb_00009r6t
EMDB ID	:	EMD-53687
Title	:	Prefusion stabilized spike glycoprotein of equine coronavirus.
Authors	:	Melchers, J.M.; Hulswit, R.J.G.; Hurdiss, D.L.
Deposited on	:	2025-05-13
Resolution	:	2.76 Å(reported)
Based on initial model	:	.

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	:	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)	:	2.48.1

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 2.76 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	Percentile Ranks	Value
Clashscore		4
Ramachandran outliers		0
Sidechain outliers		0

Worse   *Better*

▮ Percentile relative to all structures

▯ Percentile relative to all EM structures

Metric	Model-Map Fit Percentile Ranks	Value
Q-score		0.497

Worse   *Better*

▮ Percentile relative to all EM structures

▯ Percentile relative to EM structures of similar resolution
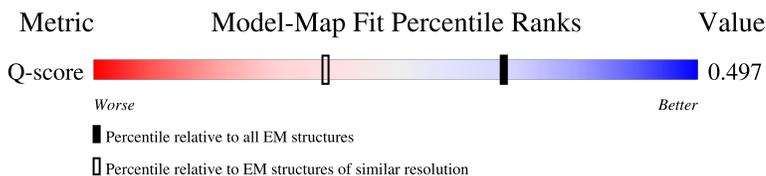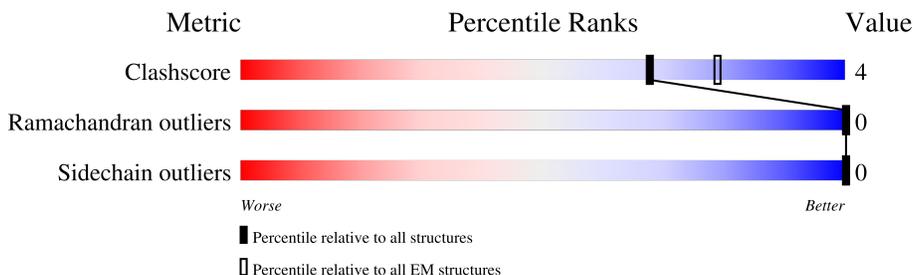
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	10642 (2.26 - 3.26)

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 <=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	1302	9% / 84% 9% 7%
1	B	1302	9% / 84% 9% 7%
1	C	1302	9% / 84% 9% 7%
2	D	2	50% / 100%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	E	2	
2	F	2	
2	G	2	
2	H	2	
2	I	2	
2	J	2	
2	K	2	
2	L	2	
2	M	2	
2	N	2	
2	O	2	
2	P	2	
2	Q	2	
2	R	2	
2	S	2	
2	T	2	
2	U	2	
2	V	2	
2	W	2	
2	X	2	
2	Y	2	
2	Z	2	
2	a	2	
2	b	2	
2	c	2	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	d	2	100% 100%

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 29034 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 Spike glycoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1211	Total	C	N	O	S	0	0
			9352	5918	1554	1814	66		
1	B	1211	Total	C	N	O	S	0	0
			9352	5918	1554	1814	66		
1	C	1211	Total	C	N	O	S	0	0
			9352	5918	1554	1814	66		

There are 78 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	13	PHE	LEU	conflict	UNP R4WAW7
A	248	MET	VAL	conflict	UNP R4WAW7
A	297	LYS	ASN	conflict	UNP R4WAW7
A	366	PHE	LEU	conflict	UNP R4WAW7
A	400	SER	ASN	conflict	UNP R4WAW7
A	410	ARG	LEU	conflict	UNP R4WAW7
A	415	ARG	SER	conflict	UNP R4WAW7
A	430	TYR	PHE	conflict	UNP R4WAW7
A	558	LEU	ILE	conflict	UNP R4WAW7
A	764	SER	ARG	conflict	UNP R4WAW7
A	766	ALA	GLN	conflict	UNP R4WAW7
A	767	GLY	ARG	conflict	UNP R4WAW7
A	768	GLY	ARG	conflict	UNP R4WAW7
A	843	GLY	GLU	conflict	UNP R4WAW7
A	852	GLU	ASN	conflict	UNP R4WAW7
A	979	GLN	SER	conflict	UNP R4WAW7
A	1026	GLY	VAL	conflict	UNP R4WAW7
A	1034	PRO	ALA	conflict	UNP R4WAW7
A	1080	PRO	ALA	conflict	UNP R4WAW7
A	1081	PRO	LEU	conflict	UNP R4WAW7
A	1089	LYS	ARG	conflict	UNP R4WAW7
A	1101	PHE	TYR	conflict	UNP R4WAW7
A	1219	SER	ASN	conflict	UNP R4WAW7
A	1236	LEU	SER	conflict	UNP R4WAW7

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
A	1241	SER	PRO	conflict	UNP R4WAW7
A	1297	LYS	ILE	conflict	UNP R4WAW7
B	13	PHE	LEU	conflict	UNP R4WAW7
B	248	MET	VAL	conflict	UNP R4WAW7
B	297	LYS	ASN	conflict	UNP R4WAW7
B	366	PHE	LEU	conflict	UNP R4WAW7
B	400	SER	ASN	conflict	UNP R4WAW7
B	410	ARG	LEU	conflict	UNP R4WAW7
B	415	ARG	SER	conflict	UNP R4WAW7
B	430	TYR	PHE	conflict	UNP R4WAW7
B	558	LEU	ILE	conflict	UNP R4WAW7
B	764	SER	ARG	conflict	UNP R4WAW7
B	766	ALA	GLN	conflict	UNP R4WAW7
B	767	GLY	ARG	conflict	UNP R4WAW7
B	768	GLY	ARG	conflict	UNP R4WAW7
B	843	GLY	GLU	conflict	UNP R4WAW7
B	852	GLU	ASN	conflict	UNP R4WAW7
B	979	GLN	SER	conflict	UNP R4WAW7
B	1026	GLY	VAL	conflict	UNP R4WAW7
B	1034	PRO	ALA	conflict	UNP R4WAW7
B	1080	PRO	ALA	conflict	UNP R4WAW7
B	1081	PRO	LEU	conflict	UNP R4WAW7
B	1089	LYS	ARG	conflict	UNP R4WAW7
B	1101	PHE	TYR	conflict	UNP R4WAW7
B	1219	SER	ASN	conflict	UNP R4WAW7
B	1236	LEU	SER	conflict	UNP R4WAW7
B	1241	SER	PRO	conflict	UNP R4WAW7
B	1297	LYS	ILE	conflict	UNP R4WAW7
C	13	PHE	LEU	conflict	UNP R4WAW7
C	248	MET	VAL	conflict	UNP R4WAW7
C	297	LYS	ASN	conflict	UNP R4WAW7
C	366	PHE	LEU	conflict	UNP R4WAW7
C	400	SER	ASN	conflict	UNP R4WAW7
C	410	ARG	LEU	conflict	UNP R4WAW7
C	415	ARG	SER	conflict	UNP R4WAW7
C	430	TYR	PHE	conflict	UNP R4WAW7
C	558	LEU	ILE	conflict	UNP R4WAW7
C	764	SER	ARG	conflict	UNP R4WAW7
C	766	ALA	GLN	conflict	UNP R4WAW7
C	767	GLY	ARG	conflict	UNP R4WAW7
C	768	GLY	ARG	conflict	UNP R4WAW7
C	843	GLY	GLU	conflict	UNP R4WAW7

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
C	852	GLU	ASN	conflict	UNP R4WAW7
C	979	GLN	SER	conflict	UNP R4WAW7
C	1026	GLY	VAL	conflict	UNP R4WAW7
C	1034	PRO	ALA	conflict	UNP R4WAW7
C	1080	PRO	ALA	conflict	UNP R4WAW7
C	1081	PRO	LEU	conflict	UNP R4WAW7
C	1089	LYS	ARG	conflict	UNP R4WAW7
C	1101	PHE	TYR	conflict	UNP R4WAW7
C	1219	SER	ASN	conflict	UNP R4WAW7
C	1236	LEU	SER	conflict	UNP R4WAW7
C	1241	SER	PRO	conflict	UNP R4WAW7
C	1297	LYS	ILE	conflict	UNP R4WAW7

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

Mol	Chain	Residues	Atoms				AltConf	Trace
2	D	2	Total 28	C 16	N 2	O 10	0	0
2	E	2	Total 28	C 16	N 2	O 10	0	0
2	F	2	Total 28	C 16	N 2	O 10	0	0
2	G	2	Total 28	C 16	N 2	O 10	0	0
2	H	2	Total 28	C 16	N 2	O 10	0	0
2	I	2	Total 28	C 16	N 2	O 10	0	0
2	J	2	Total 28	C 16	N 2	O 10	0	0
2	K	2	Total 28	C 16	N 2	O 10	0	0
2	L	2	Total 28	C 16	N 2	O 10	0	0
2	M	2	Total 28	C 16	N 2	O 10	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms				AltConf	Trace
2	N	2	Total 28	C 16	N 2	O 10	0	0
2	O	2	Total 28	C 16	N 2	O 10	0	0
2	P	2	Total 28	C 16	N 2	O 10	0	0
2	Q	2	Total 28	C 16	N 2	O 10	0	0
2	R	2	Total 28	C 16	N 2	O 10	0	0
2	S	2	Total 28	C 16	N 2	O 10	0	0
2	T	2	Total 28	C 16	N 2	O 10	0	0
2	U	2	Total 28	C 16	N 2	O 10	0	0
2	V	2	Total 28	C 16	N 2	O 10	0	0
2	W	2	Total 28	C 16	N 2	O 10	0	0
2	X	2	Total 28	C 16	N 2	O 10	0	0
2	Y	2	Total 28	C 16	N 2	O 10	0	0
2	Z	2	Total 28	C 16	N 2	O 10	0	0
2	a	2	Total 28	C 16	N 2	O 10	0	0
2	b	2	Total 28	C 16	N 2	O 10	0	0
2	c	2	Total 28	C 16	N 2	O 10	0	0
2	d	2	Total 28	C 16	N 2	O 10	0	0

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

NAG

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

- Molecule 4 is Sapienic acid (CCD ID: 8Z9) (formula: $C_{16}H_{30}O_2$) (labeled as "Ligand of Interest" by depositor).

8Z9
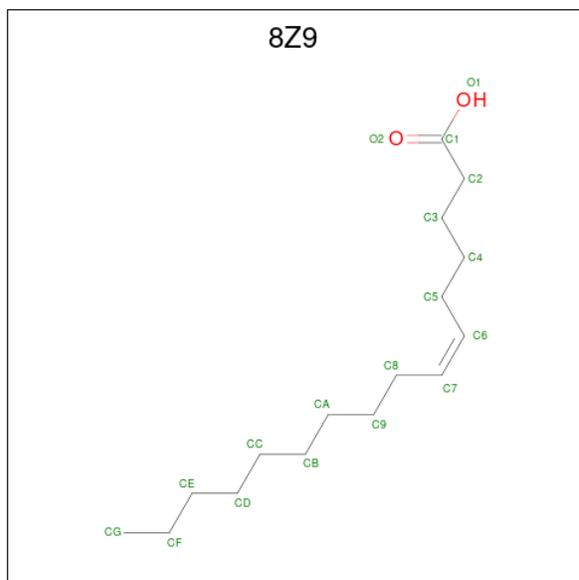
Mol	Chain	Residues	Atoms			AltConf
4	A	1	Total 18	C 16	O 2	0
4	B	1	Total 18	C 16	O 2	0
4	C	1	Total 18	C 16	O 2	0

3　Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Spike glycoprotein

• Molecule 1: Spike glycoprotein

• Molecule 1: Spike glycoprotein

Chain C:

G845 S872 R882 L883 K884 T885 G886 I887 V891 D892 D893 C902 V903 G904 S905 D906 C907 N908 T909 V910 S911 I916 R925 L926 S927 F931 N937 G941 A942 E943 I944 R945 D946 V950 N954 L973 G989 F1032 D1033 P1034 T1035 E1051 R1063

A1066 I1074 L1078 D1079 P1080 A1083 R1094 L1095 L1098 K1128 S1129 Q1130 G1153 F1156 Y1166 V1167 T1168 V1171 G1179 Y1189 F1190 N1192 V1193 Y1205 N1213 C1221 A1222 V1223 N1224 D1230 N1234 ILE LEU ILE PRO ASN LEU SER ASP PHE LYS GLU

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

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

Chain D:

50%

100%

NAG1 NAG2

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

Chain E:

50%

100%

NAG1 NAG2

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

Chain F:

100%

NAG1 NAG2

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

Chain G:

100%

100%

NAG1 NAG2

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

Chain H:

100%

100%

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

Chain I:

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

Chain J:

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

Chain K:

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

Chain L:

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

Chain M:

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

Chain N:

50%

100%

NAG1
NAG2

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

Chain O:

50%

100%

NAG1
NAG2

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

Chain P:

100%

100%

NAG1
NAG2

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

Chain Q:

100%

100%

NAG1
NAG2

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

Chain R:

100%

100%

NAG1
NAG2

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

Chain S:

50%

100%

NAG1
NAG2

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

Chain T:

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

Chain U:

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

Chain V:

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

Chain W:

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

Chain X:

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

Chain Y:

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

Chain Z:

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

Chain a:

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

Chain b:

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

Chain c:

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

Chain d:

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C3	Depositor
Number of particles used	397300	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 $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.979	Depositor
Minimum map value	-0.732	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.021	Depositor
Recommended contour level	0.08	Depositor
Map size (Å)	300.96002, 300.96002, 300.96002	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8360001, 0.8360001, 0.8360001	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, 8Z9

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	0.11	0/9561	0.30	0/13036
1	B	0.11	0/9561	0.30	0/13036
1	C	0.11	0/9561	0.30	0/13036
All	All	0.11	0/28683	0.30	0/39108

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	A	9352	0	8994	74	0
1	B	9352	0	8994	74	0
1	C	9352	0	8994	73	0
2	D	28	0	25	0	0
2	E	28	0	25	0	0
2	F	28	0	25	0	0
2	G	28	0	25	0	0
2	H	28	0	25	0	0
2	I	28	0	25	0	0
2	J	28	0	25	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	K	28	0	25	1	0
2	L	28	0	25	0	0
2	M	28	0	25	0	0
2	N	28	0	25	0	0
2	O	28	0	25	0	0
2	P	28	0	25	0	0
2	Q	28	0	25	0	0
2	R	28	0	25	0	0
2	S	28	0	25	0	0
2	T	28	0	25	1	0
2	U	28	0	25	0	0
2	V	28	0	25	0	0
2	W	28	0	25	0	0
2	X	28	0	25	0	0
2	Y	28	0	25	0	0
2	Z	28	0	25	0	0
2	a	28	0	25	0	0
2	b	28	0	25	0	0
2	c	28	0	25	1	0
2	d	28	0	25	0	0
3	A	56	0	52	0	0
3	B	56	0	52	0	0
3	C	56	0	52	0	0
4	A	18	0	0	0	0
4	B	18	0	0	0	0
4	C	18	0	0	0	0
All	All	29034	0	27813	203	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 4.

All (203) 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:C:392:ILE:HG12	1:C:604:LEU:HG	1.79	0.65
1:B:392:ILE:HG12	1:B:604:LEU:HG	1.79	0.65
1:A:392:ILE:HG12	1:A:604:LEU:HG	1.79	0.64
1:C:830:VAL:O	1:C:1094:ARG:NH1	2.31	0.64
1:A:830:VAL:O	1:A:1094:ARG:NH1	2.31	0.63
1:B:233:LEU:HG	1:B:234:PHE:H	1.63	0.63
1:A:989:GLY:O	1:C:1189:TYR:OH	2.13	0.63

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:429:LEU:HB3	1:C:602:SER:HB3	1.81	0.63
1:B:429:LEU:HB3	1:B:602:SER:HB3	1.81	0.63
1:A:883:LEU:HD13	1:C:791:VAL:HG21	1.81	0.62
1:B:224:THR:HB	1:B:230:THR:HA	1.81	0.62
1:A:429:LEU:HB3	1:A:602:SER:HB3	1.80	0.62
1:C:224:THR:HB	1:C:230:THR:HA	1.81	0.62
1:A:224:THR:HB	1:A:230:THR:HA	1.81	0.62
1:A:233:LEU:HG	1:A:234:PHE:H	1.63	0.62
1:C:233:LEU:HG	1:C:234:PHE:H	1.63	0.61
1:B:830:VAL:O	1:B:1094:ARG:NH1	2.31	0.61
1:A:18:ASP:OD2	1:C:516:VAL:N	2.32	0.61
1:B:473:VAL:HG22	1:B:589:VAL:HG22	1.83	0.61
1:A:473:VAL:HG22	1:A:589:VAL:HG22	1.83	0.61
1:A:370:ASP:HA	1:C:403:VAL:HB	1.83	0.60
1:C:473:VAL:HG22	1:C:589:VAL:HG22	1.83	0.60
1:B:801:GLN:NE2	1:B:1168:THR:OG1	2.32	0.59
1:B:801:GLN:HE21	1:B:1168:THR:HG1	1.47	0.59
1:B:516:VAL:N	1:C:18:ASP:OD2	2.35	0.59
1:C:398:PRO:HG2	1:C:401:ARG:HB2	1.85	0.59
1:A:398:PRO:HG2	1:A:401:ARG:HB2	1.84	0.59
1:A:594:GLN:OE1	1:A:599:ASN:ND2	2.36	0.59
1:B:398:PRO:HG2	1:B:401:ARG:HB2	1.84	0.59
1:A:1074:ILE:HG23	1:A:1078:LEU:HD12	1.85	0.58
1:A:950:VAL:O	1:A:954:ASN:ND2	2.36	0.58
1:C:594:GLN:OE1	1:C:599:ASN:ND2	2.36	0.58
1:B:950:VAL:O	1:B:954:ASN:ND2	2.36	0.58
1:B:594:GLN:OE1	1:B:599:ASN:ND2	2.36	0.58
1:B:1074:ILE:HG23	1:B:1078:LEU:HD12	1.85	0.57
1:A:801:GLN:NE2	1:A:1168:THR:OG1	2.32	0.57
1:C:1074:ILE:HG23	1:C:1078:LEU:HD12	1.85	0.56
1:B:410:ARG:NH1	1:B:414:GLN:OE1	2.39	0.55
1:C:950:VAL:O	1:C:954:ASN:ND2	2.36	0.55
1:C:410:ARG:NH1	1:C:414:GLN:OE1	2.39	0.55
1:A:801:GLN:HE21	1:A:1168:THR:HG1	1.53	0.55
1:A:410:ARG:NH1	1:A:414:GLN:OE1	2.39	0.55
1:B:513:THR:OG1	1:B:575:SER:O	2.25	0.55
1:C:513:THR:OG1	1:C:575:SER:O	2.25	0.54
1:A:513:THR:OG1	1:A:575:SER:O	2.25	0.53
1:B:648:VAL:O	1:B:678:THR:OG1	2.26	0.53
1:B:403:VAL:HB	1:C:370:ASP:HA	1.90	0.53
1:C:648:VAL:O	1:C:678:THR:OG1	2.26	0.53

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:516:VAL:N	1:B:18:ASP:OD2	2.41	0.52
1:C:639:ILE:HG21	1:C:667:LEU:HD22	1.91	0.52
1:A:368:GLN:HE22	1:C:400:SER:HA	1.74	0.52
1:A:648:VAL:O	1:A:678:THR:OG1	2.26	0.52
1:B:639:ILE:HG21	1:B:667:LEU:HD22	1.91	0.52
1:B:791:VAL:HG21	1:C:883:LEU:HD13	1.92	0.51
1:C:362:SER:O	1:C:366:PHE:HB2	2.11	0.51
1:B:1189:TYR:OH	1:C:989:GLY:O	2.16	0.51
1:B:362:SER:O	1:B:366:PHE:HB2	2.11	0.51
1:A:639:ILE:HG21	1:A:667:LEU:HD22	1.91	0.51
1:B:350:ARG:NH2	1:B:393:ASP:OD2	2.42	0.51
1:C:568:HIS:NE2	1:C:570:ASP:OD2	2.43	0.51
1:A:927:SER:O	1:A:931:PHE:N	2.34	0.51
1:C:927:SER:O	1:C:931:PHE:N	2.34	0.51
1:B:927:SER:O	1:B:931:PHE:N	2.34	0.50
1:A:362:SER:O	1:A:366:PHE:HB2	2.11	0.50
1:B:944:ILE:HG23	1:B:945:ARG:HG3	1.94	0.50
1:B:1095:LEU:HD23	1:B:1098:LEU:HD12	1.92	0.50
1:A:937:ASN:HB3	1:A:942:ALA:HB2	1.94	0.50
1:B:1171:VAL:HG12	1:B:1191:VAL:HG12	1.94	0.50
1:C:1171:VAL:HG12	1:C:1191:VAL:HG12	1.94	0.50
1:A:224:THR:HG22	1:A:230:THR:HG22	1.94	0.50
1:A:1095:LEU:HD23	1:A:1098:LEU:HD12	1.92	0.50
1:A:350:ARG:NH2	1:A:393:ASP:OD2	2.42	0.50
1:A:1171:VAL:HG12	1:A:1191:VAL:HG12	1.94	0.49
1:C:478:CYS:SG	1:C:563:SER:N	2.85	0.49
1:C:1095:LEU:HD23	1:C:1098:LEU:HD12	1.92	0.49
1:A:786:LEU:HD12	1:B:881:SER:HA	1.95	0.49
1:A:478:CYS:SG	1:A:563:SER:N	2.85	0.49
1:A:568:HIS:NE2	1:A:570:ASP:OD2	2.43	0.49
1:A:803:PRO:HB3	1:A:1166:TYR:HA	1.95	0.49
1:A:944:ILE:HG23	1:A:945:ARG:HG3	1.94	0.49
1:B:478:CYS:SG	1:B:563:SER:N	2.85	0.49
1:C:801:GLN:NE2	1:C:1168:THR:OG1	2.32	0.49
1:A:872:SER:O	1:A:1128:LYS:NZ	2.46	0.49
1:B:568:HIS:NE2	1:B:570:ASP:OD2	2.43	0.49
1:B:937:ASN:HB3	1:B:942:ALA:HB2	1.94	0.49
1:B:872:SER:O	1:B:1128:LYS:NZ	2.46	0.49
1:C:803:PRO:HB3	1:C:1166:TYR:HA	1.95	0.49
1:C:944:ILE:HG23	1:C:945:ARG:HG3	1.94	0.49
1:C:937:ASN:HB3	1:C:942:ALA:HB2	1.94	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:224:THR:HG22	1:B:230:THR:HG22	1.94	0.48
1:C:224:THR:HG22	1:C:230:THR:HG22	1.94	0.48
1:C:872:SER:O	1:C:1128:LYS:NZ	2.46	0.48
1:A:925:ARG:NH2	2:K:1:NAG:O7	2.46	0.48
1:A:1171:VAL:HB	1:A:1189:TYR:HB3	1.96	0.48
1:B:1171:VAL:HB	1:B:1189:TYR:HB3	1.96	0.48
1:C:350:ARG:NH2	1:C:393:ASP:OD2	2.42	0.47
1:A:468:THR:N	1:A:471:ASP:OD2	2.43	0.47
1:B:803:PRO:HB3	1:B:1166:TYR:HA	1.95	0.47
1:C:1171:VAL:HB	1:C:1189:TYR:HB3	1.96	0.47
1:A:1189:TYR:OH	1:B:989:GLY:O	2.22	0.47
1:A:804:SER:HB3	1:A:1205:TYR:HB3	1.97	0.47
1:C:925:ARG:NH2	2:c:1:NAG:O7	2.46	0.46
1:A:702:LEU:HB2	1:A:735:VAL:HB	1.98	0.46
1:B:804:SER:HB3	1:B:1205:TYR:HB3	1.97	0.46
1:B:702:LEU:HB2	1:B:735:VAL:HB	1.98	0.46
1:C:804:SER:HB3	1:C:1205:TYR:HB3	1.97	0.46
1:B:400:SER:HA	1:C:368:GLN:HE22	1.81	0.46
1:C:817:THR:H	1:C:1153:GLY:HA2	1.81	0.46
1:B:841:LEU:HD12	1:B:844:TYR:HB2	1.98	0.46
1:B:388:GLY:HA2	1:B:612:GLY:HA3	1.98	0.45
1:C:702:LEU:HB2	1:C:735:VAL:HB	1.98	0.45
1:B:817:THR:H	1:B:1153:GLY:HA2	1.81	0.45
1:A:980:LEU:O	1:A:984:TRP:NE1	2.48	0.45
1:C:841:LEU:HD12	1:C:844:TYR:HB2	1.98	0.45
1:B:468:THR:N	1:B:471:ASP:OD2	2.43	0.45
1:A:817:THR:H	1:A:1153:GLY:HA2	1.81	0.45
1:A:841:LEU:HD12	1:A:844:TYR:HB2	1.98	0.45
1:A:388:GLY:HA2	1:A:612:GLY:HA3	1.98	0.45
1:B:1080:PRO:HA	1:B:1083:ALA:HB3	2.00	0.44
1:C:388:GLY:HA2	1:C:612:GLY:HA3	1.98	0.44
1:B:925:ARG:NH2	2:T:1:NAG:O7	2.46	0.44
1:A:47:LEU:HD21	1:A:106:LYS:HD3	2.00	0.44
1:B:325:ILE:HB	1:B:328:LEU:HD11	2.00	0.44
1:C:47:LEU:HD21	1:C:106:LYS:HD3	2.00	0.44
1:A:54:ASP:OD1	1:C:657:GLN:HA	2.17	0.44
1:C:325:ILE:HB	1:C:328:LEU:HD11	2.00	0.44
1:C:377:ILE:HD11	1:C:385:MET:SD	2.58	0.44
1:A:1080:PRO:HA	1:A:1083:ALA:HB3	1.99	0.43
1:C:478:CYS:HB2	1:C:564:GLY:H	1.83	0.43
1:A:325:ILE:HB	1:A:328:LEU:HD11	2.00	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:377:ILE:HD11	1:A:385:MET:SD	2.58	0.43
1:A:159:ILE:HD12	1:A:236:ILE:HD11	2.01	0.43
1:C:159:ILE:HD12	1:C:236:ILE:HD11	2.01	0.43
1:A:478:CYS:HB2	1:A:564:GLY:H	1.83	0.43
1:A:479:PHE:CE1	1:A:553:LYS:HG2	2.54	0.43
1:A:1080:PRO:O	1:A:1083:ALA:N	2.51	0.43
1:B:47:LEU:HD21	1:B:106:LYS:HD3	2.00	0.43
1:C:746:ASP:OD1	1:C:783:ASN:ND2	2.51	0.43
1:A:403:VAL:HB	1:B:370:ASP:HA	2.00	0.43
1:B:478:CYS:HB2	1:B:564:GLY:H	1.83	0.43
1:C:1080:PRO:O	1:C:1083:ALA:N	2.51	0.43
1:A:478:CYS:HB2	1:A:564:GLY:C	2.44	0.43
1:C:478:CYS:HB2	1:C:564:GLY:C	2.44	0.43
1:C:479:PHE:CE1	1:C:553:LYS:HG2	2.54	0.43
1:A:698:SER:OG	1:A:699:GLU:OE1	2.32	0.42
1:B:479:PHE:CE1	1:B:553:LYS:HG2	2.54	0.42
1:C:1080:PRO:HA	1:C:1083:ALA:HB3	1.99	0.42
1:B:657:GLN:HA	1:C:54:ASP:OD1	2.19	0.42
1:B:1082:GLU:OE2	1:B:1086:GLN:NE2	2.45	0.42
1:C:291:MET:HB2	1:C:700:PRO:HD3	2.01	0.42
1:C:468:THR:N	1:C:471:ASP:OD2	2.43	0.42
1:B:41:VAL:HG23	1:B:75:TYR:OH	2.20	0.42
1:B:377:ILE:HD11	1:B:385:MET:SD	2.58	0.42
1:A:746:ASP:OD1	1:A:783:ASN:ND2	2.51	0.42
1:B:1129:SER:OG	1:B:1130:GLN:N	2.52	0.42
1:C:885:THR:HG21	1:C:973:LEU:HD11	2.02	0.42
1:A:221:ALA:O	1:A:233:LEU:HB3	2.20	0.42
1:B:291:MET:HB2	1:B:700:PRO:HD3	2.01	0.42
1:C:41:VAL:HG23	1:C:75:TYR:OH	2.20	0.42
1:C:1129:SER:OG	1:C:1130:GLN:N	2.52	0.42
1:A:41:VAL:HG23	1:A:75:TYR:OH	2.20	0.42
1:B:1080:PRO:O	1:B:1083:ALA:N	2.51	0.42
1:A:291:MET:HB2	1:A:700:PRO:HD3	2.01	0.42
1:B:159:ILE:HD12	1:B:236:ILE:HD11	2.01	0.42
1:B:698:SER:OG	1:B:699:GLU:OE1	2.32	0.42
1:B:478:CYS:HB2	1:B:564:GLY:C	2.44	0.41
1:A:275:ASN:ND2	1:A:277:ASP:OD1	2.53	0.41
1:A:1129:SER:OG	1:A:1130:GLN:N	2.52	0.41
1:B:221:ALA:O	1:B:233:LEU:HB3	2.20	0.41
1:C:275:ASN:ND2	1:C:277:ASP:OD1	2.53	0.41
1:A:92:LYS:O	1:A:96:LEU:N	2.53	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:92:LYS:O	1:B:96:LEU:N	2.54	0.41
1:B:496:VAL:HG12	1:B:508:THR:HG22	2.03	0.41
1:B:275:ASN:ND2	1:B:277:ASP:OD1	2.53	0.41
1:C:93:PRO:N	1:C:94:PRO:HD2	2.36	0.41
1:C:815:ILE:HD12	1:C:1156:PHE:CE1	2.56	0.41
1:A:93:PRO:N	1:A:94:PRO:HD2	2.36	0.41
1:A:916:ILE:HG23	1:A:1032:PHE:CZ	2.56	0.41
1:A:699:GLU:OE1	1:A:699:GLU:N	2.54	0.41
1:A:791:VAL:HG21	1:B:883:LEU:HD13	2.03	0.41
1:B:104:PHE:HB2	1:B:265:LEU:HD21	2.03	0.41
1:C:668:TYR:HA	1:C:681:ILE:HB	2.03	0.41
1:C:916:ILE:HG23	1:C:1032:PHE:CZ	2.56	0.41
1:A:668:TYR:HA	1:A:681:ILE:HB	2.03	0.41
1:A:785:ARG:O	1:B:878:THR:OG1	2.29	0.41
1:B:885:THR:HG21	1:B:973:LEU:HD11	2.02	0.41
1:C:221:ALA:O	1:C:233:LEU:HB3	2.20	0.41
1:C:272:LEU:HD22	1:C:280:ILE:HD13	2.03	0.41
1:A:481:VAL:HG22	1:A:551:GLN:HG2	2.04	0.40
1:A:496:VAL:HG12	1:A:508:THR:HG22	2.03	0.40
1:B:746:ASP:OD1	1:B:783:ASN:ND2	2.51	0.40
1:B:917:GLU:CD	1:B:969:SER:HG	2.24	0.40
1:B:980:LEU:O	1:B:984:TRP:NE1	2.48	0.40
1:A:885:THR:HG21	1:A:973:LEU:HD11	2.02	0.40
1:B:481:VAL:HG22	1:B:551:GLN:HG2	2.04	0.40
1:B:645:PHE:CE1	1:B:681:ILE:HG12	2.57	0.40
1:B:272:LEU:HD22	1:B:280:ILE:HD13	2.03	0.40
1:C:75:TYR:HB3	1:C:261:TRP:HB3	2.03	0.40
1:C:104:PHE:HB2	1:C:265:LEU:HD21	2.03	0.40
1:C:1063:ARG:NH1	1:C:1066:ALA:O	2.46	0.40
1:A:815:ILE:HD12	1:A:1156:PHE:CE1	2.56	0.40
1:C:481:VAL:HG22	1:C:551:GLN:HG2	2.04	0.40
1:C:698:SER:OG	1:C:699:GLU:OE1	2.32	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	1207/1302 (93%)	1160 (96%)	47 (4%)	0	100	100
1	B	1207/1302 (93%)	1162 (96%)	45 (4%)	0	100	100
1	C	1207/1302 (93%)	1161 (96%)	46 (4%)	0	100	100
All	All	3621/3906 (93%)	3483 (96%)	138 (4%)	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	1048/1131 (93%)	1048 (100%)	0	100	100
1	B	1048/1131 (93%)	1048 (100%)	0	100	100
1	C	1048/1131 (93%)	1048 (100%)	0	100	100
All	All	3144/3393 (93%)	3144 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (39) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	169	ASN
1	A	282	ASN
1	A	368	GLN
1	A	409	ASN
1	A	491	ASN
1	A	801	GLN
1	A	818	ASN
1	A	888	ASN
1	A	995	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	1059	GLN
1	A	1149	ASN
1	A	1158	HIS
1	A	1160	ASN
1	B	169	ASN
1	B	269	GLN
1	B	282	ASN
1	B	406	GLN
1	B	409	ASN
1	B	491	ASN
1	B	801	GLN
1	B	818	ASN
1	B	871	ASN
1	B	888	ASN
1	B	890	ASN
1	B	995	ASN
1	B	1059	GLN
1	B	1149	ASN
1	B	1158	HIS
1	B	1160	ASN
1	C	282	ASN
1	C	406	GLN
1	C	491	ASN
1	C	871	ASN
1	C	888	ASN
1	C	995	ASN
1	C	1059	GLN
1	C	1149	ASN
1	C	1158	HIS
1	C	1160	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates (i)

54 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
2	NAG	D	1	1,2	14,14,15	0.23	0	17,19,21	0.44	0
2	NAG	D	2	2	14,14,15	0.24	0	17,19,21	0.41	0
2	NAG	E	1	1,2	14,14,15	0.23	0	17,19,21	0.44	0
2	NAG	E	2	2	14,14,15	0.24	0	17,19,21	0.40	0
2	NAG	F	1	1,2	14,14,15	0.28	0	17,19,21	0.50	0
2	NAG	F	2	2	14,14,15	0.25	0	17,19,21	0.38	0
2	NAG	G	1	1,2	14,14,15	0.25	0	17,19,21	0.47	0
2	NAG	G	2	2	14,14,15	0.25	0	17,19,21	0.40	0
2	NAG	H	1	1,2	14,14,15	0.23	0	17,19,21	0.43	0
2	NAG	H	2	2	14,14,15	0.24	0	17,19,21	0.40	0
2	NAG	I	1	1,2	14,14,15	0.22	0	17,19,21	0.41	0
2	NAG	I	2	2	14,14,15	0.22	0	17,19,21	0.42	0
2	NAG	J	1	1,2	14,14,15	0.20	0	17,19,21	0.40	0
2	NAG	J	2	2	14,14,15	0.21	0	17,19,21	0.41	0
2	NAG	K	1	1,2	14,14,15	0.34	0	17,19,21	0.58	0
2	NAG	K	2	2	14,14,15	0.29	0	17,19,21	0.40	0
2	NAG	L	1	1,2	14,14,15	0.21	0	17,19,21	0.39	0
2	NAG	L	2	2	14,14,15	0.22	0	17,19,21	0.41	0
2	NAG	M	1	1,2	14,14,15	0.23	0	17,19,21	0.44	0
2	NAG	M	2	2	14,14,15	0.25	0	17,19,21	0.41	0
2	NAG	N	1	1,2	14,14,15	0.23	0	17,19,21	0.44	0
2	NAG	N	2	2	14,14,15	0.24	0	17,19,21	0.40	0
2	NAG	O	1	1,2	14,14,15	0.28	0	17,19,21	0.50	0
2	NAG	O	2	2	14,14,15	0.25	0	17,19,21	0.39	0
2	NAG	P	1	1,2	14,14,15	0.25	0	17,19,21	0.47	0
2	NAG	P	2	2	14,14,15	0.25	0	17,19,21	0.40	0
2	NAG	Q	1	1,2	14,14,15	0.24	0	17,19,21	0.43	0
2	NAG	Q	2	2	14,14,15	0.24	0	17,19,21	0.40	0
2	NAG	R	1	1,2	14,14,15	0.21	0	17,19,21	0.41	0
2	NAG	R	2	2	14,14,15	0.22	0	17,19,21	0.42	0
2	NAG	S	1	1,2	14,14,15	0.20	0	17,19,21	0.40	0
2	NAG	S	2	2	14,14,15	0.21	0	17,19,21	0.41	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
2	NAG	T	1	1,2	14,14,15	0.34	0	17,19,21	0.58	0
2	NAG	T	2	2	14,14,15	0.29	0	17,19,21	0.40	0
2	NAG	U	1	1,2	14,14,15	0.21	0	17,19,21	0.39	0
2	NAG	U	2	2	14,14,15	0.22	0	17,19,21	0.41	0
2	NAG	V	1	1,2	14,14,15	0.23	0	17,19,21	0.44	0
2	NAG	V	2	2	14,14,15	0.25	0	17,19,21	0.41	0
2	NAG	W	1	1,2	14,14,15	0.23	0	17,19,21	0.44	0
2	NAG	W	2	2	14,14,15	0.24	0	17,19,21	0.40	0
2	NAG	X	1	1,2	14,14,15	0.28	0	17,19,21	0.50	0
2	NAG	X	2	2	14,14,15	0.25	0	17,19,21	0.38	0
2	NAG	Y	1	1,2	14,14,15	0.25	0	17,19,21	0.46	0
2	NAG	Y	2	2	14,14,15	0.25	0	17,19,21	0.40	0
2	NAG	Z	1	1,2	14,14,15	0.24	0	17,19,21	0.43	0
2	NAG	Z	2	2	14,14,15	0.24	0	17,19,21	0.40	0
2	NAG	a	1	1,2	14,14,15	0.21	0	17,19,21	0.41	0
2	NAG	a	2	2	14,14,15	0.22	0	17,19,21	0.42	0
2	NAG	b	1	1,2	14,14,15	0.20	0	17,19,21	0.41	0
2	NAG	b	2	2	14,14,15	0.21	0	17,19,21	0.41	0
2	NAG	c	1	1,2	14,14,15	0.34	0	17,19,21	0.58	0
2	NAG	c	2	2	14,14,15	0.29	0	17,19,21	0.40	0
2	NAG	d	1	1,2	14,14,15	0.21	0	17,19,21	0.39	0
2	NAG	d	2	2	14,14,15	0.22	0	17,19,21	0.41	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	D	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	D	2	2	-	0/6/23/26	0/1/1/1
2	NAG	E	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	E	2	2	-	0/6/23/26	0/1/1/1
2	NAG	F	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	F	2	2	-	0/6/23/26	0/1/1/1
2	NAG	G	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	G	2	2	-	0/6/23/26	0/1/1/1
2	NAG	H	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	H	2	2	-	0/6/23/26	0/1/1/1
2	NAG	I	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	I	2	2	-	0/6/23/26	0/1/1/1
2	NAG	J	1	1,2	-	2/6/23/26	0/1/1/1

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	J	2	2	-	1/6/23/26	0/1/1/1
2	NAG	K	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	K	2	2	-	0/6/23/26	0/1/1/1
2	NAG	L	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	L	2	2	-	0/6/23/26	0/1/1/1
2	NAG	M	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	M	2	2	-	0/6/23/26	0/1/1/1
2	NAG	N	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	N	2	2	-	0/6/23/26	0/1/1/1
2	NAG	O	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	O	2	2	-	0/6/23/26	0/1/1/1
2	NAG	P	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	P	2	2	-	0/6/23/26	0/1/1/1
2	NAG	Q	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	Q	2	2	-	0/6/23/26	0/1/1/1
2	NAG	R	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	R	2	2	-	0/6/23/26	0/1/1/1
2	NAG	S	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	S	2	2	-	1/6/23/26	0/1/1/1
2	NAG	T	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	T	2	2	-	0/6/23/26	0/1/1/1
2	NAG	U	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	U	2	2	-	0/6/23/26	0/1/1/1
2	NAG	V	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	V	2	2	-	0/6/23/26	0/1/1/1
2	NAG	W	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	W	2	2	-	0/6/23/26	0/1/1/1
2	NAG	X	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	X	2	2	-	0/6/23/26	0/1/1/1
2	NAG	Y	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	Y	2	2	-	0/6/23/26	0/1/1/1
2	NAG	Z	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	Z	2	2	-	0/6/23/26	0/1/1/1
2	NAG	a	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	a	2	2	-	0/6/23/26	0/1/1/1
2	NAG	b	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	b	2	2	-	1/6/23/26	0/1/1/1
2	NAG	c	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	c	2	2	-	0/6/23/26	0/1/1/1
2	NAG	d	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	d	2	2	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

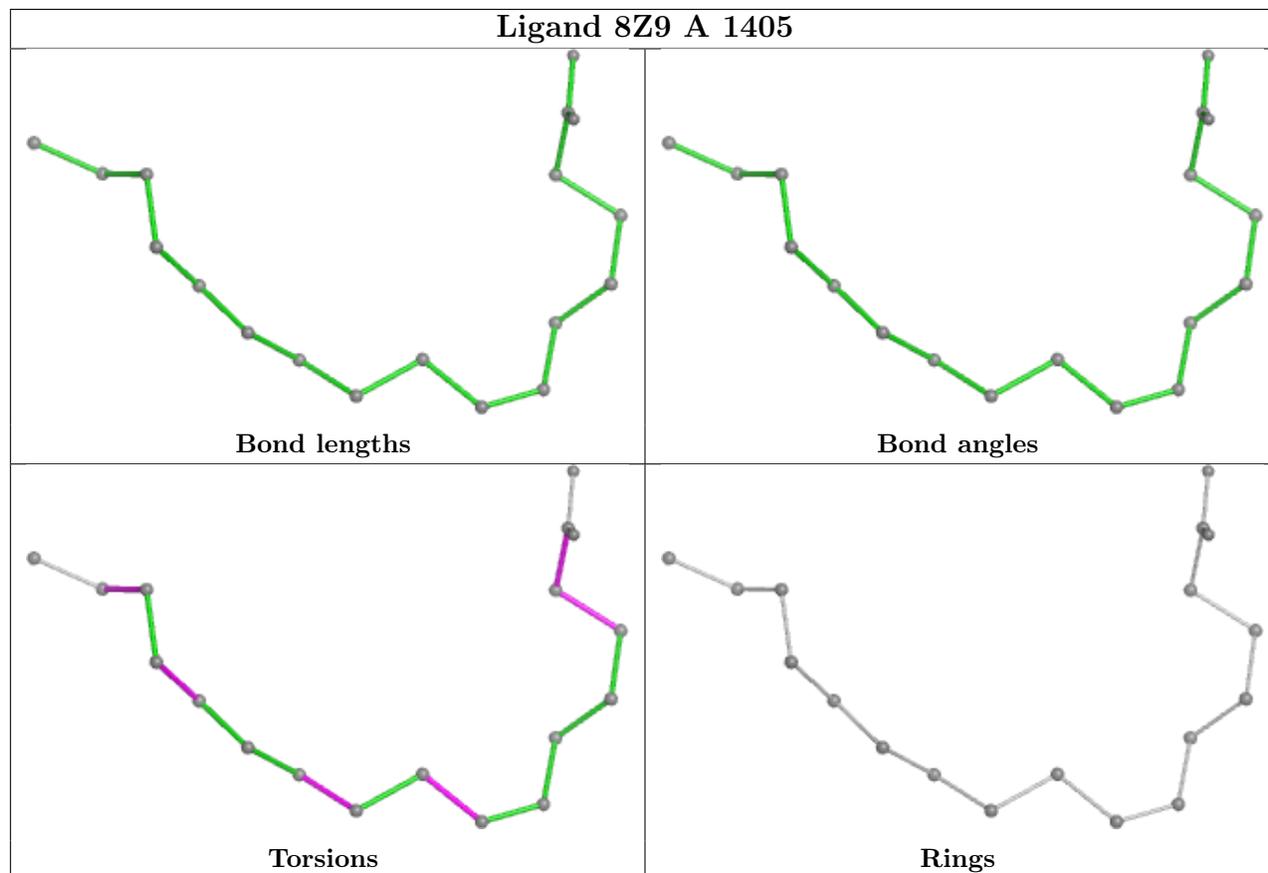All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	J	1	NAG	C4-C5-C6-O6
2	S	1	NAG	C4-C5-C6-O6
2	b	1	NAG	C4-C5-C6-O6
2	J	1	NAG	O5-C5-C6-O6
2	S	1	NAG	O5-C5-C6-O6
2	b	1	NAG	O5-C5-C6-O6
2	J	2	NAG	O5-C5-C6-O6
2	S	2	NAG	O5-C5-C6-O6
2	b	2	NAG	O5-C5-C6-O6
2	I	1	NAG	C4-C5-C6-O6
2	a	1	NAG	C4-C5-C6-O6
2	R	1	NAG	C4-C5-C6-O6
2	K	1	NAG	C4-C5-C6-O6
2	T	1	NAG	C4-C5-C6-O6
2	c	1	NAG	C4-C5-C6-O6
2	K	1	NAG	O5-C5-C6-O6
2	T	1	NAG	O5-C5-C6-O6
2	c	1	NAG	O5-C5-C6-O6
2	I	1	NAG	O5-C5-C6-O6
2	R	1	NAG	O5-C5-C6-O6
2	a	1	NAG	O5-C5-C6-O6

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	T	1	NAG	1	0
2	K	1	NAG	1	0
2	c	1	NAG	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 oligosaccharide.

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain F

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain G

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain H

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain I

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain J

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain K

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain L

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain M

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain N

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain O

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain P

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain Q

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain R

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain S

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain T

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain U

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain V

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain W

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain X

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain Y

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain Z

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain a

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain b

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain c

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain d

Bond lengths

Bond angles

Torsions

Rings

5.6 Ligand geometry (i)

15 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	1404	1	14,14,15	0.23	0	17,19,21	0.41	0
3	NAG	B	1401	1	14,14,15	0.28	0	17,19,21	0.46	0
3	NAG	A	1404	1	14,14,15	0.18	0	17,19,21	0.41	0
4	8Z9	A	1405	-	17,17,17	0.59	0	17,17,17	1.05	0
3	NAG	B	1402	1	14,14,15	0.21	0	17,19,21	0.46	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
3	NAG	C	1403	1	14,14,15	0.21	0	17,19,21	0.46	0
3	NAG	C	1405	1	14,14,15	0.19	0	17,19,21	0.41	0
3	NAG	A	1401	1	14,14,15	0.28	0	17,19,21	0.46	0
4	8Z9	C	1401	-	17,17,17	0.59	0	17,17,17	1.05	0
3	NAG	C	1402	1	14,14,15	0.28	0	17,19,21	0.46	0
3	NAG	A	1403	1	14,14,15	0.23	0	17,19,21	0.41	0
4	8Z9	B	1405	-	17,17,17	0.59	0	17,17,17	1.05	0
3	NAG	A	1402	1	14,14,15	0.21	0	17,19,21	0.46	0
3	NAG	B	1404	1	14,14,15	0.18	0	17,19,21	0.41	0
3	NAG	B	1403	1	14,14,15	0.23	0	17,19,21	0.41	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	C	1404	1	-	0/6/23/26	0/1/1/1
3	NAG	B	1401	1	-	2/6/23/26	0/1/1/1
3	NAG	A	1404	1	-	2/6/23/26	0/1/1/1
4	8Z9	A	1405	-	-	7/15/15/15	-
3	NAG	B	1402	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1403	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1405	1	-	2/6/23/26	0/1/1/1
3	NAG	A	1401	1	-	2/6/23/26	0/1/1/1
4	8Z9	C	1401	-	-	7/15/15/15	-
3	NAG	C	1402	1	-	2/6/23/26	0/1/1/1
3	NAG	A	1403	1	-	0/6/23/26	0/1/1/1
4	8Z9	B	1405	-	-	7/15/15/15	-
3	NAG	A	1402	1	-	0/6/23/26	0/1/1/1
3	NAG	B	1404	1	-	2/6/23/26	0/1/1/1
3	NAG	B	1403	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (33) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1404	NAG	C4-C5-C6-O6
3	B	1404	NAG	C4-C5-C6-O6
3	C	1405	NAG	C4-C5-C6-O6
3	A	1404	NAG	O5-C5-C6-O6
3	B	1404	NAG	O5-C5-C6-O6
3	C	1405	NAG	O5-C5-C6-O6
4	A	1405	8Z9	C1-C2-C3-C4
4	B	1405	8Z9	C1-C2-C3-C4
4	C	1401	8Z9	C1-C2-C3-C4
3	A	1401	NAG	O5-C5-C6-O6
3	B	1401	NAG	O5-C5-C6-O6
3	C	1402	NAG	O5-C5-C6-O6
3	A	1401	NAG	C4-C5-C6-O6
3	B	1401	NAG	C4-C5-C6-O6
3	C	1402	NAG	C4-C5-C6-O6
4	A	1405	8Z9	C8-C9-CA-CB
4	B	1405	8Z9	C8-C9-CA-CB
4	C	1401	8Z9	C8-C9-CA-CB
4	A	1405	8Z9	CD-CE-CF-CG
4	B	1405	8Z9	CD-CE-CF-CG
4	C	1401	8Z9	CD-CE-CF-CG
4	A	1405	8Z9	CB-CC-CD-CE
4	B	1405	8Z9	CB-CC-CD-CE
4	C	1401	8Z9	CB-CC-CD-CE
4	A	1405	8Z9	O2-C1-C2-C3
4	B	1405	8Z9	O2-C1-C2-C3
4	C	1401	8Z9	O2-C1-C2-C3
4	A	1405	8Z9	O1-C1-C2-C3
4	B	1405	8Z9	O1-C1-C2-C3
4	C	1401	8Z9	O1-C1-C2-C3
4	A	1405	8Z9	C6-C7-C8-C9
4	B	1405	8Z9	C6-C7-C8-C9
4	C	1401	8Z9	C6-C7-C8-C9

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 then 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.

Ligand 8Z9 A 1405

Bond lengths

Bond angles

Torsions

Rings

Ligand 8Z9 C 1401

Bond lengths

Bond angles

Torsions

Rings

Ligand 8Z9 B 1405

Bond lengths

Bond angles

Torsions

Rings
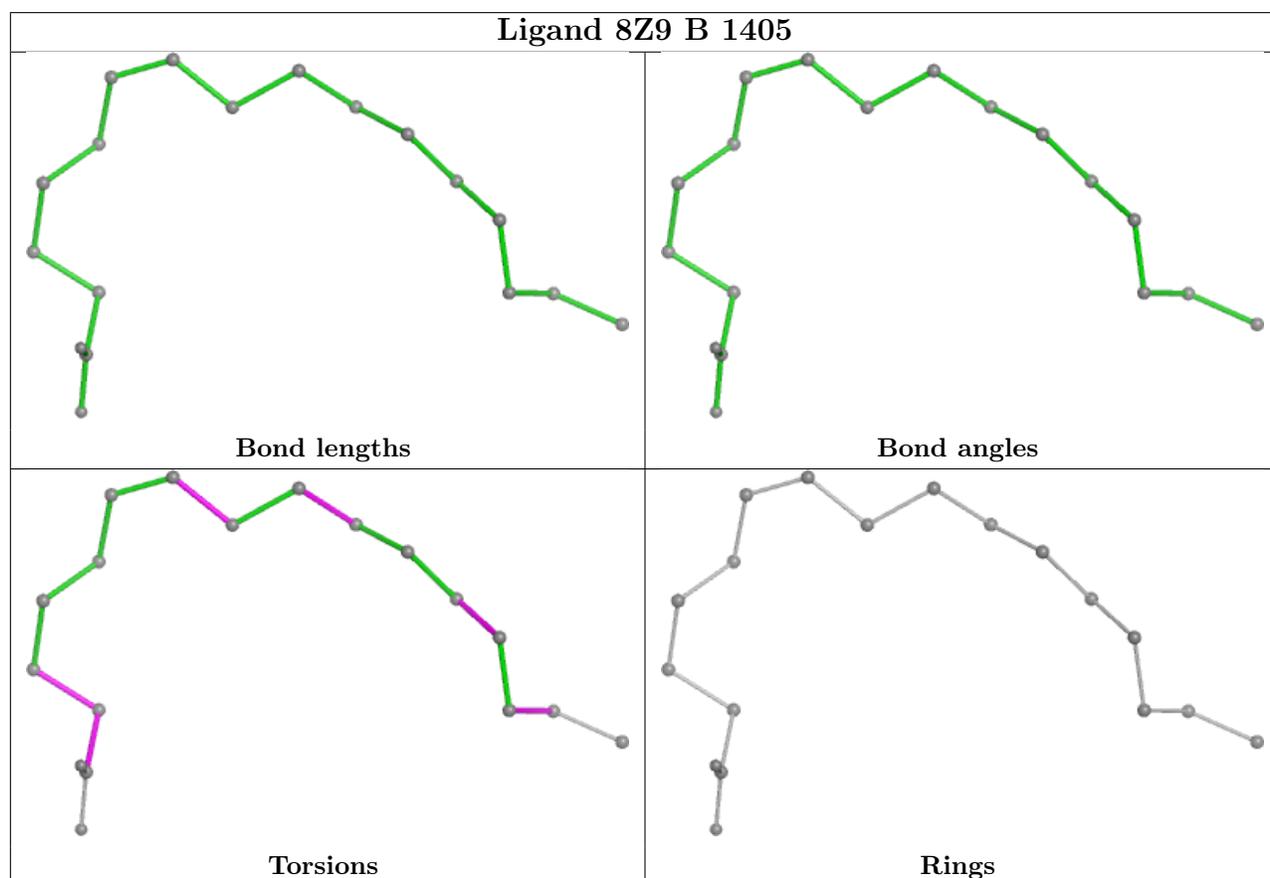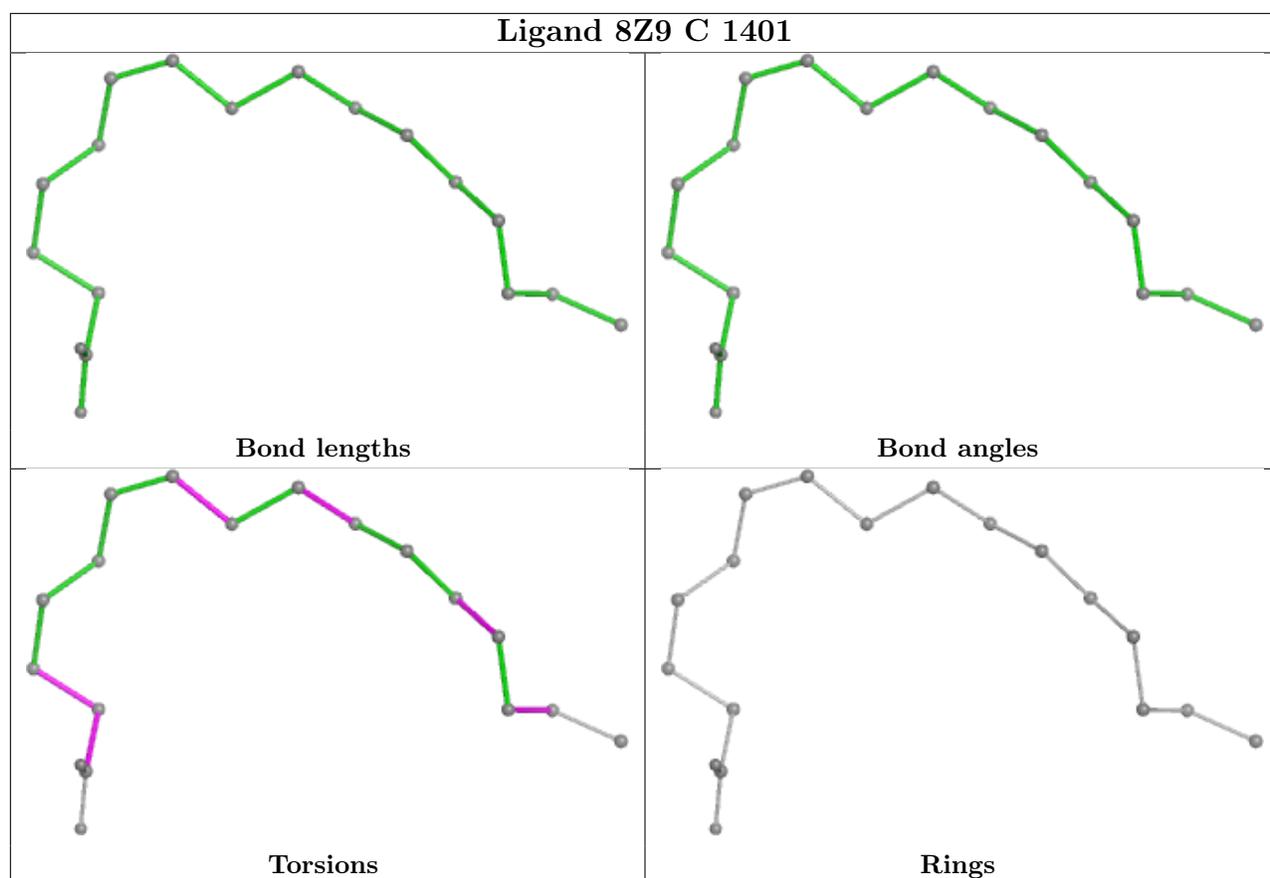
5.7　Other polymers ⓘ

There are no such residues in this entry.

5.8　Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6　Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-53687. 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 ⓘ

6.1.1　Primary map

X　　　　　　　　　　　　Y　　　　　　　　　　　　Z

6.1.2　Raw map

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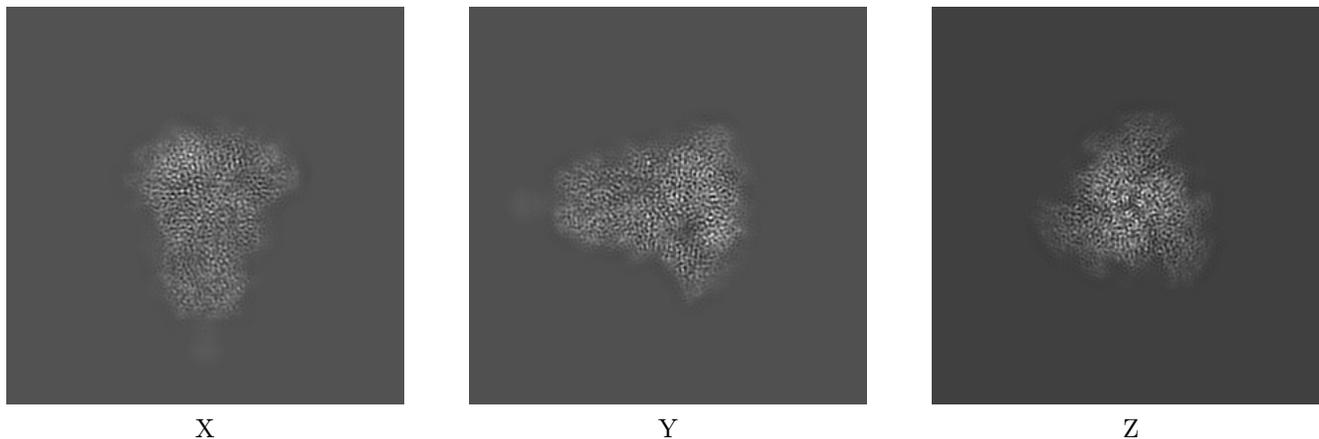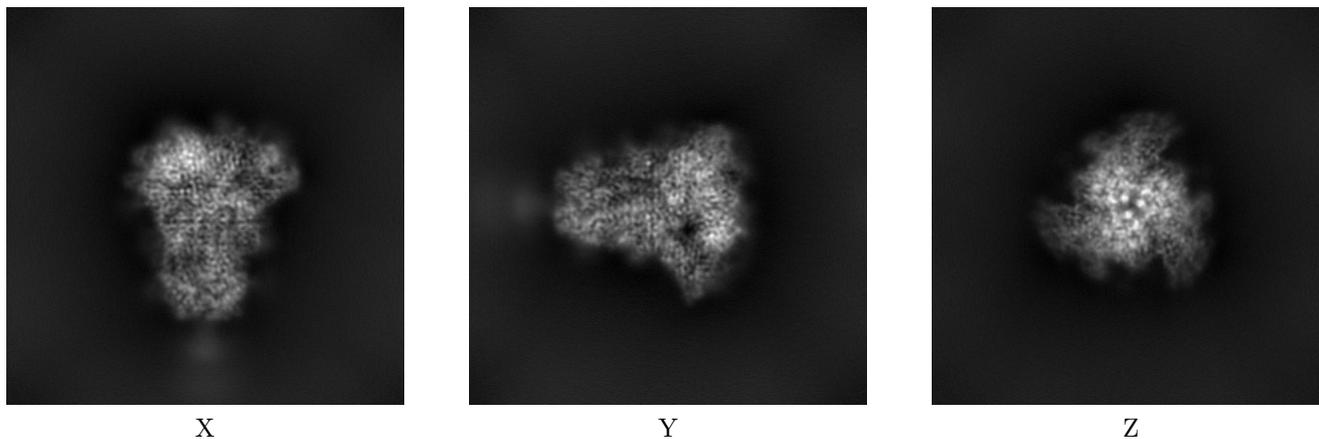
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ

6.2.1 Primary map

X Index: 180

Y Index: 180
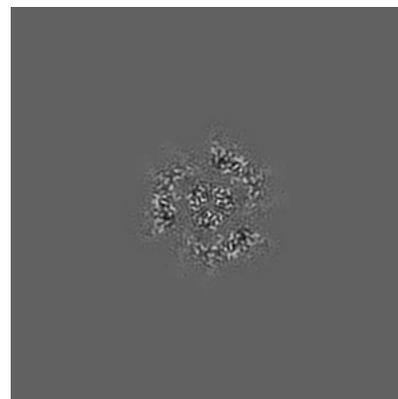
Z Index: 180

6.2.2 Raw map
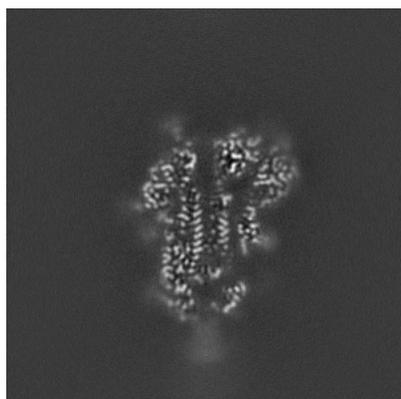
X Index: 180
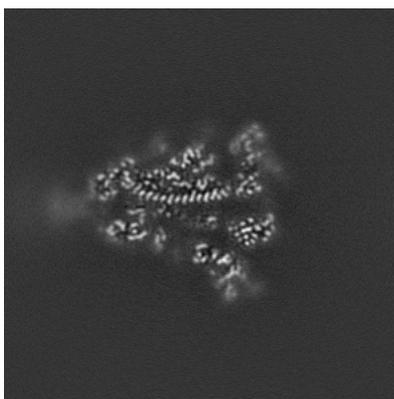
Y Index: 180
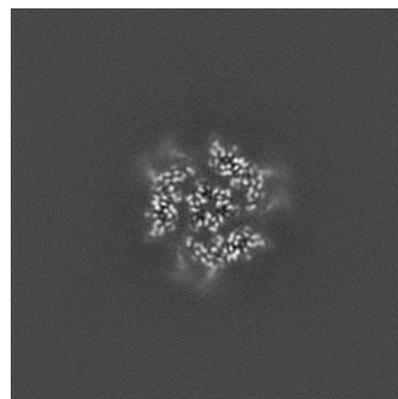
Z Index: 180

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

6.3 Largest variance slices (i)

6.3.1 Primary map
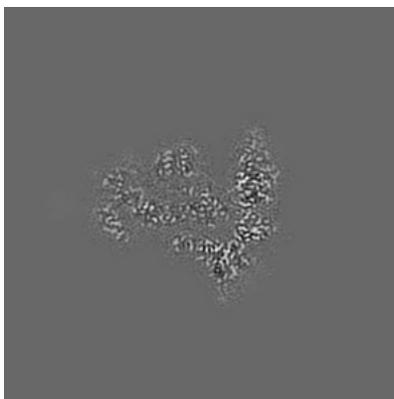
| X Index: 190 | Y Index: 168 | Z Index: 219 |
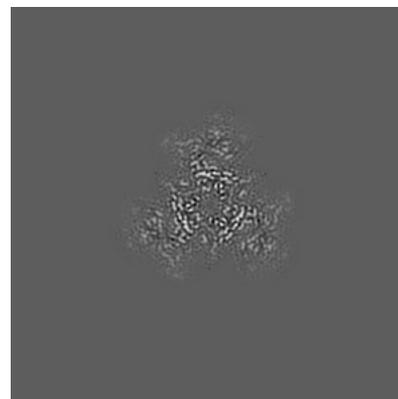
6.3.2 Raw map
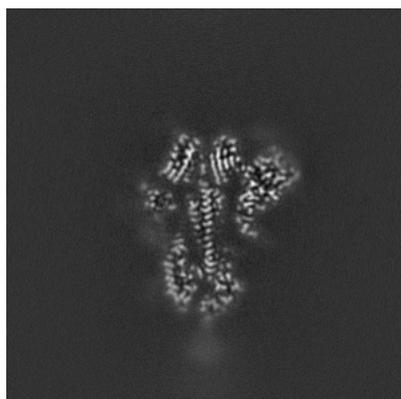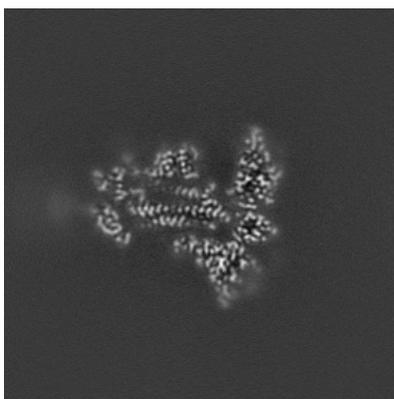
| X Index: 190 | Y Index: 169 | Z Index: 219 |
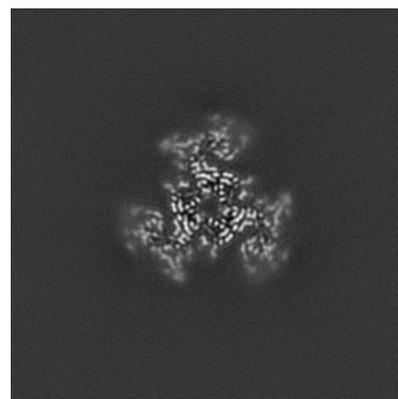
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) ⓘ

6.4.1 Primary map
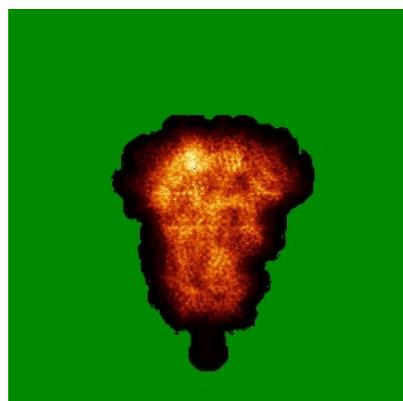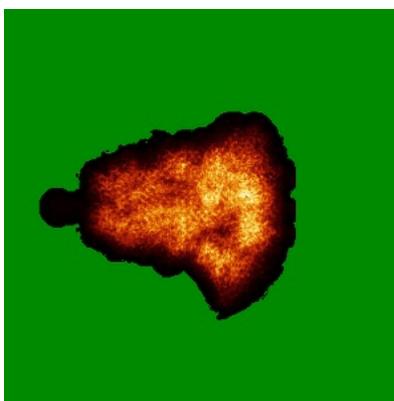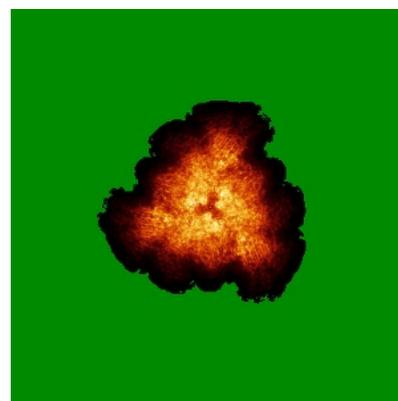
X　　　　　　　　Y　　　　　　　　Z

6.4.2 Raw map

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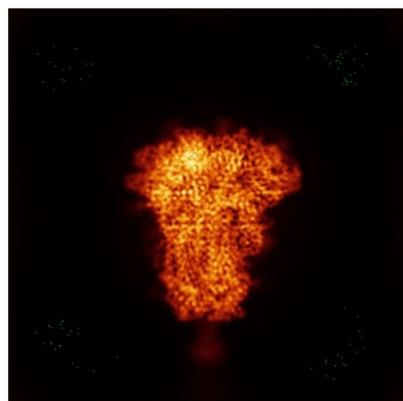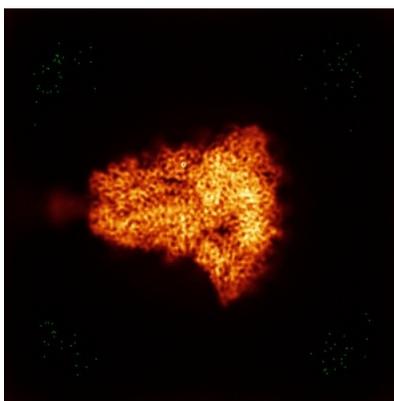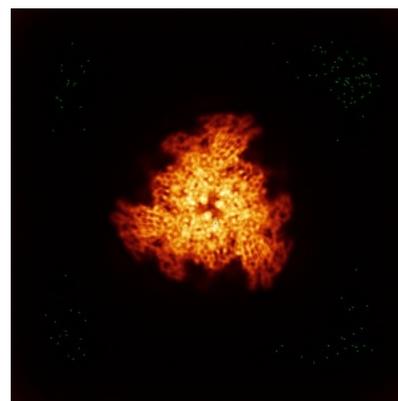
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

| X | Y | Z |
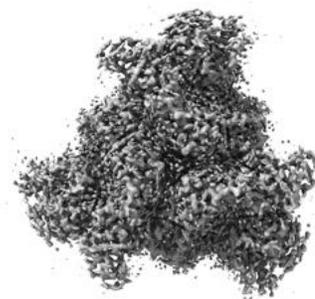
The images above show the 3D surface view of the map at the recommended contour level 0.08. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map
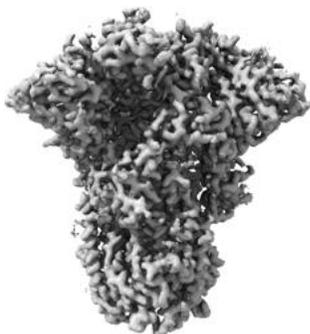
| X | Y | Z |

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 ⓘ

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

7 Map analysis ⓘ

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

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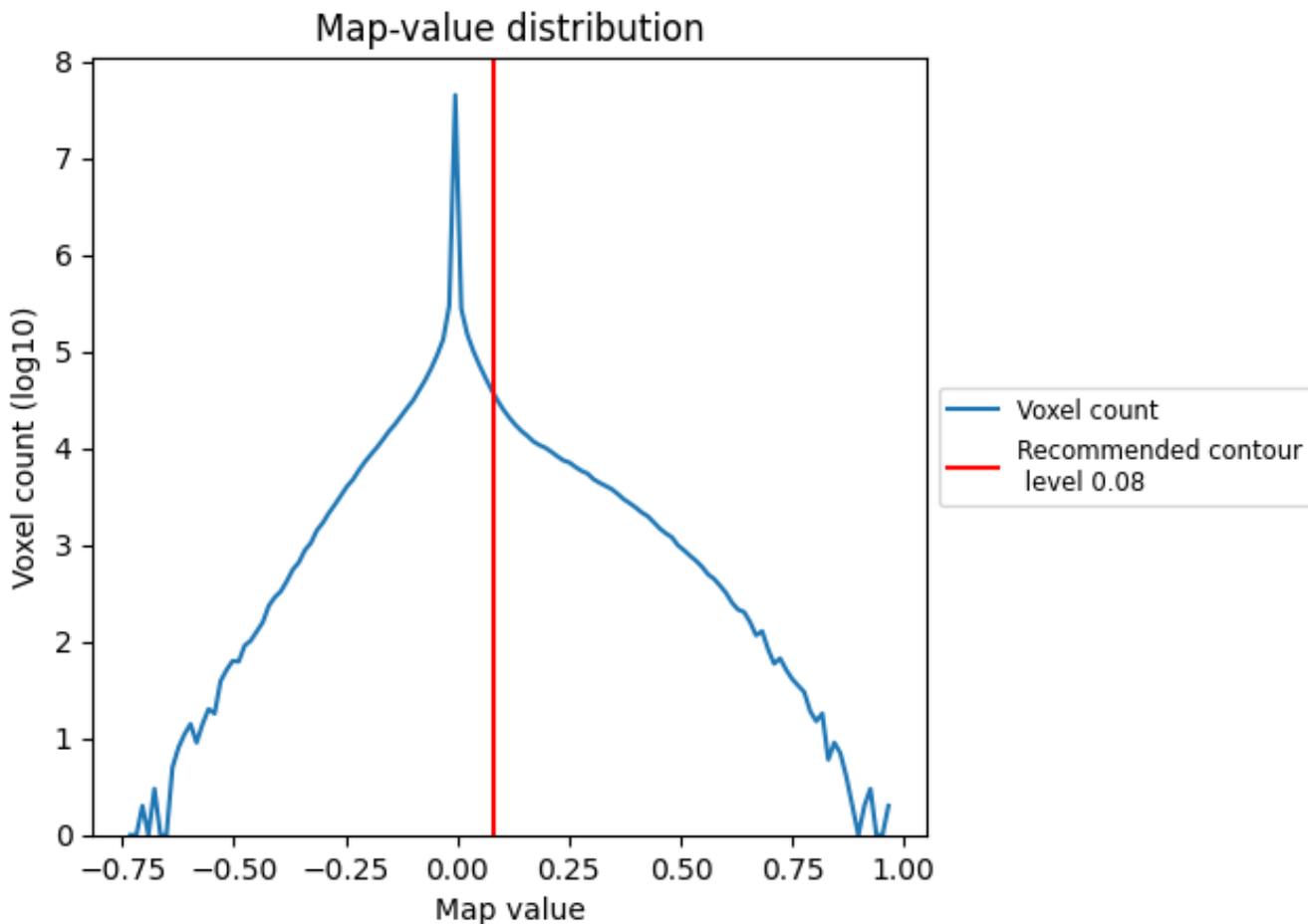
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate ⓘ
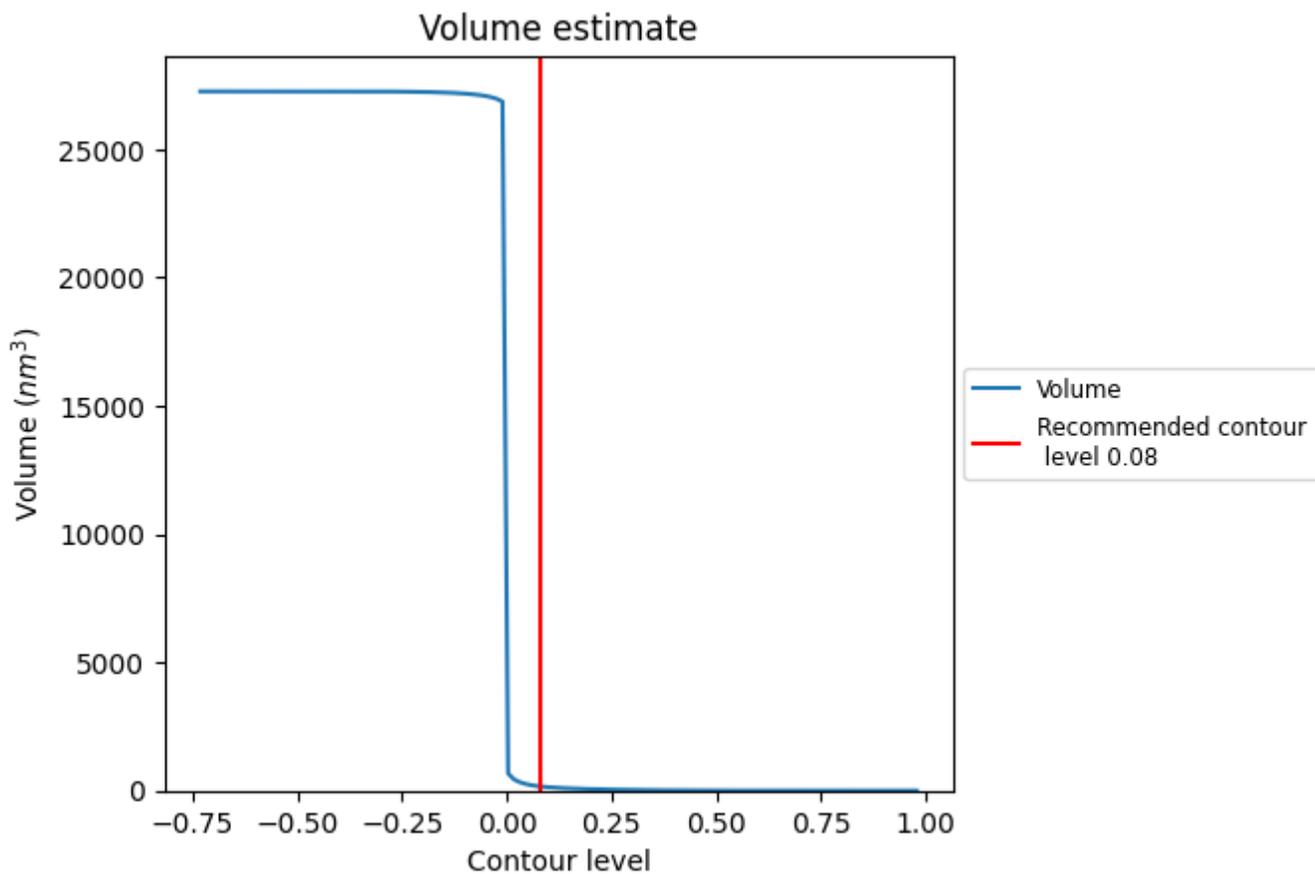
The volume at the recommended contour level is 163 nm^3; this corresponds to an approximate mass of 148 kDa.

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 ⓘ
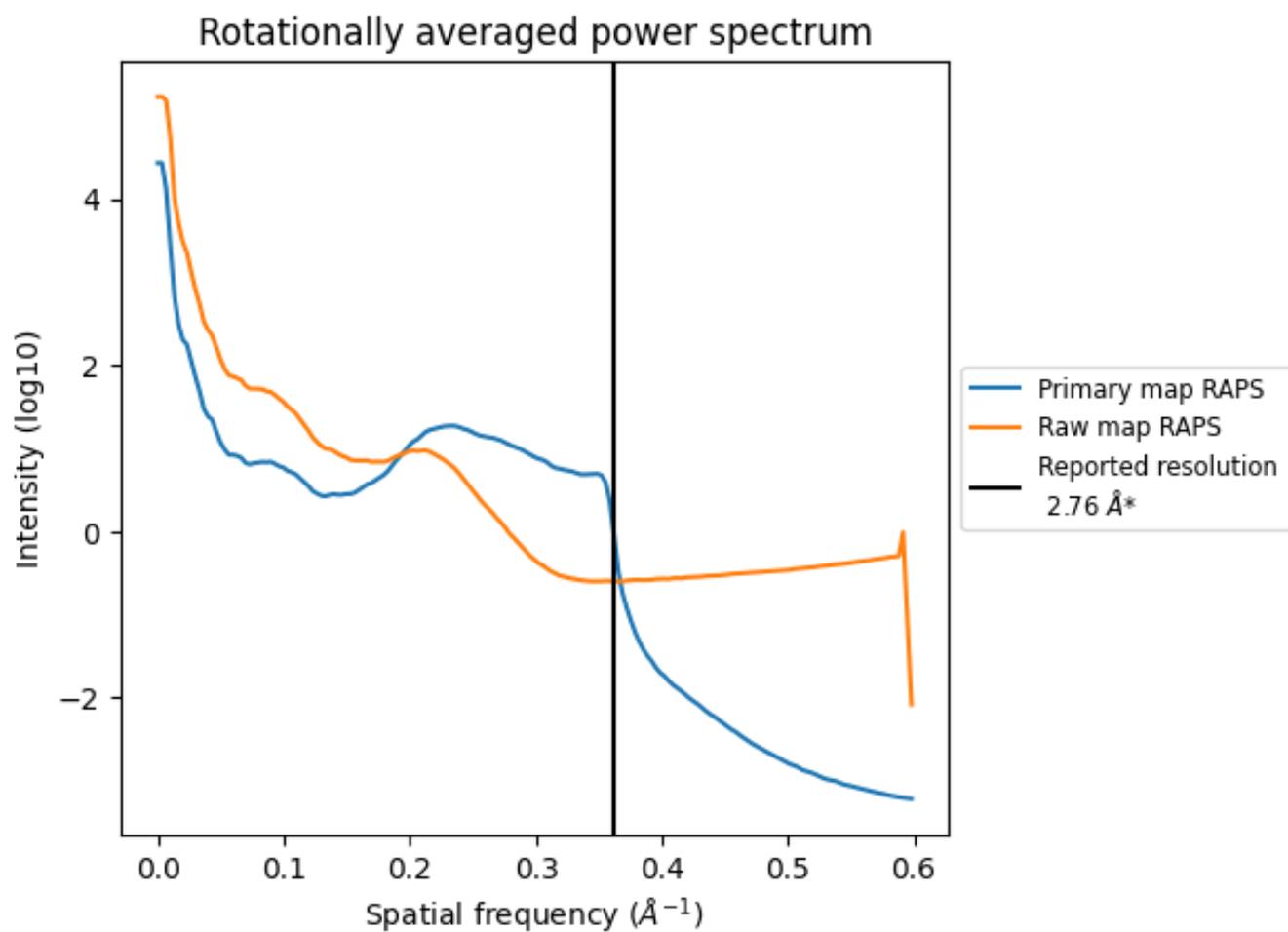
*Reported resolution corresponds to spatial frequency of 0.362 Å^{-1}

8 Fourier-Shell correlation ⓘ

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 ⓘ
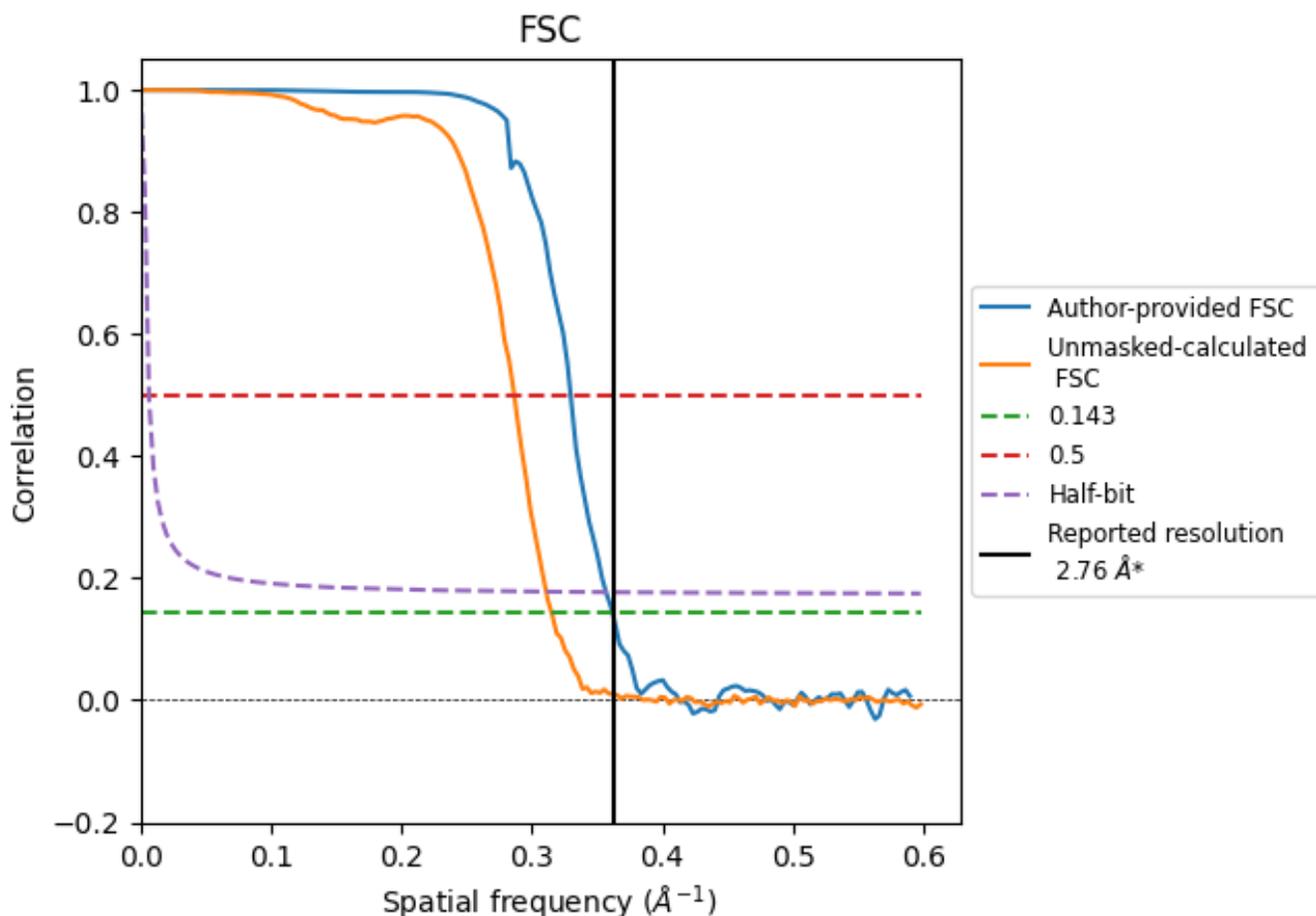
*Reported resolution corresponds to spatial frequency of 0.362 Å^{-1}

8.2   Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.76	-	-
Author-provided FSC curve	2.76	3.03	2.80
Unmasked-calculated*	3.17	3.49	3.22

*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 3.17 differs from the reported value 2.76 by more than 10 %

9　Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-53687 and PDB model 9R6T. Per-residue inclusion information can be found in section 3 on page 11.

9.1　Map-model overlay ⓘ


X　　　　　　　　　　　　Y　　　　　　　　　　　　Z
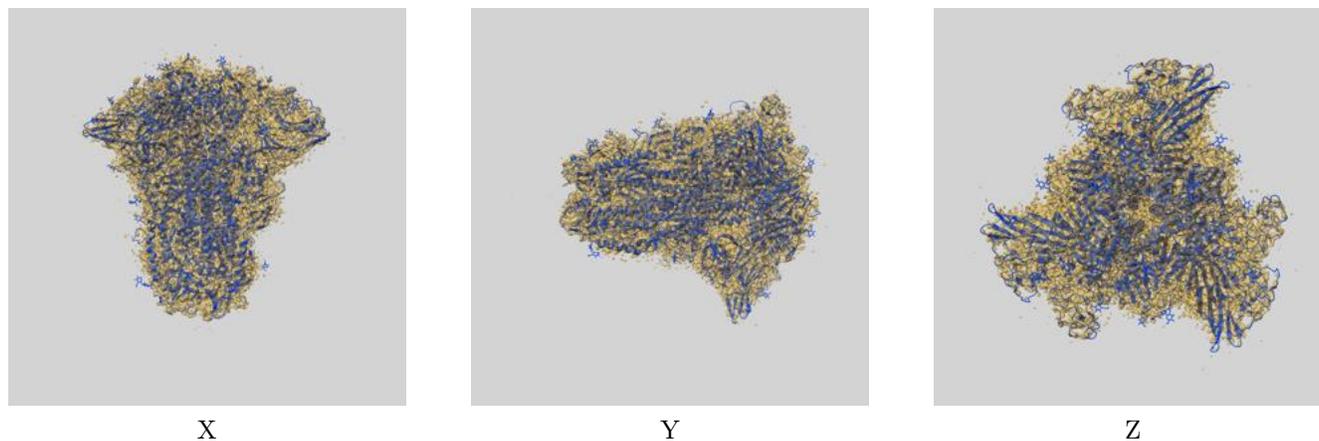
The images above show the 3D surface view of the map at the recommended contour level 0.08 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2　Q-score mapped to coordinate model　ⓘ

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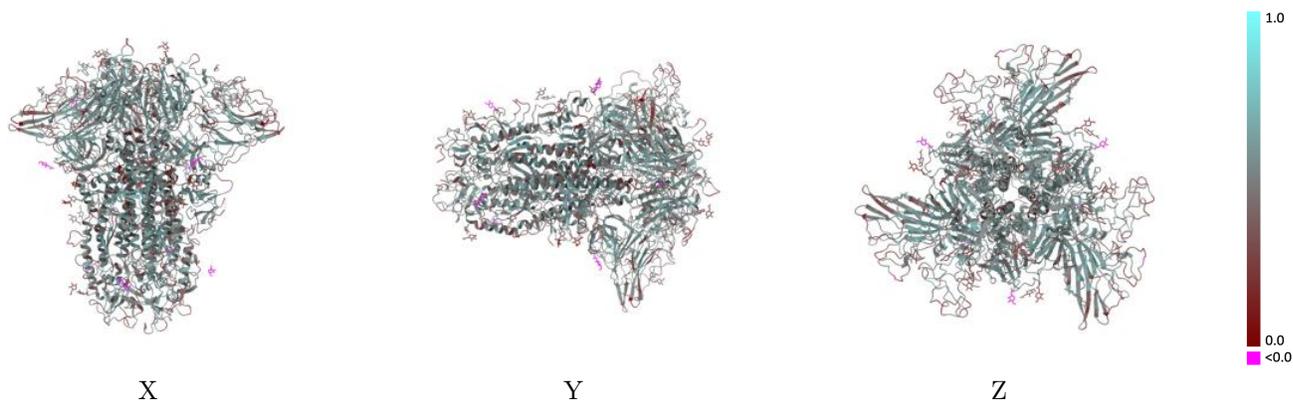
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

X　　　　　　　　　　Y　　　　　　　　　　Z
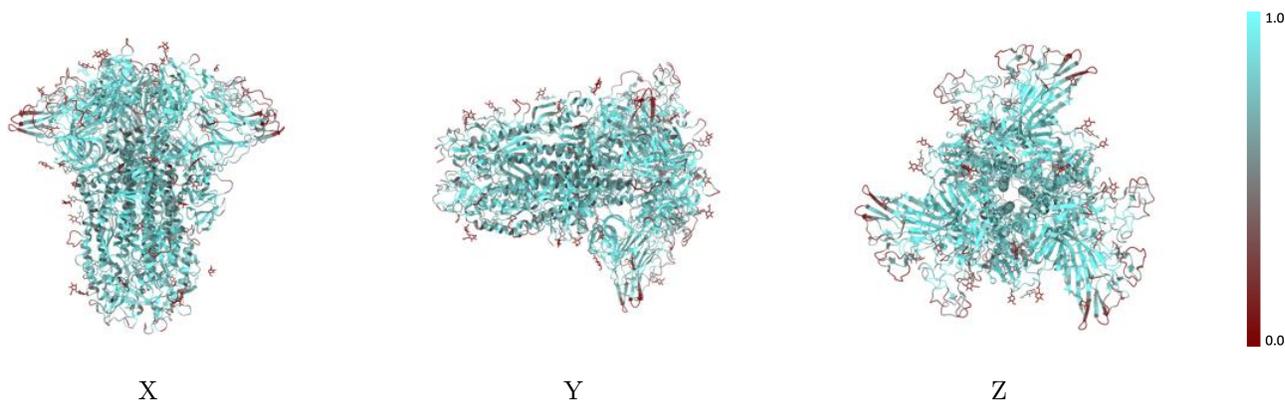
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.08).

9.4 Atom inclusion ⓘ
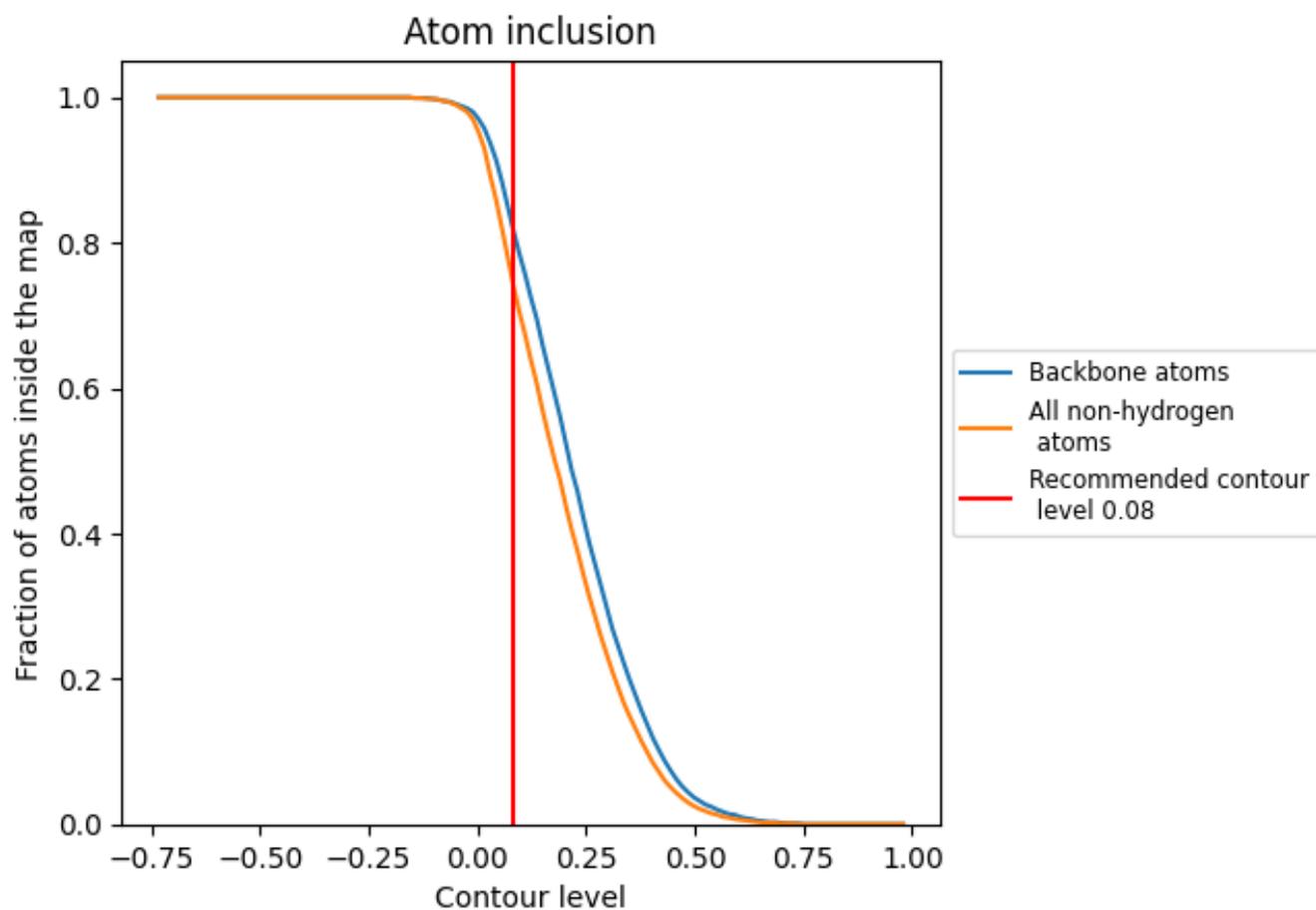
At the recommended contour level, 82% of all backbone atoms, 75% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.08) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7500	0.4970
A	0.7620	0.4990
B	0.7630	0.5030
C	0.7630	0.5020
D	0.5000	0.4880
E	0.3570	0.4220
F	0.5710	0.5170
G	0.1430	0.2500
H	0.1790	0.2650
I	0.1790	0.2600
J	0.3930	0.3930
K	0.2140	0.2220
L	0.0360	0.2870
M	0.5000	0.4730
N	0.3210	0.4260
O	0.4290	0.5020
P	0.1430	0.2370
Q	0.1790	0.2220
R	0.1790	0.2670
S	0.3930	0.3880
T	0.2140	0.2240
U	0.0360	0.2690
V	0.5000	0.4630
W	0.3210	0.4110
X	0.5000	0.5060
Y	0.1430	0.2320
Z	0.2140	0.2520
a	0.1790	0.2620
b	0.3570	0.4080
c	0.2140	0.2160
d	0.0360	0.2810

1.0

0.0
<0.0