Full wwPDB EM Validation Report ⓘ

Nov 6, 2024 – 12:41 am GMT

PDB ID	:	8RZ7
EMDB ID	:	EMD-19605
Title	:	(CAG)2 DNA-bound MutSbeta in open form with kinked MSH2 clamp
Authors	:	Lee, J.-H.; Thomsen, M.; Daub, H.; Steinbacher, S.; Sztyler, A.; Thieulin-Pardo, G.; Neudegger, T.; Plotnikov, N.; Iyer, R.R.; Wilkinson, H.; Monteagudo, E.; Felsenfeld, D.P.; Haque, T.; Finley, M.; Dominguez, C.; Vogt, T.F.; Prasad, B.C.
Deposited on	:	2024-02-12
Resolution	:	3.37 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:

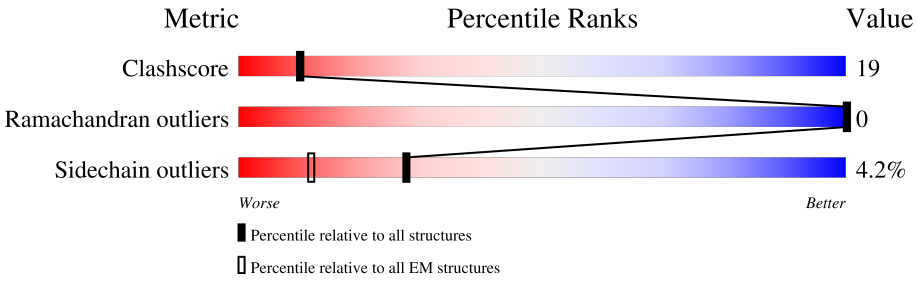
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.37 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=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	934	7% 59% 23% · 17%
2	B	1137	· 42% 29% · 28%
3	C	66	5% 9% 17% · 73%
4	D	60	7% 10% 23% 67%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 13544 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 DNA mismatch repair protein Msh2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	773	6120	3892	1036	1161	31	0	0

- Molecule 2 is a protein called DNA mismatch repair protein Msh3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	820	6588	4214	1122	1223	29	0	0

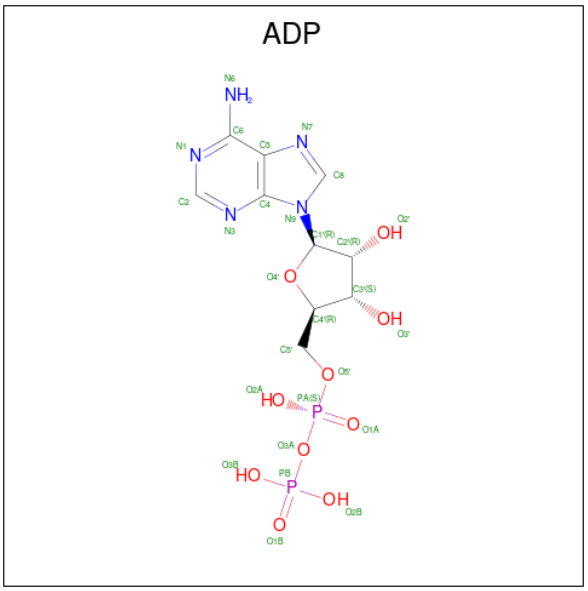
- Molecule 3 is a DNA chain called DNA_1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	C	18	373	176	70	109	18	0	0

- Molecule 4 is a DNA chain called DNA_2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
4	D	20	407	193	74	120	20	0	0

- Molecule 5 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
5	A	1	Total	C	N	O	P	0
			27	10	5	10	2	
5	B	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 6 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

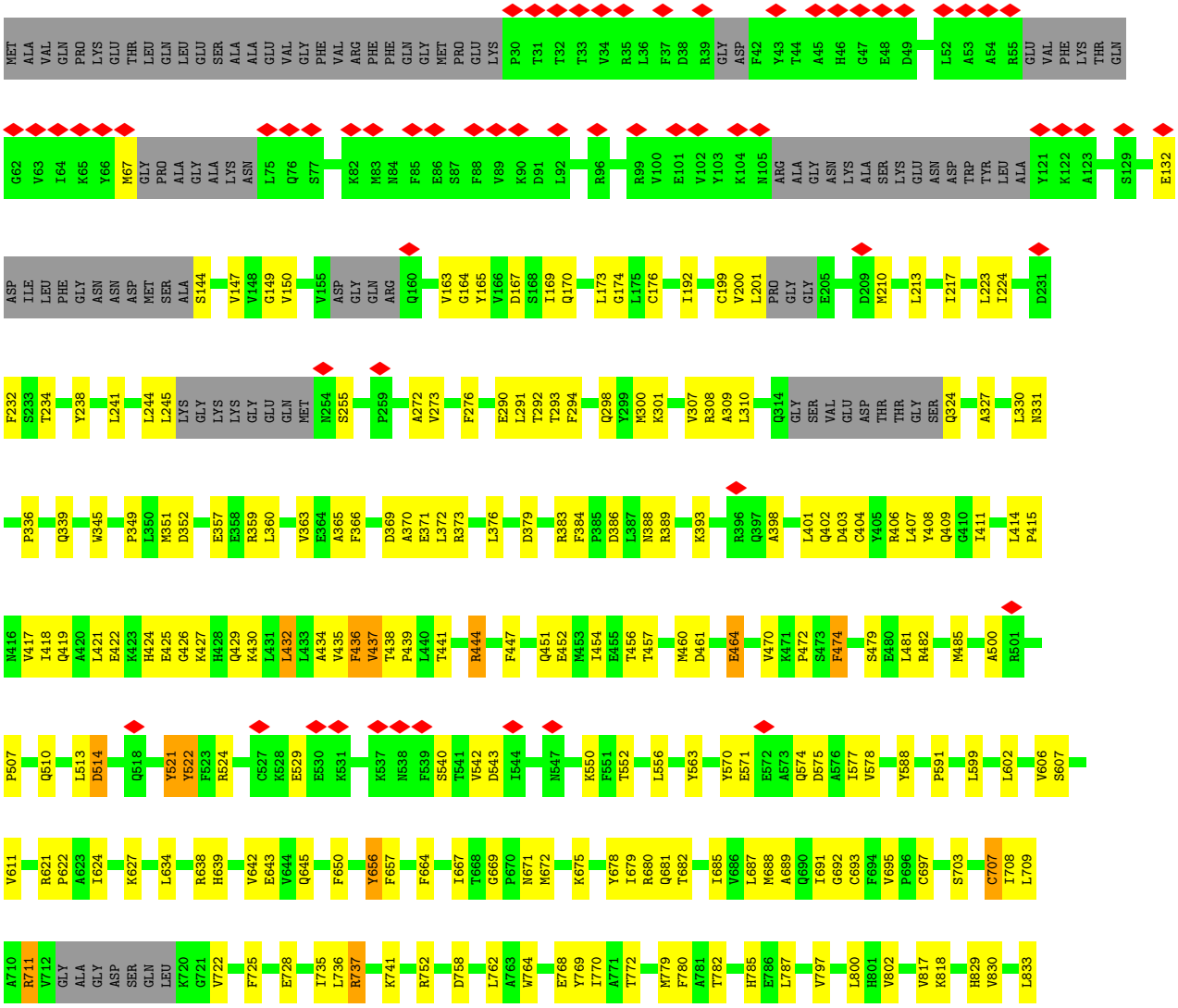
Mol	Chain	Residues	Atoms		AltConf
6	A	1	Total	Mg	0
			1	1	
6	B	1	Total	Mg	0
			1	1	

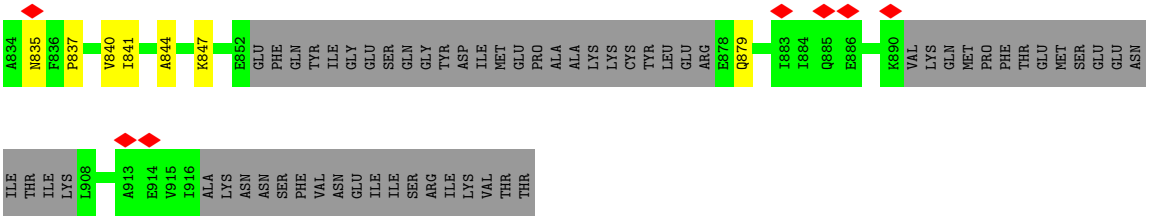
3 Residue-property plots (i)

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: DNA mismatch repair protein Msh2

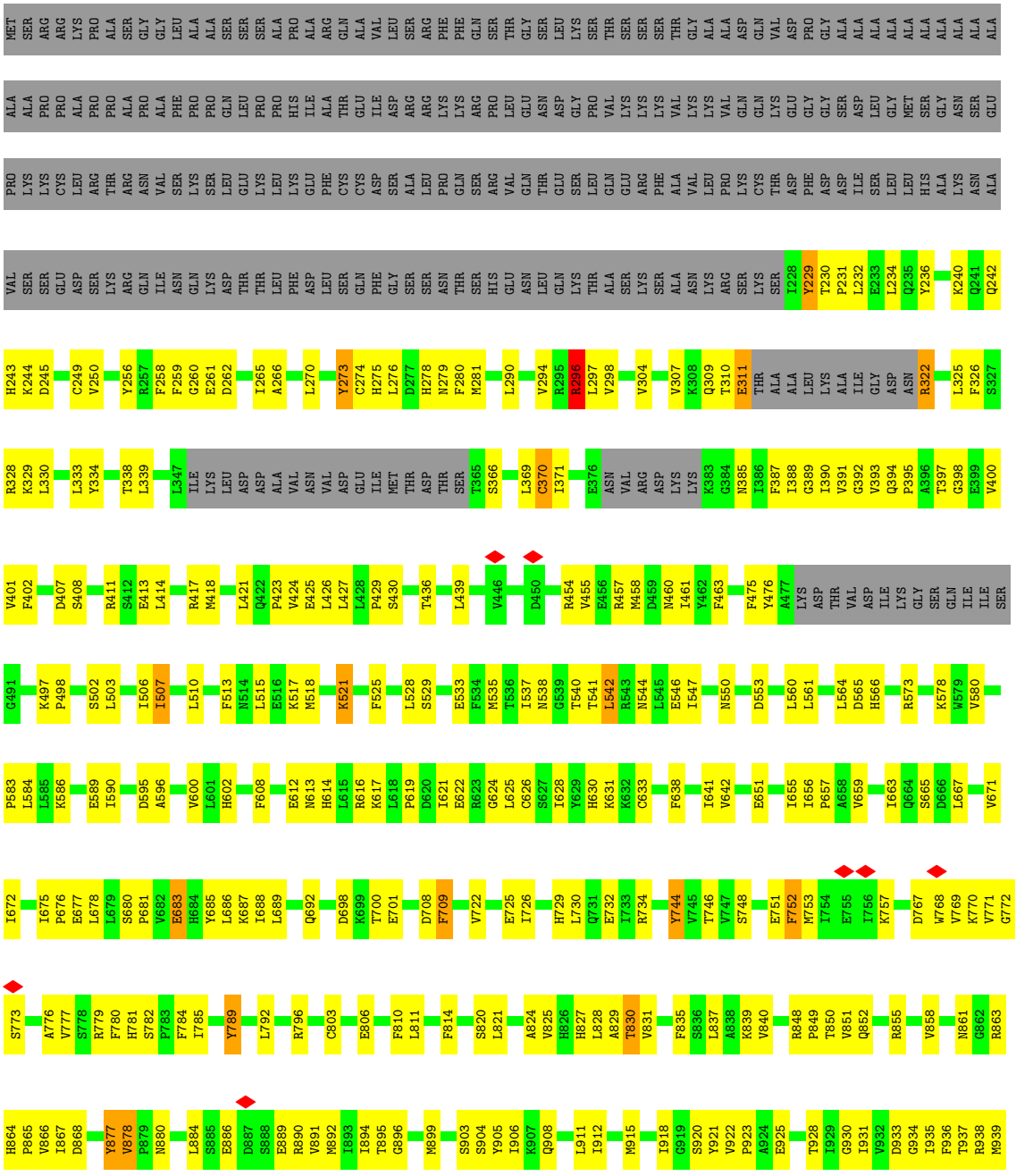
Chain A:

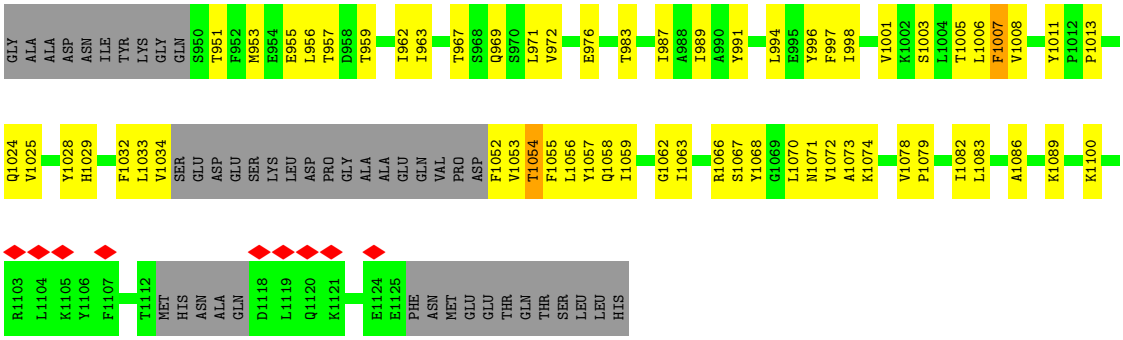




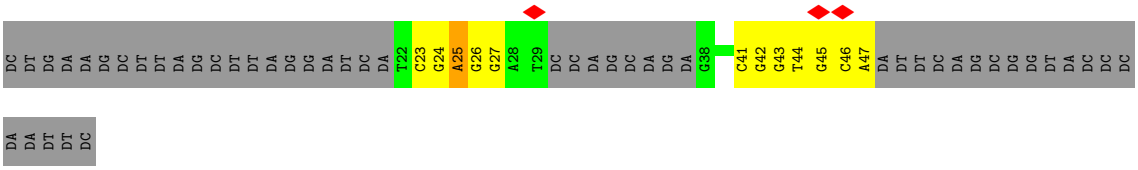
• Molecule 2: DNA mismatch repair protein Msh3

Chain B:

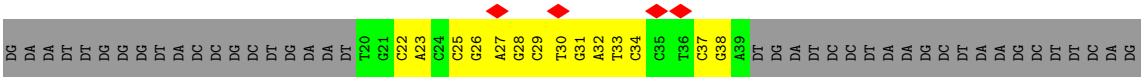




- Molecule 3: DNA_1



- Molecule 4: DNA_2



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	265375	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/Å^2$)	49.35	Depositor
Minimum defocus (nm)	700	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	1.992	Depositor
Minimum map value	-0.002	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.024	Depositor
Recommended contour level	0.015	Depositor
Map size (Å)	292.544, 292.544, 292.544	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.9142, 0.9142, 0.9142	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

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

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	0.54	8/6205 (0.1%)	0.72	11/8355 (0.1%)
2	B	0.55	13/6709 (0.2%)	0.70	12/9053 (0.1%)
3	C	0.26	0/417	0.72	1/640 (0.2%)
4	D	0.25	0/455	0.69	0/699
All	All	0.53	21/13786 (0.2%)	0.71	24/18747 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	B	0	3

All (21) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	683	GLU	CG-CD	-7.99	1.40	1.51
1	A	144	SER	CA-CB	-7.73	1.41	1.52
2	B	732	GLU	CG-CD	7.69	1.63	1.51
2	B	701	GLU	CG-CD	-7.66	1.40	1.51
2	B	773	SER	CA-CB	7.28	1.63	1.52
2	B	311	GLU	CG-CD	-7.08	1.41	1.51
2	B	517	LYS	CD-CE	6.56	1.67	1.51
1	A	425	GLU	CG-CD	6.44	1.61	1.51
1	A	818	LYS	CD-CE	6.37	1.67	1.51
2	B	1100	LYS	CD-CE	5.96	1.66	1.51
1	A	464	GLU	CG-CD	-5.78	1.43	1.51
1	A	728	GLU	CG-CD	-5.77	1.43	1.51
2	B	533	GLU	CG-CD	5.73	1.60	1.51
2	B	976	GLU	CG-CD	5.72	1.60	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	296	ARG	CD-NE	5.71	1.56	1.46
1	A	752	ARG	CG-CD	5.66	1.66	1.51
2	B	589	GLU	CG-CD	5.58	1.60	1.51
2	B	578	LYS	CD-CE	5.54	1.65	1.51
1	A	741	LYS	CD-CE	-5.35	1.37	1.51
1	A	722	VAL	CA-CB	-5.18	1.43	1.54
2	B	521	LYS	CD-CE	-5.17	1.38	1.51

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	573	ARG	NE-CZ-NH1	-9.64	115.48	120.30
2	B	573	ARG	NE-CZ-NH2	8.34	124.47	120.30
1	A	461	ASP	CB-CG-OD2	-7.73	111.34	118.30
1	A	521	TYR	CB-CG-CD2	-7.35	116.59	121.00
1	A	308	ARG	NE-CZ-NH2	-7.24	116.68	120.30
1	A	461	ASP	CB-CG-OD1	7.09	124.69	118.30
2	B	938	ARG	NE-CZ-NH2	-7.01	116.80	120.30
2	B	273	TYR	CB-CG-CD1	6.91	125.14	121.00
2	B	938	ARG	NE-CZ-NH1	6.88	123.74	120.30
2	B	1052	PHE	CB-CG-CD2	6.71	125.49	120.80
2	B	1052	PHE	CB-CG-CD1	-6.56	116.21	120.80
2	B	573	ARG	CD-NE-CZ	6.49	132.69	123.60
1	A	570	TYR	CB-CG-CD2	-6.38	117.17	121.00
1	A	737	ARG	NE-CZ-NH2	-6.28	117.16	120.30
2	B	273	TYR	CB-CG-CD2	-6.16	117.30	121.00
1	A	308	ARG	NE-CZ-NH1	6.08	123.34	120.30
1	A	132	GLU	CB-CA-C	5.81	122.02	110.40
2	B	617	LYS	CA-CB-CG	5.56	125.63	113.40
3	C	25	DA	C1'-O4'-C4'	-5.48	104.62	110.10
1	A	389	ARG	NE-CZ-NH1	5.45	123.03	120.30
1	A	389	ARG	NE-CZ-NH2	-5.41	117.60	120.30
2	B	533	GLU	CG-CD-OE1	-5.36	107.58	118.30
2	B	533	GLU	CG-CD-OE2	5.20	128.70	118.30
1	A	737	ARG	NE-CZ-NH1	5.18	122.89	120.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	1066	ARG	Sidechain
2	B	296	ARG	Sidechain

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Mol	Chain	Res	Type	Group
2	B	322	ARG	Sidechain

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	6120	0	6199	162	0
2	B	6588	0	6691	277	0
3	C	373	0	204	11	0
4	D	407	0	225	16	0
5	A	27	0	12	1	0
5	B	27	0	12	2	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
All	All	13544	0	13343	436	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 19.

All (436) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:435:VAL:O	1:A:439:PRO:HD3	1.20	1.32
1:A:406:ARG:NH1	1:A:409:GLN:OE1	1.67	1.24
2:B:757:LYS:HG3	2:B:776:ALA:O	1.47	1.11
1:A:436:PHE:HZ	1:A:602:LEU:HD22	1.21	1.05
1:A:627:LYS:O	1:A:627:LYS:HG2	1.57	0.99
2:B:232:LEU:HB2	4:D:34:DC:OP1	1.60	0.99
1:A:769:TYR:HB2	2:B:1082:ILE:HD11	1.46	0.98
1:A:435:VAL:O	1:A:439:PRO:CD	2.11	0.97
1:A:830:VAL:HG22	2:B:956:LEU:HD21	1.46	0.96
1:A:436:PHE:O	1:A:439:PRO:HD2	1.65	0.96
1:A:336:PRO:HG2	1:A:386:ASP:HB2	1.51	0.93
2:B:751:GLU:HB2	2:B:789:TYR:CZ	2.05	0.92
2:B:891:VAL:HG21	2:B:998:ILE:HG12	1.56	0.88
2:B:782:SER:HB2	2:B:785:ILE:HD12	1.54	0.86

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:566:HIS:HB3	2:B:839:LYS:HD3	1.56	0.86
1:A:301:LYS:HB2	1:A:707:CYS:HB3	1.61	0.83
1:A:685:ILE:HD11	1:A:697:CYS:SG	2.19	0.82
2:B:1033:LEU:HB3	2:B:1054:THR:HG23	1.62	0.82
2:B:401:VAL:HG21	2:B:421:LEU:HD11	1.63	0.81
1:A:436:PHE:C	1:A:439:PRO:HD2	2.01	0.80
1:A:434:ALA:O	1:A:438:THR:HG23	1.83	0.77
2:B:540:THR:HG22	2:B:544:ASN:HD21	1.48	0.77
1:A:627:LYS:O	1:A:627:LYS:CG	2.34	0.76
1:A:411:ILE:HB	1:A:451:GLN:HE21	1.50	0.75
2:B:240:LYS:O	2:B:244:LYS:HA	1.87	0.74
1:A:414:LEU:HD23	1:A:418:ILE:HD11	1.69	0.74
2:B:659:VAL:HG13	2:B:663:ILE:HD12	1.67	0.73
2:B:768:TRP:HB3	2:B:780:PHE:HB3	1.70	0.73
1:A:436:PHE:CZ	1:A:602:LEU:HD22	2.14	0.72
2:B:722:VAL:O	2:B:726:ILE:HD12	1.89	0.72
1:A:460:MET:O	1:A:464:GLU:HG3	1.89	0.72
1:A:360:LEU:HD11	1:A:622:PRO:HD2	1.70	0.71
1:A:758:ASP:OD2	2:B:1067:SER:HB2	1.91	0.71
1:A:331:ASN:HD21	1:A:339:GLN:HA	1.55	0.70
1:A:769:TYR:CB	2:B:1082:ILE:HD11	2.19	0.70
2:B:229:TYR:CE1	2:B:279:ASN:HB3	2.26	0.70
1:A:830:VAL:HG21	2:B:989:ILE:CD1	2.22	0.69
1:A:664:PHE:HB3	1:A:797:VAL:HG22	1.75	0.68
2:B:864:HIS:ND1	2:B:867:ILE:HG12	2.09	0.68
2:B:849:PRO:HG3	2:B:922:VAL:HG13	1.76	0.68
2:B:972:VAL:HG13	2:B:1005:THR:HB	1.76	0.68
1:A:376:LEU:HD11	1:A:417:VAL:HG23	1.75	0.68
2:B:792:LEU:O	2:B:796:ARG:HG2	1.95	0.67
1:A:173:LEU:HB2	1:A:291:LEU:HA	1.76	0.67
2:B:751:GLU:HB2	2:B:789:TYR:CE1	2.29	0.67
2:B:772:GLY:H	2:B:779:ARG:HB2	1.58	0.67
2:B:370:CYS:HB2	2:B:427:LEU:HB3	1.77	0.67
2:B:671:VAL:HG11	2:B:830:THR:HG21	1.77	0.67
2:B:894:ILE:HB	2:B:1008:VAL:HG22	1.77	0.66
2:B:908:GLN:HE21	2:B:912:ILE:HD12	1.61	0.66
1:A:432:LEU:O	1:A:435:VAL:HG12	1.96	0.66
2:B:886:GLU:OE1	2:B:890:ARG:NH1	2.29	0.66
2:B:656:ILE:HG23	2:B:657:PRO:HD3	1.78	0.65
2:B:891:VAL:HG13	2:B:1005:THR:HG23	1.78	0.65
1:A:421:LEU:HB3	1:A:437:VAL:HG12	1.79	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:722:VAL:O	2:B:725:GLU:HG3	1.96	0.65
2:B:855:ARG:HD3	2:B:969:GLN:HA	1.77	0.65
2:B:236:TYR:CE2	2:B:259:PHE:HB3	2.31	0.64
2:B:878:VAL:CG1	2:B:1057:TYR:HB2	2.26	0.64
2:B:417:ARG:HH21	2:B:529:SER:HB3	1.61	0.64
2:B:748:SER:OG	3:C:41:DC:H5"	1.97	0.64
1:A:513:LEU:HD22	1:A:521:TYR:HB3	1.80	0.64
1:A:574:GLN:HG3	1:A:578:VAL:HG13	1.80	0.63
2:B:398:GLY:HA2	2:B:518:MET:CE	2.29	0.63
1:A:369:ASP:OD1	1:A:370:ALA:N	2.32	0.63
2:B:393:VAL:HG12	2:B:506:ILE:HD11	1.81	0.62
2:B:232:LEU:CB	4:D:34:DC:OP1	2.45	0.62
1:A:414:LEU:CD2	1:A:418:ILE:HD11	2.29	0.62
2:B:746:THR:CG2	2:B:752:PHE:HA	2.28	0.62
2:B:892:MET:HB2	2:B:1006:LEU:HD22	1.79	0.62
1:A:634:LEU:HD13	1:A:685:ILE:HD13	1.81	0.62
1:A:408:TYR:HB2	1:A:454:ILE:HG21	1.82	0.61
2:B:746:THR:HG22	2:B:751:GLU:O	2.01	0.61
2:B:685:TYR:CD2	2:B:814:PHE:HD1	2.18	0.61
2:B:936:PHE:HB3	2:B:962:ILE:HG12	1.81	0.61
1:A:165:TYR:CE2	1:A:174:GLY:HA3	2.36	0.60
2:B:935:ILE:HD12	2:B:971:LEU:HD23	1.82	0.60
1:A:847:LYS:HG3	2:B:991:TYR:CD1	2.37	0.60
2:B:584:LEU:HB2	2:B:590:ILE:HG12	1.84	0.60
2:B:394:GLN:HG2	2:B:397:THR:H	1.67	0.59
2:B:395:PRO:HA	2:B:518:MET:CE	2.33	0.59
2:B:878:VAL:HG11	2:B:1057:TYR:HB2	1.83	0.59
3:C:25:DA:H2"	3:C:26:DG:C8	2.38	0.59
2:B:546:GLU:HG2	2:B:550:ASN:HA	1.82	0.59
2:B:333:LEU:HB2	2:B:513:PHE:HD1	1.67	0.59
1:A:830:VAL:HG21	2:B:989:ILE:HD11	1.84	0.58
2:B:338:THR:HB	2:B:515:LEU:HD12	1.84	0.58
2:B:849:PRO:HD3	2:B:921:TYR:HA	1.84	0.58
1:A:379:ASP:O	1:A:383:ARG:NH2	2.36	0.58
2:B:231:PRO:O	2:B:234:LEU:HB3	2.03	0.58
2:B:651:GLU:O	2:B:655:ILE:HG13	2.04	0.58
2:B:963:ILE:HG23	2:B:996:TYR:CE2	2.38	0.58
2:B:994:LEU:HD13	2:B:1007:PHE:HD2	1.68	0.58
1:A:241:LEU:O	1:A:245:LEU:N	2.33	0.58
1:A:393:LYS:NZ	1:A:398:ALA:O	2.37	0.58
2:B:698:ASP:OD2	2:B:700:THR:OG1	2.21	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1074:LYS:HA	2:B:1083:LEU:HD11	1.85	0.58
4:D:25:DC:H2"	4:D:26:DG:C8	2.39	0.58
1:A:769:TYR:HB2	2:B:1082:ILE:CD1	2.28	0.58
2:B:1063:ILE:HD12	2:B:1063:ILE:H	1.67	0.58
1:A:833:LEU:CD2	2:B:957:THR:HA	2.34	0.57
2:B:672:ILE:HD11	2:B:831:VAL:HG21	1.86	0.57
2:B:619:PRO:HD2	2:B:621:ILE:HD11	1.86	0.57
3:C:41:DC:H2"	3:C:42:DG:C8	2.39	0.57
2:B:769:VAL:H	2:B:781:HIS:H	1.51	0.56
1:A:310:LEU:HD11	1:A:708:ILE:HG21	1.88	0.56
1:A:357:GLU:OE1	1:A:621:ARG:NH1	2.36	0.56
1:A:679:ILE:HG23	1:A:779:MET:HB2	1.86	0.56
1:A:452:GLU:O	1:A:456:THR:HG23	2.06	0.56
2:B:393:VAL:CG1	2:B:506:ILE:HD11	2.35	0.56
2:B:655:ILE:HG22	2:B:659:VAL:HG23	1.86	0.56
2:B:884:LEU:HD11	2:B:1006:LEU:HD21	1.88	0.56
1:A:664:PHE:HE2	1:A:770:ILE:HB	1.70	0.56
2:B:586:LYS:O	2:B:590:ILE:HG13	2.05	0.56
1:A:201:LEU:HB2	1:A:224:ILE:HD11	1.87	0.56
1:A:438:THR:HA	1:A:441:THR:HG22	1.88	0.56
2:B:675:ILE:HG23	2:B:676:PRO:HD3	1.88	0.55
1:A:678:TYR:O	1:A:681:GLN:HB3	2.06	0.55
1:A:414:LEU:HB3	1:A:415:PRO:HD3	1.88	0.55
2:B:622:GLU:HB2	2:B:825:VAL:HG11	1.88	0.55
2:B:891:VAL:HB	2:B:1025:VAL:HG22	1.87	0.55
2:B:540:THR:O	2:B:544:ASN:ND2	2.40	0.55
1:A:672:MET:HG3	2:B:951:THR:HB	1.89	0.55
1:A:165:TYR:HE2	1:A:294:PHE:HB2	1.71	0.54
2:B:771:VAL:N	2:B:779:ARG:O	2.40	0.54
1:A:764:TRP:CD1	2:B:1089:LYS:HG3	2.42	0.54
2:B:413:GLU:HB2	2:B:417:ARG:NH1	2.22	0.54
2:B:414:LEU:O	2:B:418:MET:HG2	2.07	0.54
2:B:310:THR:HG22	2:B:311:GLU:HG3	1.89	0.54
2:B:294:VAL:HG11	2:B:334:TYR:HD2	1.71	0.54
2:B:987:ILE:HD13	2:B:1013:PRO:HG2	1.89	0.54
1:A:298:GLN:O	1:A:351:MET:HB2	2.08	0.54
1:A:457:THR:HA	1:A:474:PHE:HE1	1.70	0.54
2:B:628:ILE:HD12	2:B:638:PHE:HD1	1.73	0.54
2:B:730:LEU:HB2	2:B:744:TYR:CE2	2.43	0.54
2:B:624:GLY:HA3	2:B:641:ILE:HD13	1.89	0.54
1:A:150:VAL:HG12	1:A:163:VAL:HG22	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:769:VAL:N	2:B:781:HIS:O	2.41	0.54
1:A:147:VAL:HG21	1:A:276:PHE:CE1	2.43	0.54
1:A:345:TRP:CH2	1:A:359:ARG:HD2	2.43	0.54
1:A:365:ALA:HB2	1:A:429:GLN:HB2	1.88	0.54
1:A:709:LEU:HB3	1:A:735:ILE:HD13	1.90	0.54
1:A:736:LEU:HG	1:A:769:TYR:HD2	1.71	0.54
2:B:276:LEU:HD23	2:B:278:HIS:H	1.71	0.54
2:B:391:VAL:HG11	2:B:503:LEU:HA	1.90	0.54
2:B:425:GLU:OE1	2:B:454:ARG:NH1	2.41	0.53
2:B:418:MET:HE1	2:B:426:LEU:HD21	1.90	0.53
1:A:675:LYS:O	1:A:679:ILE:HG12	2.08	0.53
2:B:608:PHE:CZ	2:B:663:ILE:HG12	2.44	0.53
2:B:628:ILE:HD13	2:B:633:CYS:SG	2.48	0.53
2:B:631:LYS:HD2	2:B:811:LEU:HB3	1.91	0.53
2:B:542:LEU:HD23	2:B:547:ILE:HB	1.89	0.53
4:D:33:DT:H4'	4:D:34:DC:OP1	2.08	0.53
1:A:199:CYS:SG	1:A:200:VAL:N	2.81	0.53
2:B:675:ILE:HD12	2:B:824:ALA:HB1	1.91	0.53
1:A:524:ARG:HA	1:A:550:LYS:HA	1.90	0.53
2:B:865:PRO:HG3	2:B:923:PRO:HG3	1.90	0.53
2:B:1056:LEU:O	2:B:1056:LEU:HD12	2.09	0.53
1:A:384:PHE:CG	1:A:599:LEU:HD21	2.43	0.53
2:B:230:THR:HG23	4:D:34:DC:H3'	1.90	0.53
2:B:767:ASP:O	2:B:782:SER:HA	2.08	0.53
1:A:327:ALA:O	1:A:331:ASN:HB3	2.08	0.52
2:B:564:LEU:HA	2:B:840:VAL:HG21	1.91	0.52
1:A:192:ILE:HD11	1:A:307:VAL:HB	1.92	0.52
1:A:407:LEU:O	1:A:411:ILE:HG12	2.09	0.52
4:D:33:DT:H2"	4:D:34:DC:C6	2.44	0.52
1:A:359:ARG:O	1:A:363:VAL:HG23	2.08	0.52
2:B:541:THR:HG21	2:B:935:ILE:O	2.10	0.52
2:B:642:VAL:HG12	2:B:686:LEU:HD13	1.92	0.52
2:B:880:ASN:HD22	2:B:905:TYR:HD1	1.58	0.52
2:B:997:PHE:HA	2:B:1001:VAL:HG22	1.92	0.52
1:A:688:MET:HA	1:A:691:ILE:HG22	1.91	0.52
2:B:535:MET:HG3	2:B:934:GLY:HA2	1.92	0.52
1:A:481:LEU:O	1:A:485:MET:HG3	2.10	0.51
2:B:309:GLN:HE22	4:D:31:DG:H4'	1.75	0.51
2:B:369:LEU:HD21	2:B:421:LEU:HD12	1.91	0.51
2:B:560:LEU:HD13	2:B:911:LEU:HD22	1.92	0.51
1:A:421:LEU:HB3	1:A:437:VAL:CG1	2.39	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:782:SER:HB2	2:B:785:ILE:CD1	2.32	0.51
2:B:963:ILE:HG23	2:B:996:TYR:HE2	1.75	0.51
1:A:324:GLN:N	1:A:645:GLN:OE1	2.44	0.51
1:A:785:HIS:H	2:B:983:THR:HG22	1.75	0.51
2:B:1055:PHE:HE1	2:B:1068:TYR:CE1	2.29	0.51
1:A:309:ALA:O	1:A:680:ARG:HD3	2.11	0.51
1:A:711:ARG:HD3	1:A:711:ARG:C	2.30	0.51
2:B:680:SER:N	2:B:681:PRO:HD2	2.25	0.51
2:B:757:LYS:HA	2:B:777:VAL:HA	1.93	0.51
2:B:330:LEU:HD21	2:B:333:LEU:HD21	1.92	0.51
2:B:1056:LEU:HD13	2:B:1058:GLN:HG2	1.92	0.51
1:A:669:GLY:HA3	1:A:802:VAL:HG22	1.93	0.51
2:B:298:VAL:HG11	2:B:339:LEU:HD12	1.92	0.51
2:B:393:VAL:HG23	2:B:400:VAL:HG22	1.93	0.51
1:A:421:LEU:HG	1:A:436:PHE:HE2	1.76	0.50
2:B:877:TYR:HH	2:B:904:SER:HG	1.57	0.50
1:A:366:PHE:HZ	1:A:421:LEU:HD11	1.76	0.50
2:B:366:SER:HB2	2:B:424:VAL:HG21	1.93	0.50
1:A:427:LYS:H	1:A:430:LYS:HB2	1.76	0.50
2:B:899:MET:HB3	2:B:1055:PHE:CE2	2.45	0.50
4:D:29:DC:H2"	4:D:30:DT:C6	2.46	0.50
2:B:878:VAL:HG13	2:B:1057:TYR:HB2	1.93	0.50
1:A:232:PHE:HA	1:A:272:ALA:HB2	1.92	0.50
2:B:230:THR:HG22	2:B:232:LEU:H	1.77	0.50
4:D:22:DC:H2"	4:D:23:DA:C8	2.46	0.50
1:A:768:GLU:O	1:A:772:THR:HG22	2.12	0.50
1:A:833:LEU:HD23	2:B:957:THR:HA	1.94	0.50
2:B:994:LEU:HD13	2:B:1007:PHE:CD2	2.46	0.50
2:B:1053:VAL:HG21	2:B:1072:VAL:HG23	1.93	0.49
1:A:542:VAL:H	1:A:550:LYS:HG3	1.77	0.49
2:B:656:ILE:CG2	2:B:657:PRO:HD3	2.41	0.49
1:A:667:ILE:HD13	1:A:800:LEU:HB2	1.93	0.49
2:B:729:HIS:CG	2:B:784:PHE:CE2	3.00	0.49
2:B:537:ILE:HD11	2:B:547:ILE:CD1	2.42	0.49
4:D:27:DA:H2"	4:D:28:DG:C8	2.48	0.49
1:A:210:MET:O	1:A:213:LEU:HB3	2.12	0.49
1:A:238:TYR:O	1:A:255:SER:OG	2.29	0.49
2:B:614:HIS:CE1	2:B:655:ILE:HD11	2.48	0.49
1:A:414:LEU:HD22	1:A:444:ARG:HB2	1.95	0.49
1:A:434:ALA:O	1:A:437:VAL:HG22	2.13	0.49
2:B:369:LEU:HD23	2:B:392:GLY:HA3	1.93	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:397:THR:O	2:B:626:CYS:HB2	2.13	0.49
2:B:631:LYS:HA	2:B:811:LEU:HD23	1.95	0.49
2:B:538:ASN:HB3	2:B:541:THR:HG23	1.94	0.49
2:B:541:THR:HG22	2:B:937:THR:H	1.77	0.49
2:B:458:MET:HB2	2:B:463:PHE:HE1	1.78	0.49
2:B:729:HIS:CG	2:B:784:PHE:HE2	2.30	0.49
1:A:571:GLU:HA	1:A:574:GLN:HG2	1.95	0.49
2:B:688:ILE:HG22	2:B:689:LEU:HD12	1.94	0.49
2:B:861:ASN:HB2	2:B:925:GLU:HG2	1.95	0.49
3:C:23:DC:H2"	3:C:24:DG:H5'	1.94	0.48
1:A:330:LEU:HD23	1:A:611:VAL:HG11	1.95	0.48
1:A:359:ARG:NH1	1:A:691:ILE:O	2.46	0.48
2:B:683:GLU:O	2:B:687:LYS:HG2	2.12	0.48
2:B:903:SER:HA	2:B:906:ILE:HG12	1.95	0.48
3:C:44:DT:H2"	3:C:45:DG:C8	2.49	0.48
1:A:762:LEU:HD21	2:B:1073:ALA:HB2	1.96	0.48
1:A:414:LEU:O	1:A:417:VAL:HG12	2.13	0.48
1:A:366:PHE:O	1:A:373:ARG:HD3	2.13	0.48
2:B:683:GLU:HG3	2:B:687:LYS:HE2	1.96	0.48
1:A:360:LEU:HD12	1:A:621:ARG:HG3	1.94	0.48
1:A:638:ARG:HE	1:A:643:GLU:CD	2.17	0.48
2:B:726:ILE:HG22	2:B:744:TYR:CE2	2.48	0.48
1:A:514:ASP:HB2	1:A:522:TYR:CE1	2.49	0.48
2:B:250:VAL:HG12	2:B:307:VAL:HB	1.95	0.48
2:B:855:ARG:HD3	2:B:969:GLN:HG2	1.94	0.48
2:B:769:VAL:H	2:B:781:HIS:N	2.12	0.48
2:B:915:MET:CE	2:B:923:PRO:HD3	2.44	0.48
2:B:1034:VAL:HG11	2:B:1071:ASN:HD22	1.79	0.47
1:A:624:ILE:HD11	1:A:689:ALA:HB1	1.96	0.47
2:B:867:ILE:HB	2:B:877:TYR:CZ	2.49	0.47
1:A:725:PHE:HD2	2:B:1072:VAL:HG11	1.78	0.47
2:B:770:LYS:HB2	2:B:780:PHE:CE1	2.49	0.47
2:B:231:PRO:HB2	4:D:34:DC:OP2	2.13	0.47
3:C:46:DC:H2"	3:C:47:DA:C8	2.50	0.47
1:A:500:ALA:HB1	1:A:507:PRO:HA	1.97	0.47
1:A:830:VAL:CG2	2:B:956:LEU:HD21	2.31	0.47
2:B:260:GLY:HA2	2:B:281:MET:HG3	1.97	0.47
2:B:937:THR:HB	2:B:939:MET:CE	2.45	0.47
2:B:266:ALA:O	2:B:270:LEU:CB	2.63	0.47
2:B:414:LEU:HD23	2:B:439:LEU:HD23	1.97	0.47
2:B:903:SER:HB2	5:B:2000:ADP:O1A	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:472:PRO:HB2	1:A:479:SER:HA	1.97	0.47
1:A:650:PHE:HA	5:A:2000:ADP:C2	2.50	0.47
2:B:1055:PHE:CE1	2:B:1068:TYR:CE1	3.03	0.47
1:A:513:LEU:HA	1:A:522:TYR:O	2.16	0.46
2:B:389:GLY:HA3	2:B:498:PRO:HB2	1.97	0.46
3:C:26:DG:OP2	3:C:26:DG:H2'	2.16	0.46
3:C:42:DG:H2"	3:C:43:DG:C8	2.50	0.46
4:D:26:DG:H2"	4:D:27:DA:C8	2.51	0.46
1:A:485:MET:HB3	1:A:563:TYR:HE1	1.81	0.46
2:B:401:VAL:HB	2:B:528:LEU:HG	1.98	0.46
2:B:424:VAL:HG23	2:B:425:GLU:HG3	1.97	0.46
2:B:889:GLU:OE2	2:B:1028:TYR:HE2	1.98	0.46
2:B:895:THR:HG22	2:B:896:GLY:H	1.79	0.46
2:B:1001:VAL:HG23	2:B:1003:SER:H	1.80	0.46
1:A:147:VAL:HG21	1:A:276:PHE:HE1	1.79	0.46
1:A:300:MET:HG2	1:A:349:PRO:HB2	1.98	0.46
1:A:411:ILE:HB	1:A:451:GLN:NE2	2.23	0.46
2:B:518:MET:HG2	2:B:630:HIS:NE2	2.29	0.46
2:B:858:VAL:HB	2:B:928:THR:CG2	2.45	0.46
2:B:890:ARG:HH21	2:B:1024:GLN:HG2	1.81	0.46
1:A:762:LEU:HD12	2:B:1086:ALA:HB1	1.98	0.46
1:A:837:PRO:HD3	2:B:963:ILE:HG21	1.97	0.46
2:B:366:SER:O	2:B:394:GLN:HG3	2.16	0.46
2:B:915:MET:HE1	2:B:923:PRO:HD3	1.98	0.46
1:A:682:THR:O	1:A:685:ILE:HG22	2.15	0.46
2:B:628:ILE:HA	2:B:633:CYS:SG	2.56	0.46
2:B:388:ILE:CD1	2:B:414:LEU:HD22	2.46	0.46
2:B:429:PRO:HG3	2:B:463:PHE:CD2	2.51	0.46
2:B:708:ASP:OD1	2:B:709:PHE:N	2.48	0.46
2:B:962:ILE:HG22	2:B:997:PHE:HZ	1.80	0.46
2:B:475:PHE:HD2	2:B:476:TYR:CD1	2.34	0.45
2:B:769:VAL:O	2:B:780:PHE:HA	2.15	0.45
3:C:25:DA:H2"	3:C:26:DG:H8	1.79	0.45
3:C:25:DA:H2"	3:C:26:DG:O5'	2.16	0.45
1:A:829:HIS:HE1	2:B:953:MET:HA	1.82	0.45
2:B:261:GLU:O	2:B:265:ILE:HD12	2.16	0.45
2:B:850:THR:HB	2:B:928:THR:HA	1.97	0.45
1:A:543:ASP:H	1:A:550:LYS:HD2	1.80	0.45
2:B:369:LEU:HD12	2:B:423:PRO:HG3	1.99	0.45
2:B:678:LEU:HD22	2:B:820:SER:HB2	1.99	0.45
2:B:730:LEU:HD22	2:B:744:TYR:CD2	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:837:LEU:HD22	2:B:920:SER:HB3	1.98	0.45
2:B:848:ARG:HH11	2:B:848:ARG:HG2	1.79	0.45
2:B:936:PHE:O	2:B:972:VAL:HA	2.16	0.45
1:A:369:ASP:OD1	1:A:371:GLU:HG2	2.16	0.45
1:A:414:LEU:O	1:A:418:ILE:HG12	2.17	0.45
2:B:746:THR:HG22	2:B:752:PHE:HA	1.99	0.45
2:B:994:LEU:HG	2:B:998:ILE:HD11	1.99	0.45
1:A:679:ILE:O	1:A:682:THR:HG22	2.16	0.44
2:B:297:LEU:HB3	2:B:304:VAL:HG21	1.99	0.44
2:B:692:GLN:HA	2:B:692:GLN:OE1	2.17	0.44
1:A:173:LEU:N	1:A:290:GLU:O	2.50	0.44
1:A:435:VAL:O	1:A:438:THR:OG1	2.31	0.44
1:A:782:THR:HG21	1:A:787:LEU:HD23	1.99	0.44
2:B:242:GLN:O	2:B:243:HIS:ND1	2.50	0.44
2:B:400:VAL:HG11	2:B:525:PHE:CZ	2.52	0.44
2:B:933:ASP:OD1	2:B:967:THR:OG1	2.30	0.44
3:C:26:DG:H2"	3:C:27:DG:C8	2.52	0.44
1:A:241:LEU:HA	1:A:244:LEU:HB3	1.99	0.44
2:B:307:VAL:HG13	2:B:329:LYS:O	2.18	0.44
2:B:326:PHE:N	4:D:33:DT:OP2	2.49	0.44
2:B:595:ASP:O	2:B:665:SER:OG	2.35	0.44
2:B:955:GLU:O	2:B:959:THR:HG22	2.17	0.44
1:A:622:PRO:HG3	1:A:695:VAL:HG13	1.98	0.44
2:B:370:CYS:CB	2:B:427:LEU:HB3	2.45	0.44
2:B:370:CYS:SG	2:B:502:SER:HB2	2.58	0.44
2:B:987:ILE:HG12	2:B:1011:TYR:HB3	1.99	0.44
1:A:470:VAL:HG21	1:A:577:ILE:HG21	1.99	0.44
2:B:521:LYS:N	2:B:521:LYS:HD3	2.32	0.44
1:A:424:HIS:CE1	1:A:426:GLY:HA3	2.53	0.44
1:A:602:LEU:O	1:A:606:VAL:HG23	2.16	0.44
2:B:430:SER:OG	2:B:460:ASN:OD1	2.35	0.44
2:B:972:VAL:O	2:B:1005:THR:HA	2.18	0.44
1:A:365:ALA:HB2	1:A:429:GLN:CB	2.47	0.44
1:A:402:GLN:O	1:A:406:ARG:HG2	2.17	0.44
1:A:149:GLY:O	1:A:163:VAL:HA	2.18	0.43
1:A:199:CYS:HB3	1:A:217:ILE:HD11	2.00	0.43
1:A:363:VAL:HG21	1:A:692:GLY:O	2.16	0.43
1:A:436:PHE:CZ	1:A:602:LEU:HD13	2.53	0.43
2:B:510:LEU:HD23	2:B:510:LEU:HA	1.80	0.43
2:B:613:ASN:HA	2:B:616:ARG:NH1	2.33	0.43
2:B:863:ARG:HD3	2:B:868:ASP:CG	2.39	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:550:ASN:ND2	2:B:553:ASP:OD1	2.45	0.43
1:A:384:PHE:CD2	1:A:599:LEU:HD21	2.53	0.43
2:B:709:PHE:HB3	2:B:806:GLU:HG2	2.00	0.43
2:B:912:ILE:HG12	2:B:923:PRO:HD2	2.00	0.43
1:A:300:MET:HE1	1:A:687:LEU:HD12	2.01	0.43
1:A:638:ARG:HA	1:A:681:GLN:NE2	2.33	0.43
1:A:829:HIS:CE1	2:B:953:MET:HA	2.53	0.43
2:B:256:TYR:CE2	2:B:290:LEU:HD22	2.54	0.43
2:B:956:LEU:HD12	2:B:956:LEU:HA	1.76	0.43
1:A:847:LYS:HA	1:A:847:LYS:HD2	1.82	0.43
2:B:326:PHE:CD1	4:D:32:DA:H3'	2.54	0.43
2:B:561:LEU:O	2:B:565:ASP:HB2	2.19	0.43
2:B:656:ILE:HA	2:B:659:VAL:HB	2.01	0.43
2:B:884:LEU:HD21	2:B:892:MET:HG3	1.99	0.43
2:B:413:GLU:HB2	2:B:417:ARG:HH11	1.82	0.43
2:B:309:GLN:HG2	2:B:328:ARG:NH1	2.34	0.43
2:B:497:LYS:HB2	2:B:498:PRO:HD3	2.00	0.43
2:B:937:THR:HB	2:B:939:MET:HE1	2.00	0.43
1:A:167:ASP:OD2	1:A:170:GLN:HB2	2.19	0.42
2:B:369:LEU:HA	2:B:392:GLY:HA3	2.00	0.42
2:B:730:LEU:O	2:B:734:ARG:HG3	2.19	0.42
2:B:864:HIS:HE1	2:B:866:VAL:HB	1.84	0.42
1:A:634:LEU:CD1	1:A:685:ILE:HG21	2.49	0.42
2:B:411:ARG:NE	2:B:436:THR:OG1	2.52	0.42
2:B:851:VAL:HG13	2:B:931:ILE:HD11	2.00	0.42
2:B:852:GLN:O	2:B:930:GLY:HA2	2.19	0.42
2:B:863:ARG:HG2	2:B:923:PRO:HB2	2.00	0.42
1:A:634:LEU:HD13	1:A:685:ILE:HG21	2.02	0.42
2:B:395:PRO:HA	2:B:518:MET:HE3	2.01	0.42
2:B:675:ILE:HG12	2:B:828:LEU:HD21	2.00	0.42
1:A:678:TYR:CE1	1:A:817:VAL:HG11	2.54	0.42
2:B:671:VAL:O	2:B:675:ILE:HG22	2.19	0.42
2:B:785:ILE:O	2:B:789:TYR:HB2	2.18	0.42
2:B:325:LEU:HB2	4:D:33:DT:P	2.59	0.42
2:B:612:GLU:HG3	2:B:835:PHE:CD2	2.55	0.42
2:B:746:THR:HG22	2:B:751:GLU:C	2.39	0.42
1:A:174:GLY:HA2	1:A:292:THR:O	2.19	0.42
2:B:333:LEU:HB2	2:B:513:PHE:CD1	2.52	0.42
2:B:994:LEU:HD12	2:B:994:LEU:HA	1.88	0.42
1:A:372:LEU:HD22	1:A:424:HIS:HB2	2.00	0.42
1:A:419:GLN:O	1:A:422:GLU:HG2	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:455:VAL:HG11	2:B:457:ARG:HH21	1.85	0.42
2:B:675:ILE:HG23	2:B:676:PRO:CD	2.49	0.42
1:A:414:LEU:CD2	1:A:444:ARG:HB2	2.50	0.42
1:A:639:HIS:HB3	1:A:642:VAL:HG12	2.01	0.42
2:B:245:ASP:OD1	2:B:245:ASP:N	2.45	0.42
2:B:371:ILE:HG12	2:B:390:ILE:HG22	2.01	0.42
4:D:37:DC:H2"	4:D:38:DG:H8	1.85	0.42
1:A:401:LEU:HA	1:A:404:CYS:SG	2.60	0.42
1:A:829:HIS:HD1	1:A:829:HIS:C	2.24	0.42
2:B:249:CYS:HB3	2:B:258:PHE:CD1	2.55	0.42
2:B:535:MET:SD	2:B:935:ILE:HG12	2.60	0.42
2:B:583:PRO:HG3	2:B:918:ILE:HD11	2.01	0.42
2:B:675:ILE:CD1	2:B:824:ALA:HB1	2.49	0.42
2:B:1089:LYS:HD2	2:B:1089:LYS:HA	1.72	0.42
1:A:164:GLY:O	1:A:273:VAL:HG11	2.20	0.41
2:B:421:LEU:HA	2:B:421:LEU:HD23	1.74	0.41
2:B:266:ALA:O	2:B:270:LEU:HB3	2.20	0.41
2:B:829:ALA:O	2:B:830:THR:C	2.58	0.41
2:B:994:LEU:HD22	2:B:1007:PHE:CD2	2.54	0.41
1:A:447:PHE:HE1	1:A:591:PRO:CB	2.33	0.41
1:A:574:GLN:O	1:A:578:VAL:HG13	2.19	0.41
2:B:503:LEU:HA	2:B:506:ILE:HG22	2.02	0.41
2:B:744:TYR:HB3	2:B:752:PHE:HB3	2.01	0.41
2:B:877:TYR:CD2	5:B:2000:ADP:C2	3.08	0.41
1:A:472:PRO:HB3	1:A:482:ARG:HB2	2.01	0.41
2:B:395:PRO:HA	2:B:518:MET:SD	2.61	0.41
2:B:994:LEU:HG	2:B:998:ILE:CD1	2.50	0.41
1:A:841:ILE:HD13	1:A:841:ILE:HA	1.96	0.41
1:A:844:ALA:HB1	2:B:989:ILE:HD13	2.03	0.41
2:B:388:ILE:HD11	2:B:414:LEU:HD22	2.03	0.41
2:B:821:LEU:O	2:B:825:VAL:HG23	2.21	0.41
2:B:1028:TYR:HB3	2:B:1059:ILE:HG23	2.02	0.41
1:A:575:ASP:O	1:A:578:VAL:HG22	2.21	0.41
1:A:837:PRO:HD2	1:A:840:VAL:CG1	2.50	0.41
2:B:677:GLU:HA	2:B:680:SER:OG	2.20	0.41
1:A:169:ILE:O	1:A:388:ASN:OD1	2.38	0.41
1:A:366:PHE:CZ	1:A:421:LEU:HD11	2.56	0.41
1:A:372:LEU:CD2	1:A:424:HIS:HB2	2.51	0.41
1:A:667:ILE:HG13	1:A:679:ILE:HD11	2.03	0.41
2:B:407:ASP:OD1	2:B:408:SER:N	2.53	0.41
2:B:613:ASN:HA	2:B:616:ARG:NH2	2.36	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:768:TRP:CB	2:B:780:PHE:HB3	2.47	0.41
2:B:1029:HIS:ND1	2:B:1062:GLY:O	2.31	0.41
2:B:580:VAL:HA	2:B:918:ILE:CD1	2.51	0.40
2:B:596:ALA:O	2:B:600:VAL:HG23	2.21	0.40
1:A:540:SER:N	1:A:552:THR:O	2.52	0.40
2:B:689:LEU:HD11	2:B:810:PHE:HE2	1.85	0.40
2:B:1078:VAL:HG12	2:B:1079:PRO:HD2	2.03	0.40
1:A:656:TYR:HD1	1:A:657:PHE:N	2.18	0.40
2:B:503:LEU:O	2:B:507:ILE:HG22	2.21	0.40
2:B:621:ILE:HA	2:B:641:ILE:HD11	2.03	0.40
2:B:848:ARG:HB2	2:B:921:TYR:CZ	2.56	0.40
2:B:1067:SER:OG	2:B:1070:LEU:HB2	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	747/934 (80%)	712 (95%)	35 (5%)	0	100	100
2	B	804/1137 (71%)	751 (93%)	53 (7%)	0	100	100
All	All	1551/2071 (75%)	1463 (94%)	88 (6%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

The Analysed column shows the number of residues for which the sidechain conformation was

analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	678/808 (84%)	649 (96%)	29 (4%)	25 51
2	B	736/998 (74%)	705 (96%)	31 (4%)	25 51
All	All	1414/1806 (78%)	1354 (96%)	60 (4%)	27 51

All (60) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	67	MET
1	A	176	CYS
1	A	223	LEU
1	A	234	THR
1	A	293	THR
1	A	352	ASP
1	A	403	ASP
1	A	432	LEU
1	A	436	PHE
1	A	437	VAL
1	A	444	ARG
1	A	474	PHE
1	A	510	GLN
1	A	514	ASP
1	A	522	TYR
1	A	529	GLU
1	A	556	LEU
1	A	588	TYR
1	A	607	SER
1	A	656	TYR
1	A	671	ASN
1	A	693	CYS
1	A	703	SER
1	A	707	CYS
1	A	711	ARG
1	A	737	ARG
1	A	780	PHE
1	A	835	ASN
1	A	879	GLN
2	B	229	TYR
2	B	262	ASP
2	B	273	TYR
2	B	274	CYS
2	B	275	HIS

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Mol	Chain	Res	Type
2	B	280	PHE
2	B	296	ARG
2	B	322	ARG
2	B	370	CYS
2	B	385	ASN
2	B	387	PHE
2	B	402	PHE
2	B	461	ILE
2	B	507	ILE
2	B	542	LEU
2	B	602	HIS
2	B	625	LEU
2	B	667	LEU
2	B	709	PHE
2	B	744	TYR
2	B	752	PHE
2	B	753	MET
2	B	789	TYR
2	B	803	CYS
2	B	827	HIS
2	B	830	THR
2	B	877	TYR
2	B	878	VAL
2	B	1007	PHE
2	B	1032	PHE
2	B	1054	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	374	GLN
1	A	388	ASN
1	A	424	HIS
1	A	451	GLN
1	A	535	ASN
1	A	671	ASN
2	B	544	ASN
2	B	908	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 for Mogul analysis.

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	ADP	A	2000	6	24,29,29	0.73	0	29,45,45	1.02	2 (6%)
5	ADP	B	2000	6	24,29,29	0.68	0	29,45,45	1.09	3 (10%)

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	ADP	A	2000	6	-	0/12/32/32	0/3/3/3
5	ADP	B	2000	6	-	3/12/32/32	0/3/3/3

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	B	2000	ADP	C3'-C2'-C1'	2.79	105.18	100.98
5	A	2000	ADP	PA-O3A-PB	-2.73	123.47	132.83
5	A	2000	ADP	C5-C6-N6	2.50	124.15	120.35
5	B	2000	ADP	PA-O3A-PB	-2.29	124.98	132.83
5	B	2000	ADP	C5-C6-N6	2.15	123.62	120.35

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	2000	ADP	C5'-O5'-PA-O2A
5	B	2000	ADP	C5'-O5'-PA-O3A
5	B	2000	ADP	C3'-C4'-C5'-O5'

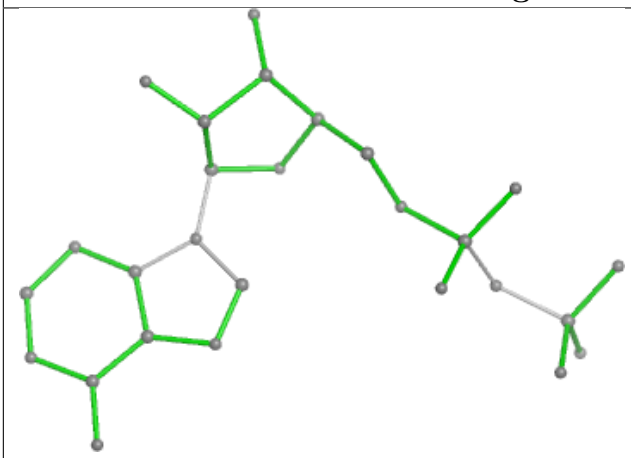
There are no ring outliers.

2 monomers are involved in 3 short contacts:

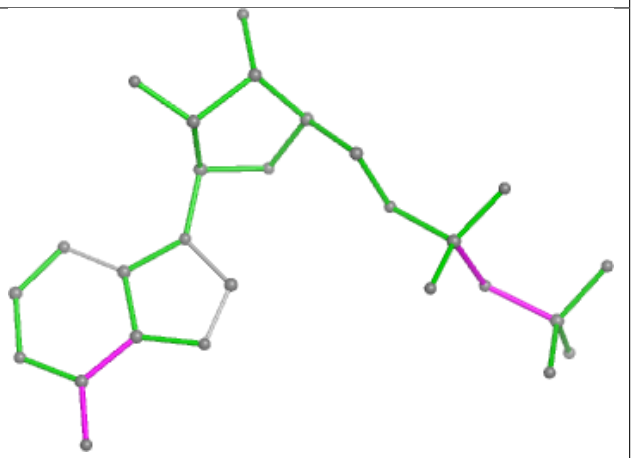
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	2000	ADP	1	0
5	B	2000	ADP	2	0

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 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.

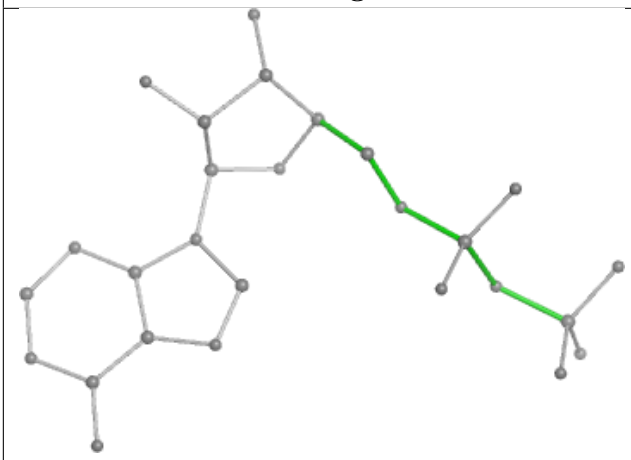
Ligand ADP A 2000



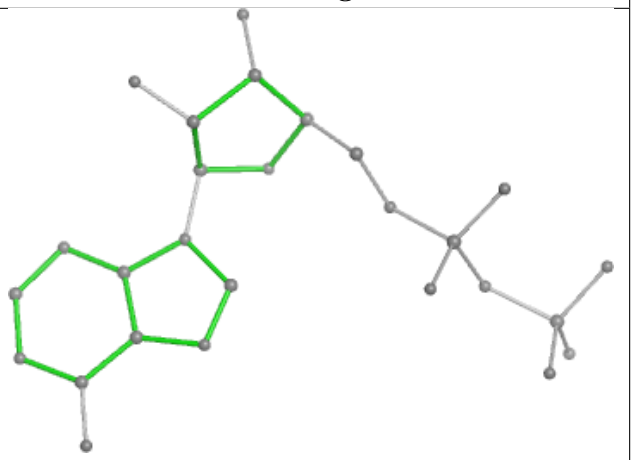
Bond lengths



Bond angles

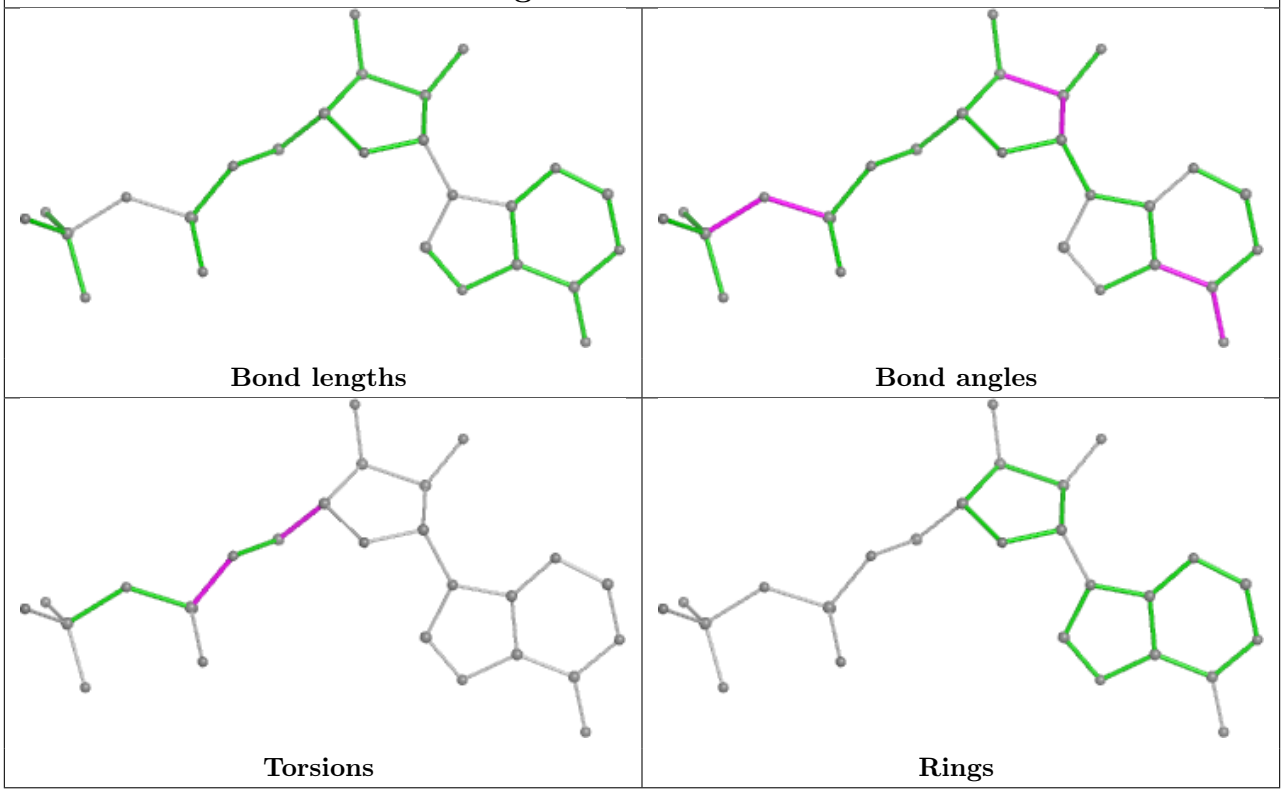


Torsions



Rings

Ligand ADP B 2000



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

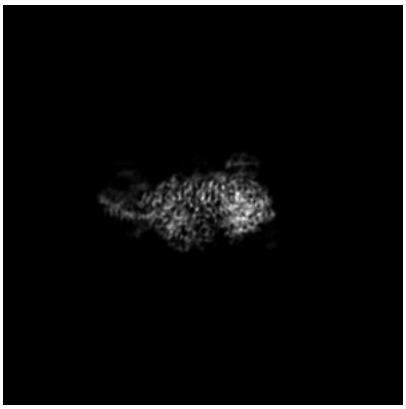
This section contains visualisations of the EMDB entry EMD-19605. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

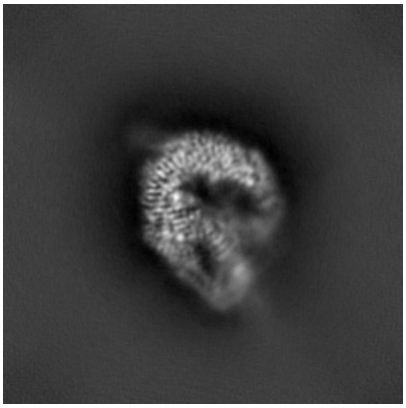
X



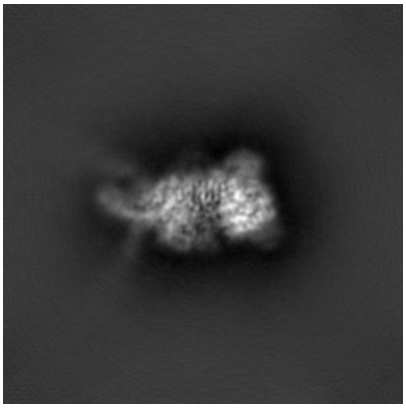
Y

Z

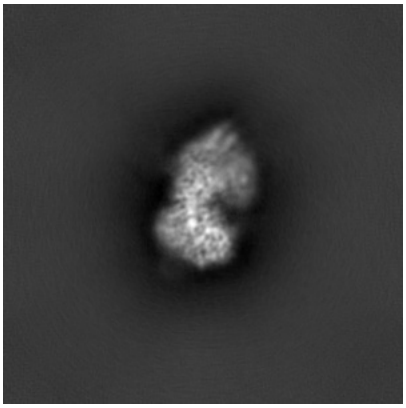
6.1.2 Raw map



X



Y



Z

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

6.2 Central slices (i)

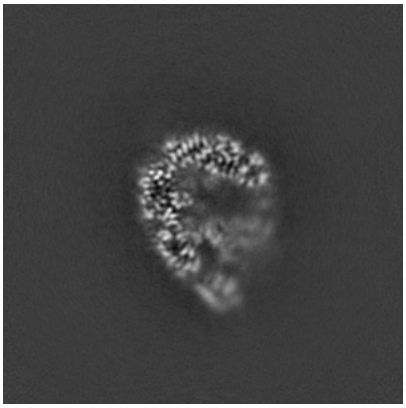
6.2.1 Primary map

X Index: 160

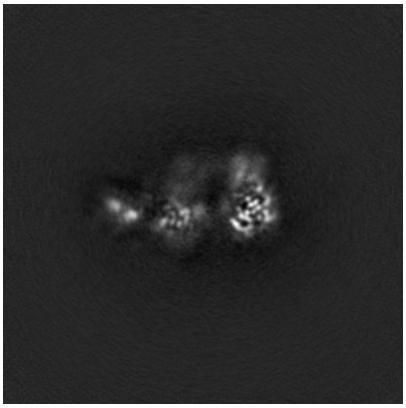
Y Index: 160

Z Index: 160

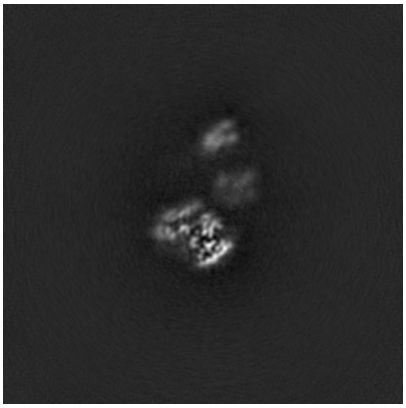
6.2.2 Raw map



X Index: 160



Y Index: 160



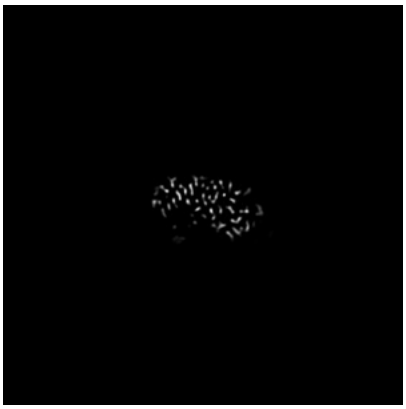
Z Index: 160

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

6.3 Largest variance slices (i)

6.3.1 Primary map

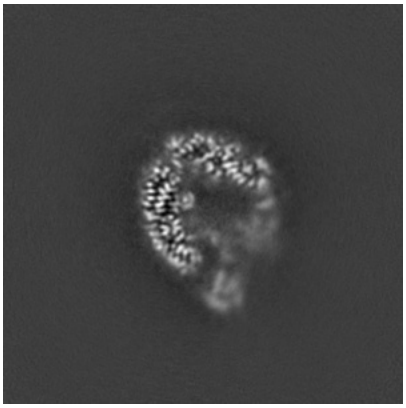
X Index: 164



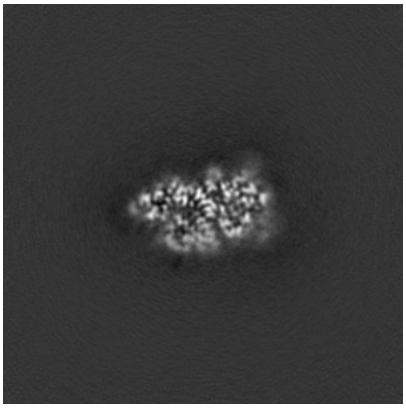
Y Index: 128

Z Index: 187

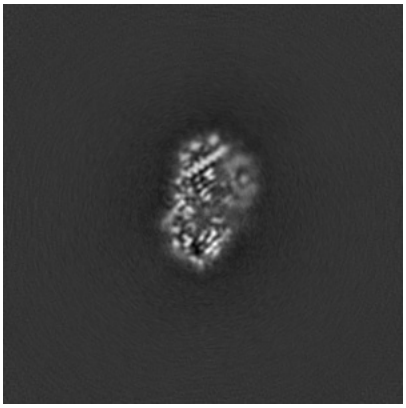
6.3.2 Raw map



X Index: 164



Y Index: 138

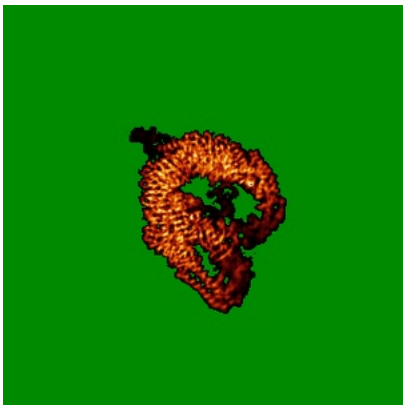


Z Index: 187

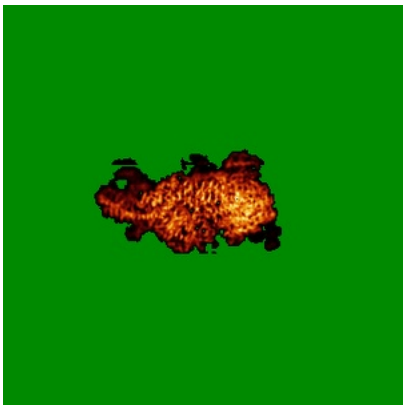
The images above show the largest variance slices of the map in three orthogonal directions.

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

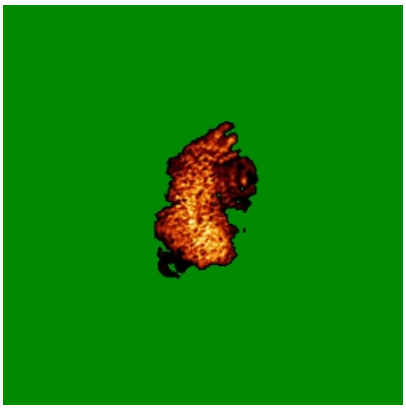
6.4.1 Primary map



X

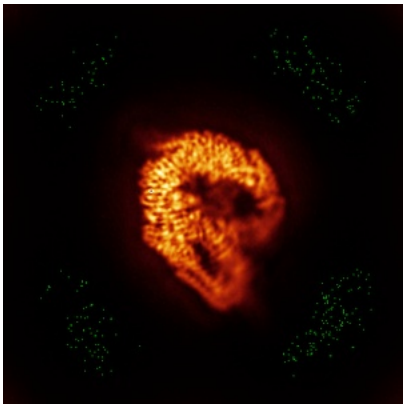


Y

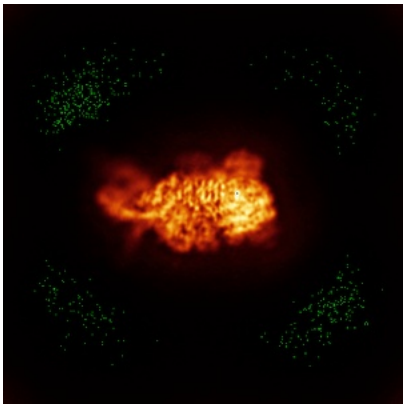


Z

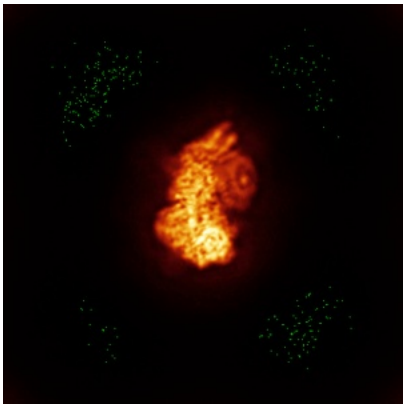
6.4.2 Raw map



X



Y

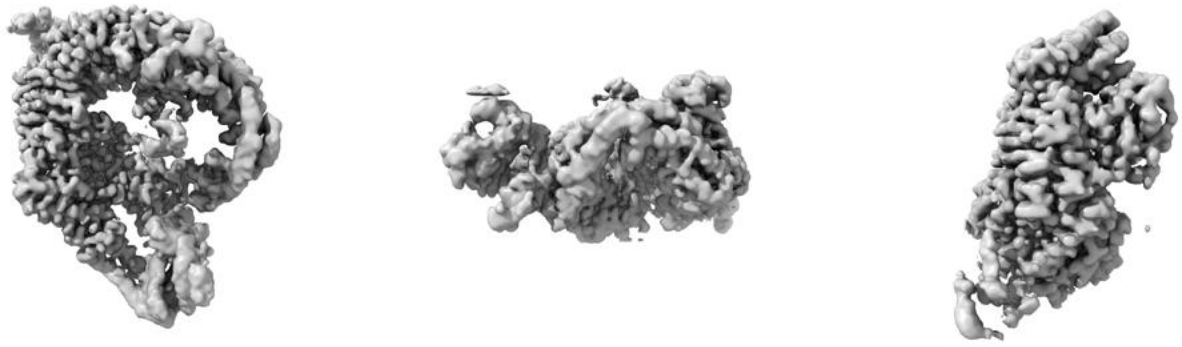


Z

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)

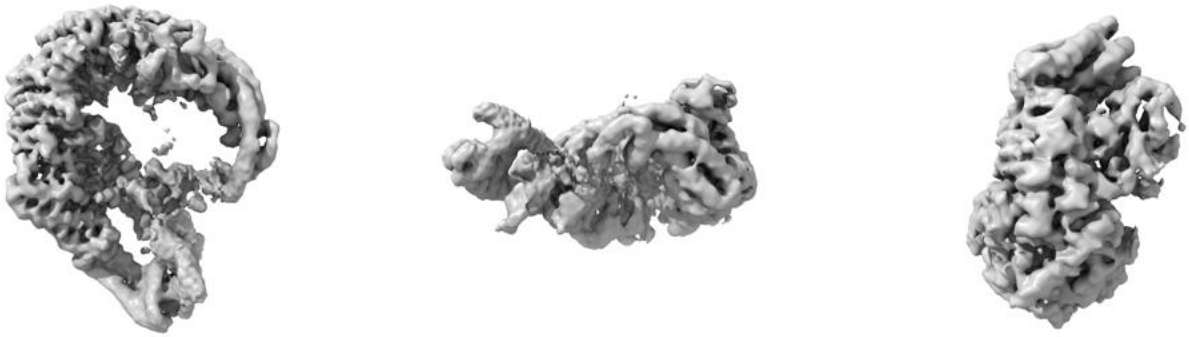
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.015. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

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

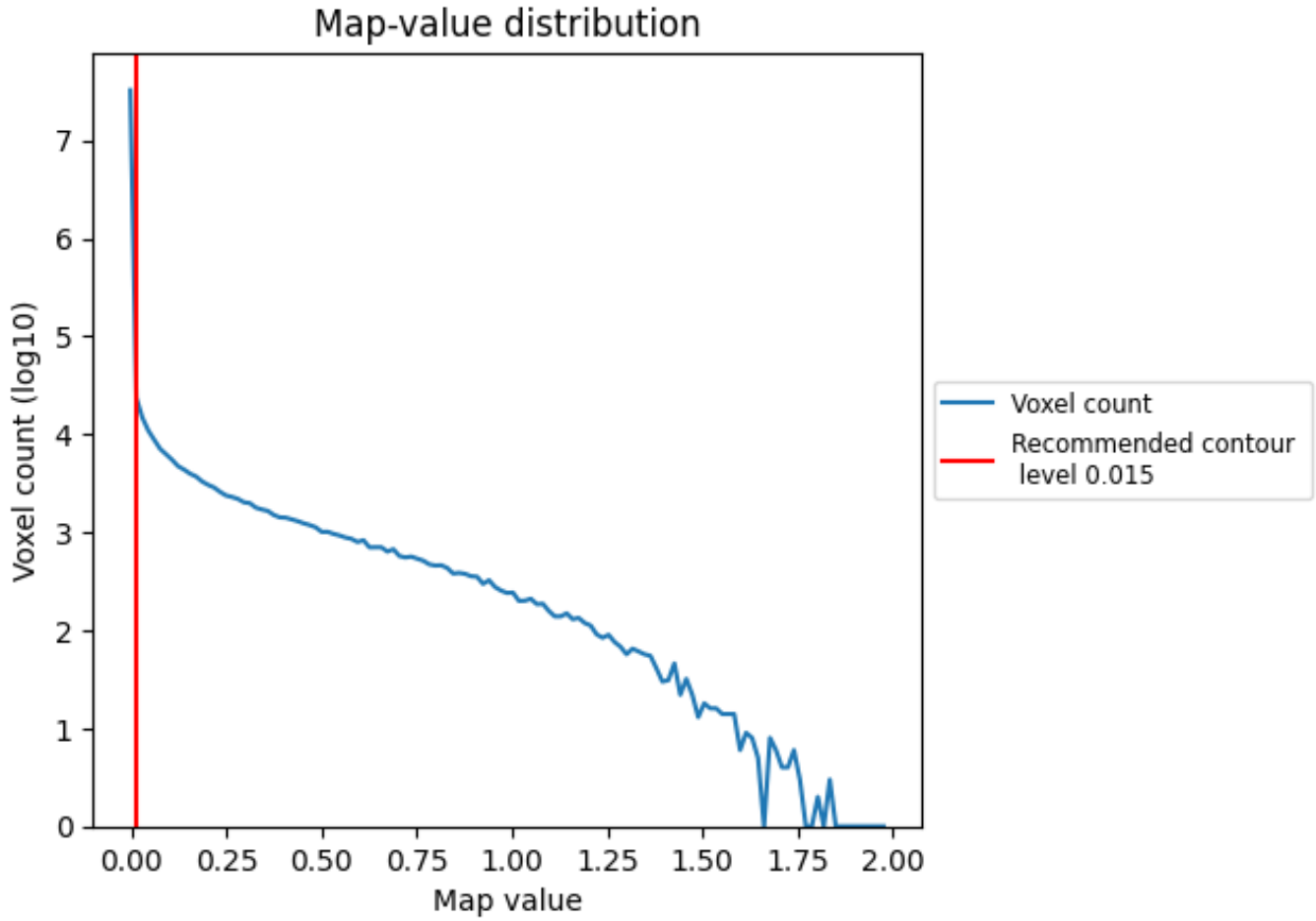
6.6 Mask visualisation (i)

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

7 Map analysis

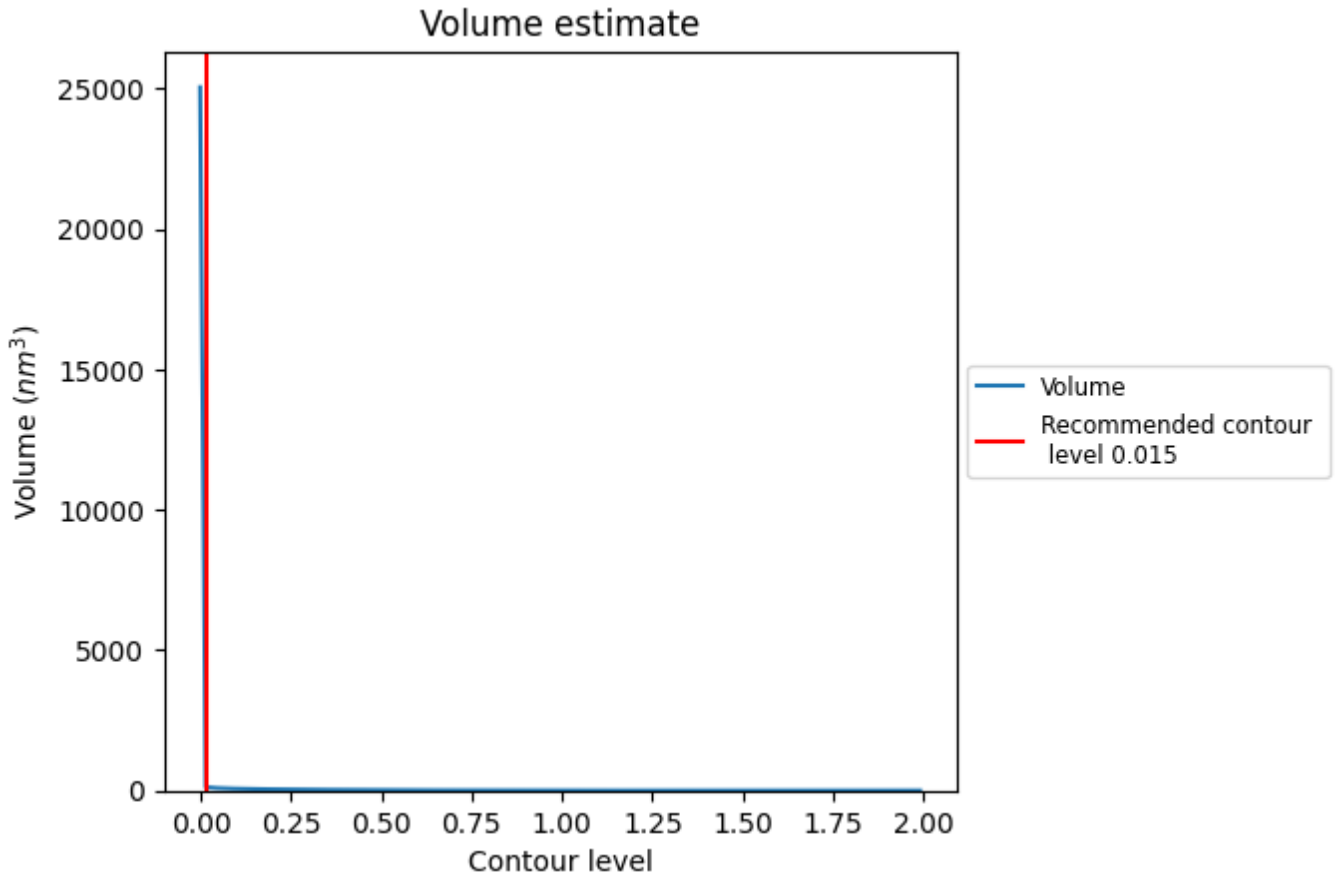
This section contains the results of statistical analysis of the map.

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.

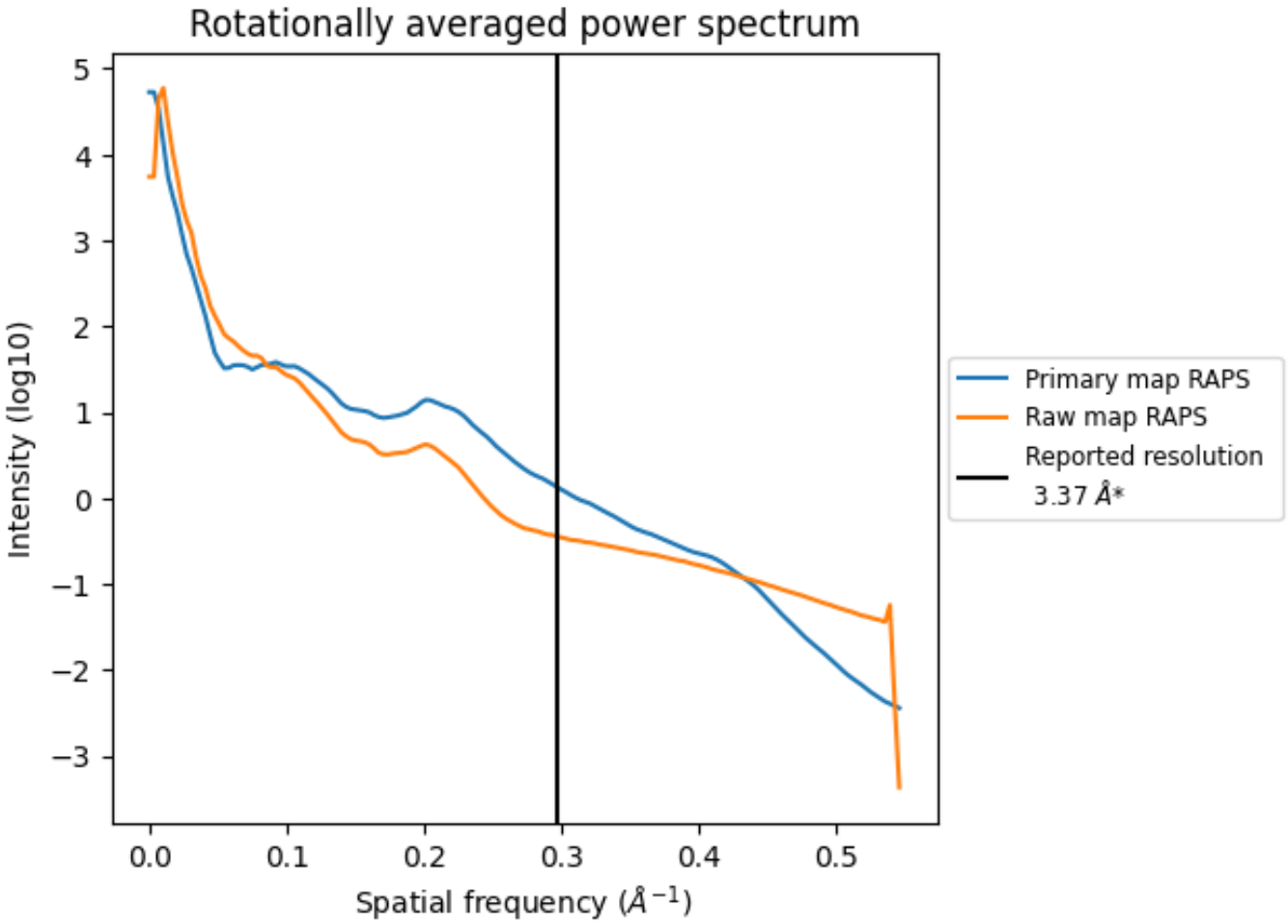
7.2 Volume estimate



The volume at the recommended contour level is 117 nm^3; this corresponds to an approximate mass of 106 kDa.

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

7.3 Rotationally averaged power spectrum (i)

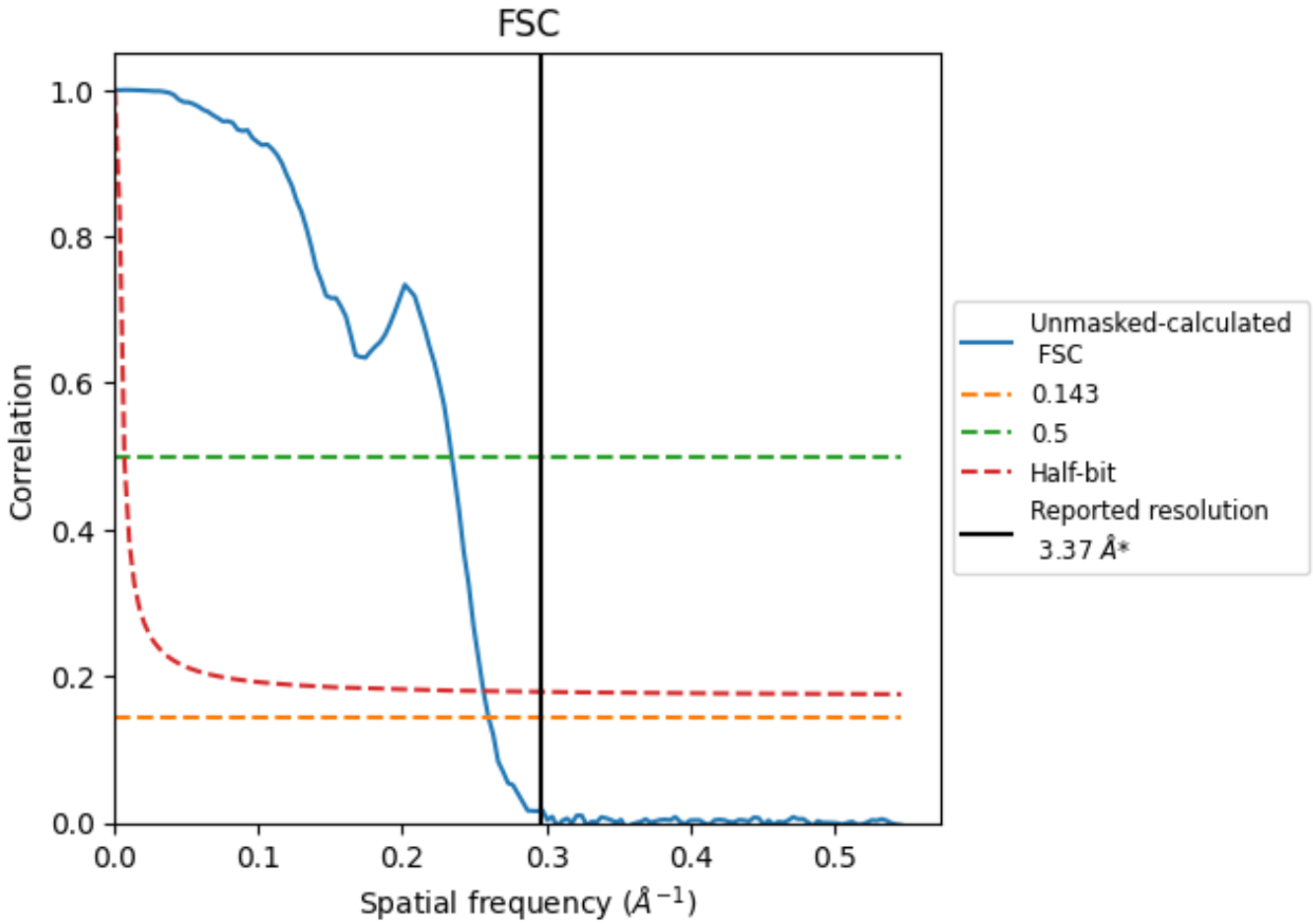


*Reported resolution corresponds to spatial frequency of 0.297 Å^{-1}

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 0.297 Å^{-1}

8.2 Resolution estimates (i)

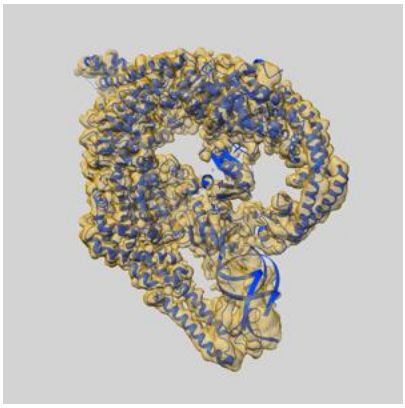
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.37	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.85	4.27	3.90

*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 3.85 differs from the reported value 3.37 by more than 10 %

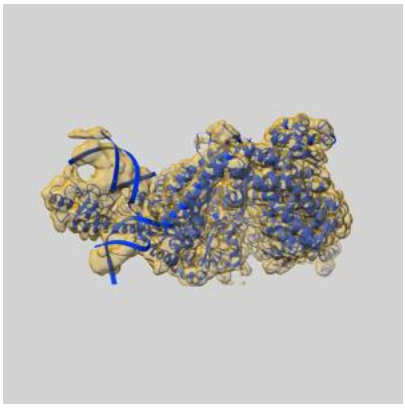
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-19605 and PDB model 8RZ7. Per-residue inclusion information can be found in section 3 on page 5.

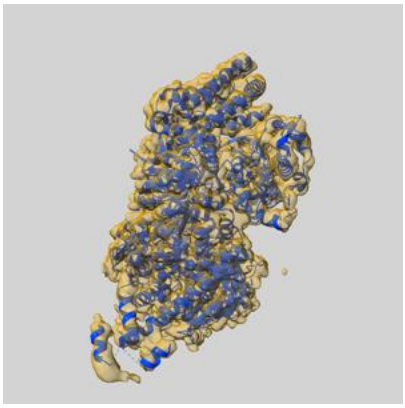
9.1 Map-model overlay



X



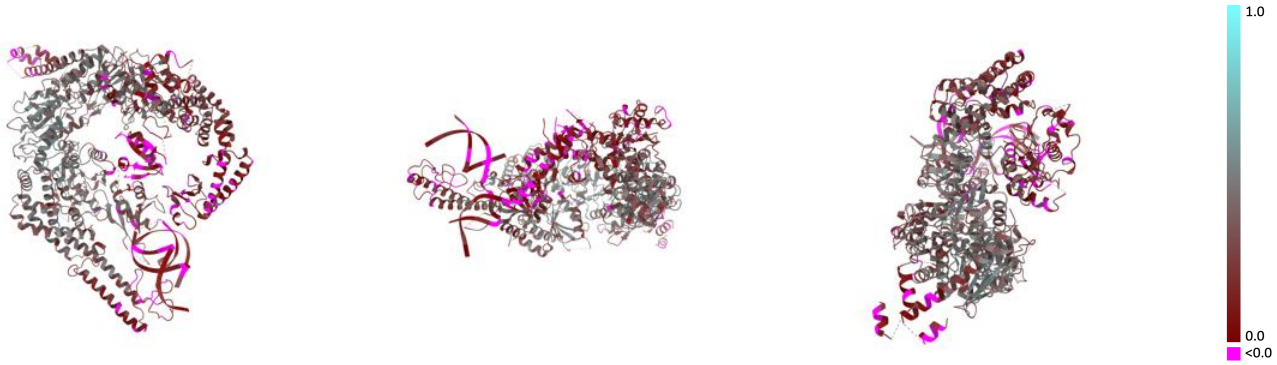
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.015 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.

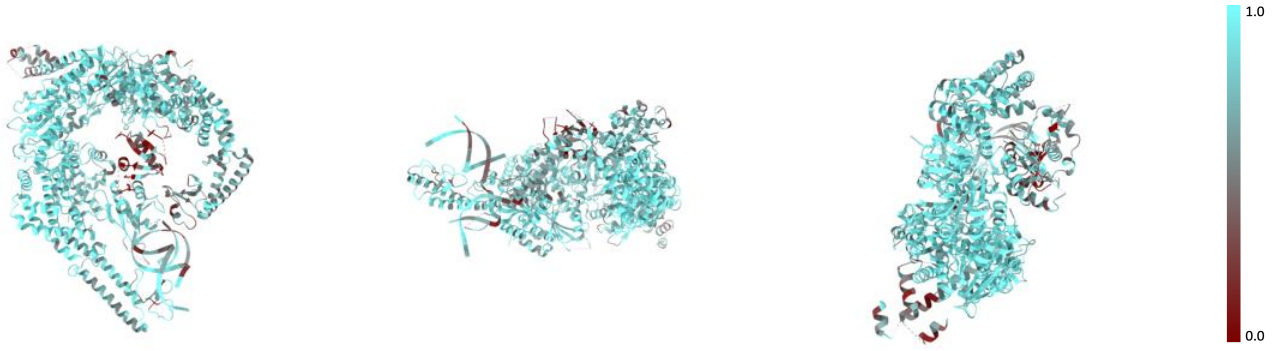
9.2 Q-score mapped to coordinate model (i)



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.

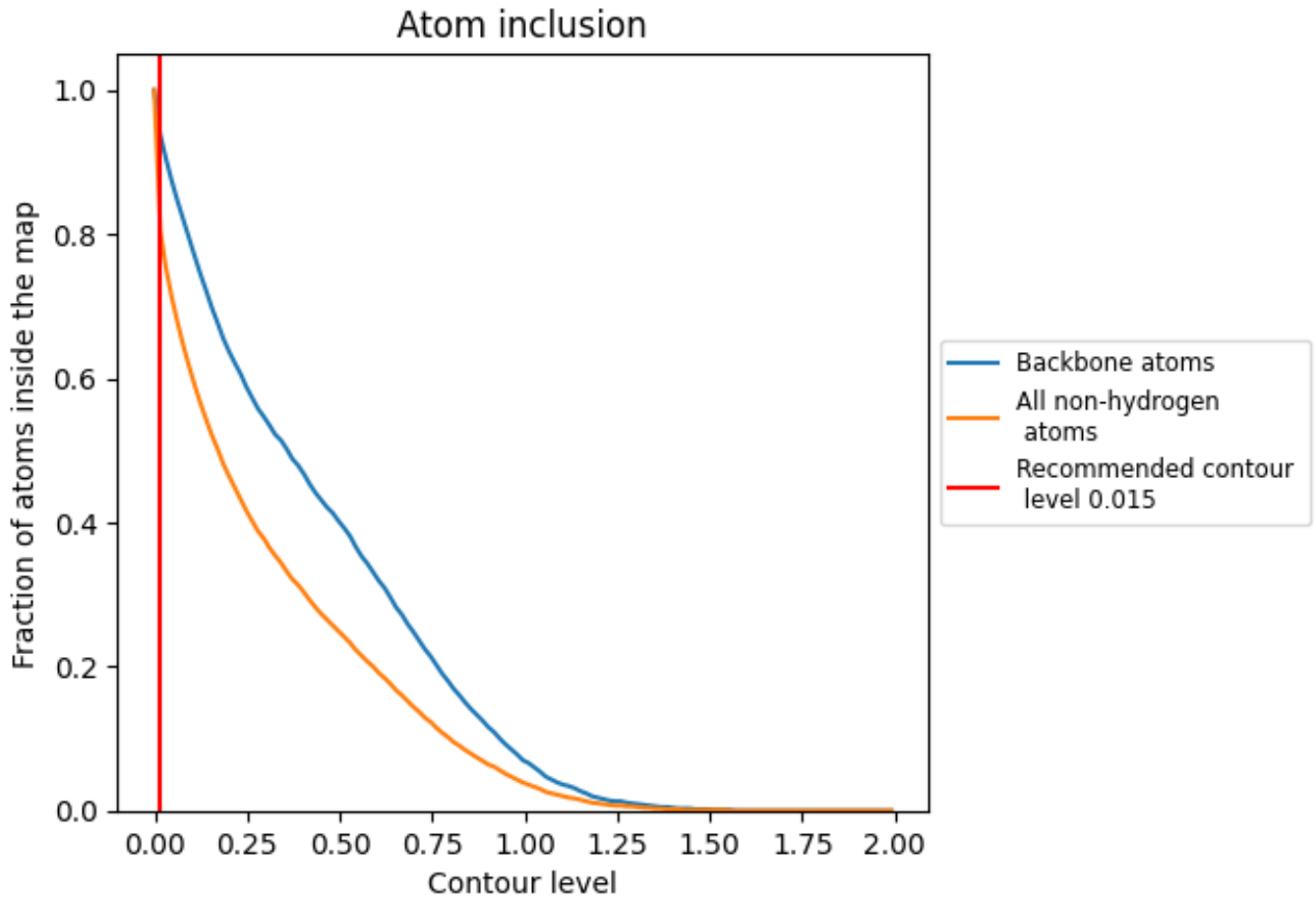
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.015).

9.4 Atom inclusion (i)



At the recommended contour level, 94% 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 (0.015) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8040	0.2920
A	0.7530	0.2550
B	0.8680	0.3510
C	0.7240	0.1060
D	0.6000	0.0580