



Full wwPDB EM Validation Report ⓘ

Mar 6, 2026 – 03:41 PM UTC

PDB ID : 8JJ1 / pdb_00008jj1
EMDB ID : EMD-36337
Title : Cryo-EM structure of GluN1-2A NMDAR in complex with human Fab2G7 in two fab conformation
Authors : Wang, H.; Zhu, S.
Deposited on : 2023-05-29
Resolution : 3.77 Å(reported)

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

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

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:

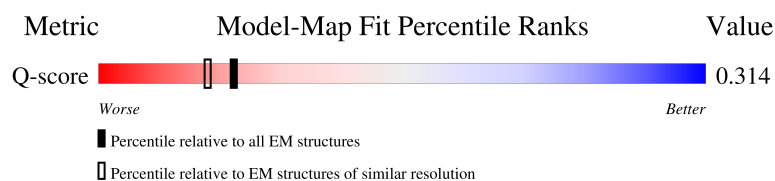
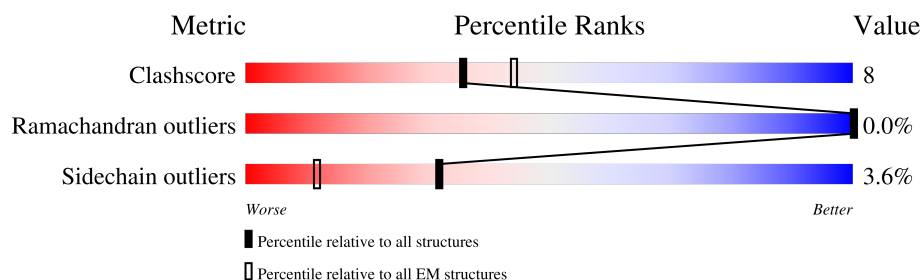
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data 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 3.77 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	10146 (3.27 - 4.27)

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	E	253	 5% 40% 8% 52%
1	H	253	 5% 41% 7% 52%
2	A	841	 6% 70% 19% • 9%
2	C	841	 5% 70% 20% • 10%

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Mol	Chain	Length	Quality of chain
3	B	847	5% 69% 21% 8%
3	D	847	72% 19% 8%
4	F	234	5% 44% 55%
4	G	234	9% 43% 55%
5	I	2	100%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 28026 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 Fab 2G7 Heavy Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	H	122	Total	C	N	O	S	0	0
			930	584	159	184	3		
1	E	122	Total	C	N	O	S	0	0
			930	584	159	184	3		

- Molecule 2 is a protein called Glutamate receptor ionotropic, NMDA 2A.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	A	763	Total	C	N	O	S	0	0
			6033	3898	982	1115	38		
2	C	760	Total	C	N	O	S	0	0
			6004	3879	977	1110	38		

- Molecule 3 is a protein called Glutamate receptor ionotropic, NMDA 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	B	778	Total	C	N	O	S	0	0
			6153	3923	1065	1131	34		
3	D	780	Total	C	N	O	S	0	0
			6158	3931	1058	1135	34		

- Molecule 4 is a protein called Fab 2G7 Light Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	F	106	Total	C	N	O	S	0	0
			818	515	138	161	4		
4	G	106	Total	C	N	O	S	0	0
			818	515	138	161	4		

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				AltConf	Trace
5	I	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).

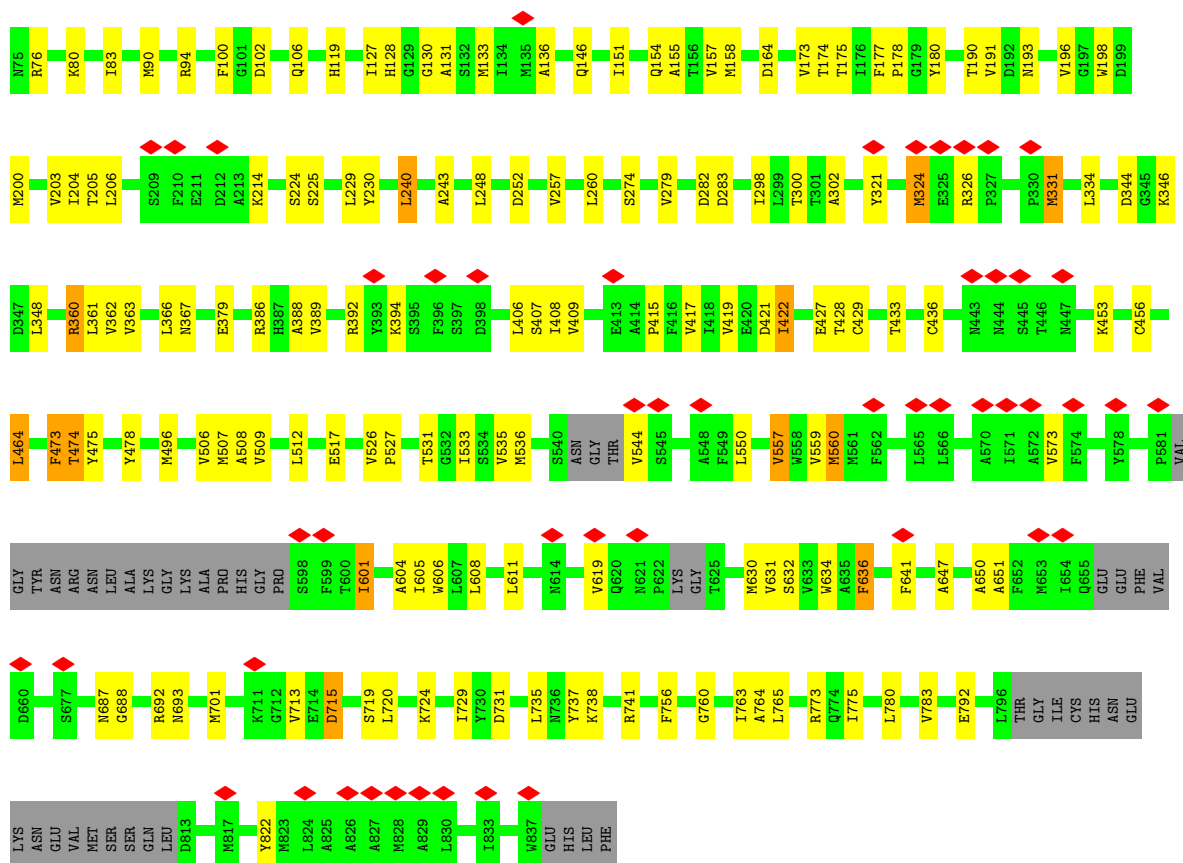


Mol	Chain	Residues	Atoms				AltConf
6	A	1	Total	C	N	O	0
			14	8	1	5	
6	B	1	Total	C	N	O	0
			14	8	1	5	
6	B	1	Total	C	N	O	0
			14	8	1	5	
6	B	1	Total	C	N	O	0
			14	8	1	5	
6	B	1	Total	C	N	O	0
			14	8	1	5	
6	C	1	Total	C	N	O	0
			14	8	1	5	
6	D	1	Total	C	N	O	0
			14	8	1	5	
6	D	1	Total	C	N	O	0
			14	8	1	5	

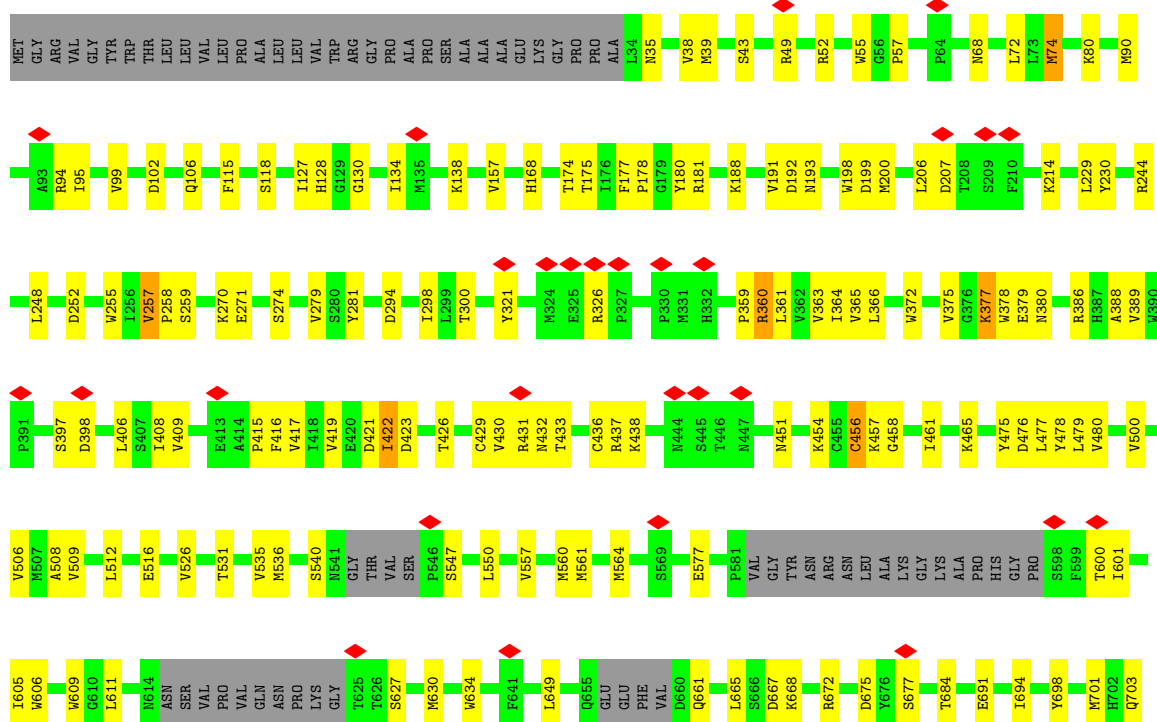
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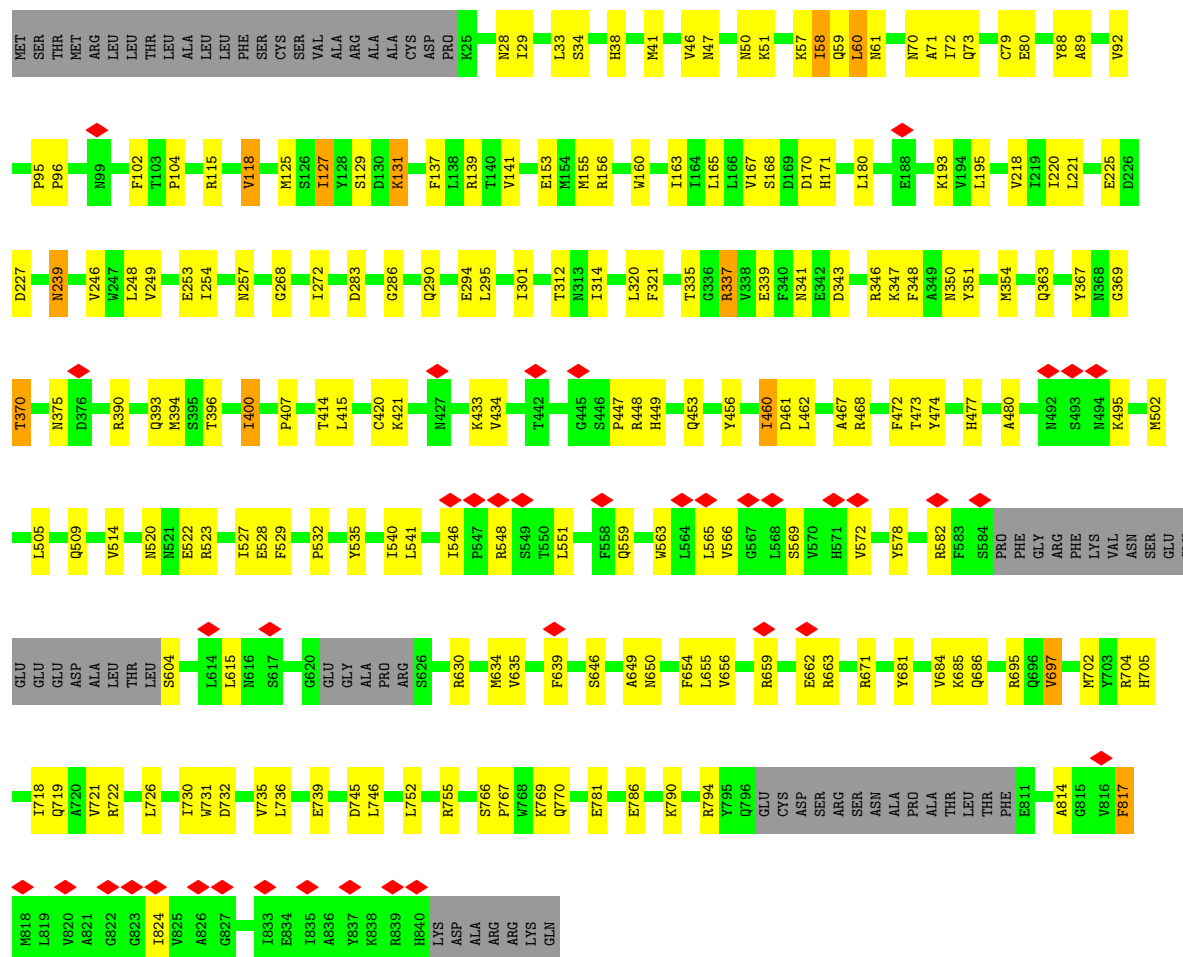
Mol	Chain	Residues	Atoms				AltConf
6	D	1	Total	C	N	O	0
			14	8	1	5	
6	D	1	Total	C	N	O	0
			14	8	1	5	
6	D	1	Total	C	N	O	0
			14	8	1	5	



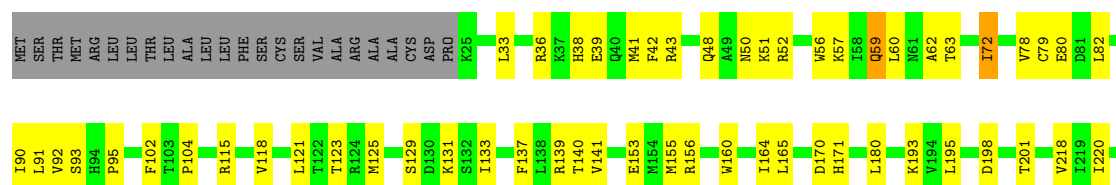
• Molecule 2: Glutamate receptor ionotropic, NMDA 2A

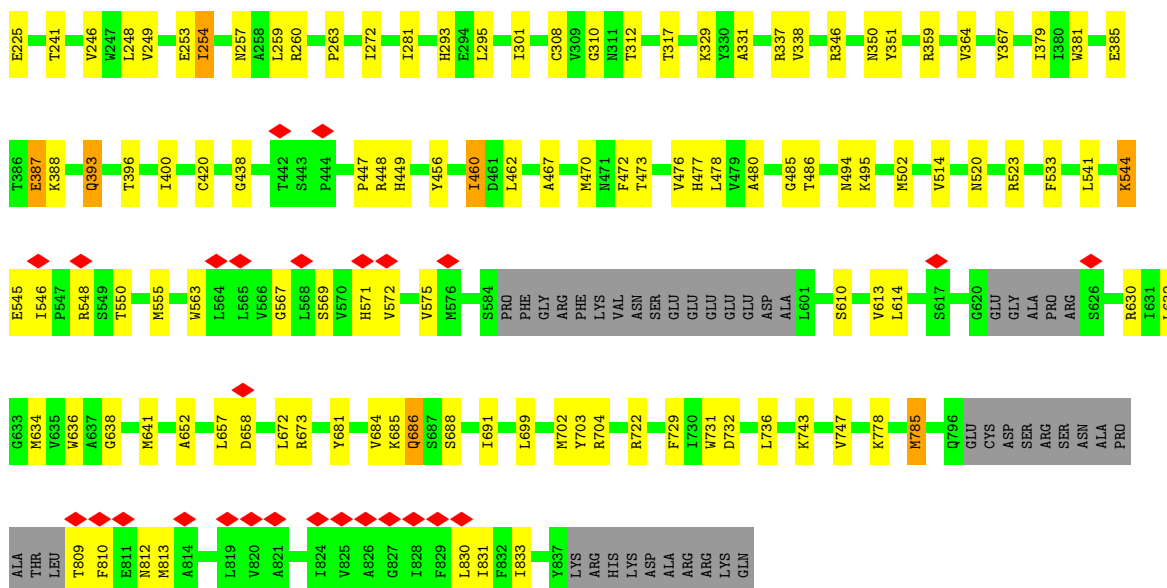


- Molecule 3: Glutamate receptor ionotropic, NMDA 1

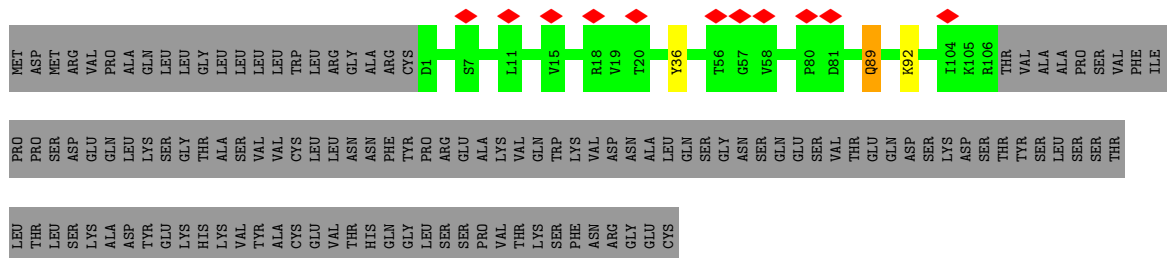
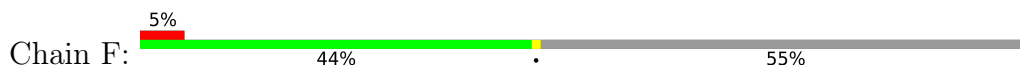


- Molecule 3: Glutamate receptor ionotropic, NMDA 1

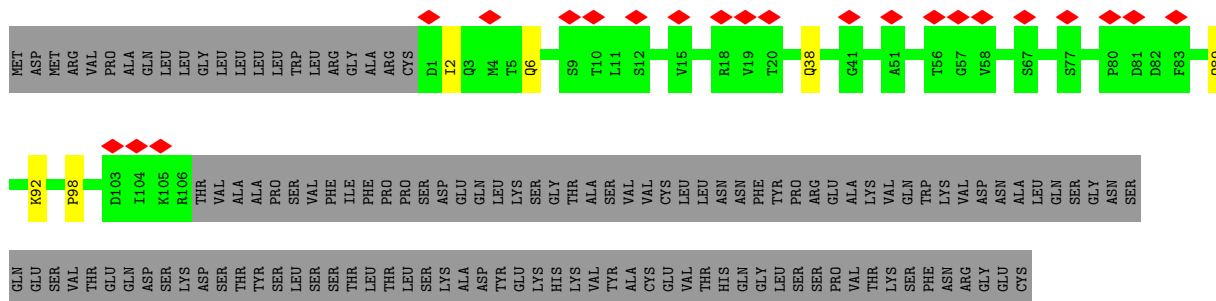
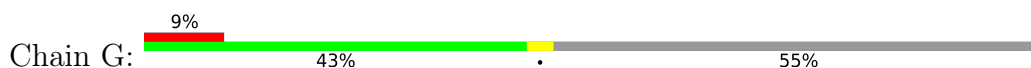




- Molecule 4: Fab 2G7 Light Chain



- Molecule 4: Fab 2G7 Light Chain



- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	202786	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 ($e^-/\text{\AA}^2$)	70	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.079	Depositor
Minimum map value	-0.023	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.014	Depositor
Map size (Å)	388.80002, 388.80002, 388.80002	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.08, 1.08, 1.08	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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	E	0.05	0/953	0.17	0/1300
1	H	0.05	0/953	0.17	0/1300
2	A	0.07	0/6179	0.22	0/8390
2	C	0.07	0/6148	0.22	0/8343
3	B	0.08	0/6290	0.22	0/8518
3	D	0.08	0/6295	0.22	0/8529
4	F	0.07	0/838	0.23	0/1138
4	G	0.07	0/838	0.27	0/1138
All	All	0.07	0/28494	0.22	0/38656

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 [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	E	930	0	883	11	0
1	H	930	0	883	11	0
2	A	6033	0	5965	94	0
2	C	6004	0	5931	115	0
3	B	6153	0	6128	128	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	D	6158	0	6129	111	0
4	F	818	0	797	1	0
4	G	818	0	797	4	0
5	I	28	0	25	0	0
6	A	14	0	13	0	0
6	B	56	0	52	0	0
6	C	14	0	13	0	0
6	D	70	0	65	2	0
All	All	28026	0	27681	433	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 8.

All (433) 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:H:6:GLN:H	1:H:113:GLN:HE22	1.30	0.80
1:E:6:GLN:H	1:E:113:GLN:HE22	1.33	0.77
3:B:131:LYS:HB2	2:C:178:PRO:HG2	1.68	0.74
3:B:70:ASN:ND2	2:C:321:TYR:O	2.22	0.72
3:B:70:ASN:HD21	2:C:321:TYR:HB3	1.57	0.69
3:B:520:ASN:HB3	3:B:523:ARG:HD3	1.75	0.69
3:B:456:TYR:HA	3:B:460:ILE:HG12	1.75	0.68
3:B:218:VAL:HG12	3:B:246:VAL:HB	1.76	0.67
3:D:722:ARG:HH21	3:D:743:LYS:HD3	1.59	0.66
3:D:63:THR:HG22	6:D:901:NAG:H61	1.78	0.66
2:C:168:HIS:HA	2:C:198:TRP:HD1	1.60	0.66
3:B:125:MET:O	3:B:139:ARG:NH1	2.29	0.65
3:D:673:ARG:HD2	3:D:702:MET:HE1	1.78	0.65
3:D:90:ILE:HB	3:D:118:VAL:HG12	1.79	0.64
2:A:164:ASP:O	2:A:453:LYS:NZ	2.30	0.64
3:B:129:SER:OG	3:B:139:ARG:NH2	2.30	0.64
2:C:630:MET:HB3	3:D:831:ILE:HG21	1.79	0.64
1:E:30:THR:HA	1:E:53:PRO:HB2	1.78	0.64
2:C:508:ALA:HB3	2:C:764:ALA:HB3	1.80	0.63
2:A:527:PRO:HB3	2:A:760:GLY:HA3	1.80	0.63
3:B:634:MET:HE2	2:C:606:TRP:HB2	1.81	0.62
1:H:30:THR:HA	1:H:53:PRO:HB2	1.80	0.62
2:C:377:LYS:NZ	2:C:379:GLU:OE2	2.33	0.62
3:D:567:GLY:O	3:D:571:HIS:ND1	2.32	0.62
3:D:125:MET:O	3:D:139:ARG:NH1	2.32	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:83:ILE:HB	3:D:72:ILE:HD11	1.83	0.61
3:B:163:ILE:HD11	3:B:220:ILE:HG13	1.81	0.61
2:C:35:ASN:HB3	2:C:95:ILE:HD13	1.83	0.61
3:D:555:MET:O	3:D:563:TRP:NE1	2.33	0.61
2:A:174:THR:HG22	2:A:230:TYR:HB2	1.83	0.60
3:B:448:ARG:NH2	3:B:480:ALA:O	2.33	0.60
3:B:125:MET:SD	3:B:125:MET:N	2.75	0.60
2:A:324:MET:SD	2:A:324:MET:N	2.75	0.60
2:C:430:VAL:HG21	2:C:457:LYS:HD3	1.84	0.60
3:D:533:PHE:HB2	3:D:785:MET:HE2	1.82	0.60
2:A:737:TYR:OH	2:A:741:ARG:NH1	2.35	0.59
2:A:43:SER:OG	2:A:49:ARG:NH2	2.34	0.59
2:C:536:MET:HE3	2:C:735:LEU:HG	1.83	0.59
2:C:577:GLU:HG3	2:C:600:THR:HG22	1.83	0.59
3:D:462:LEU:HD13	3:D:785:MET:HE1	1.83	0.59
3:B:70:ASN:HB3	3:B:73:GLN:HB2	1.84	0.59
3:B:578:TYR:HH	3:B:604:SER:N	2.00	0.59
2:A:80:LYS:NZ	3:D:80:GLU:OE1	2.35	0.59
2:A:693:ASN:ND2	3:B:781:GLU:OE1	2.36	0.59
3:D:43:ARG:HG2	3:D:62:ALA:HB1	1.85	0.59
3:D:272:ILE:HD12	3:D:350:ASN:HB3	1.85	0.59
2:C:43:SER:OG	2:C:49:ARG:NH2	2.35	0.58
3:D:638:GLY:HA2	3:D:641:MET:HE3	1.85	0.58
2:C:535:VAL:HG22	2:C:729:ILE:HG12	1.84	0.58
3:B:58:ILE:HD12	3:B:59:GLN:H	1.69	0.58
2:A:367:ASN:OD1	2:A:392:ARG:NH2	2.34	0.58
3:D:387:GLU:OE1	3:D:388:LYS:N	2.36	0.58
2:A:536:MET:HE3	2:A:735:LEU:HG	1.85	0.58
2:A:106:GLN:HE22	3:D:115:ARG:HH12	1.51	0.58
2:A:535:VAL:HG22	2:A:729:ILE:HG12	1.84	0.58
2:A:344:ASP:OD1	2:A:346:LYS:NZ	2.36	0.58
2:C:257:VAL:HG22	2:C:258:PRO:HD2	1.85	0.58
3:D:129:SER:OG	3:D:139:ARG:NH2	2.36	0.58
3:D:456:TYR:HA	3:D:460:ILE:HG12	1.85	0.58
2:C:456:CYS:HB3	2:C:461:ILE:HD13	1.86	0.57
2:C:279:VAL:HG12	2:C:363:VAL:HG22	1.85	0.57
3:D:338:VAL:HG22	3:D:346:ARG:HH12	1.70	0.57
2:A:647:ALA:HB3	3:B:655:LEU:HD23	1.86	0.56
3:D:470:MET:HE1	6:D:905:NAG:H82	1.87	0.56
3:B:46:VAL:O	3:B:50:ASN:ND2	2.38	0.56
3:B:153:GLU:OE1	3:B:156:ARG:NH2	2.36	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:394:MET:SD	3:B:394:MET:N	2.79	0.56
2:C:74:MET:SD	2:C:74:MET:N	2.78	0.56
3:D:225:GLU:OE2	3:D:257:ASN:ND2	2.36	0.56
2:C:406:LEU:HD22	2:C:506:VAL:HG11	1.87	0.56
2:C:437:ARG:HB2	2:C:451:ASN:HD21	1.71	0.56
2:A:386:ARG:HG2	2:A:388:ALA:H	1.69	0.56
2:A:650:ALA:HB2	3:D:652:ALA:HB1	1.88	0.56
3:B:80:GLU:OE2	2:C:80:LYS:NZ	2.32	0.56
2:C:516:GLU:OE2	3:D:778:LYS:NZ	2.32	0.56
2:A:713:VAL:HB	2:A:738:LYS:HE3	1.88	0.56
2:A:127:ILE:HG22	2:A:128:HIS:H	1.71	0.55
2:A:131:ALA:O	2:A:146:GLN:NE2	2.39	0.55
2:C:127:ILE:HG22	2:C:128:HIS:H	1.71	0.55
3:D:550:THR:HG21	3:D:658:ASP:HA	1.88	0.55
2:A:279:VAL:HG12	2:A:363:VAL:HG22	1.87	0.55
2:A:507:MET:HB3	2:A:763:ILE:HD11	1.87	0.55
3:D:541:LEU:HB3	3:D:729:PHE:HB3	1.87	0.55
2:A:74:MET:SD	2:A:74:MET:N	2.80	0.55
3:B:634:MET:HG2	2:C:606:TRP:HA	1.89	0.55
3:D:50:ASN:HD21	3:D:60:LEU:HB2	1.71	0.55
3:B:685:LYS:HG3	3:B:686:GLN:H	1.71	0.55
2:C:432:ASN:OD1	2:C:465:LYS:NZ	2.38	0.55
3:D:125:MET:N	3:D:125:MET:SD	2.79	0.55
3:D:331:ALA:HA	3:D:337:ARG:HA	1.89	0.55
2:C:259:SER:HB3	2:C:279:VAL:HG23	1.89	0.54
2:A:119:HIS:HB3	2:A:321:TYR:HE2	1.71	0.54
3:B:118:VAL:HG23	3:B:137:PHE:HA	1.89	0.54
3:D:104:PRO:HG3	3:D:123:THR:HG21	1.90	0.54
2:C:157:VAL:HG21	2:C:361:LEU:HD23	1.88	0.54
2:A:39:MET:HG2	2:A:72:LEU:HB2	1.88	0.54
2:A:193:ASN:HD21	3:D:495:LYS:HG3	1.72	0.54
2:A:421:ASP:OD1	2:A:422:ILE:N	2.40	0.54
2:C:90:MET:HG3	2:C:94:ARG:HH21	1.73	0.54
2:C:416:PHE:HE1	2:C:796:LEU:HD21	1.72	0.54
2:A:326:ARG:H	2:A:326:ARG:HD3	1.73	0.54
2:C:175:THR:HG23	2:C:206:LEU:HB3	1.88	0.54
2:A:508:ALA:HB3	2:A:764:ALA:HB3	1.90	0.54
1:H:99:ASP:OD2	3:D:51:LYS:NZ	2.29	0.54
2:C:438:LYS:HB2	2:C:479:LEU:HD12	1.89	0.54
3:B:283:ASP:OD2	3:B:335:THR:OG1	2.24	0.54
3:D:257:ASN:OD1	3:D:260:ARG:NH2	2.41	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:573:VAL:HG22	2:A:604:ALA:HB3	1.90	0.53
3:D:544:LYS:HD3	3:D:545:GLU:H	1.72	0.53
3:B:170:ASP:OD1	3:B:171:HIS:N	2.42	0.53
2:C:776:ASP:OD1	2:C:777:LEU:N	2.42	0.53
2:A:531:THR:OG1	2:A:731:ASP:OD1	2.26	0.53
3:B:272:ILE:HD12	3:B:350:ASN:HB3	1.91	0.53
3:D:259:LEU:O	3:D:359:ARG:NH2	2.41	0.53
3:D:520:ASN:OD1	3:D:523:ARG:NH1	2.38	0.53
3:D:544:LYS:HB3	3:D:546:ILE:HG13	1.91	0.53
2:A:196:VAL:HA	2:A:427:GLU:HG3	1.91	0.53
2:A:298:ILE:HD11	2:A:348:LEU:HB2	1.90	0.53
3:B:718:ILE:HD13	3:B:739:GLU:HG3	1.90	0.53
3:B:415:LEU:HD21	3:B:421:LYS:HE2	1.91	0.53
2:A:157:VAL:HG21	2:A:361:LEU:HD23	1.89	0.53
2:C:436:CYS:O	2:C:454:LYS:N	2.41	0.53
3:D:396:THR:O	3:D:473:THR:OG1	2.22	0.52
3:B:528:GLU:HG2	3:B:769:LYS:HD2	1.91	0.52
3:D:36:ARG:NH2	3:D:39:GLU:OE1	2.38	0.52
3:B:646:SER:O	3:B:650:ASN:ND2	2.32	0.52
3:B:745:ASP:OD1	3:B:745:ASP:N	2.42	0.52
2:A:429:CYS:HB3	2:A:433:THR:HG21	1.92	0.52
2:A:634:TRP:HD1	3:B:824:ILE:HG12	1.74	0.52
1:H:39:GLN:OE1	4:G:38:GLN:NE2	2.33	0.52
3:B:131:LYS:NZ	3:B:343:ASP:O	2.39	0.52
2:C:364:ILE:HD12	2:C:372:TRP:HB3	1.91	0.52
2:A:133:MET:SD	2:A:133:MET:N	2.83	0.52
2:A:606:TRP:HZ2	3:D:630:ARG:HA	1.75	0.52
3:B:731:TRP:CG	3:B:732:ASP:H	2.28	0.52
3:B:363:GLN:OE1	3:B:375:ASN:ND2	2.43	0.52
2:A:406:LEU:HD22	2:A:506:VAL:HG11	1.92	0.52
3:B:702:MET:O	3:B:705:HIS:ND1	2.43	0.52
3:D:170:ASP:OD1	3:D:171:HIS:N	2.43	0.52
2:C:526:VAL:HG11	2:C:780:LEU:HD21	1.93	0.51
3:D:610:SER:OG	3:D:636:TRP:NE1	2.38	0.51
3:B:337:ARG:NH2	3:B:339:GLU:OE1	2.39	0.51
3:B:541:LEU:HD11	3:B:746:LEU:HB3	1.91	0.51
2:C:540:SER:OG	2:C:661:GLN:NE2	2.44	0.51
3:B:33:LEU:HD13	3:B:38:HIS:HB3	1.93	0.51
1:E:12:ARG:NH1	1:E:17:SER:O	2.43	0.51
2:C:360:ARG:HA	2:C:379:GLU:HB3	1.90	0.51
1:H:12:ARG:NH1	1:H:17:SER:O	2.43	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:351:TYR:HB2	3:B:367:TYR:HB3	1.91	0.51
2:A:533:ILE:HB	2:A:756:PHE:HB3	1.93	0.51
2:A:688:GLY:O	2:A:692:ARG:NH2	2.43	0.51
2:C:672:ARG:NE	2:C:675:ASP:OD2	2.36	0.51
3:D:42:PHE:CG	3:D:281:ILE:HG21	2.46	0.51
3:D:249:VAL:HG11	3:D:254:ILE:HG23	1.93	0.51
3:D:544:LYS:HG2	3:D:747:VAL:HB	1.92	0.51
3:B:115:ARG:NH1	2:C:106:GLN:OE1	2.38	0.51
3:D:351:TYR:HB2	3:D:367:TYR:HB3	1.93	0.51
3:B:752:LEU:HD22	3:B:755:ARG:HG2	1.93	0.50
2:C:180:TYR:HD2	2:C:230:TYR:HB3	1.76	0.50
2:C:281:TYR:HE1	2:C:360:ARG:HD2	1.76	0.50
3:B:495:LYS:HG3	2:C:193:ASN:HD21	1.76	0.50
2:C:531:THR:OG1	2:C:731:ASP:OD1	2.29	0.50
2:A:560:MET:SD	2:A:560:MET:N	2.83	0.50
2:A:765:LEU:HD21	2:A:775:ILE:HD12	1.93	0.50
3:B:88:TYR:HB3	3:B:321:PHE:HE2	1.74	0.50
3:B:155:MET:HA	3:B:160:TRP:HD1	1.76	0.50
3:B:634:MET:HB3	2:C:609:TRP:CD1	2.47	0.50
2:C:611:LEU:HD11	2:C:634:TRP:HE3	1.77	0.50
3:D:165:LEU:HD22	3:D:180:LEU:HD23	1.93	0.50
2:C:35:ASN:HB2	2:C:95:ILE:HA	1.93	0.50
3:B:767:PRO:O	3:B:770:GLN:NE2	2.44	0.50
3:D:218:VAL:HG13	3:D:246:VAL:HB	1.94	0.50
3:D:220:ILE:HG12	3:D:248:LEU:HB2	1.94	0.50
3:D:448:ARG:NH2	3:D:480:ALA:O	2.43	0.50
3:B:639:PHE:CE1	2:C:820:VAL:HG22	2.47	0.50
2:C:102:ASP:HB3	2:C:130:GLY:H	1.77	0.49
2:C:600:THR:OG1	2:C:601:ILE:N	2.45	0.49
3:D:809:THR:OG1	3:D:810:PHE:N	2.44	0.49
2:A:715:ASP:OD1	2:A:715:ASP:N	2.34	0.49
3:B:522:GLU:OE1	3:B:695:ARG:NH2	2.40	0.49
2:A:191:VAL:HG23	2:A:198:TRP:HE3	1.78	0.49
2:C:207:ASP:OD1	2:C:214:LYS:NZ	2.40	0.49
1:H:91:THR:HG23	1:H:118:THR:HA	1.94	0.49
2:A:360:ARG:HA	2:A:379:GLU:HB2	1.94	0.49
3:B:193:LYS:HE2	3:B:195:LEU:HD11	1.94	0.49
3:B:165:LEU:HD22	3:B:180:LEU:HD23	1.95	0.49
3:B:415:LEU:HD13	3:B:420:CYS:HA	1.94	0.49
2:C:174:THR:HG22	2:C:230:TYR:HB2	1.95	0.49
2:C:703:GLN:O	2:C:706:THR:OG1	2.31	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:526:VAL:HG11	2:A:780:LEU:HD21	1.95	0.49
2:C:248:LEU:O	2:C:255:TRP:NE1	2.39	0.49
3:B:766:SER:O	3:B:769:LYS:NZ	2.41	0.48
2:C:180:TYR:CD2	2:C:230:TYR:HB3	2.48	0.48
3:B:396:THR:O	3:B:473:THR:OG1	2.28	0.48
3:B:578:TYR:HB3	3:B:582:ARG:HH12	1.78	0.48
2:A:224:SER:OG	2:A:225:SER:N	2.47	0.48
3:B:286:GLY:O	3:B:290:GLN:NE2	2.46	0.48
1:E:47:TRP:HZ2	1:E:50:TRP:HD1	1.62	0.48
2:A:601:ILE:HD13	2:A:601:ILE:H	1.77	0.48
2:C:423:ASP:OD2	2:C:426:THR:OG1	2.28	0.48
3:B:654:PHE:HA	2:C:809:SER:HA	1.95	0.48
2:C:49:ARG:HA	2:C:52:ARG:HG2	1.95	0.48
3:D:95:PRO:HG3	3:D:102:PHE:HB3	1.95	0.48
4:G:6:GLN:HG3	4:G:98:PRO:HD2	1.96	0.48
3:B:541:LEU:HB2	3:B:736:LEU:HG	1.95	0.48
3:D:92:VAL:HG21	3:D:104:PRO:HB3	1.96	0.48
2:C:365:VAL:HG23	2:C:375:VAL:HG21	1.96	0.48
2:A:636:PHE:HB2	3:B:615:LEU:HD22	1.96	0.47
3:B:225:GLU:OE2	3:B:257:ASN:ND2	2.40	0.47
3:B:630:ARG:O	3:B:634:MET:HG3	2.13	0.47
2:C:35:ASN:ND2	2:C:68:ASN:OD1	2.46	0.47
3:D:153:GLU:OE1	3:D:156:ARG:NH1	2.33	0.47
3:B:47:ASN:O	3:B:51:LYS:HB2	2.14	0.47
3:B:559:GLN:OE1	2:C:811:GLN:NE2	2.47	0.47
3:B:790:LYS:HG2	3:B:794:ARG:HD2	1.95	0.47
1:E:91:THR:HG23	1:E:118:THR:HA	1.95	0.47
3:B:460:ILE:HG13	3:B:461:ASP:N	2.29	0.47
3:B:569:SER:HA	3:B:572:VAL:HG22	1.97	0.47
3:B:654:PHE:O	3:B:659:ARG:NH2	2.47	0.47
2:C:398:ASP:N	2:C:398:ASP:OD1	2.48	0.47
4:F:36:TYR:HE1	4:F:89:GLN:HB3	1.78	0.47
2:A:229:LEU:HB3	2:A:257:VAL:HG12	1.96	0.47
3:B:400:ILE:O	3:B:477:HIS:N	2.45	0.47
3:D:731:TRP:CG	3:D:732:ASP:H	2.32	0.47
2:A:45:ASP:HB3	2:A:48:GLU:HG2	1.96	0.47
3:B:220:ILE:HG12	3:B:248:LEU:HB2	1.96	0.47
3:B:337:ARG:NH2	3:B:348:PHE:HB2	2.30	0.47
2:C:39:MET:HE3	2:C:72:LEU:HD22	1.97	0.47
2:A:407:SER:HB2	2:A:478:TYR:HE1	1.79	0.47
1:H:47:TRP:HZ2	1:H:50:TRP:HD1	1.63	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:697:VAL:HG11	2:C:431:ARG:HB2	1.97	0.46
2:C:52:ARG:HA	2:C:55:TRP:CE2	2.50	0.46
2:C:191:VAL:HG23	2:C:198:TRP:HE3	1.80	0.46
3:D:486:THR:HG23	3:D:691:ILE:HD11	1.97	0.46
2:C:408:ILE:O	2:C:478:TYR:N	2.37	0.46
3:B:523:ARG:HB3	3:B:529:PHE:CE1	2.50	0.46
2:C:274:SER:HA	2:C:366:LEU:HD22	1.97	0.46
2:A:415:PRO:HG3	2:A:737:TYR:CG	2.50	0.46
3:B:337:ARG:HH22	3:B:348:PHE:HB2	1.78	0.46
3:B:786:GLU:OE1	3:B:786:GLU:N	2.42	0.46
2:C:560:MET:HE3	3:D:813:MET:HB3	1.97	0.46
2:A:191:VAL:HG11	2:A:200:MET:HG3	1.97	0.46
2:C:627:SER:O	2:C:630:MET:HG3	2.16	0.46
2:C:667:ASP:OD1	2:C:668:LYS:N	2.49	0.46
3:D:140:THR:HB	3:D:346:ARG:HH21	1.80	0.46
3:D:812:ASN:ND2	3:D:813:MET:SD	2.79	0.46
1:E:11:VAL:HG22	1:E:118:THR:HB	1.97	0.46
2:C:177:PHE:HB3	2:C:180:TYR:CD1	2.51	0.46
3:D:672:LEU:O	3:D:681:TYR:OH	2.30	0.46
3:B:92:VAL:HG21	3:B:104:PRO:HB3	1.97	0.45
2:C:191:VAL:HG11	2:C:200:MET:HG3	1.97	0.45
3:D:198:ASP:HB2	3:D:201:THR:HB	1.96	0.45
3:D:381:TRP:HB2	3:D:385:GLU:HG3	1.98	0.45
3:B:467:ALA:HA	3:B:472:PHE:HB2	1.99	0.45
3:B:58:ILE:HB	3:B:60:LEU:HD22	1.98	0.45
2:C:408:ILE:N	2:C:476:ASP:O	2.43	0.45
2:A:331:MET:SD	2:A:331:MET:N	2.84	0.45
3:B:168:SER:OG	3:B:227:ASP:OD2	2.33	0.45
3:B:639:PHE:HE1	2:C:820:VAL:HG22	1.82	0.45
2:C:360:ARG:H	2:C:360:ARG:NH1	2.14	0.45
2:C:408:ILE:HB	2:C:477:LEU:HA	1.97	0.45
2:C:561:MET:HA	2:C:564:MET:HE2	1.99	0.45
3:D:38:HIS:HA	3:D:41:MET:HG2	1.99	0.45
3:D:78:VAL:HA	3:D:82:LEU:HD13	1.98	0.45
3:D:131:LYS:NZ	3:D:137:PHE:O	2.33	0.45
2:C:244:ARG:NH1	2:C:397:SER:O	2.49	0.45
2:A:175:THR:HG23	2:A:206:LEU:HB3	1.99	0.45
2:A:302:ALA:HB1	2:A:334:LEU:HD11	1.98	0.45
3:B:239:ASN:O	3:B:239:ASN:ND2	2.45	0.45
2:C:512:LEU:HD23	2:C:512:LEU:H	1.82	0.45
2:C:698:TYR:HB3	2:C:701:MET:HB3	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:820:VAL:O	2:C:823:MET:HG3	2.16	0.45
3:D:42:PHE:CE2	3:D:281:ILE:HG13	2.52	0.45
2:A:243:ALA:HB1	2:A:248:LEU:HB2	1.99	0.45
3:D:153:GLU:HG3	3:D:367:TYR:HE1	1.81	0.45
3:D:523:ARG:NH1	3:D:688:SER:OG	2.49	0.45
2:A:611:LEU:HD22	2:A:631:VAL:HB	1.99	0.45
2:C:168:HIS:O	2:C:199:ASP:N	2.35	0.45
2:A:63:LEU:HD11	2:A:300:THR:HB	1.99	0.44
3:B:407:PRO:HG3	3:B:735:VAL:HG13	1.99	0.44
3:D:830:LEU:HD12	3:D:833:ILE:HD11	1.99	0.44
2:A:260:LEU:HD23	2:A:260:LEU:H	1.81	0.44
3:B:58:ILE:H	3:B:58:ILE:HG13	1.50	0.44
3:D:438:GLY:HA3	3:D:478:LEU:HB2	1.99	0.44
2:A:39:MET:HE3	2:A:100:PHE:HD1	1.82	0.44
2:C:359:PRO:HD2	2:C:378:TRP:HZ3	1.81	0.44
3:D:485:GLY:HA3	3:D:502:MET:HG2	1.98	0.44
2:A:177:PHE:HB3	2:A:180:TYR:CD2	2.52	0.44
2:A:496:MET:HE3	2:A:512:LEU:HD13	1.99	0.44
3:B:95:PRO:HG3	3:B:102:PHE:HB3	1.99	0.44
2:C:500:VAL:O	2:C:766:GLN:NE2	2.49	0.44
3:D:572:VAL:HA	3:D:575:VAL:HG22	2.00	0.44
3:D:830:LEU:O	3:D:833:ILE:HG13	2.18	0.44
2:C:38:VAL:HA	2:C:99:VAL:HB	1.99	0.44
2:C:188:LYS:NZ	2:C:192:ASP:OD2	2.49	0.44
3:D:241:THR:HG21	3:D:263:PRO:HG3	2.00	0.44
3:B:721:VAL:HG22	3:B:726:LEU:HB2	1.99	0.43
1:H:33:TYR:CE2	1:H:101:THR:HA	2.53	0.43
3:B:153:GLU:HG3	3:B:367:TYR:HE1	1.83	0.43
3:B:563:TRP:HA	3:B:566:VAL:HG22	2.01	0.43
3:D:686:GLN:CD	3:D:686:GLN:H	2.25	0.43
2:A:274:SER:HA	2:A:366:LEU:HD22	1.99	0.43
2:A:651:ALA:HB2	3:B:656:VAL:HG12	1.99	0.43
3:B:34:SER:HB2	3:B:96:PRO:HB3	1.99	0.43
3:B:635:VAL:HG11	2:C:827:ALA:HB2	1.99	0.43
2:C:719:SER:HB2	2:C:724:LYS:HB2	1.99	0.43
2:A:190:THR:HG23	3:D:494:ASN:HD21	1.84	0.43
2:A:632:SER:HB3	3:B:615:LEU:HB2	2.00	0.43
3:B:390:ARG:O	3:B:393:GLN:NE2	2.37	0.43
3:D:33:LEU:HD13	3:D:42:PHE:HD2	1.84	0.43
3:D:91:LEU:HB3	3:D:121:LEU:HD21	2.00	0.43
2:A:780:LEU:HA	2:A:783:VAL:HG12	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:447:PRO:HB2	3:D:449:HIS:HE1	1.83	0.43
3:B:505:LEU:HD23	3:B:527:ILE:HG12	2.00	0.43
3:B:551:LEU:HD21	3:B:655:LEU:HD13	2.00	0.43
1:E:51:ILE:HD13	1:E:58:THR:HG22	2.00	0.43
3:B:268:GLY:N	3:B:354:MET:O	2.51	0.43
2:C:270:LYS:NZ	2:C:271:GLU:OE2	2.49	0.43
2:C:421:ASP:OD1	2:C:454:LYS:NZ	2.50	0.43
2:C:422:ILE:HG13	2:C:454:LYS:HA	2.01	0.43
1:H:39:GLN:HB2	1:H:45:LEU:HD23	2.00	0.43
3:D:59:GLN:HE21	3:D:293:HIS:CE1	2.37	0.43
3:D:193:LYS:HE2	3:D:195:LEU:HD21	2.01	0.43
3:B:719:GLN:NE2	3:B:722:ARG:HH21	2.17	0.43
3:D:50:ASN:ND2	3:D:60:LEU:HB2	2.34	0.43
3:B:221:LEU:HD22	3:B:253:GLU:HG2	2.01	0.43
2:C:429:CYS:HB3	2:C:433:THR:HG21	2.01	0.43
3:D:467:ALA:HA	3:D:472:PHE:HB2	2.01	0.43
3:D:520:ASN:HD21	3:D:523:ARG:HG3	1.84	0.43
2:A:76:ARG:HG3	3:D:310:GLY:HA2	2.01	0.42
2:A:427:GLU:O	2:A:428:THR:OG1	2.30	0.42
3:B:565:LEU:HD22	2:C:817:MET:HE3	2.00	0.42
2:C:252:ASP:OD1	2:C:252:ASP:N	2.51	0.42
2:C:326:ARG:H	2:C:326:ARG:HD3	1.83	0.42
2:C:408:ILE:HD11	2:C:475:TYR:HD1	1.84	0.42
2:A:433:THR:HG1	2:A:456:CYS:C	2.25	0.42
2:C:386:ARG:HG2	2:C:388:ALA:H	1.85	0.42
2:A:136:ALA:HA	3:D:133:ILE:HG12	2.01	0.42
2:A:557:VAL:HG12	2:A:559:VAL:HG22	2.02	0.42
3:B:295:LEU:HG	3:B:301:ILE:HG21	2.01	0.42
3:B:337:ARG:O	3:B:346:ARG:NH2	2.52	0.42
2:A:178:PRO:HB3	3:D:131:LYS:HB2	2.02	0.42
3:B:249:VAL:HG11	3:B:254:ILE:HG23	2.02	0.42
3:B:509:GLN:HE21	3:B:509:GLN:HB3	1.64	0.42
2:A:155:ALA:HA	2:A:158:MET:HE2	2.01	0.42
3:B:546:ILE:HG23	3:B:548:ARG:HH11	1.84	0.42
2:C:294:ASP:O	2:C:298:ILE:HG12	2.19	0.42
2:A:173:VAL:HA	2:A:204:ILE:HB	2.02	0.42
3:B:369:GLY:O	3:B:370:THR:OG1	2.29	0.42
2:C:684:THR:HG22	2:C:705:MET:HG2	2.02	0.42
3:D:39:GLU:O	3:D:43:ARG:HG3	2.20	0.42
1:H:51:ILE:HD13	1:H:58:THR:HG22	2.02	0.42
3:B:814:ALA:HA	3:B:817:PHE:HD2	1.85	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:691:GLU:HA	2:C:694:ILE:HG12	2.02	0.42
1:H:11:VAL:HG22	1:H:118:THR:HB	2.01	0.42
2:A:473:PHE:HD1	2:A:473:PHE:HA	1.64	0.42
3:B:540:ILE:HD12	3:B:730:ILE:HG12	2.02	0.42
2:C:457:LYS:C	2:C:461:ILE:HD12	2.45	0.42
3:D:249:VAL:HG13	3:D:253:GLU:HB2	2.02	0.42
3:D:364:VAL:HG21	3:D:379:ILE:HG12	2.02	0.42
3:D:393:GLN:HE21	3:D:393:GLN:HB2	1.71	0.42
3:B:115:ARG:HD3	3:B:314:ILE:HG23	2.02	0.41
3:B:447:PRO:O	3:B:449:HIS:ND1	2.47	0.41
3:B:532:PRO:HG2	3:B:535:TYR:CZ	2.55	0.41
3:B:681:TYR:O	3:B:705:HIS:NE2	2.53	0.41
3:B:649:ALA:HB3	2:C:649:LEU:HD23	2.03	0.41
3:D:56:TRP:CZ2	4:G:2:ILE:HD13	2.55	0.41
2:A:90:MET:O	2:A:94:ARG:NH2	2.53	0.41
2:A:252:ASP:OD1	2:A:252:ASP:N	2.53	0.41
3:B:790:LYS:HA	3:B:794:ARG:HB2	2.02	0.41
2:C:417:VAL:HG12	2:C:419:VAL:HG12	2.02	0.41
2:C:665:LEU:HD12	2:C:756:PHE:HB2	2.02	0.41
2:A:550:LEU:HD21	2:A:822:TYR:HE2	1.85	0.41
2:C:244:ARG:HG3	2:C:397:SER:HB2	2.02	0.41
3:D:613:VAL:HG11	3:D:636:TRP:HD1	1.85	0.41
1:E:32:TYR:HD2	1:E:100:ALA:HA	1.85	0.41
4:G:92:LYS:HB2	4:G:92:LYS:HE2	1.82	0.41
2:A:630:MET:HE3	3:B:824:ILE:HA	2.03	0.41
2:C:380:ASN:O	2:C:380:ASN:ND2	2.53	0.41
3:D:33:LEU:HB2	3:D:39:GLU:HG2	2.01	0.41
3:D:632:LEU:HA	3:D:636:TRP:CE3	2.55	0.41
3:B:29:ILE:HD12	3:B:89:ALA:HB3	2.02	0.41
3:B:434:VAL:HG11	3:B:474:TYR:HE2	1.86	0.41
3:D:155:MET:HA	3:D:160:TRP:HD1	1.86	0.41
3:D:541:LEU:HB2	3:D:736:LEU:HG	2.02	0.41
2:A:102:ASP:HB3	2:A:130:GLY:H	1.85	0.41
2:A:605:ILE:HD12	3:D:634:MET:HE2	2.02	0.41
3:D:447:PRO:O	3:D:449:HIS:ND1	2.44	0.41
3:D:638:GLY:O	3:D:641:MET:HG2	2.20	0.41
1:E:39:GLN:HB2	1:E:45:LEU:HD23	2.02	0.41
3:B:346:ARG:NH1	3:B:347:LYS:O	2.54	0.41
3:B:414:THR:HG23	3:B:453:GLN:HA	2.02	0.41
2:C:57:PRO:HB3	2:C:300:THR:HG21	2.02	0.41
2:C:415:PRO:HD2	2:C:734:VAL:HG22	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:699:LEU:HB3	3:D:702:MET:HB2	2.02	0.41
2:A:151:ILE:HA	2:A:154:GLN:HB2	2.03	0.41
2:A:240:LEU:HD13	2:A:240:LEU:HA	1.87	0.41
2:A:415:PRO:HG3	2:A:737:TYR:CD2	2.56	0.41
2:A:474:THR:HG22	2:A:475:TYR:H	1.86	0.41
3:B:731:TRP:CG	3:B:732:ASP:N	2.89	0.41
2:C:229:LEU:HD21	2:C:255:TRP:HZ3	1.85	0.41
2:C:811:GLN:HE21	2:C:811:GLN:HB3	1.61	0.41
3:D:93:SER:HA	3:D:121:LEU:HB2	2.02	0.41
3:D:400:ILE:O	3:D:477:HIS:N	2.43	0.41
3:D:632:LEU:O	3:D:636:TRP:HB2	2.21	0.41
3:D:685:LYS:HD2	3:D:685:LYS:HA	1.80	0.41
2:A:282:ASP:OD1	2:A:283:ASP:N	2.46	0.41
3:B:127:ILE:HG22	3:B:171:HIS:ND1	2.36	0.41
3:B:502:MET:HE2	3:B:523:ARG:HG3	2.03	0.41
3:D:253:GLU:OE1	3:D:253:GLU:N	2.53	0.41
2:A:35:ASN:ND2	2:A:68:ASN:OD1	2.35	0.40
3:B:28:ASN:HA	3:B:61:ASN:HB3	2.03	0.40
2:C:416:PHE:O	2:C:458:GLY:HA3	2.20	0.40
2:A:45:ASP:OD2	2:A:47:THR:OG1	2.24	0.40
3:D:544:LYS:HD3	3:D:545:GLU:N	2.35	0.40
2:A:408:ILE:HG21	2:A:464:LEU:HD11	2.03	0.40
3:B:421:LYS:O	3:B:433:LYS:NZ	2.38	0.40
3:B:662:GLU:HB2	3:B:671:ARG:HH12	1.86	0.40
2:C:605:ILE:HG22	2:C:609:TRP:CD1	2.56	0.40
3:D:569:SER:HA	3:D:572:VAL:HG22	2.03	0.40
1:E:109:ASP:OD1	1:E:110:TYR:N	2.54	0.40
3:B:38:HIS:HA	3:B:41:MET:HG2	2.04	0.40
3:D:810:PHE:CE2	3:D:812:ASN:HB3	2.57	0.40
1:E:33:TYR:CE2	1:E:101:THR:HA	2.57	0.40
2:A:719:SER:HB2	2:A:724:LYS:HB3	2.03	0.40
3:B:71:ALA:HB3	2:C:321:TYR:HE2	1.86	0.40
3:B:290:GLN:O	3:B:294:GLU:HG2	2.21	0.40
3:B:341:ASN:OD1	3:B:341:ASN:N	2.54	0.40
3:B:447:PRO:HB2	3:B:449:HIS:HE1	1.86	0.40
2:C:115:PHE:O	2:C:118:SER:OG	2.30	0.40
2:C:547:SER:HB2	2:C:550:LEU:HD12	2.04	0.40
3:D:520:ASN:ND2	3:D:523:ARG:H	2.20	0.40
3:D:813:MET:SD	3:D:813:MET:N	2.95	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	E	120/253 (47%)	119 (99%)	1 (1%)	0	100	100
1	H	120/253 (47%)	119 (99%)	1 (1%)	0	100	100
2	A	751/841 (89%)	724 (96%)	27 (4%)	0	100	100
2	C	748/841 (89%)	721 (96%)	27 (4%)	0	100	100
3	B	770/847 (91%)	746 (97%)	23 (3%)	1 (0%)	48	79
3	D	772/847 (91%)	742 (96%)	30 (4%)	0	100	100
4	F	104/234 (44%)	102 (98%)	2 (2%)	0	100	100
4	G	104/234 (44%)	100 (96%)	4 (4%)	0	100	100
All	All	3489/4350 (80%)	3373 (97%)	115 (3%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	B	370	THR

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	E	98/212 (46%)	98 (100%)	0	100	100
1	H	98/212 (46%)	98 (100%)	0	100	100
2	A	669/729 (92%)	633 (95%)	36 (5%)	20	45
2	C	663/729 (91%)	646 (97%)	17 (3%)	40	60

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	B	671/730 (92%)	647 (96%)	24 (4%)	31	53
3	D	672/730 (92%)	642 (96%)	30 (4%)	24	48
4	F	92/205 (45%)	90 (98%)	2 (2%)	45	63
4	G	92/205 (45%)	91 (99%)	1 (1%)	65	73
All	All	3055/3752 (81%)	2945 (96%)	110 (4%)	32	53

All (110) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	A	42	HIS
2	A	74	MET
2	A	203	VAL
2	A	205	THR
2	A	214	LYS
2	A	240	LEU
2	A	324	MET
2	A	331	MET
2	A	360	ARG
2	A	362	VAL
2	A	389	VAL
2	A	394	LYS
2	A	409	VAL
2	A	417	VAL
2	A	419	VAL
2	A	422	ILE
2	A	436	CYS
2	A	464	LEU
2	A	473	PHE
2	A	474	THR
2	A	509	VAL
2	A	517	GLU
2	A	544	VAL
2	A	557	VAL
2	A	560	MET
2	A	601	ILE
2	A	608	LEU
2	A	619	VAL
2	A	636	PHE
2	A	641	PHE
2	A	687	ASN
2	A	701	MET

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Mol	Chain	Res	Type
2	A	715	ASP
2	A	720	LEU
2	A	773	ARG
2	A	792	GLU
3	B	57	LYS
3	B	58	ILE
3	B	60	LEU
3	B	72	ILE
3	B	79	CYS
3	B	118	VAL
3	B	127	ILE
3	B	131	LYS
3	B	141	VAL
3	B	167	VAL
3	B	239	ASN
3	B	312	THR
3	B	320	LEU
3	B	337	ARG
3	B	400	ILE
3	B	460	ILE
3	B	462	LEU
3	B	468	ARG
3	B	514	VAL
3	B	663	ARG
3	B	684	VAL
3	B	697	VAL
3	B	704	ARG
3	B	817	PHE
2	C	74	MET
2	C	134	ILE
2	C	138	LYS
2	C	181	ARG
2	C	257	VAL
2	C	360	ARG
2	C	377	LYS
2	C	389	VAL
2	C	409	VAL
2	C	422	ILE
2	C	456	CYS
2	C	480	VAL
2	C	509	VAL
2	C	557	VAL

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Mol	Chain	Res	Type
2	C	677	SER
2	C	763	ILE
2	C	811	GLN
3	D	48	GLN
3	D	52	ARG
3	D	57	LYS
3	D	59	GLN
3	D	72	ILE
3	D	79	CYS
3	D	141	VAL
3	D	164	ILE
3	D	254	ILE
3	D	295	LEU
3	D	301	ILE
3	D	308	CYS
3	D	312	THR
3	D	317	THR
3	D	329	LYS
3	D	387	GLU
3	D	393	GLN
3	D	420	CYS
3	D	460	ILE
3	D	476	VAL
3	D	514	VAL
3	D	544	LYS
3	D	548	ARG
3	D	614	LEU
3	D	657	LEU
3	D	684	VAL
3	D	686	GLN
3	D	703	TYR
3	D	704	ARG
3	D	785	MET
4	F	89	GLN
4	F	92	LYS
4	G	89	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (57) such sidechains are listed below:

Mol	Chain	Res	Type
2	A	146	GLN
2	A	153	GLN

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Mol	Chain	Res	Type
2	A	218	GLN
2	A	340	ASN
2	A	380	ASN
2	A	503	GLN
2	A	614	ASN
2	A	671	GLN
2	A	710	GLN
2	A	766	GLN
3	B	38	HIS
3	B	48	GLN
3	B	50	ASN
3	B	73	GLN
3	B	101	HIS
3	B	161	ASN
3	B	177	GLN
3	B	196	GLN
3	B	270	GLN
3	B	290	GLN
3	B	311	ASN
3	B	355	ASN
3	B	371	HIS
3	B	477	HIS
3	B	509	GLN
3	B	525	GLN
3	B	616	ASN
3	B	719	GLN
3	B	812	ASN
2	C	35	ASN
2	C	59	GLN
2	C	152	GLN
2	C	153	GLN
2	C	154	GLN
2	C	168	HIS
2	C	218	GLN
2	C	451	ASN
2	C	485	HIS
2	C	661	GLN
2	C	710	GLN
2	C	766	GLN
2	C	811	GLN
2	C	816	ASN
3	D	38	HIS

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Mol	Chain	Res	Type
3	D	50	ASN
3	D	270	GLN
3	D	293	HIS
3	D	393	GLN
3	D	471	ASN
3	D	487	GLN
3	D	494	ASN
3	D	525	GLN
3	D	710	ASN
4	F	42	GLN
4	F	55	GLN
4	F	89	GLN
4	G	42	GLN

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 ⓘ

2 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
5	NAG	I	1	3,5	14,14,15	0.30	0	17,19,21	0.50	0
5	NAG	I	2	5	14,14,15	0.22	0	17,19,21	0.43	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the

Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	I	1	3,5	-	0/6/23/26	0/1/1/1
5	NAG	I	2	5	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

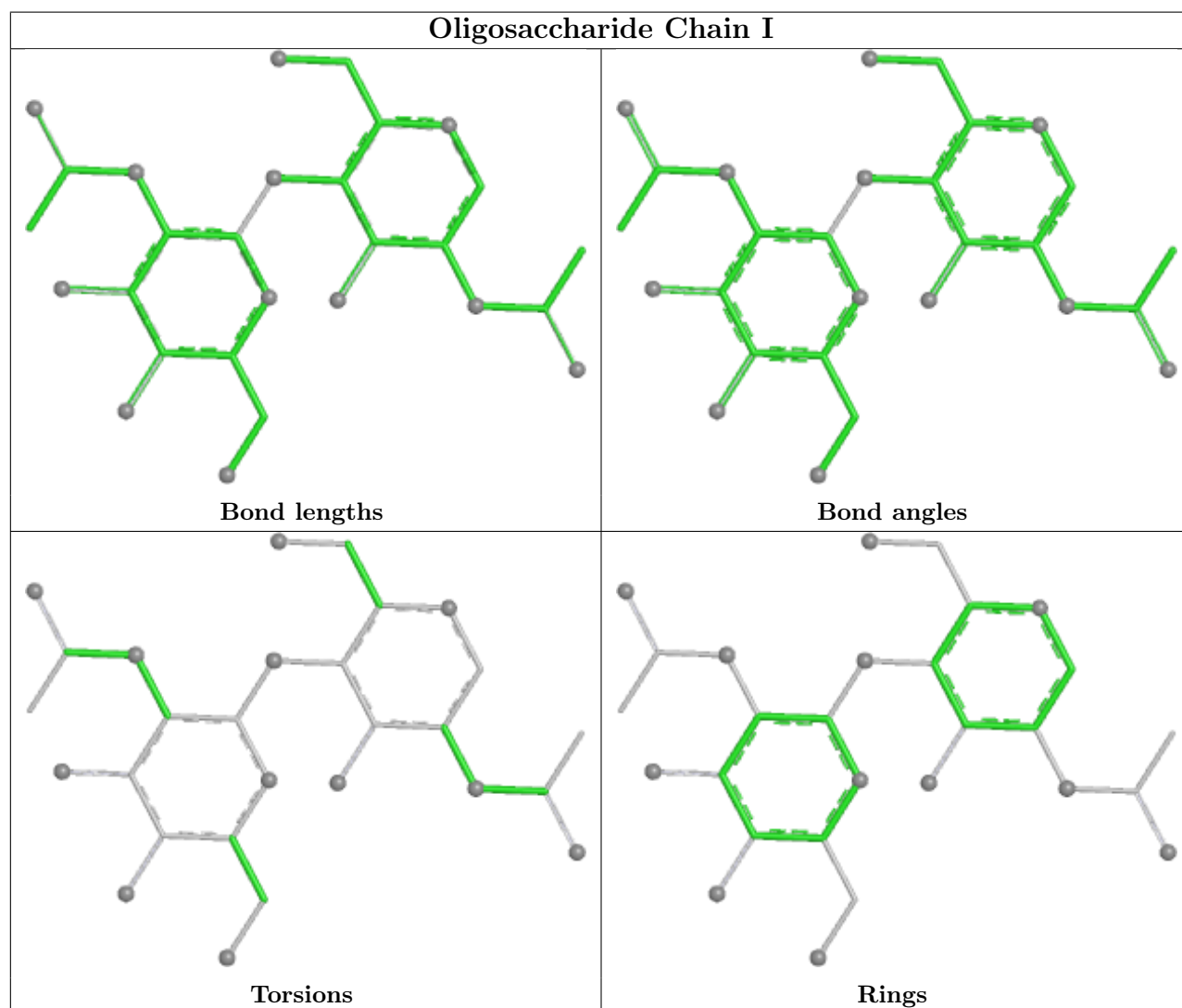
There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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



5.6 Ligand geometry

11 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	$\# Z > 2$
6	NAG	A	901	2	14,14,15	0.29	0	17,19,21	0.37	0
6	NAG	D	904	3	14,14,15	0.25	0	17,19,21	0.44	0
6	NAG	B	903	3	14,14,15	0.21	0	17,19,21	0.45	0
6	NAG	D	901	3	14,14,15	0.24	0	17,19,21	0.42	0
6	NAG	D	902	3	14,14,15	0.23	0	17,19,21	0.43	0
6	NAG	D	905	3	14,14,15	0.24	0	17,19,21	0.43	0
6	NAG	B	901	3	14,14,15	0.23	0	17,19,21	0.43	0
6	NAG	C	901	2	14,14,15	0.22	0	17,19,21	0.43	0
6	NAG	B	902	3	14,14,15	0.23	0	17,19,21	0.42	0
6	NAG	D	903	3	14,14,15	0.23	0	17,19,21	0.44	0
6	NAG	B	904	3	14,14,15	0.23	0	17,19,21	0.44	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
6	NAG	A	901	2	-	1/6/23/26	0/1/1/1
6	NAG	D	904	3	-	2/6/23/26	0/1/1/1
6	NAG	B	903	3	-	2/6/23/26	0/1/1/1
6	NAG	D	901	3	-	2/6/23/26	0/1/1/1
6	NAG	D	902	3	-	2/6/23/26	0/1/1/1
6	NAG	D	905	3	-	1/6/23/26	0/1/1/1
6	NAG	B	901	3	-	1/6/23/26	0/1/1/1
6	NAG	C	901	2	-	2/6/23/26	0/1/1/1
6	NAG	B	902	3	-	2/6/23/26	0/1/1/1
6	NAG	D	903	3	-	2/6/23/26	0/1/1/1
6	NAG	B	904	3	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (19) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	D	904	NAG	O5-C5-C6-O6
6	D	901	NAG	O5-C5-C6-O6
6	D	902	NAG	O5-C5-C6-O6
6	D	901	NAG	C4-C5-C6-O6
6	D	902	NAG	C4-C5-C6-O6
6	D	904	NAG	C4-C5-C6-O6
6	B	902	NAG	O5-C5-C6-O6
6	B	903	NAG	O5-C5-C6-O6
6	B	902	NAG	C4-C5-C6-O6
6	B	904	NAG	C4-C5-C6-O6
6	D	903	NAG	O5-C5-C6-O6
6	B	903	NAG	C4-C5-C6-O6
6	D	903	NAG	C4-C5-C6-O6
6	B	904	NAG	O5-C5-C6-O6
6	B	901	NAG	O5-C5-C6-O6
6	C	901	NAG	C4-C5-C6-O6
6	D	905	NAG	C4-C5-C6-O6
6	A	901	NAG	O5-C5-C6-O6
6	C	901	NAG	O5-C5-C6-O6

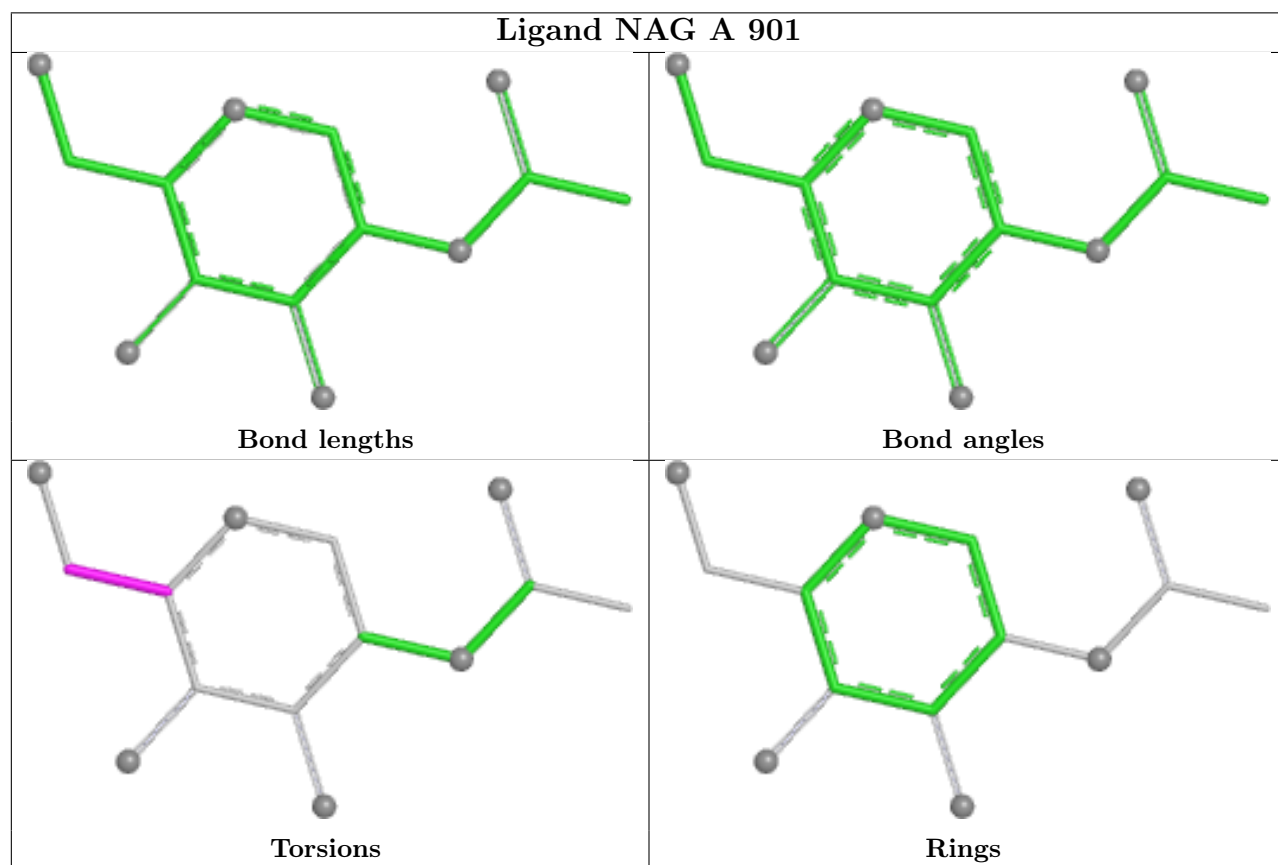
There are no ring outliers.

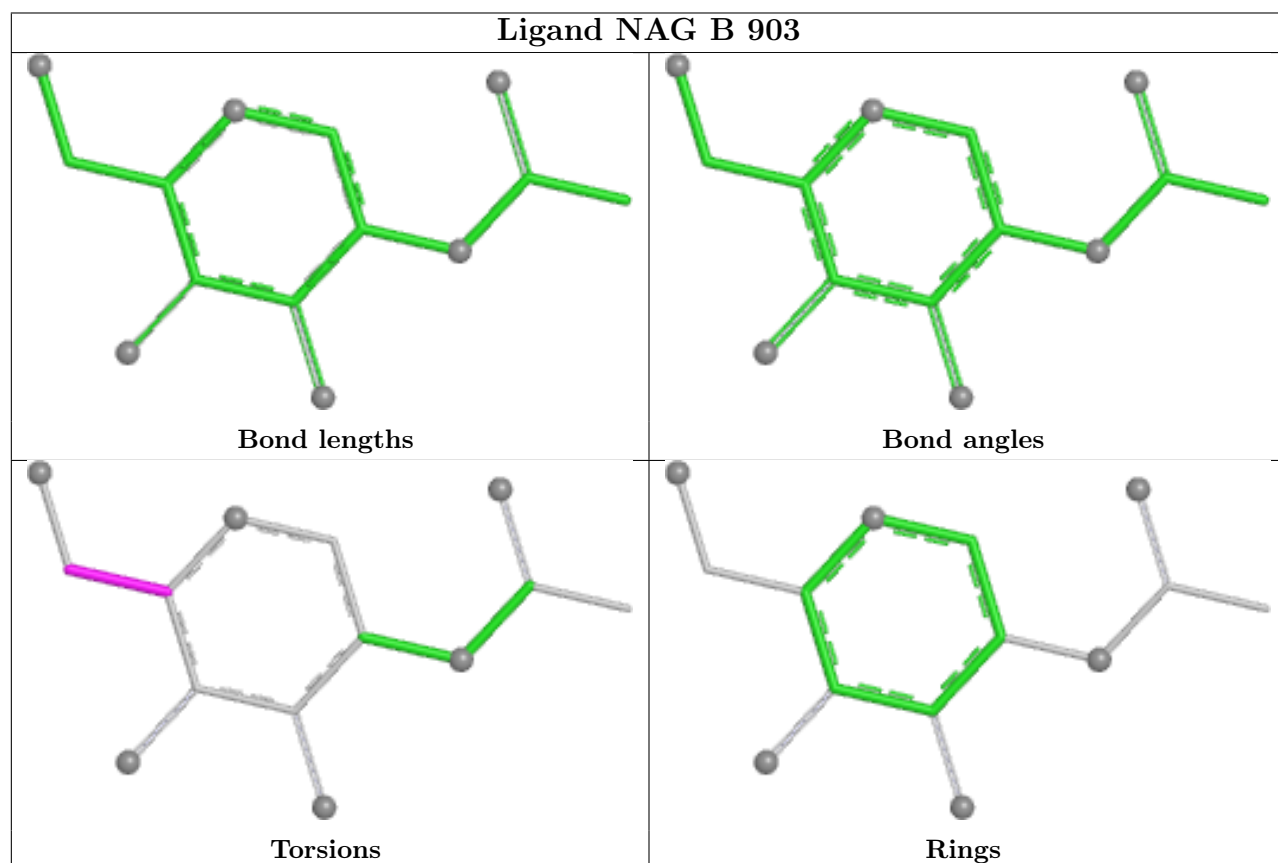
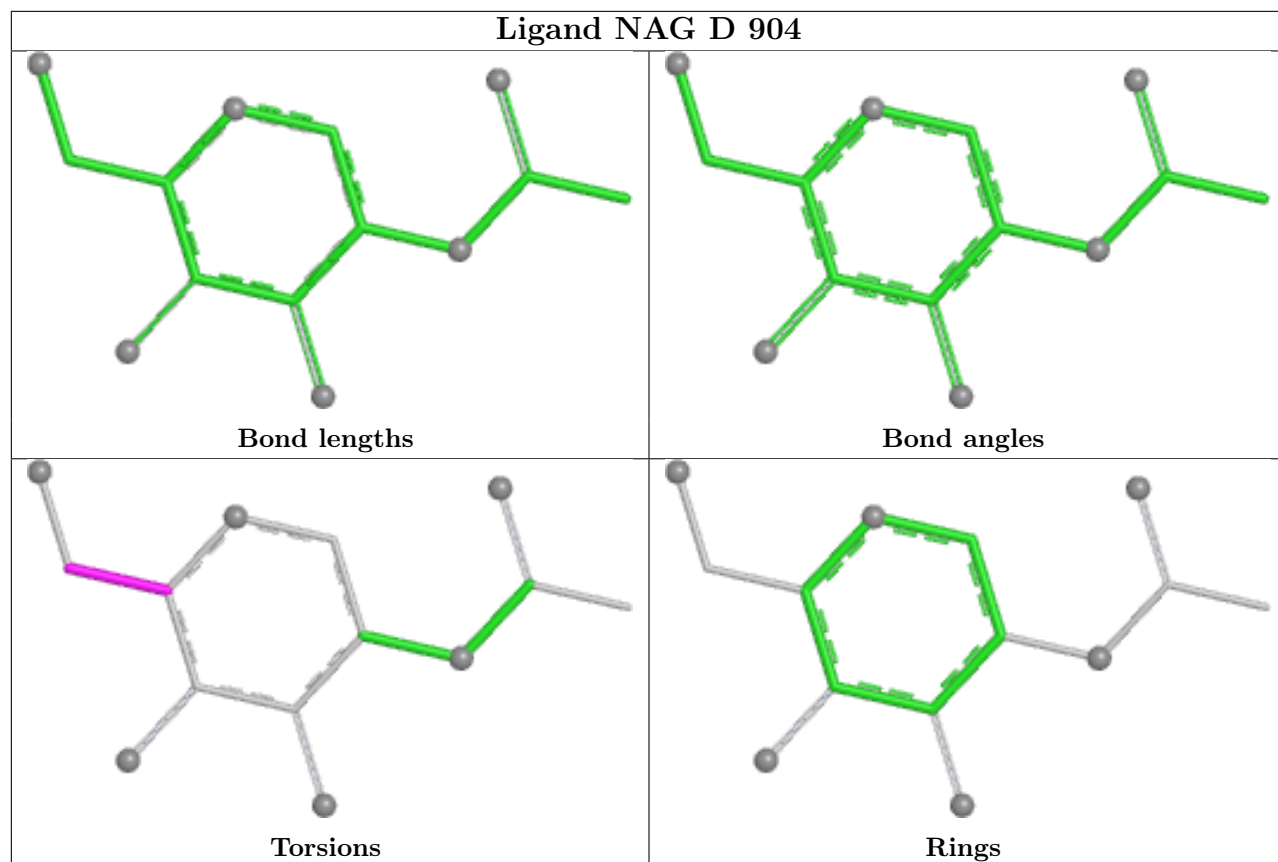
2 monomers are involved in 2 short contacts:

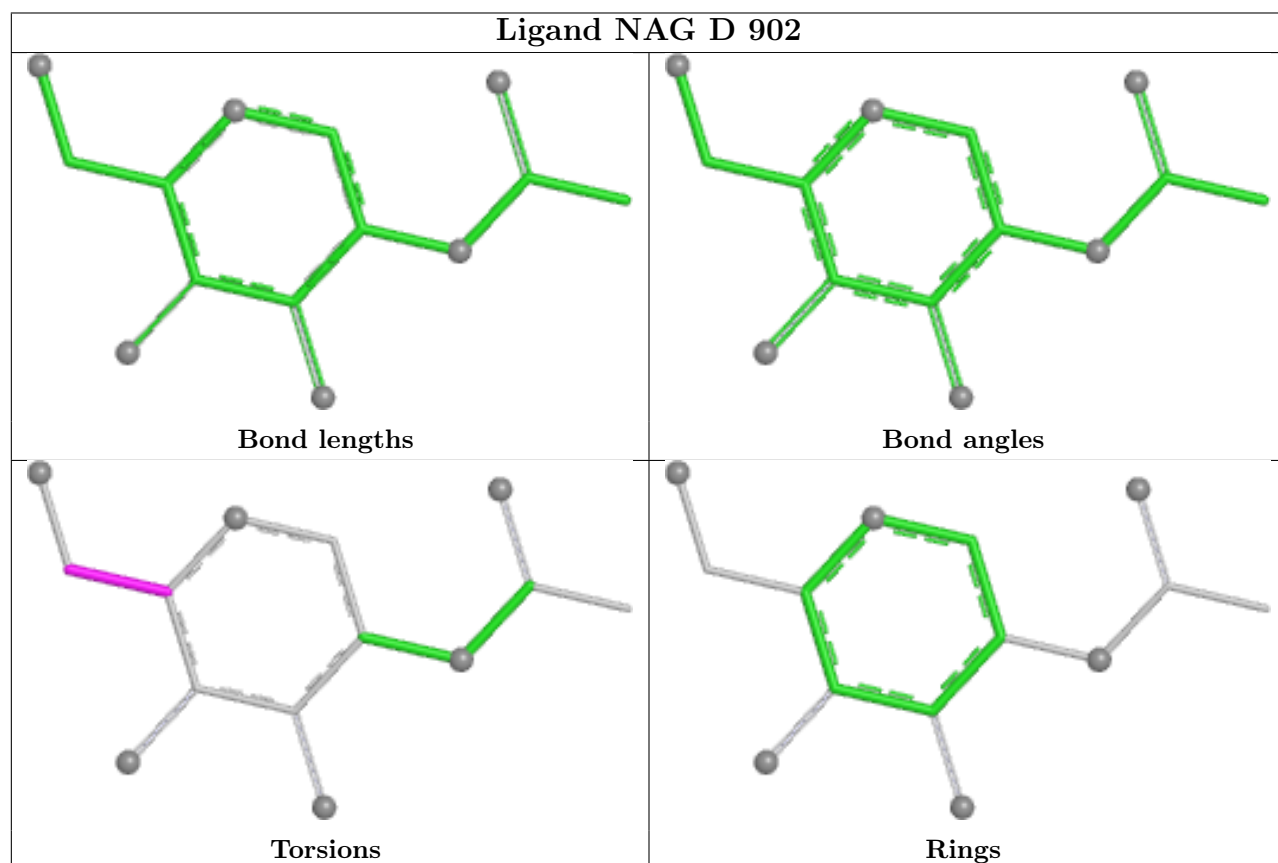
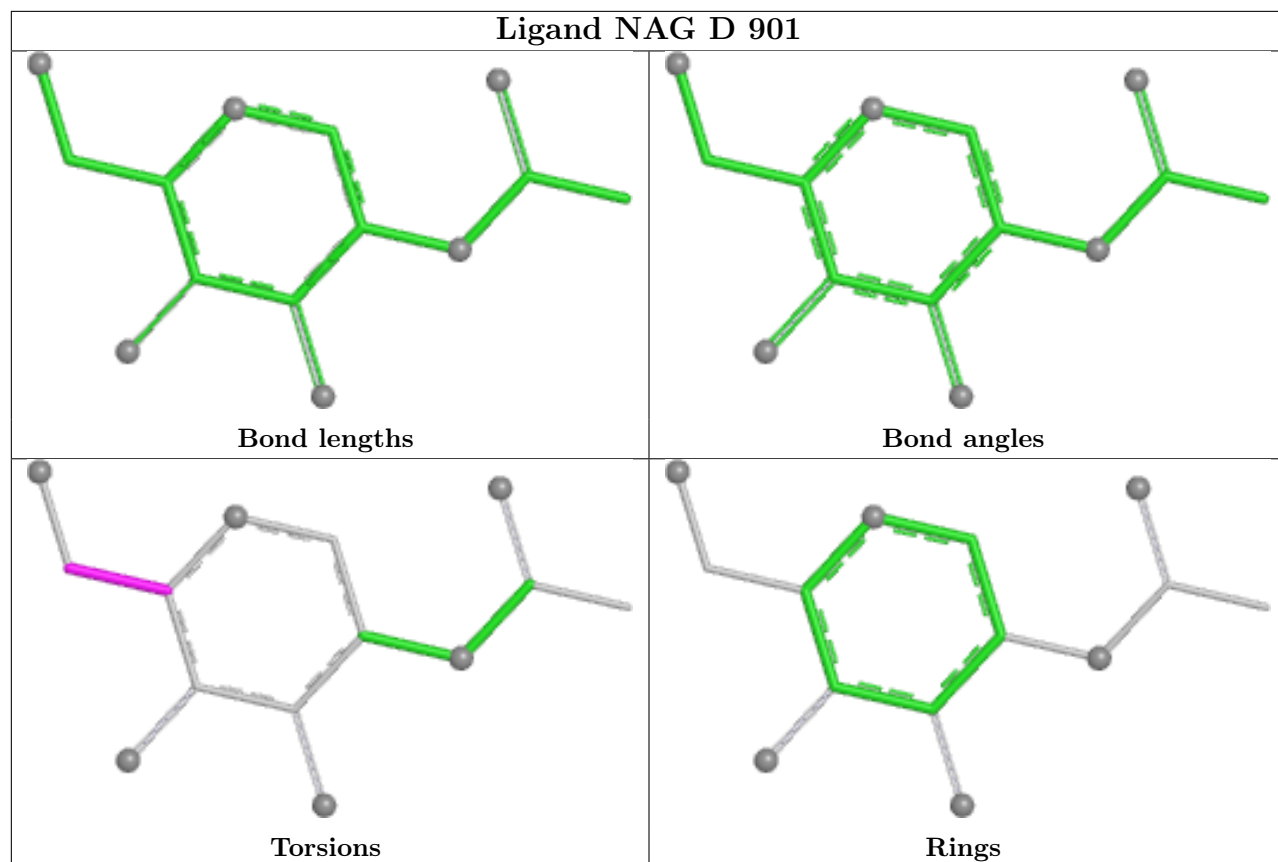
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	901	NAG	1	0
6	D	905	NAG	1	0

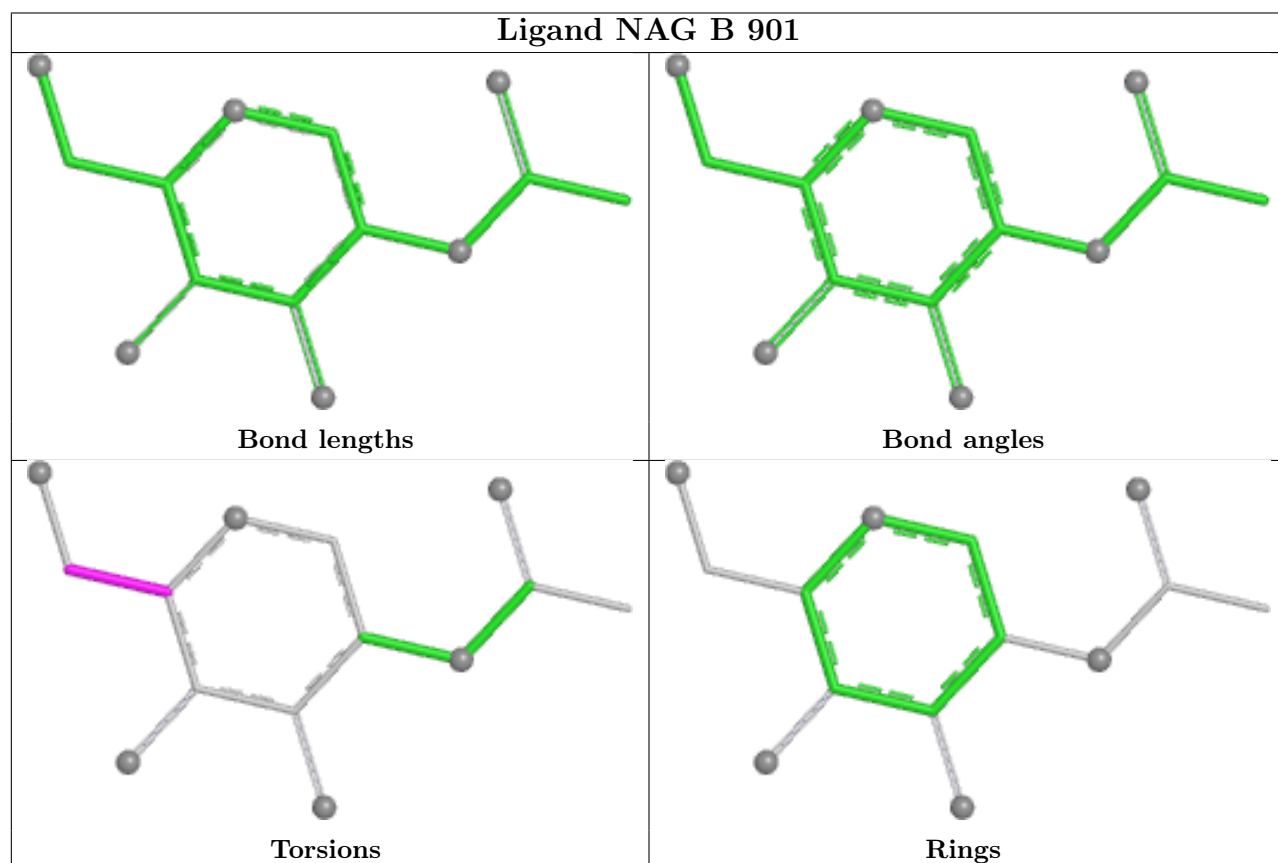
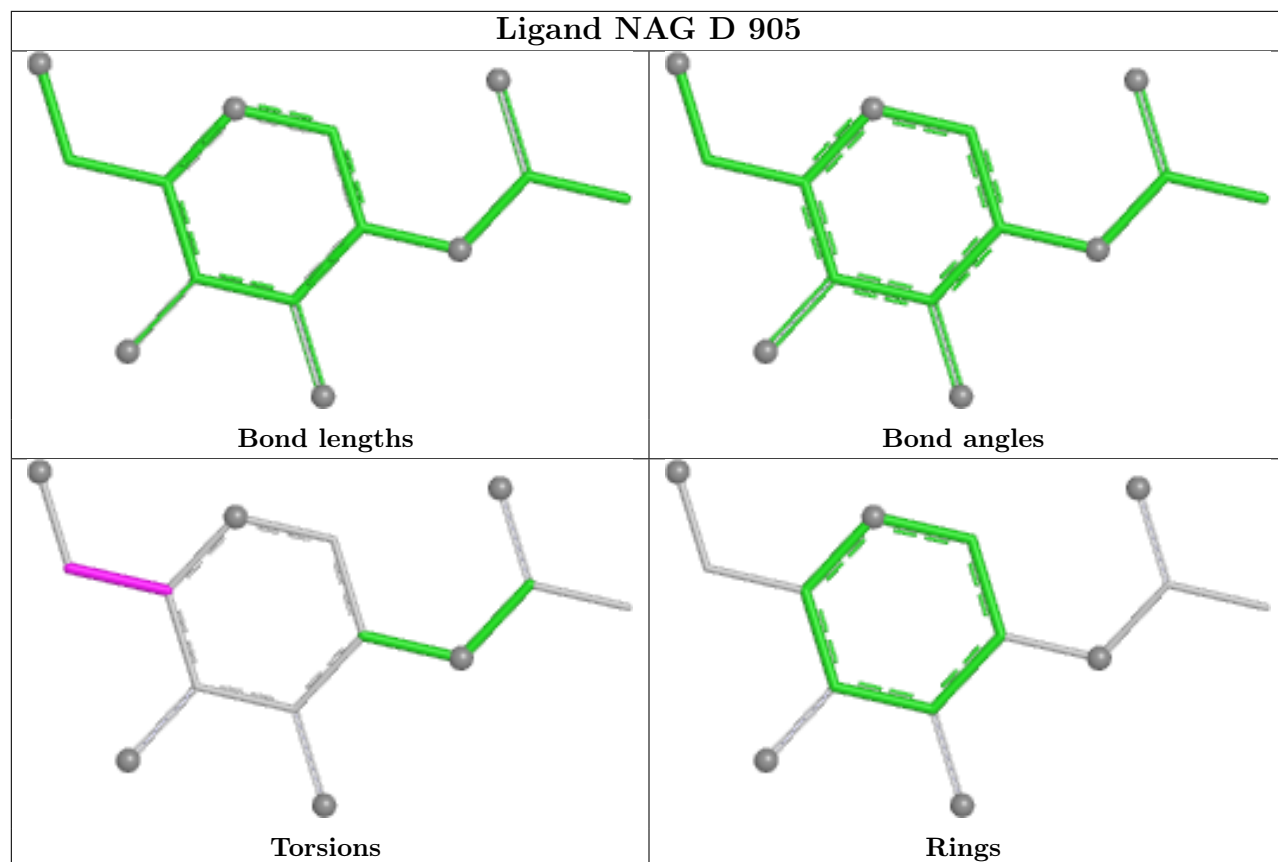
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

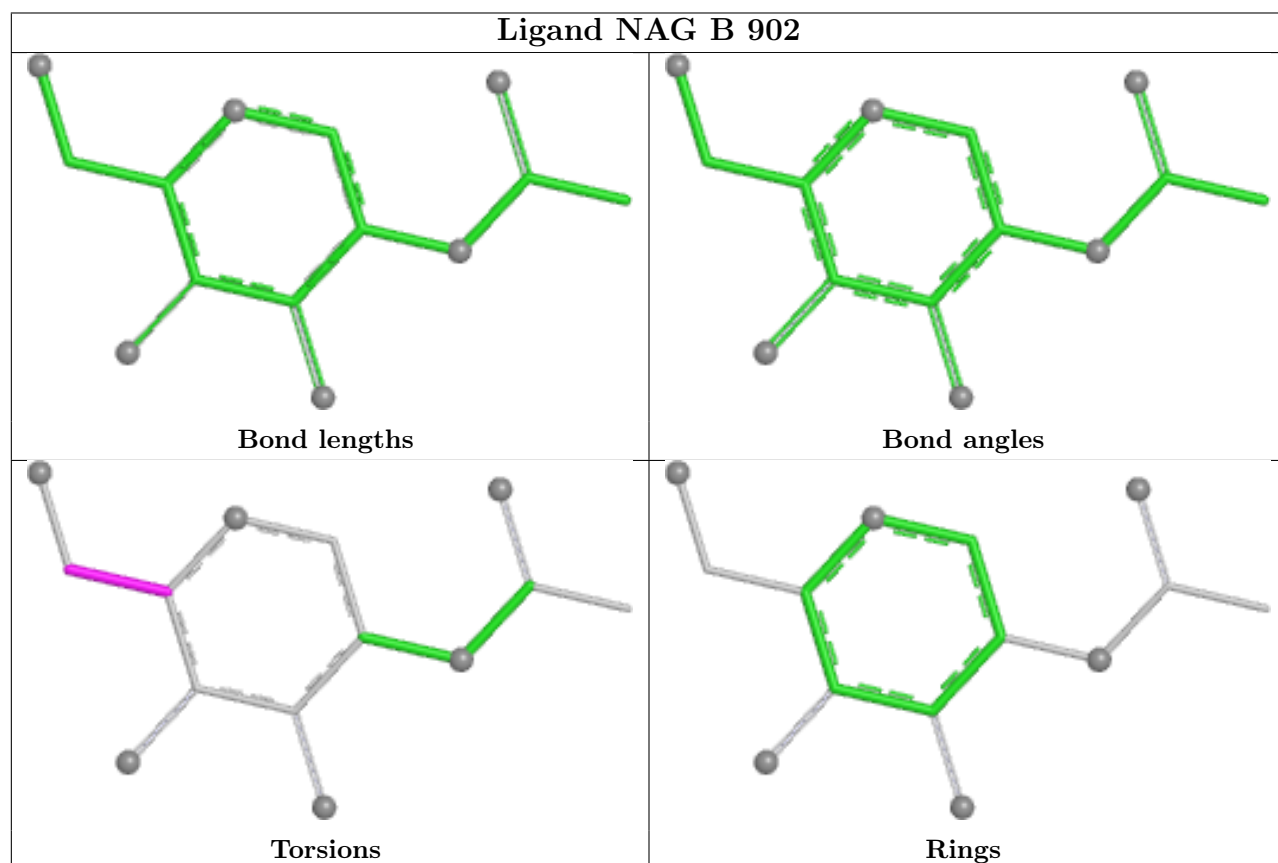
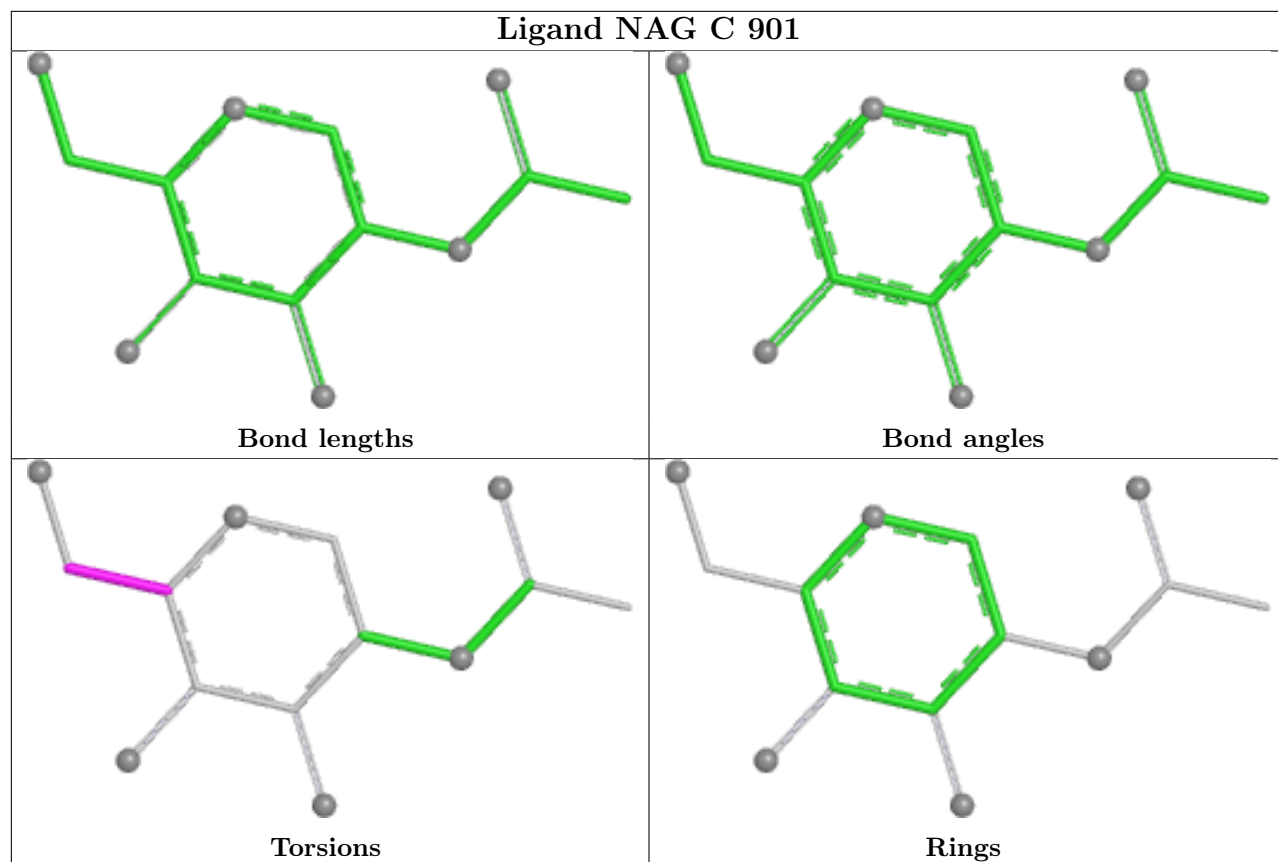
The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

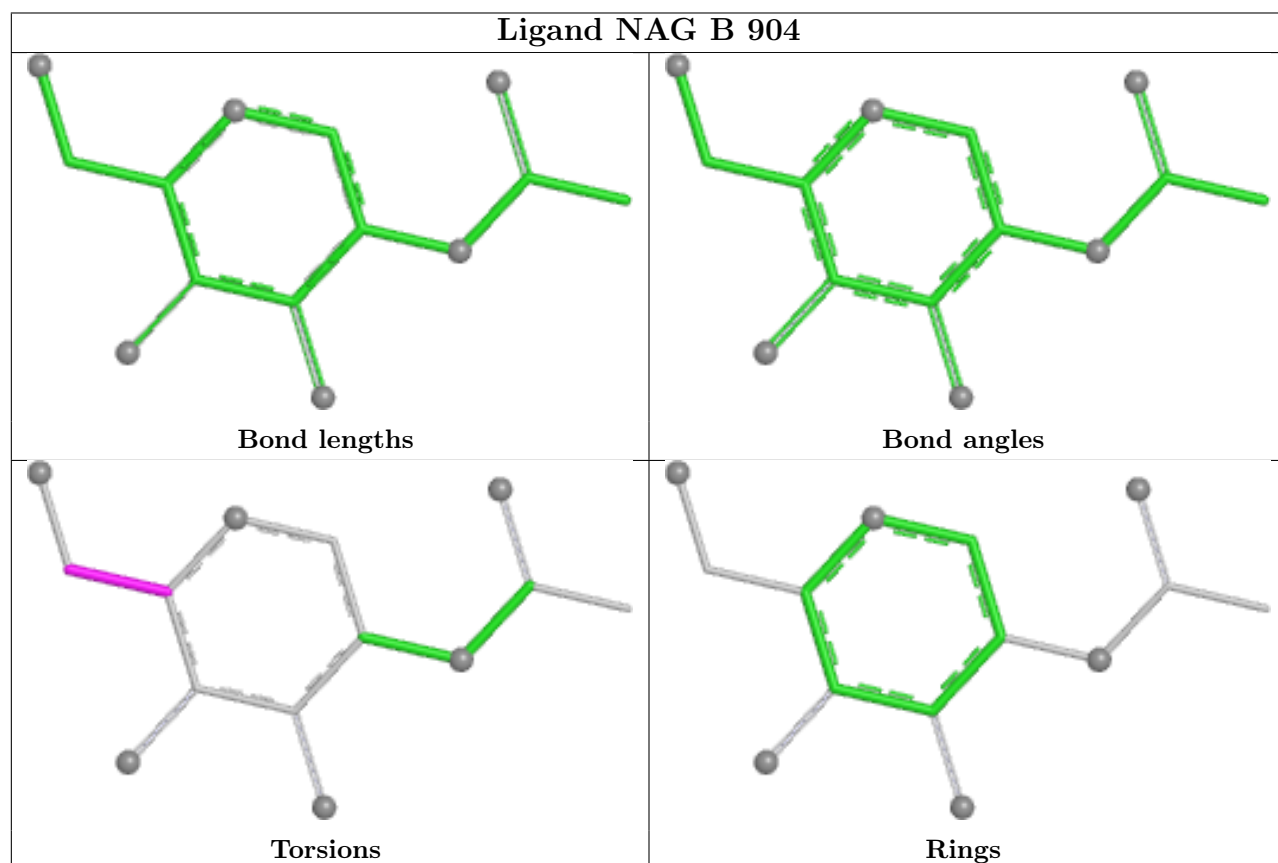
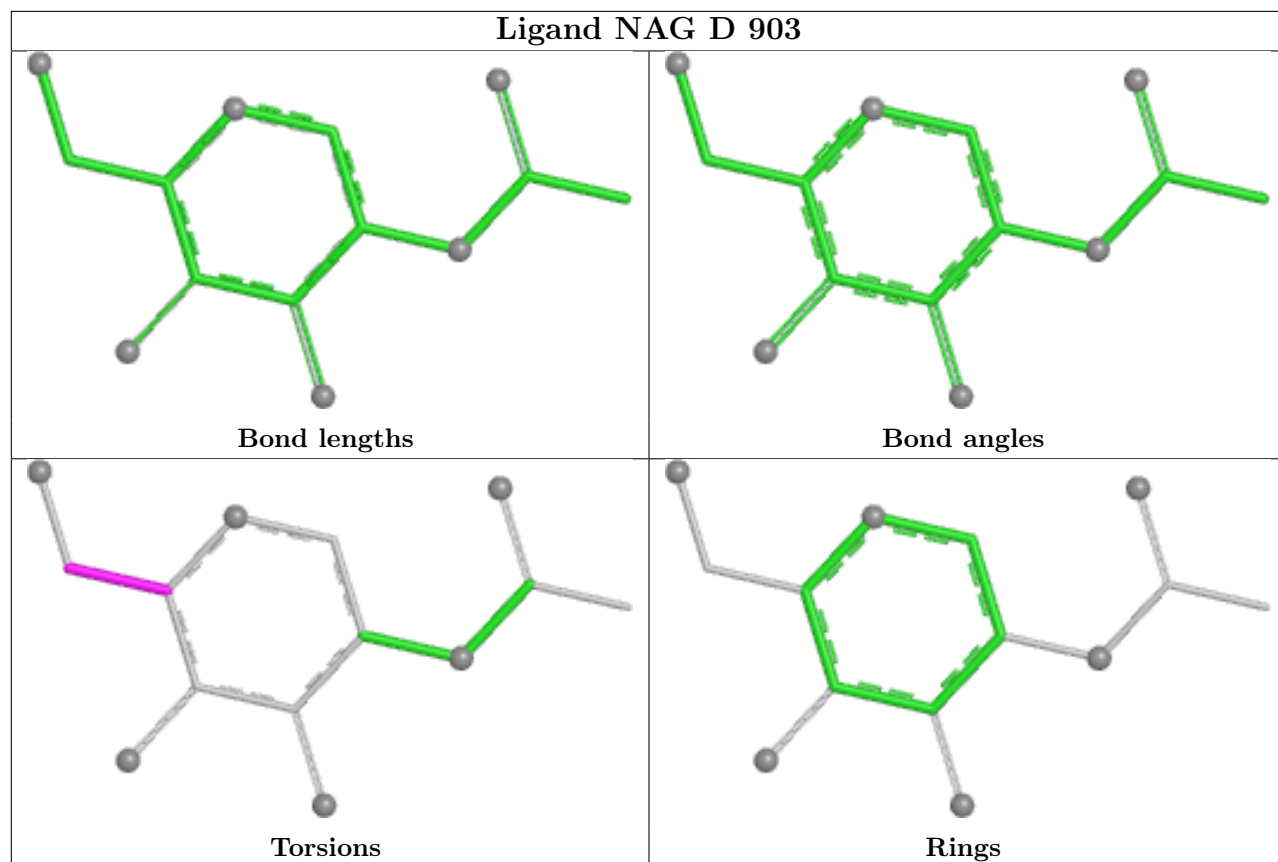












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

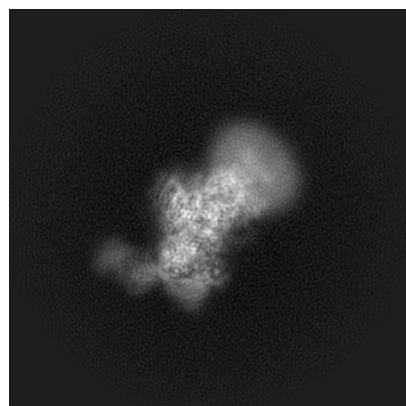
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-36337. These allow visual inspection of the internal detail of the map and identification of artifacts.

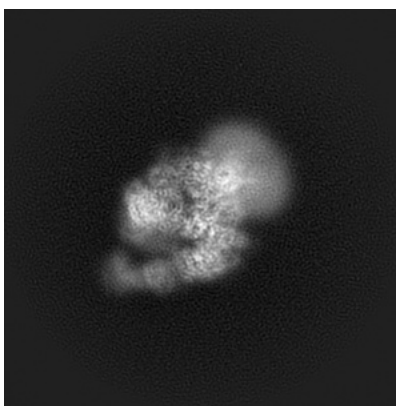
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

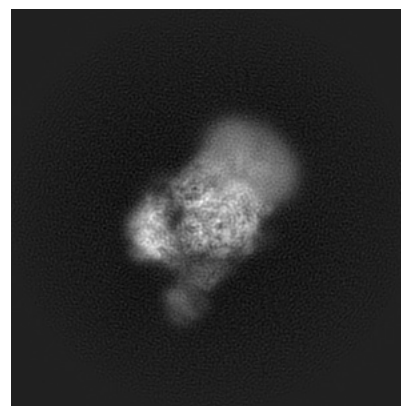
6.1.1 Primary map



X

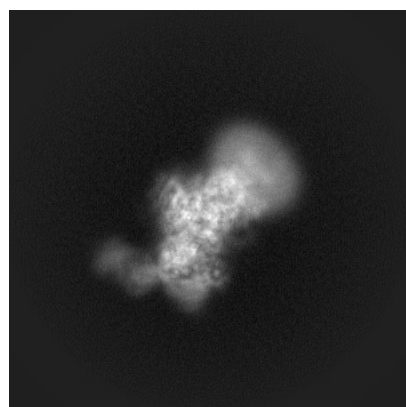


Y

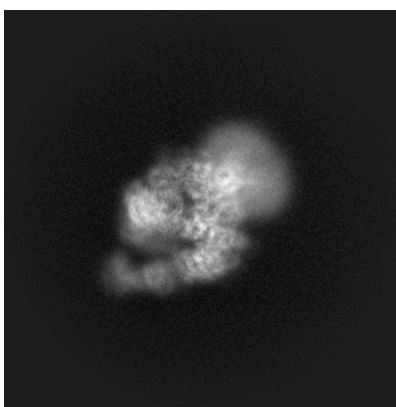


Z

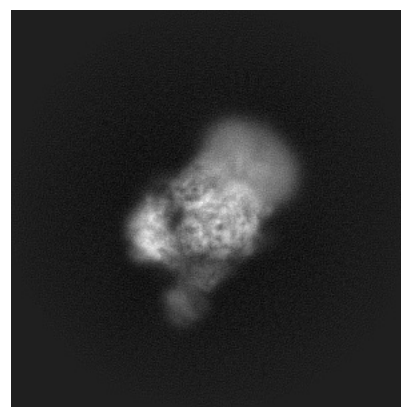
6.1.2 Raw map



X



Y

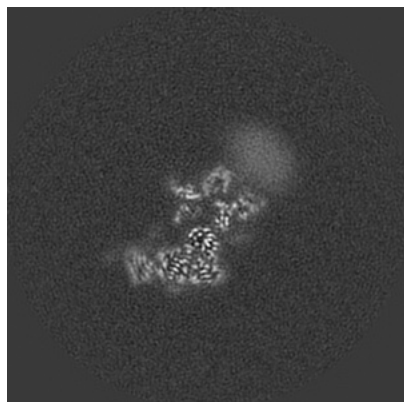


Z

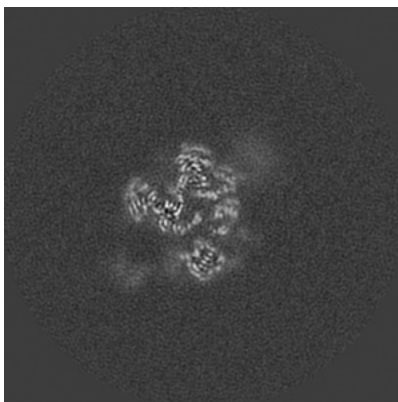
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

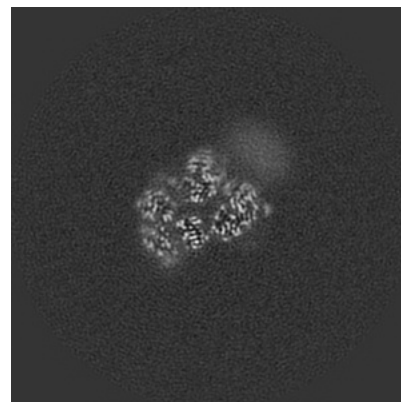
6.2.1 Primary map



X Index: 180

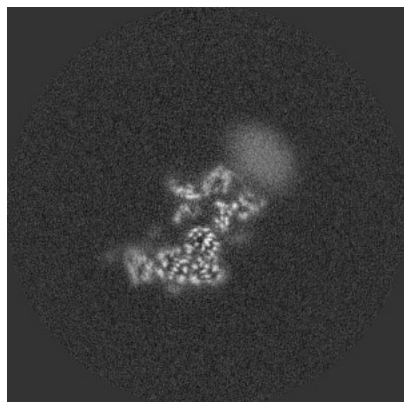


Y Index: 180

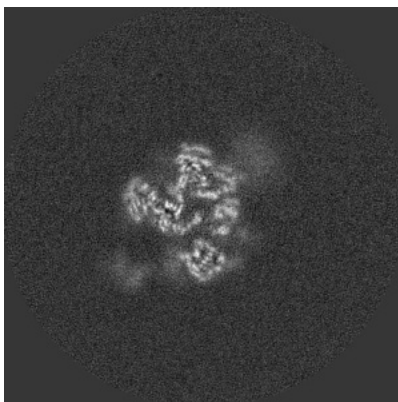


Z Index: 180

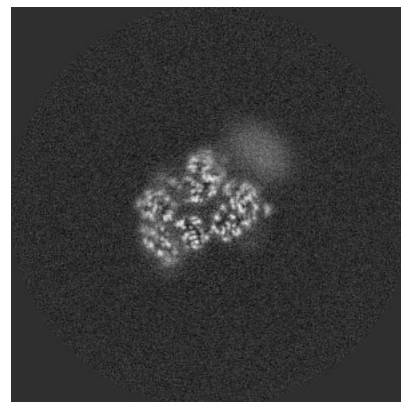
6.2.2 Raw map



X Index: 180



Y Index: 180

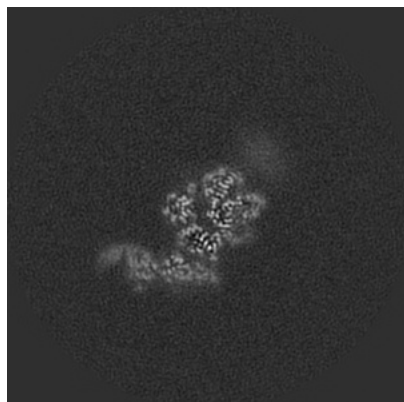


Z Index: 180

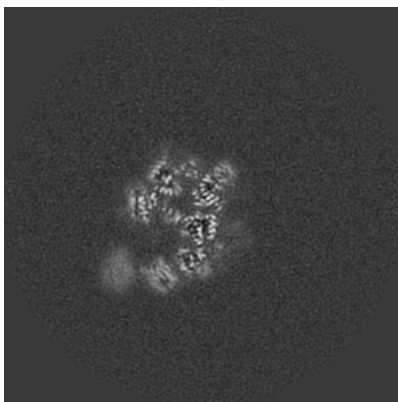
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

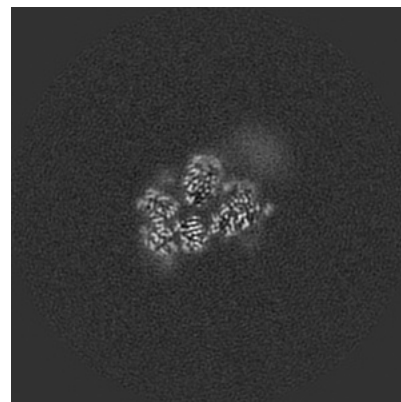
6.3.1 Primary map



X Index: 171

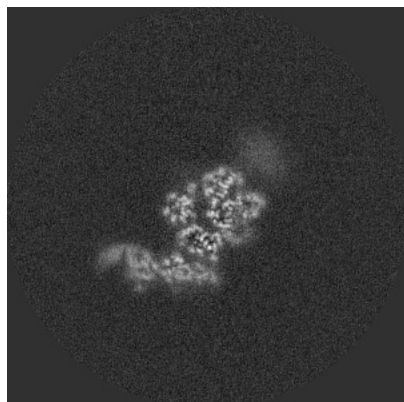


Y Index: 159

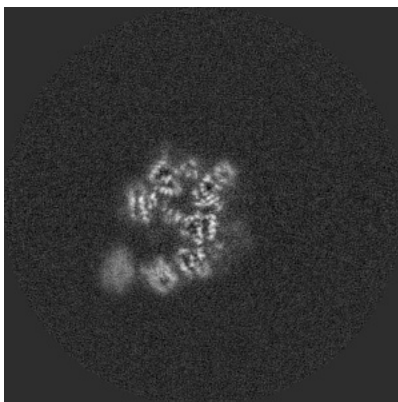


Z Index: 177

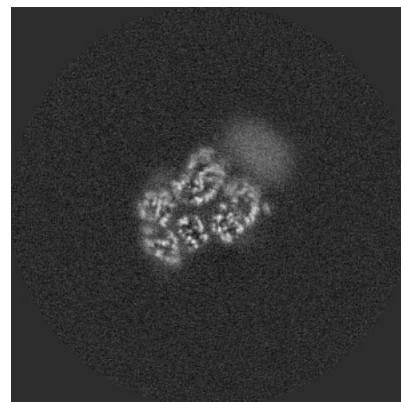
6.3.2 Raw map



X Index: 171



Y Index: 159

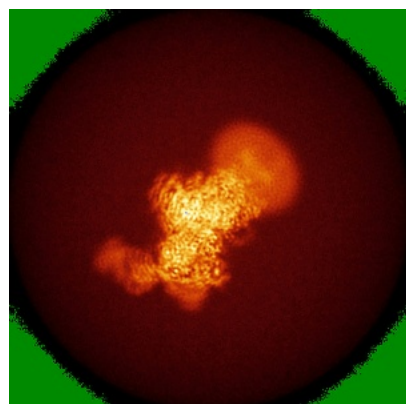


Z Index: 183

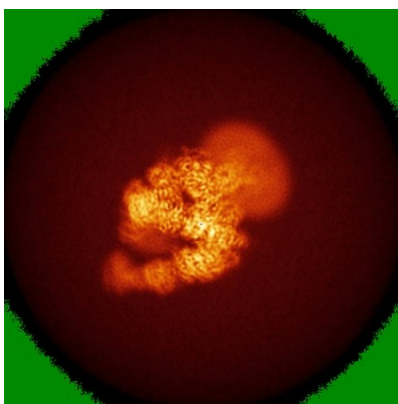
The images above show the largest variance slices of the map in three orthogonal directions.

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

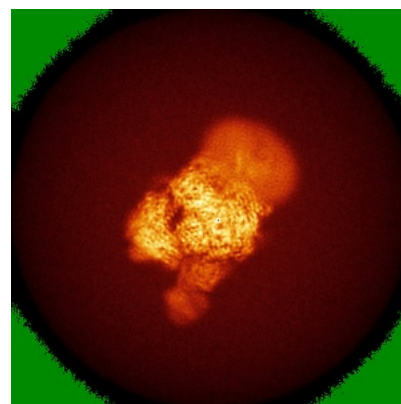
6.4.1 Primary map



X

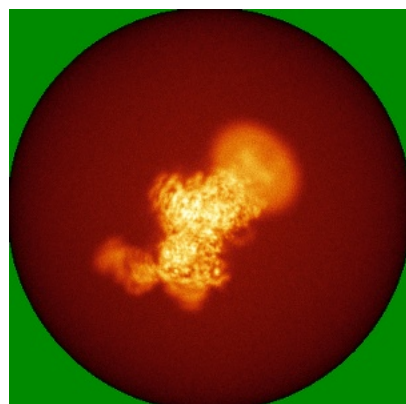


Y

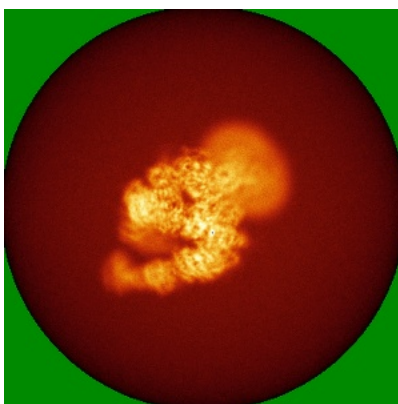


Z

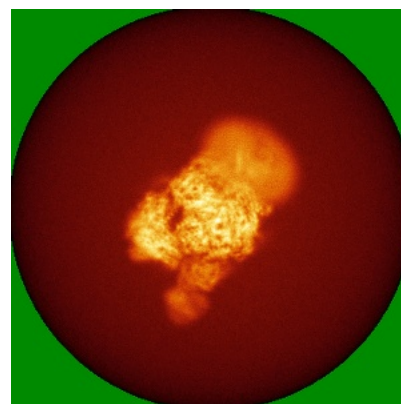
6.4.2 Raw map



X



Y



Z

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

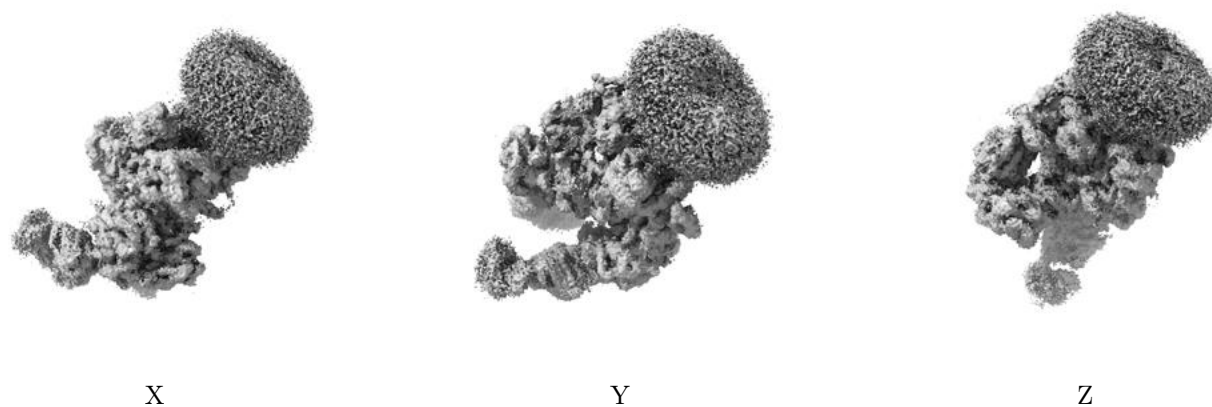
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.014. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

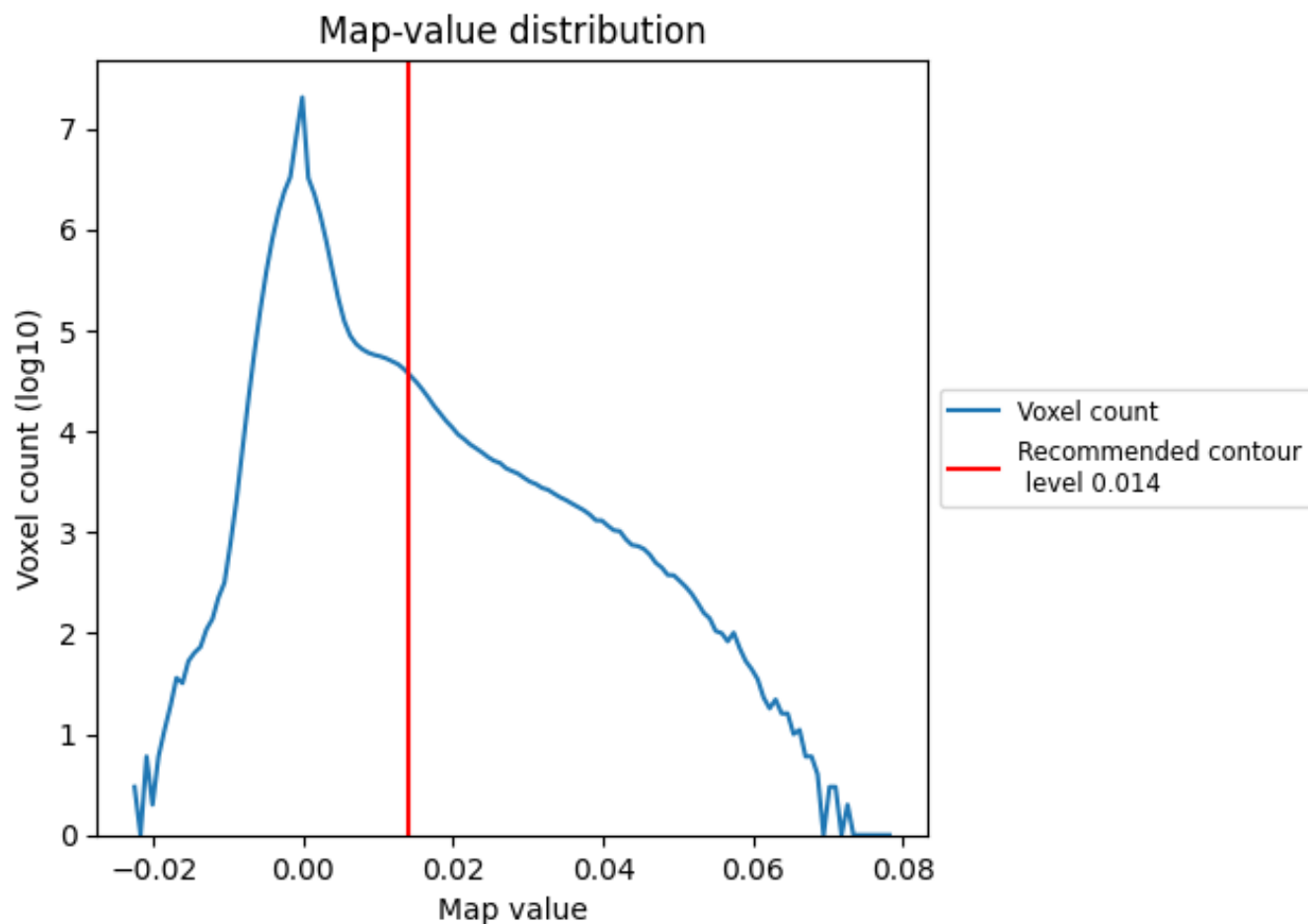
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

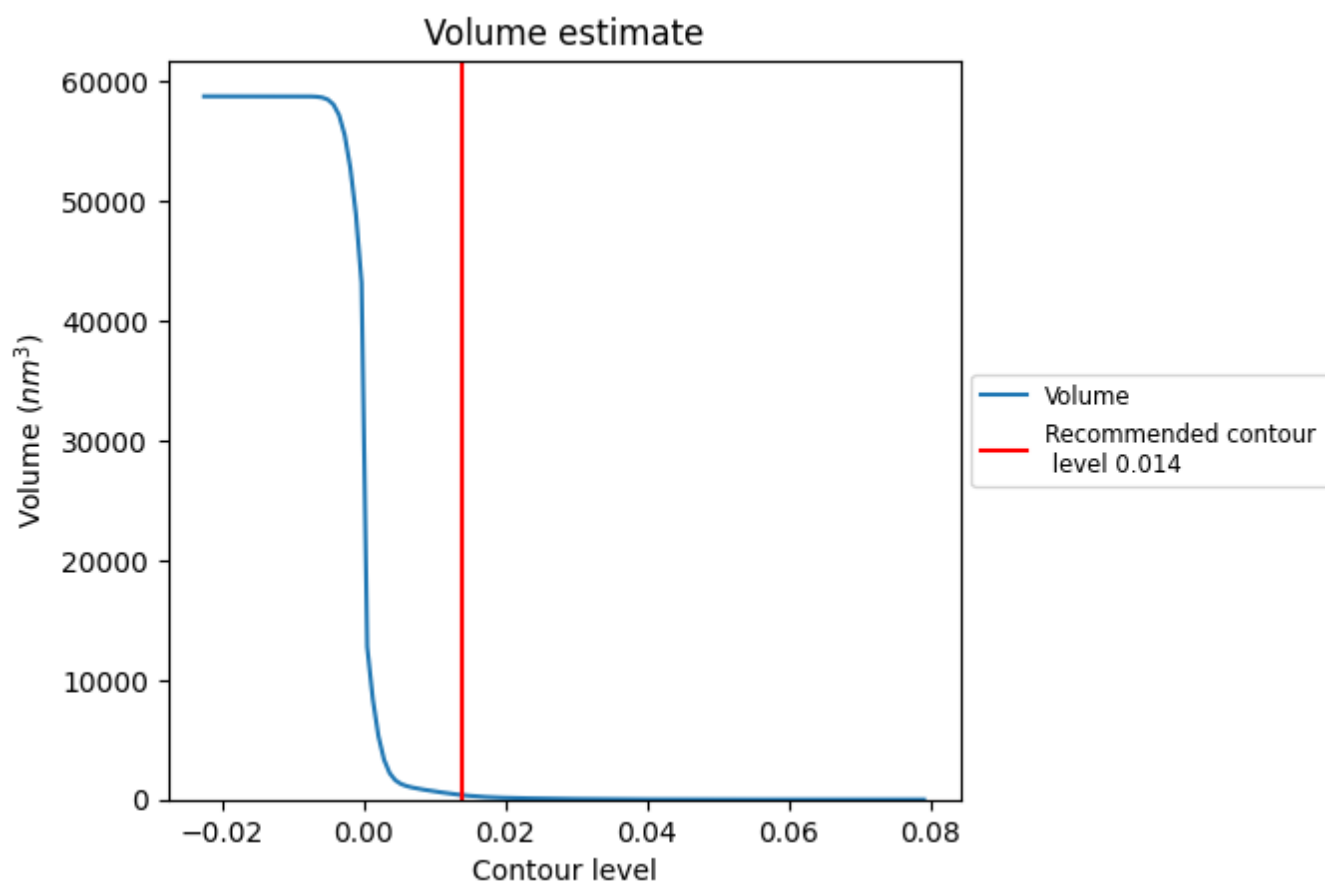
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

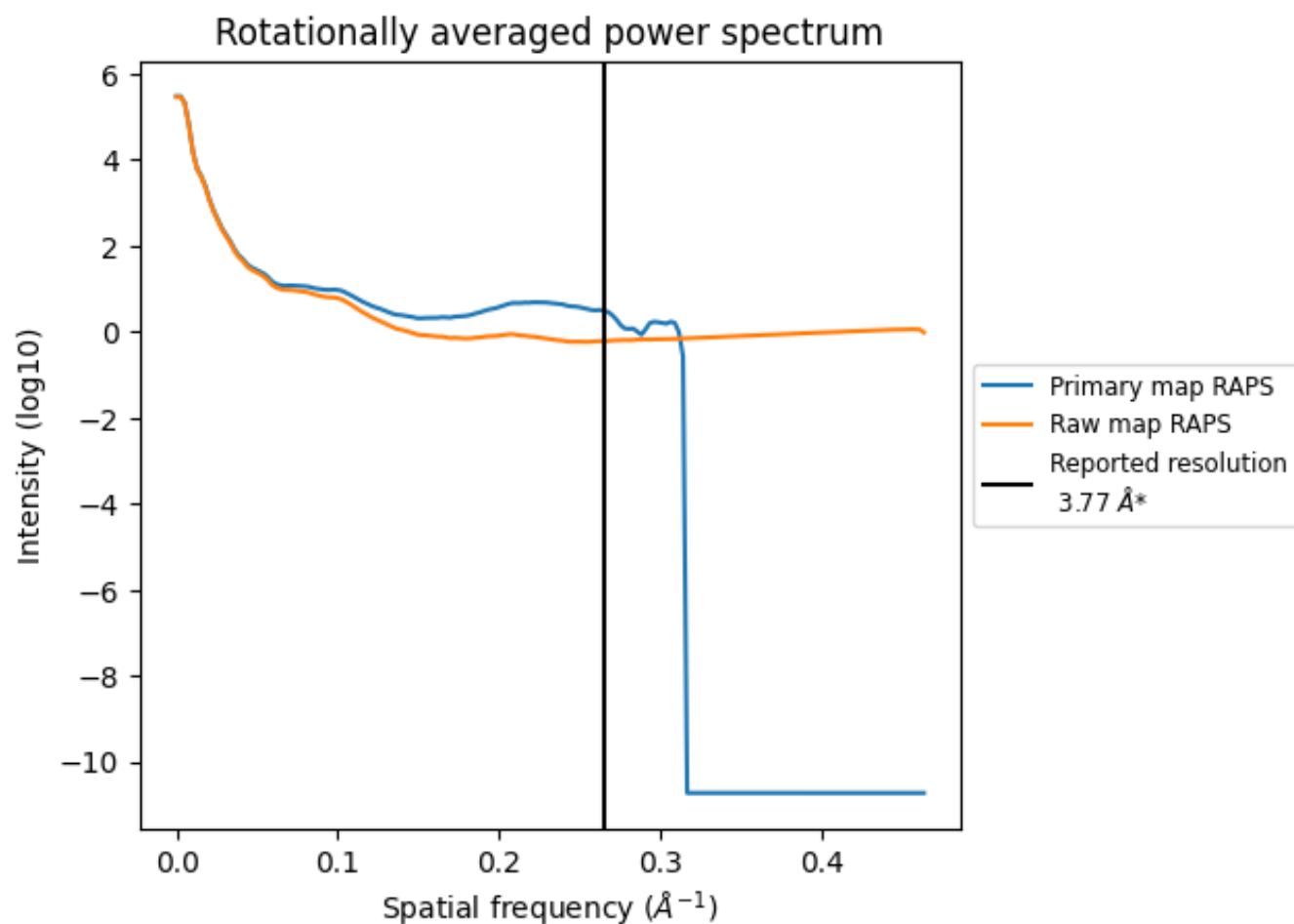
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 368 nm³; this corresponds to an approximate mass of 333 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 ⓘ

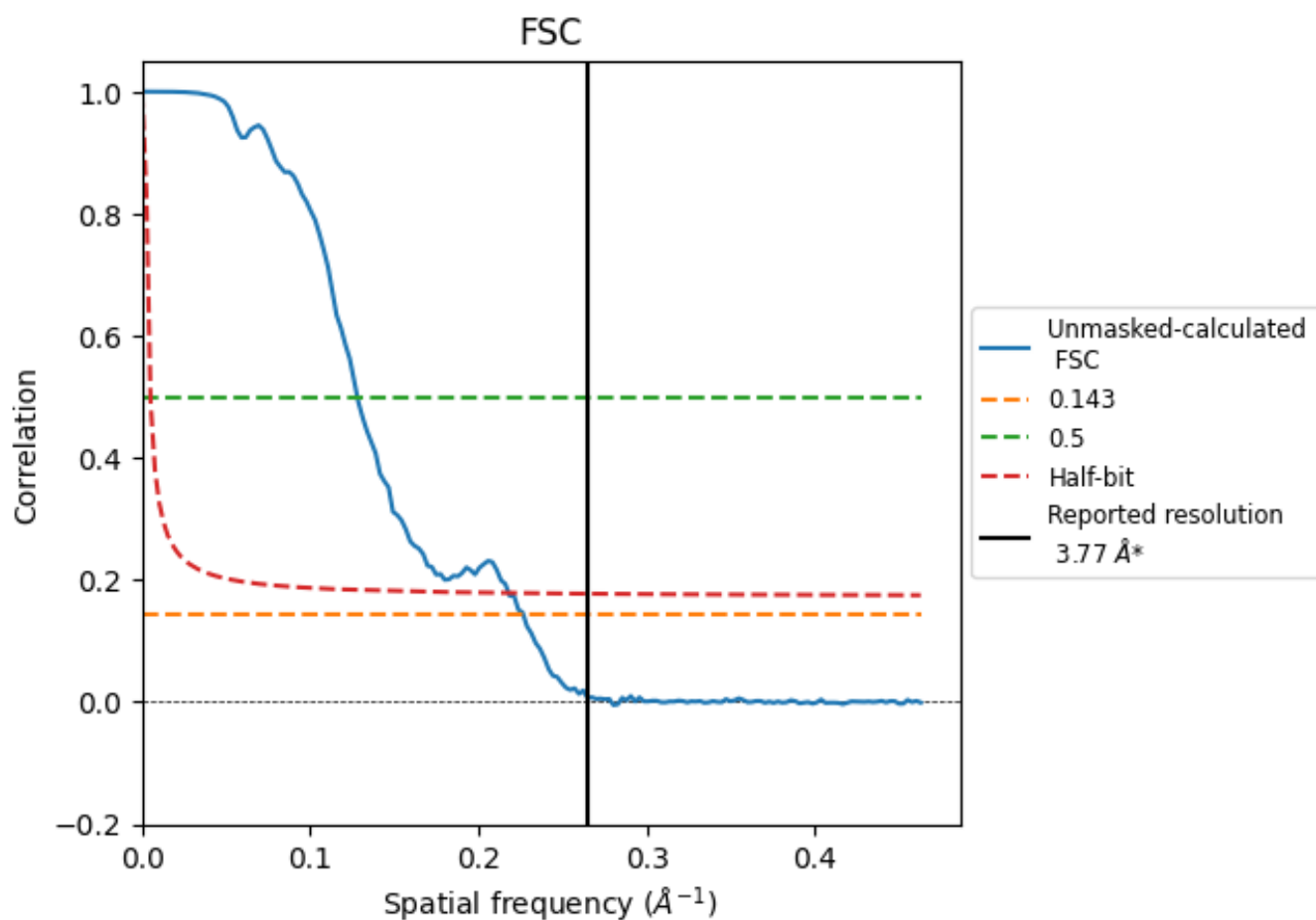


*Reported resolution corresponds to spatial frequency of 0.265 Å⁻¹

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 $0.265 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

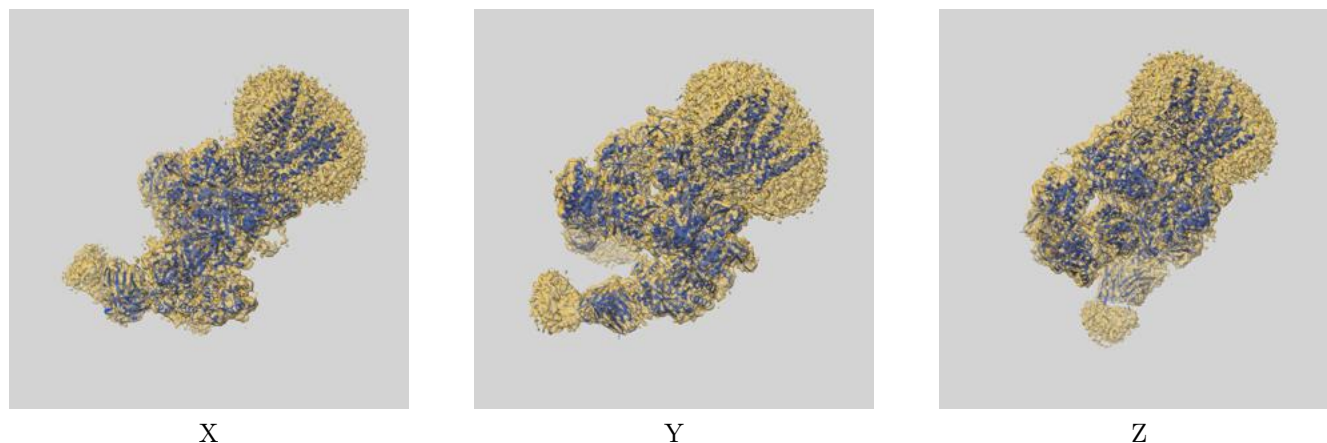
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.77	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.41	7.81	4.59

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.41 differs from the reported value 3.77 by more than 10 %

9 Map-model fit [i](#)

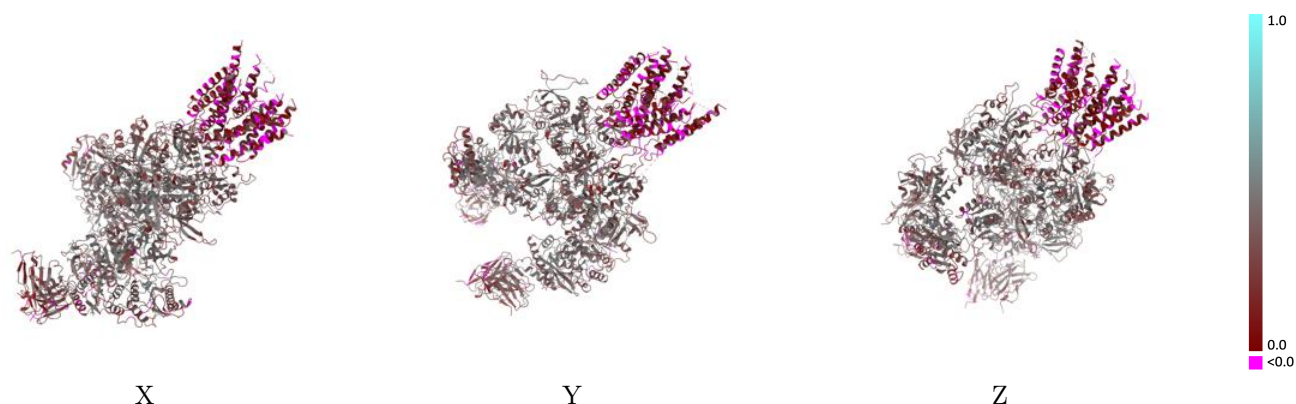
This section contains information regarding the fit between EMDB map EMD-36337 and PDB model 8JJ1. Per-residue inclusion information can be found in section [3](#) on page [7](#).

9.1 Map-model overlay [i](#)



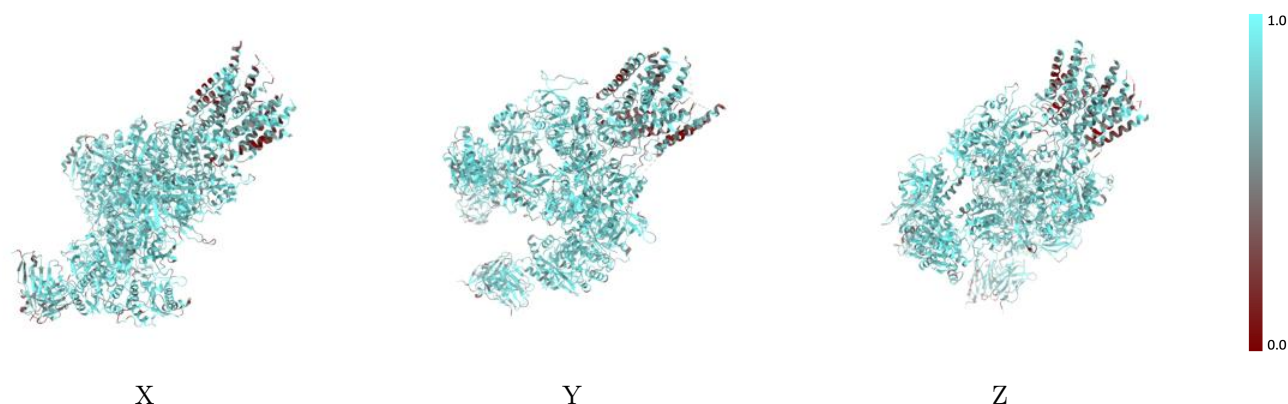
The images above show the 3D surface view of the map at the recommended contour level 0.014 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



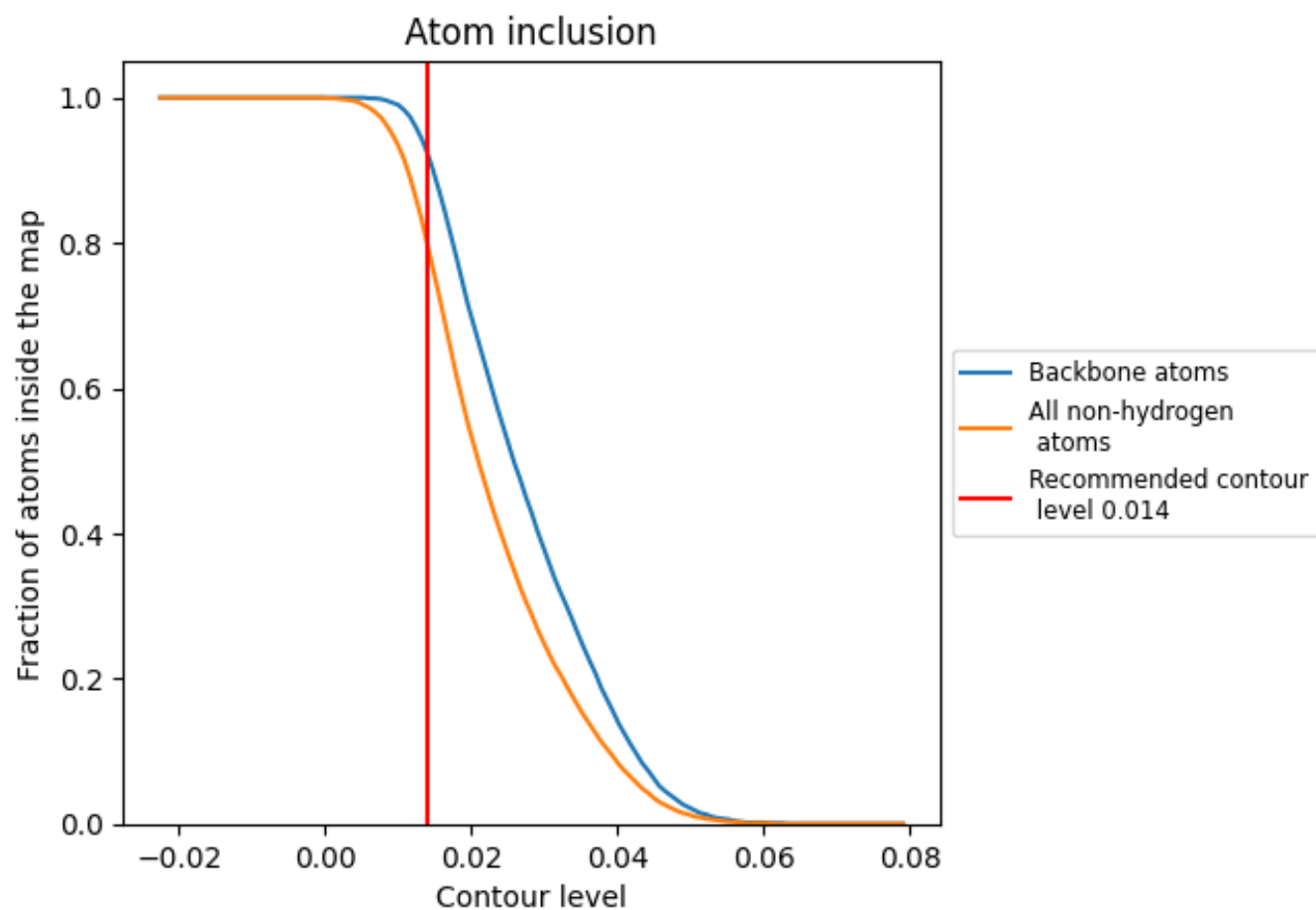
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.014).

9.4 Atom inclusion ⓘ



At the recommended contour level, 92% of all backbone atoms, 80% 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 (0.014) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7980	0.3140
A	0.7830	0.3120
B	0.8180	0.3270
C	0.8000	0.3180
D	0.8250	0.3340
E	0.7970	0.2800
F	0.7460	0.2150
G	0.6670	0.2330
H	0.7440	0.2700
I	0.8930	0.4800

1.0

0.0

<0.0