Full wwPDB EM Validation Report (i)

Jun 3, 2025 – 08:23 PM JST

PDB ID	:	9UHT / pdb_00009uht
EMDB ID	:	EMD-64175
Title	:	SARS-CoV-2 E-RTC in complex with RNA-nsp9 and GMPPNP
Authors	:	Huang, Y.C.; Liu, Y.X.; Lou, Z.Y.; Rao, Z.H.; Yan, L.M.
Deposited on	:	2025-04-14
Resolution	:	2.89 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 (i) 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 (i)) were used in the production of this report:

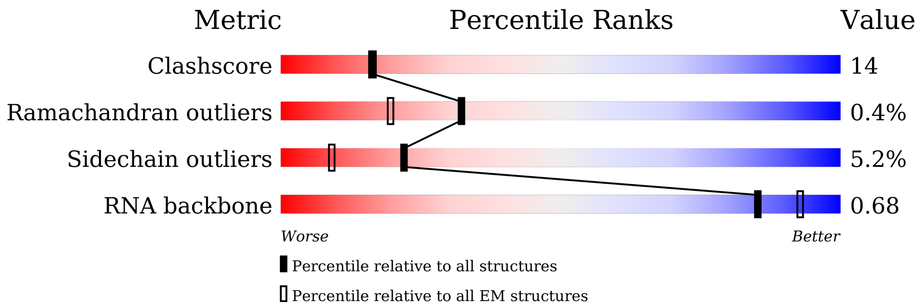
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0rc1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

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 2.89 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
RNA backbone	6643	2191

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	932	• / 86% 12% •
2	B	198	33% / 73% 21% • •
2	D	198	48% / 66% 28% • 6%
3	C	78	18% / 74% 26%
4	E	593	98% / 59% 39% ••
4	F	593	93% / 53% 44% ••
5	G	113	47% / 42% 42% 11% •

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Mol	Chain	Length	Quality of chain
6	H	4	75% / 25% 25% 50%
7	I	25	8% / 52% 36% 12%
8	J	27	44% 56%

2 Entry composition (i)

There are 11 unique types of molecules in this entry. The entry contains 22068 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 RNA-directed RNA polymerase nsp12.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	931	Total 7496	C 4787	N 1257	O 1398	S 54	0	0

- Molecule 2 is a protein called Non-structural protein 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	190	Total 1417	C 884	N 244	O 278	S 11	0	0
2	D	187	Total 1426	C 896	N 245	O 274	S 11	0	0

- Molecule 3 is a protein called Non-structural protein 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	78	Total 600	C 376	N 98	O 119	S 7	0	0

- Molecule 4 is a protein called Helicase nsp13.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	586	Total 4513	C 2878	N 751	O 849	S 35	1	0
4	F	586	Total 4513	C 2878	N 751	O 849	S 35	1	0

- Molecule 5 is a protein called Viral protein genome-linked nsp9.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	G	113	Total 868	C 549	N 150	O 164	S 5	0	0

- Molecule 6 is a RNA chain called RNA (5'-R(P*AP*UP*UP*A)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
6	H	4	84	38	14	28	4	0	0

- Molecule 7 is a RNA chain called PRIMER.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
7	I	25	545	242	105	173	25	0	0

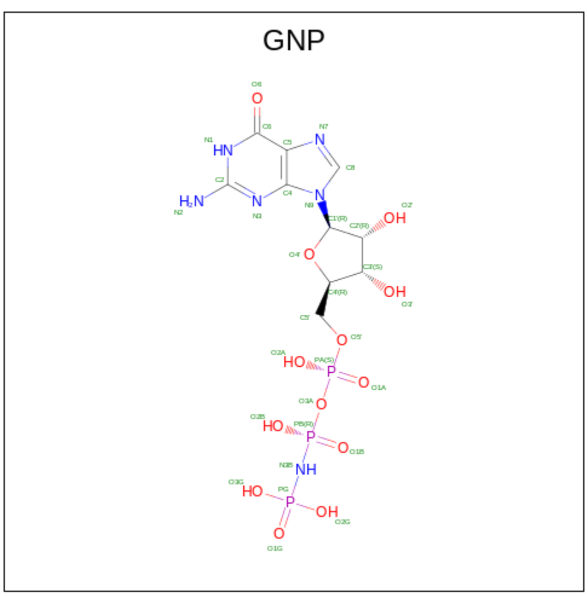
- Molecule 8 is a RNA chain called TEMPLATE.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
8	J	27	565	253	94	191	27	0	0

- Molecule 9 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
9	A	2	2	2	0
9	E	3	3	3	0
9	F	3	3	3	0

- Molecule 10 is PHOSPHOAMINOPHOSPHONIC ACID-GUANYLATE ESTER (CCD ID: GNP) (formula: $C_{10}H_{17}N_6O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
10	A	1	32	10	6	13	3	0

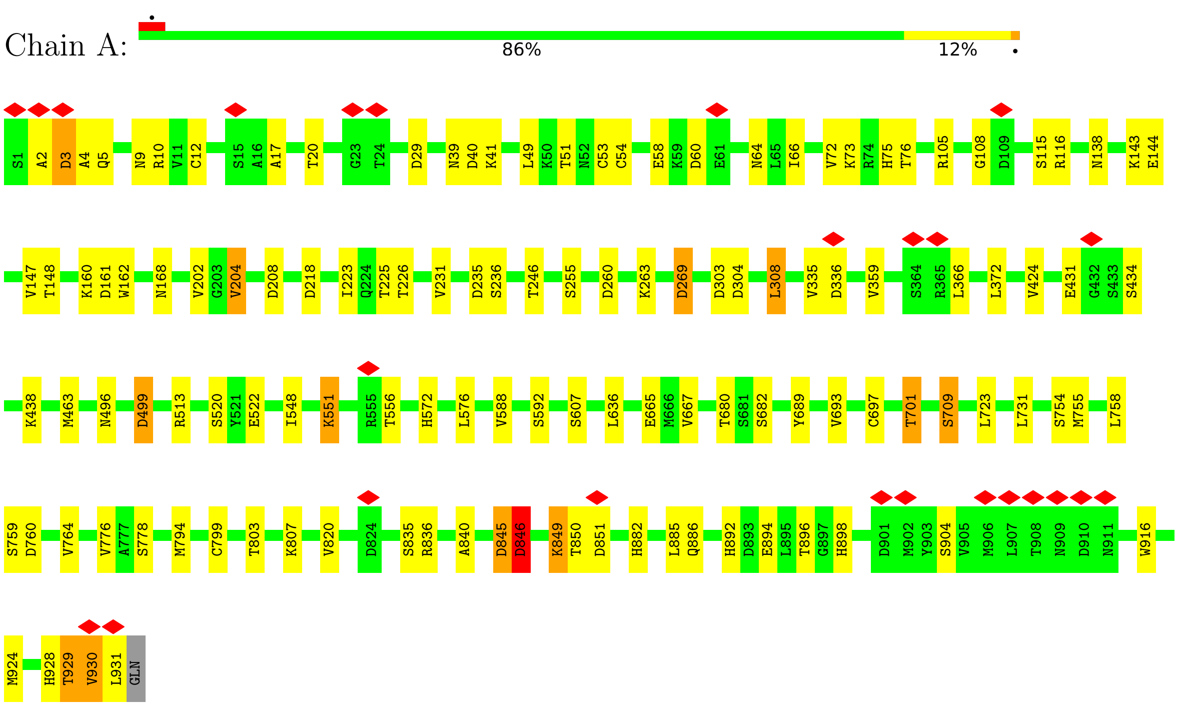
- Molecule 11 is water.

Mol	Chain	Residues	Atoms		AltConf
			Total	O	
11	A	1	1	1	0

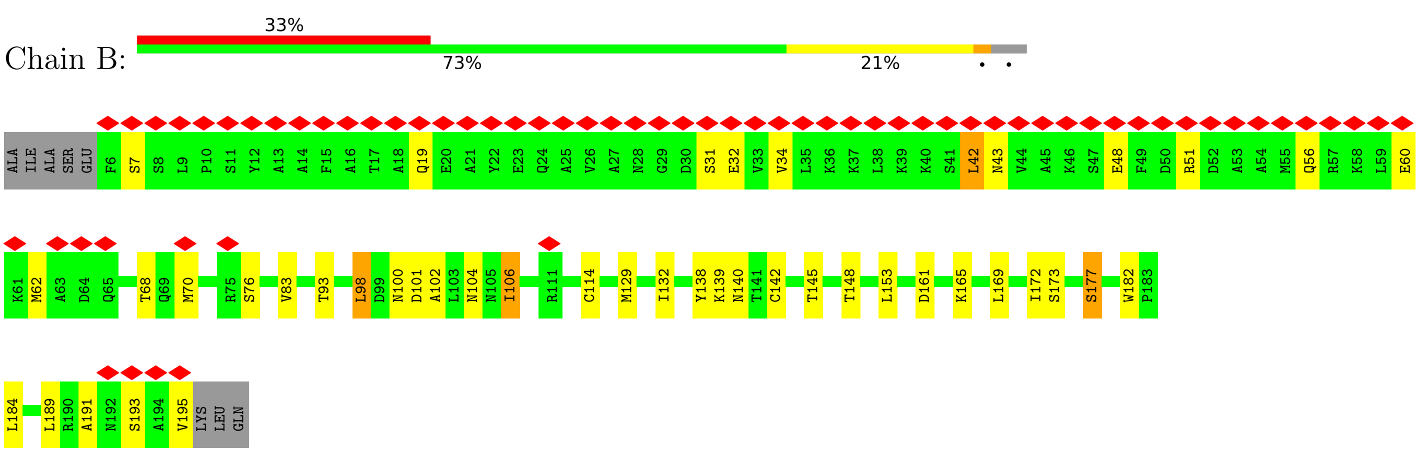
3 Residue-property plots

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

- Molecule 1: RNA-directed RNA polymerase nsp12

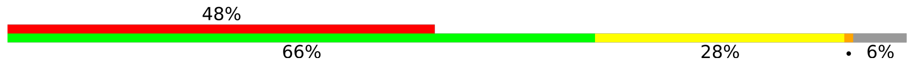


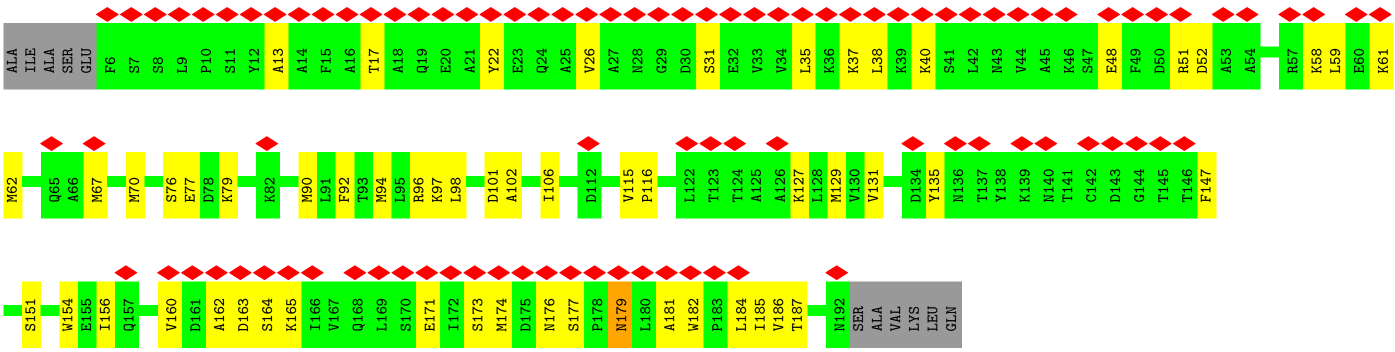
- Molecule 2: Non-structural protein 8



- Molecule 2: Non-structural protein 8

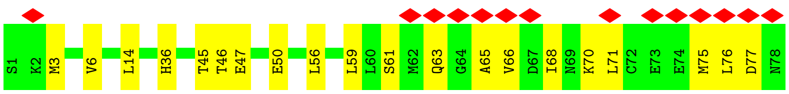
Chain D:





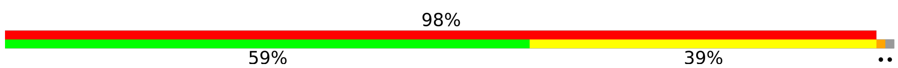
• Molecule 3: Non-structural protein 7

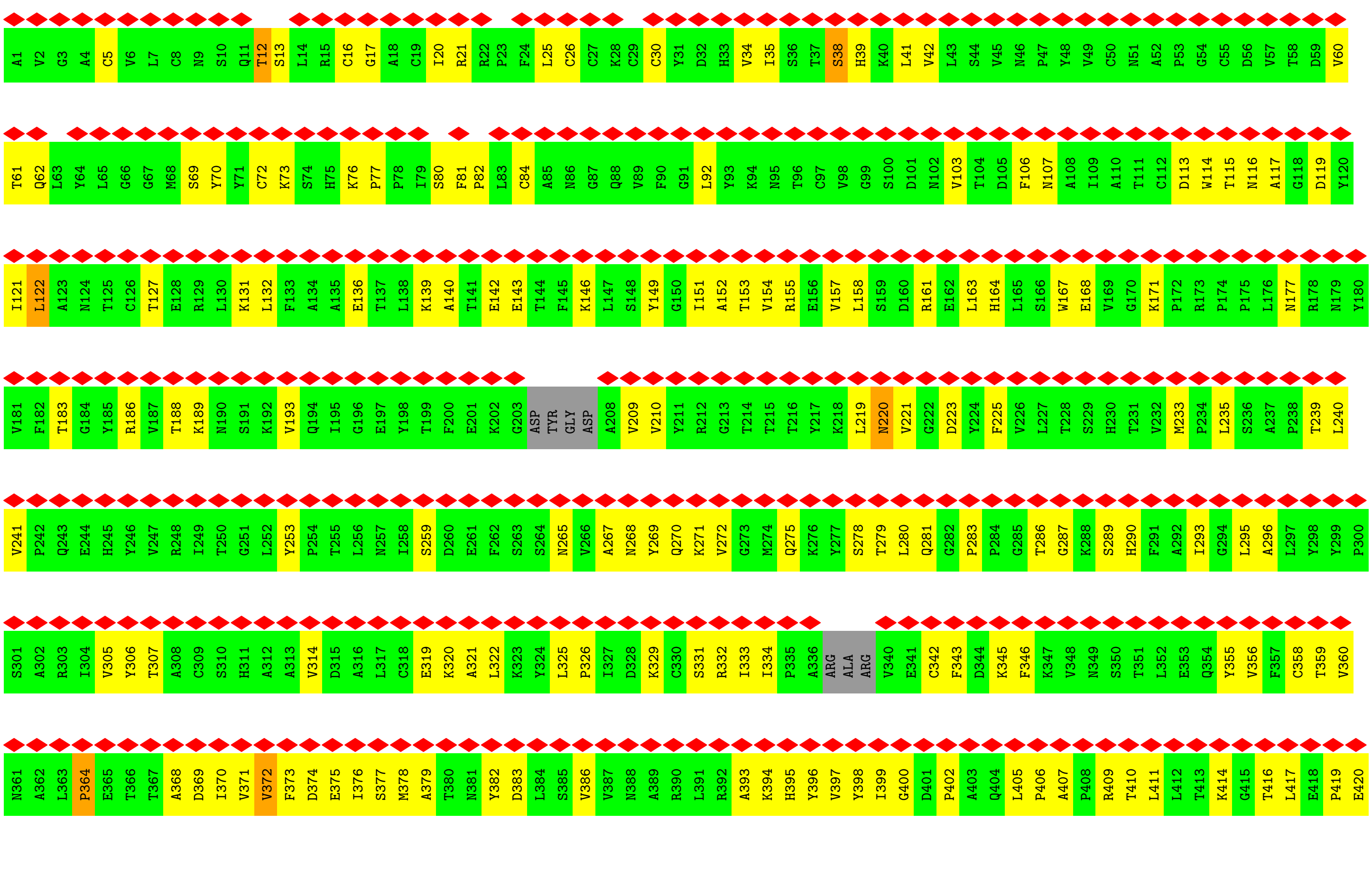
Chain C:



• Molecule 4: Helicase nsp13

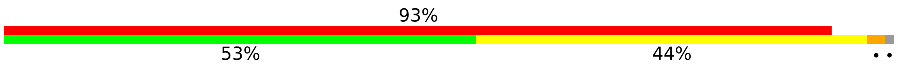
Chain E:

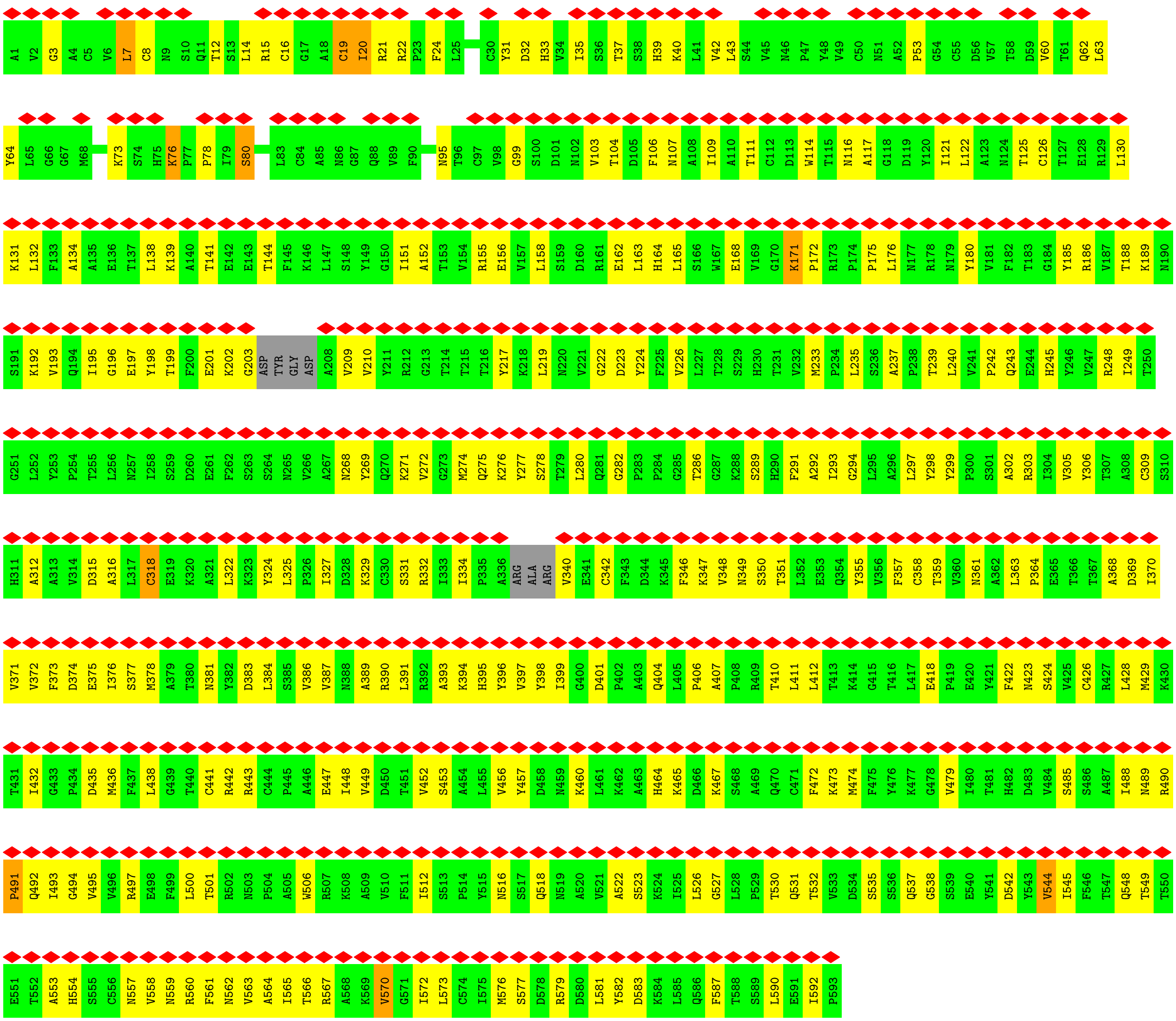




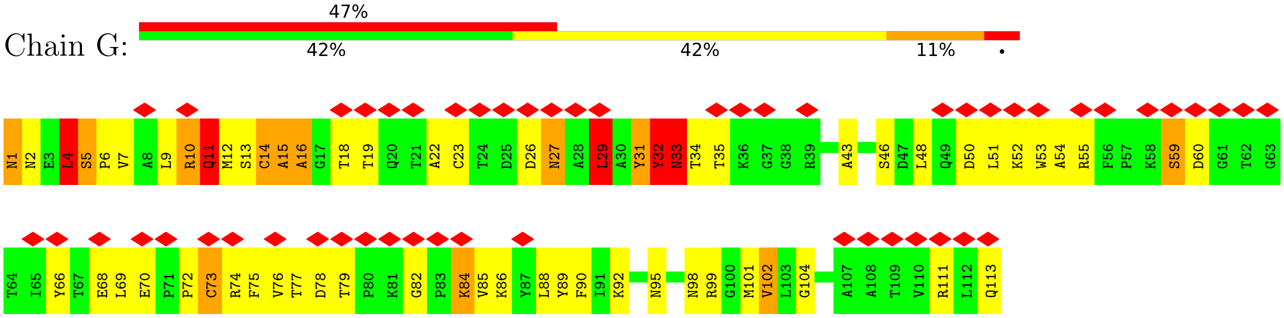
- Molecule 4: Helicase nsp13

Chain F:

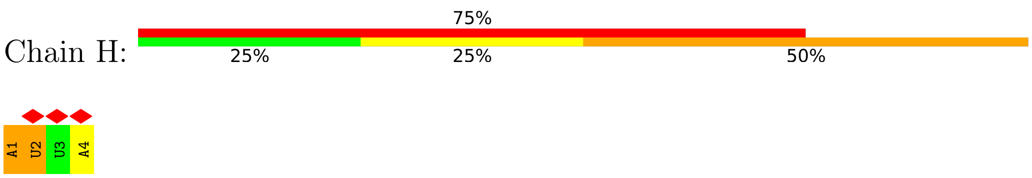




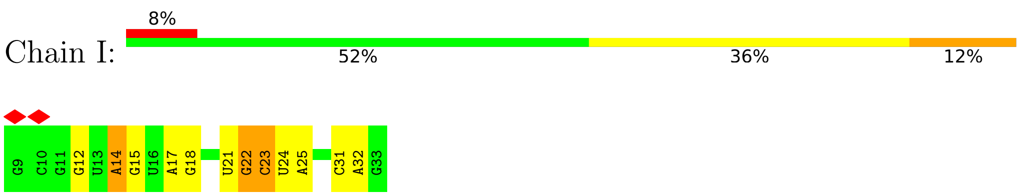
- Molecule 5: Viral protein genome-linked nsp9



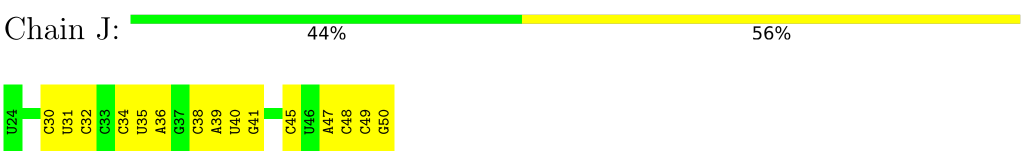
- Molecule 6: RNA (5'-R(P*AP*UP*UP*A)-3')



- Molecule 7: PRIMER



- Molecule 8: TEMPLATE



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, POINT	Depositor
Number of particles used	70998, 70998, 70998, 70998, 70998, Not provided, 135145, Not provided, Not provided, 70998, Not provided, Not provided, 135145, Not provided, Not provided, 135145, Not provided, Not provided, 70998, Not provided, Not provided, 135145, Not provided, Not provided, 135145, Not provided, Not provided, 70998, 70998, 70998, 70998, 70998, Not provided, 135145, Not provided, Not provided, 70998, Not provided, Not provided, 135145, Not provided, Not provided, 135145, Not provided, Not provided, 70998, Not provided, Not provided, 135145, Not provided, Not provided, 135145, Not provided, Not provided, 70998, 70998, 70998, 70998, 70998, Not provided, 135145, Not provided, Not provided, 70998, Not provided, Not provided, 135145, Not provided, Not provided, 135145, Not provided, Not provided, 70998, Not provided, Not provided, 135145, Not provided, Not provided, 135145, 70998, 70998	Depositor

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Property	Value	Source
Resolution determination method	FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, Not provided, Not provided, Not provided, Not provided, FSC 0.143 CUT-OFF, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, FSC 0.143 CUT-OFF, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, Not provided, Not provided, Not provided, Not provided, FSC 0.143 CUT-OFF, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, FSC 0.143 CUT-OFF, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, Not provided, Not provided, Not provided, Not provided, FSC 0.143 CUT-OFF, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, FSC 0.143 CUT-OFF, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, Not provided, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION, Not provided, Not provided	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{Å}^2$)	60.00, 50.0	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k), FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	2.480	Depositor

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Property	Value	Source
Minimum map value	-1.063	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.047	Depositor
Recommended contour level	0.4	Depositor
Map size (Å)	384.0, 384.0, 384.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.96, 0.96, 0.96	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.22	0/7685	0.46	6/10430 (0.1%)
2	B	0.29	1/1435 (0.1%)	0.46	0/1951
2	D	0.20	0/1445	0.47	0/1959
3	C	0.18	0/603	0.53	0/812
4	E	0.24	2/4615 (0.0%)	0.56	3/6290 (0.0%)
4	F	0.20	0/4615	0.57	0/6290
5	G	0.95	5/884 (0.6%)	1.33	16/1200 (1.3%)
6	H	1.27	2/93 (2.2%)	1.48	2/142 (1.4%)
7	I	0.10	0/611	0.23	0/953
8	J	0.10	0/628	0.20	0/974
All	All	0.29	10/22614 (0.0%)	0.56	27/31001 (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
4	F	0	1
5	G	0	1
All	All	0	2

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	G	1	ASN	C-N	15.19	1.55	1.33
6	H	1	A	O3'-P	-10.23	1.45	1.61
4	E	364	PRO	CG-CD	-6.99	1.27	1.50
5	G	2	ASN	CA-C	-6.99	1.44	1.53
4	E	364	PRO	N-CD	6.84	1.57	1.47
5	G	15	ALA	N-CA	6.71	1.54	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	H	1	A	P-OP2	6.36	1.61	1.49
5	G	14	CYS	N-CA	6.20	1.54	1.46
5	G	4	LEU	CA-C	-5.57	1.47	1.53
2	B	191	ALA	CA-C	-5.18	1.46	1.52

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	G	1	ASN	O-C-N	-18.62	93.20	123.00
4	E	364	PRO	CA-N-CD	-15.75	89.96	112.00
6	H	1	A	P-O3'-C3'	13.57	140.56	120.20
5	G	32	TYR	N-CA-C	13.10	138.71	110.80
1	A	850	THR	CA-C-N	12.23	142.70	122.76
1	A	850	THR	C-N-CA	12.23	142.70	122.76
5	G	31	TYR	N-CA-C	10.77	126.42	110.48
5	G	14	CYS	N-CA-C	9.93	131.94	110.80
5	G	15	ALA	N-CA-C	9.53	123.07	107.73
1	A	845	ASP	N-CA-C	-9.51	95.61	110.36
4	E	364	PRO	N-CD-CG	-9.49	88.97	103.20
5	G	33	ASN	N-CA-C	8.32	128.53	110.80
5	G	11	GLN	N-CA-C	8.15	128.15	110.80
5	G	10	ARG	N-CA-C	7.68	122.28	108.69
5	G	29	LEU	N-CA-C	-7.66	94.38	108.24
5	G	16	ALA	N-CA-C	7.53	120.02	108.42
5	G	1	ASN	N-CA-C	6.89	130.30	111.00
1	A	846	ASP	N-CA-C	6.29	124.20	110.80
5	G	13	SER	N-CA-C	6.12	118.15	108.79
6	H	1	A	OP1-P-O3'	6.12	126.35	108.00
5	G	1	ASN	CB-CA-C	-6.05	98.60	110.10
4	E	364	PRO	CA-CB-CG	-5.94	93.21	104.50
5	G	4	LEU	CA-C-O	-5.60	115.01	122.51
5	G	14	CYS	CA-C-O	-5.19	113.09	120.51
1	A	849	LYS	CA-C-N	5.18	130.90	122.67
1	A	849	LYS	C-N-CA	5.18	130.90	122.67
5	G	13	SER	CA-C-O	-5.07	115.80	121.23

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	F	76	LYS	Peptide
5	G	1	ASN	Mainchain

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	7496	0	7239	78	0
2	B	1417	0	1388	26	0
2	D	1426	0	1433	42	0
3	C	600	0	629	17	0
4	E	4513	0	4431	168	0
4	F	4513	0	4431	215	0
5	G	868	0	877	45	0
6	H	84	0	43	9	0
7	I	545	0	272	13	0
8	J	565	0	291	21	0
9	A	2	0	0	0	0
9	E	3	0	0	0	0
9	F	3	0	0	0	0
10	A	32	0	13	4	0
11	A	1	0	0	2	0
All	All	22068	0	21047	603	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 14.

All (603) 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)
4:F:479:VAL:H	4:F:491:PRO:HG2	1.30	0.96
4:F:371:VAL:HB	4:F:396:TYR:HA	1.53	0.91
5:G:53:TRP:HE1	5:G:66:TYR:HB3	1.44	0.83
4:F:233:MET:H	4:F:233:MET:HE2	1.43	0.82
4:F:202:LYS:HB3	4:F:210:VAL:HB	1.61	0.80
1:A:846:ASP:OD1	1:A:849:LYS:CD	2.30	0.80
4:E:443:ARG:HH12	4:E:445:PRO:HD3	1.47	0.79
4:E:278:SER:HB2	4:E:397:VAL:HG12	1.65	0.79
1:A:846:ASP:OD1	1:A:849:LYS:HD2	1.85	0.77
1:A:930:VAL:HG13	1:A:931:LEU:HD12	1.66	0.77
4:E:548:GLN:HE22	4:E:551:GLU:HG2	1.49	0.77
5:G:77:THR:HG21	5:G:86:LYS:NZ	2.00	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:364:PRO:HD2	4:E:364:PRO:O	1.86	0.76
4:E:143:GLU:HA	4:E:146:LYS:HE3	1.67	0.76
2:D:174:MET:H	2:D:174:MET:HE2	1.51	0.75
4:E:287:GLY:H	4:E:442:ARG:HD2	1.50	0.75
2:D:173:SER:O	2:D:177:SER:OG	2.05	0.74
2:D:176:ASN:O	2:D:176:ASN:ND2	2.21	0.74
1:A:5:GLN:O	1:A:9:ASN:ND2	2.22	0.73
4:E:154:VAL:HB	4:E:223:ASP:HB3	1.71	0.73
4:F:363:LEU:HD12	4:F:364:PRO:HD2	1.71	0.73
4:E:306:TYR:HA	4:E:372:VAL:HG22	1.71	0.72
5:G:77:THR:HG21	5:G:86:LYS:HZ2	1.53	0.72
7:I:12:G:N1	8:J:48:C:N3	2.29	0.72
4:E:555:SER:HB2	4:E:560:ARG:HD3	1.71	0.71
4:F:447:GLU:HB3	4:F:467:LYS:HD3	1.70	0.71
4:E:326:PRO:HB2	4:E:329:LYS:HG3	1.73	0.70
4:F:12:THR:HG22	4:F:14:LEU:H	1.56	0.70
4:F:280:LEU:HD21	4:F:436:MET:HB2	1.73	0.70
4:F:390:ARG:HB3	4:F:391:LEU:HD23	1.73	0.70
4:E:253:TYR:OH	4:F:155:ARG:NH2	2.24	0.70
4:E:371:VAL:HB	4:E:396:TYR:HB3	1.75	0.69
5:G:16:ALA:HA	5:G:54:ALA:HA	1.74	0.69
4:F:195:ILE:HD11	4:F:223:ASP:HB3	1.73	0.69
5:G:27:ASN:N	5:G:27:ASN:OD1	2.25	0.69
4:F:278:SER:O	4:F:398:TYR:N	2.26	0.68
4:F:363:LEU:HD23	4:F:390:ARG:HH11	1.57	0.68
4:F:448:ILE:HG21	4:F:566:THR:HA	1.74	0.68
2:B:100:ASN:O	2:B:104:ASN:ND2	2.25	0.68
4:E:546:PHE:HB3	4:E:574:CYS:HA	1.74	0.68
10:A:1003:GNP:N3	10:A:1003:GNP:H2'	2.09	0.68
2:B:43:ASN:ND2	8:J:47:A:O3'	2.26	0.68
4:F:410:THR:HG23	4:F:411:LEU:H	1.59	0.67
1:A:226:THR:HG21	5:G:75:PHE:HB3	1.75	0.67
4:F:422:PHE:HB2	4:F:426:CYS:HB2	1.77	0.66
4:E:151:ILE:H	4:E:168:GLU:HG2	1.60	0.66
4:E:239:THR:HG23	4:E:240:LEU:HD23	1.76	0.66
4:E:443:ARG:O	4:E:569:LYS:NZ	2.25	0.66
1:A:9:ASN:HA	1:A:12:CYS:HB2	1.78	0.66
1:A:218:ASP:OD2	10:A:1003:GNP:N3B	2.28	0.66
4:E:132:LEU:HG	4:E:235:LEU:HD22	1.78	0.66
4:E:114:TRP:HB3	4:E:411:LEU:HD11	1.77	0.65
4:E:480:ILE:HD13	4:E:551:GLU:HG3	1.77	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:77:PRO:O	4:E:80:SER:OG	2.14	0.65
7:I:12:G:N2	8:J:48:C:O2	2.15	0.65
4:E:576:MET:HG3	4:E:582:TYR:HD2	1.62	0.65
5:G:68:GLU:HG2	5:G:92:LYS:HD2	1.78	0.65
4:E:73:LYS:HA	4:E:76:LYS:HE3	1.79	0.65
4:E:510:VAL:H	4:E:544:VAL:HA	1.62	0.65
4:E:305:VAL:HB	4:E:371:VAL:HG13	1.77	0.65
4:F:132:LEU:HD22	4:F:235:LEU:HD11	1.79	0.65
2:B:101:ASP:OD1	2:B:102:ALA:N	2.30	0.64
4:E:286:THR:HG22	4:E:441:CYS:HA	1.78	0.64
4:F:131:LYS:NZ	4:F:423:ASN:O	2.29	0.64
4:F:248:ARG:HD2	4:F:249:ILE:H	1.62	0.64
4:E:453:SER:HA	4:E:457:TYR:HB2	1.77	0.64
4:E:321:ALA:HA	4:E:325:LEU:HD23	1.80	0.64
4:E:373:PHE:O	4:E:399:ILE:N	2.29	0.64
4:E:484:VAL:HG22	4:E:485:SER:H	1.61	0.64
4:F:558:VAL:HG22	4:F:559:ASN:H	1.62	0.64
4:E:26:CYS:O	4:E:30:CYS:N	2.30	0.64
4:F:233:MET:HE2	4:F:233:MET:N	2.11	0.64
4:F:8:CYS:HB3	4:F:99:GLY:H	1.63	0.64
2:D:147:PHE:HB3	2:D:154:TRP:HB2	1.80	0.63
4:E:69:SER:OG	4:E:70:TYR:N	2.31	0.63
4:F:109:ILE:HG21	4:F:122:LEU:HD22	1.80	0.63
4:F:561:PHE:HB2	4:F:564:ALA:HB3	1.80	0.63
8:J:38:C:H2'	8:J:39:A:H8	1.64	0.63
3:C:47:GLU:OE2	3:C:47:GLU:N	2.32	0.62
4:E:177:ASN:ND2	4:E:516:ASN:OD1	2.32	0.62
4:F:33:HIS:HE1	4:F:39:HIS:CG	2.13	0.62
4:F:103:VAL:O	4:F:107:ASN:ND2	2.33	0.62
4:F:391:LEU:HD12	4:F:393:ALA:HB2	1.81	0.62
4:E:471:CYS:O	4:E:588:THR:OG1	2.17	0.62
4:E:16:CYS:HB2	4:E:25:LEU:HD12	1.79	0.62
4:F:381:ASN:OD1	4:F:424:SER:OG	2.14	0.62
4:E:219:LEU:HD11	4:E:225:PHE:HE2	1.65	0.62
4:F:163:LEU:O	4:F:209:VAL:N	2.33	0.62
2:D:51:ARG:HG3	7:I:17:A:H4'	1.81	0.62
4:F:292:ALA:HB1	4:F:306:TYR:HE2	1.64	0.62
4:E:409:ARG:HD3	4:E:417:LEU:HD13	1.81	0.61
4:E:523:SER:HA	4:E:527:GLY:HA2	1.82	0.61
4:F:544:VAL:HG21	4:F:567:ARG:HG3	1.81	0.61
4:E:163:LEU:HB3	4:E:209:VAL:HB	1.82	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:358:CYS:SG	4:E:359:THR:N	2.73	0.61
4:E:17:GLY:HA3	4:E:41:LEU:HG	1.83	0.61
5:G:23:CYS:O	5:G:55:ARG:NH2	2.34	0.60
2:B:189:LEU:HD13	2:B:195:VAL:HG12	1.83	0.60
1:A:223:ILE:HD13	5:G:104:GLY:HA2	1.82	0.60
4:E:407:ALA:HB3	4:E:409:ARG:HE	1.66	0.60
4:F:277:TYR:HA	4:F:396:TYR:HB2	1.83	0.60
3:C:56:LEU:HD23	2:D:106:ILE:HD11	1.83	0.60
4:F:553:ALA:O	4:F:557:ASN:ND2	2.35	0.60
4:F:134:ALA:O	4:F:138:LEU:HD23	2.00	0.60
4:E:279:THR:HG22	4:E:435:ASP:HB2	1.82	0.60
4:F:331:SER:HA	4:F:346:PHE:HB3	1.83	0.60
1:A:41:LYS:NZ	6:H:1:A:H61	1.99	0.60
5:G:53:TRP:NE1	5:G:66:TYR:HB3	2.17	0.59
4:F:188:THR:HG23	4:F:189:LYS:H	1.66	0.59
4:E:153:THR:HG23	4:E:155:ARG:HH21	1.67	0.59
2:B:56:GLN:O	2:B:60:GLU:HG2	2.02	0.59
4:F:512:ILE:HG13	4:F:531:GLN:HB3	1.84	0.59
4:F:278:SER:HB2	4:F:397:VAL:HA	1.83	0.59
2:D:127:LYS:NZ	2:D:129:MET:SD	2.76	0.58
4:F:155:ARG:HG2	4:F:156:GLU:OE1	2.03	0.58
4:E:322:LEU:HD12	4:E:345:LYS:HB3	1.85	0.58
4:F:104:THR:HA	4:F:107:ASN:HD22	1.67	0.58
4:F:282:GLY:HA3	4:F:286:THR:HG21	1.84	0.58
5:G:31:TYR:N	5:G:43:ALA:O	2.35	0.58
4:E:157:VAL:HG21	4:E:219:LEU:HB3	1.86	0.58
2:D:171:GLU:OE1	2:D:176:ASN:ND2	2.37	0.58
4:E:290:HIS:CD2	4:E:442:ARG:HH22	2.22	0.58
4:F:332:ARG:NH1	4:F:346:PHE:H	2.02	0.57
4:E:564:ALA:HA	4:E:567:ARG:HG2	1.85	0.57
4:F:155:ARG:H	4:F:155:ARG:HD3	1.69	0.57
4:F:371:VAL:O	4:F:397:VAL:N	2.37	0.57
1:A:41:LYS:HZ2	6:H:1:A:H61	1.52	0.57
4:F:141:THR:HA	4:F:144:THR:HG22	1.87	0.57
4:E:149:TYR:HA	4:E:171:LYS:HD2	1.86	0.57
5:G:53:TRP:HE1	5:G:66:TYR:CB	2.16	0.57
4:F:318:CYS:HB2	4:F:346:PHE:CE2	2.39	0.57
1:A:225:THR:HG22	1:A:226:THR:H	1.70	0.57
2:B:19:GLN:HA	2:B:42:LEU:HD21	1.86	0.57
2:B:132:ILE:HG21	2:B:138:TYR:HB2	1.87	0.57
4:E:578:ASP:O	4:E:580:ASP:N	2.37	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:456:VAL:HG21	4:F:559:ASN:HD22	1.70	0.56
1:A:846:ASP:OD1	1:A:849:LYS:CE	2.53	0.56
4:E:267:ALA:O	4:E:271:LYS:HD3	2.05	0.56
4:F:168:GLU:OE2	4:F:168:GLU:N	2.37	0.56
4:F:401:ASP:HB3	4:F:404:GLN:HB2	1.86	0.56
5:G:84:LYS:HD3	5:G:86:LYS:NZ	2.19	0.56
1:A:930:VAL:O	1:A:931:LEU:C	2.46	0.56
4:F:325:LEU:HB2	4:F:329:LYS:HE2	1.88	0.56
1:A:29:ASP:N	1:A:53:CYS:O	2.37	0.56
4:E:20:ILE:HG23	4:E:21:ARG:HG2	1.88	0.56
4:E:342:CYS:SG	4:E:343:PHE:N	2.78	0.56
4:F:37:THR:HG21	4:F:111:THR:HG21	1.85	0.56
4:F:456:VAL:HG21	4:F:559:ASN:ND2	2.20	0.56
2:D:182:TRP:O	2:D:184:LEU:N	2.38	0.56
4:E:265:ASN:O	4:E:268:ASN:HB2	2.05	0.56
2:B:169:LEU:HA	2:B:172:ILE:HD12	1.87	0.56
2:B:161:ASP:OD2	2:B:165:LYS:NZ	2.39	0.56
1:A:755:MET:HG2	1:A:764:VAL:HG22	1.88	0.56
4:F:248:ARG:HD2	4:F:249:ILE:HD12	1.87	0.56
1:A:894:GLU:O	1:A:898:HIS:HB3	2.06	0.56
7:I:17:A:H2'	7:I:18:G:C8	2.40	0.56
4:E:114:TRP:HE3	4:E:119:ASP:HB3	1.71	0.55
5:G:16:ALA:O	5:G:23:CYS:HA	2.06	0.55
4:F:358:CYS:SG	4:F:359:THR:N	2.79	0.55
1:A:697:CYS:O	1:A:701:THR:HG22	2.06	0.55
4:E:576:MET:HG3	4:E:582:TYR:CD2	2.41	0.55
4:F:489:ASN:HB2	4:F:549:THR:HG23	1.89	0.55
7:I:22:G:O2'	7:I:23:C:OP1	2.23	0.55
4:F:171:LYS:HG3	4:F:172:PRO:HD2	1.88	0.55
4:F:488:ILE:HG23	4:F:490:ARG:HH12	1.71	0.55
1:A:269:ASP:OD1	1:A:269:ASP:N	2.38	0.55
4:F:31:TYR:O	4:F:35:ILE:HG12	2.05	0.55
5:G:48:LEU:HB2	5:G:51:LEU:HD11	1.87	0.55
1:A:846:ASP:OD1	1:A:849:LYS:HE3	2.06	0.55
2:B:182:TRP:O	2:B:184:LEU:N	2.40	0.55
2:D:174:MET:H	2:D:174:MET:CE	2.16	0.55
4:E:278:SER:N	4:E:396:TYR:O	2.37	0.55
4:F:297:LEU:HB3	4:F:325:LEU:HD11	1.89	0.55
4:F:500:LEU:HD23	4:F:506:TRP:HB3	1.89	0.55
4:E:283:PRO:HB2	4:E:286:THR:HG21	1.88	0.55
4:F:369:ASP:O	4:F:394:LYS:N	2.39	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:41:LYS:NZ	6:H:1:A:N6	2.55	0.54
4:E:41:LEU:HD12	4:E:42:VAL:N	2.23	0.54
4:E:161:ARG:HA	4:E:210:VAL:HA	1.89	0.54
8:J:49:C:H2'	8:J:50:G:C8	2.42	0.54
4:E:489:ASN:ND2	4:E:518:GLN:OE1	2.33	0.54
4:F:305:VAL:HB	4:F:373:PHE:HE1	1.71	0.54
4:F:464:HIS:HB3	4:F:465:LYS:HZ2	1.72	0.54
2:B:43:ASN:ND2	8:J:48:C:OP1	2.41	0.54
2:D:48:GLU:OE2	2:D:51:ARG:NH1	2.33	0.54
1:A:138:ASN:ND2	1:A:138:ASN:O	2.40	0.54
1:A:892:HIS:O	1:A:896:THR:HG23	2.08	0.54
4:F:175:PRO:HB2	4:F:180:TYR:HE2	1.71	0.54
2:D:173:SER:HB2	2:D:176:ASN:HB3	1.89	0.54
4:F:64:TYR:HB3	4:F:80:SER:HB2	1.89	0.54
8:J:40:U:H2'	8:J:41:G:H8	1.73	0.54
4:F:151:ILE:HD11	4:F:224:TYR:HB3	1.90	0.54
4:F:16:CYS:SG	4:F:19:CYS:HB2	2.48	0.54
4:E:374:ASP:HA	4:E:399:ILE:HB	1.90	0.53
4:E:514:PRO:HD2	4:E:549:THR:HG21	1.90	0.53
4:E:293:ILE:HG12	4:E:320:LYS:HG2	1.91	0.53
5:G:84:LYS:HD3	5:G:86:LYS:HZ2	1.74	0.53
8:J:38:C:H2'	8:J:39:A:C8	2.43	0.53
2:D:179:ASN:OD1	2:D:179:ASN:N	2.42	0.53
4:F:523:SER:HA	4:F:527:GLY:HA2	1.89	0.53
3:C:14:LEU:HD22	3:C:36:HIS:CG	2.44	0.53
4:E:332:ARG:HB2	4:E:346:PHE:HB2	1.89	0.53
4:F:271:LYS:O	4:F:275:GLN:N	2.41	0.53
4:E:377:SER:OG	4:E:378:MET:SD	2.66	0.53
4:E:374:ASP:OD1	4:E:375:GLU:N	2.41	0.53
4:E:376:ILE:HG22	4:E:400:GLY:HA3	1.91	0.53
5:G:15:ALA:HA	5:G:26:ASP:HA	1.90	0.53
5:G:72:PRO:HB3	5:G:89:TYR:CZ	2.44	0.53
7:I:24:U:H2'	7:I:25:A:H8	1.73	0.53
4:F:448:ILE:HD13	4:F:566:THR:HA	1.90	0.53
4:F:62:GLN:OE1	4:F:62:GLN:N	2.42	0.52
4:F:312:ALA:HB3	4:F:537:GLN:HB2	1.91	0.52
4:F:3:GLY:HA3	4:F:24:PHE:CE2	2.44	0.52
4:E:114:TRP:CE3	4:E:119:ASP:HB3	2.44	0.52
1:A:588:VAL:HG23	1:A:758:LEU:HD12	1.90	0.52
4:F:239:THR:HG21	4:F:381:ASN:HB3	1.92	0.52
1:A:592:SER:HB3	8:J:30:C:H4'	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:332:ARG:HE	4:E:333:ILE:H	1.56	0.52
4:F:203:GLY:HA2	4:F:209:VAL:HA	1.92	0.52
4:F:299:TYR:O	4:F:355:TYR:OH	2.28	0.52
4:F:268:ASN:HB3	4:F:291:PHE:HZ	1.73	0.52
4:F:406:PRO:HG2	4:F:560:ARG:HD3	1.91	0.52
4:E:269:TYR:CD1	4:E:295:LEU:HD13	2.45	0.52
4:E:453:SER:HB3	4:E:459:ASN:HA	1.91	0.52
4:E:38:SER:O	4:E:38:SER:OG	2.24	0.52
2:B:102:ALA:O	2:B:106:ILE:HG23	2.10	0.52
4:F:104:THR:HA	4:F:107:ASN:HB2	1.91	0.52
4:F:378:MET:HA	4:F:407:ALA:HB2	1.92	0.52
2:D:147:PHE:N	2:D:154:TRP:O	2.38	0.51
4:F:185:TYR:CD1	4:F:192:LYS:HB2	2.45	0.51
4:E:268:ASN:CG	4:E:436:MET:HE1	2.34	0.51
4:E:369:ASP:OD1	4:E:370:ILE:HG12	2.09	0.51
4:F:33:HIS:CE1	4:F:39:HIS:CG	2.96	0.51
4:F:292:ALA:HB1	4:F:306:TYR:CE2	2.44	0.51
5:G:78:ASP:HB2	5:G:113:GLN:HG3	1.90	0.51
4:E:81:PHE:HD1	4:E:82:PRO:HD2	1.76	0.51
4:E:420:GLU:HB2	4:E:427:ARG:HD3	1.92	0.51
4:F:155:ARG:NE	4:F:156:GLU:OE2	2.44	0.51
4:F:493:ILE:HD11	4:F:518:GLN:HG3	1.91	0.51
2:B:177:SER:HB2	2:B:182:TRP:HZ2	1.75	0.51
4:E:305:VAL:HG13	4:E:356:VAL:HG23	1.91	0.51
3:C:46:THR:O	3:C:50:GLU:HG2	2.11	0.51
4:F:472:PHE:HZ	4:F:474[B]:MET:HE2	1.76	0.51
1:A:759:SER:O	1:A:759:SER:OG	2.25	0.51
4:F:268:ASN:HB3	4:F:291:PHE:CZ	2.45	0.51
4:F:370:ILE:HG23	4:F:395:HIS:HB2	1.93	0.51
4:F:497:ARG:O	4:F:501:THR:HG23	2.11	0.51
4:E:484:VAL:HG13	4:E:486:SER:H	1.76	0.51
4:F:155:ARG:HH22	4:F:164:HIS:CD2	2.29	0.51
5:G:59:SER:OG	5:G:60:ASP:N	2.42	0.51
1:A:39:ASN:HD21	6:H:1:A:N6	2.09	0.51
1:A:794:MET:HE3	1:A:799:CYS:SG	2.51	0.51
1:A:928:HIS:O	1:A:929:THR:C	2.54	0.51
4:E:477:LYS:O	4:E:548:GLN:NE2	2.43	0.51
4:F:276:LYS:O	4:F:396:TYR:N	2.44	0.51
4:F:472:PHE:HZ	4:F:474[A]:MET:HE2	1.76	0.51
7:I:21:U:H2’	7:I:22:G:C8	2.46	0.51
7:I:31:C:H2’	7:I:32:A:H8	1.74	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:303:ASP:N	1:A:303:ASP:OD1	2.43	0.51
4:E:117:ALA:O	4:E:121:ILE:HG13	2.11	0.51
4:E:425:VAL:HA	4:E:428:LEU:HB3	1.92	0.51
4:F:15:ARG:HD3	4:F:22:ARG:HB3	1.91	0.50
4:F:32:ASP:HA	4:F:35:ILE:HG12	1.94	0.50
4:F:449:VAL:HA	4:F:452:VAL:HG12	1.94	0.50
4:F:488:ILE:HG23	4:F:490:ARG:NH1	2.26	0.50
4:E:383:ASP:HA	4:E:386:VAL:HG12	1.93	0.50
4:F:579:ARG:HH12	4:F:582:TYR:HB3	1.76	0.50
4:E:289:SER:HB3	4:E:290:HIS:CE1	2.47	0.50
4:F:410:THR:HG23	4:F:411:LEU:N	2.26	0.50
4:F:592:ILE:HD12	4:F:592:ILE:O	2.12	0.50
7:I:17:A:H2'	7:I:18:G:H8	1.77	0.50
1:A:41:LYS:HZ2	6:H:1:A:N6	2.09	0.50
4:E:233:MET:SD	4:E:233:MET:N	2.83	0.50
4:F:60:VAL:HA	4:F:63:LEU:HD12	1.92	0.50
5:G:73:CYS:SG	5:G:74:ARG:N	2.84	0.50
4:F:315:ASP:HA	4:F:318:CYS:SG	2.52	0.50
1:A:496:ASN:N	1:A:496:ASN:OD1	2.45	0.50
4:E:268:ASN:OD1	4:E:436:MET:HE1	2.12	0.50
4:F:7:LEU:HD11	4:F:106:PHE:CZ	2.46	0.50
4:F:245:HIS:NE2	4:F:275:GLN:OE1	2.42	0.50
4:F:383:ASP:OD1	4:F:384:LEU:N	2.45	0.50
4:F:567:ARG:HB2	4:F:572:ILE:HD11	1.93	0.50
4:F:316:ALA:HB2	4:F:538:GLY:HA3	1.94	0.50
1:A:499:ASP:OD1	1:A:513:ARG:NH2	2.35	0.50
4:E:139:LYS:HD3	4:E:382:TYR:CD2	2.47	0.50
4:E:536:SER:O	4:E:536:SER:OG	2.23	0.50
4:F:268:ASN:HD21	4:F:436:MET:HB3	1.77	0.50
1:A:304:ASP:HB2	1:A:636:LEU:HD13	1.94	0.49
4:F:583:ASP:OD1	4:F:583:ASP:N	2.45	0.49
3:C:70:LYS:HD3	3:C:70:LYS:C	2.37	0.49
4:E:290:HIS:HA	4:E:293:ILE:HD13	1.93	0.49
4:F:489:ASN:OD1	4:F:492:GLN:HG2	2.11	0.49
4:F:563:VAL:O	4:F:566:THR:OG1	2.20	0.49
4:F:269:TYR:HB3	4:F:298:TYR:CZ	2.48	0.49
1:A:40:ASP:HB3	5:G:6:PRO:HG2	1.95	0.49
2:B:43:ASN:ND2	8:J:48:C:P	2.86	0.49
3:C:63:GLN:OE1	3:C:63:GLN:HA	2.13	0.49
4:E:139:LYS:HD3	4:E:382:TYR:HD2	1.77	0.49
5:G:79:THR:HG21	5:G:84:LYS:HD2	1.95	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:90:MET:O	2:D:94:MET:HG3	2.12	0.49
4:F:195:ILE:O	4:F:198:TYR:OH	2.28	0.49
4:F:121:ILE:O	4:F:125:THR:HG23	2.12	0.48
4:F:322:LEU:HD22	4:F:327:ILE:HD13	1.94	0.48
5:G:98:ASN:O	5:G:102:VAL:HG13	2.13	0.48
4:E:127:THR:O	4:E:131:LYS:HG2	2.13	0.48
4:E:314:VAL:HG21	4:E:342:CYS:SG	2.53	0.48
4:F:15:ARG:HG3	4:F:43:LEU:HB2	1.95	0.48
1:A:208:ASP:OD2	11:A:1101:HOH:O	2.20	0.48
4:F:158:LEU:HB2	4:F:163:LEU:HA	1.95	0.48
4:F:302:ALA:HA	4:F:303:ARG:NH1	2.29	0.48
4:F:372:VAL:HA	4:F:397:VAL:HB	1.94	0.48
4:F:373:PHE:CE2	4:F:387:VAL:HB	2.48	0.48
4:E:305:VAL:O	4:E:372:VAL:N	2.41	0.48
4:E:119:ASP:O	4:E:122:LEU:HD23	2.14	0.48
4:E:568:ALA:HB3	4:E:572:ILE:HG13	1.94	0.48
4:F:243:GLN:HE22	4:F:432:ILE:HD12	1.79	0.48
4:F:277:TYR:OH	4:F:428:LEU:HD21	2.13	0.48
1:A:851:ASP:HB2	2:D:79:LYS:HE3	1.95	0.48
8:J:40:U:H2'	8:J:41:G:C8	2.48	0.48
1:A:39:ASN:ND2	6:H:1:A:N1	2.61	0.48
1:A:551:LYS:HE3	1:A:551:LYS:HB3	1.70	0.48
4:E:265:ASN:ND2	4:E:269:TYR:OH	2.47	0.48
4:E:543:TYR:CE1	4:E:571:GLY:HA3	2.49	0.48
4:E:186:ARG:O	4:E:193:VAL:N	2.35	0.47
4:F:278:SER:HB3	4:F:436:MET:SD	2.55	0.47
5:G:76:VAL:HG22	5:G:85:VAL:HG22	1.96	0.47
4:F:334:ILE:HG13	4:F:342:CYS:HB3	1.94	0.47
4:E:439:GLY:HA2	4:E:461:LEU:HB3	1.95	0.47
4:E:533:VAL:HG11	4:E:560:ARG:HD2	1.96	0.47
4:F:359:THR:HG22	4:F:361:ASN:H	1.79	0.47
1:A:208:ASP:CG	11:A:1101:HOH:O	2.58	0.47
4:F:7:LEU:HD11	4:F:106:PHE:HZ	1.79	0.47
4:F:492:GLN:OE1	4:F:577:SER:OG	2.29	0.47
4:F:545:ILE:HA	4:F:573:LEU:HD22	1.97	0.47
1:A:846:ASP:OD1	1:A:849:LYS:CG	2.63	0.47
2:B:31:SER:OG	2:B:32:GLU:N	2.48	0.47
2:D:177:SER:O	2:D:179:ASN:N	2.41	0.47
4:F:516:ASN:HD21	4:F:530:THR:HG23	1.80	0.47
4:F:334:ILE:HG23	4:F:342:CYS:HB2	1.96	0.47
4:F:488:ILE:HD12	4:F:489:ASN:H	1.80	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:G:50:ASP:OD1	5:G:52:LYS:NZ	2.42	0.47
1:A:12:CYS:SG	1:A:17:ALA:HB1	2.54	0.47
2:D:163:ASP:HB2	2:D:165:LYS:HD2	1.97	0.47
4:E:405:LEU:HD21	4:E:533:VAL:HG12	1.96	0.47
4:E:419:PRO:HA	4:E:422:PHE:CE2	2.49	0.47
4:F:138:LEU:HA	4:F:141:THR:HG22	1.95	0.47
4:F:237:ALA:HB3	4:F:389:ALA:HB2	1.97	0.47
4:F:275:GLN:HE21	4:F:435:ASP:HB3	1.78	0.47
1:A:160:LYS:HD3	1:A:161:ASP:H	1.80	0.47
4:F:116:ASN:OD1	4:F:117:ALA:N	2.48	0.47
4:F:197:GLU:N	4:F:217:TYR:OH	2.40	0.47
4:F:522:ALA:HB1	4:F:526:LEU:HD21	1.97	0.47
4:F:271:LYS:HG2	4:F:436:MET:HE3	1.97	0.47
4:E:492:GLN:O	4:E:496:VAL:HG23	2.14	0.47
2:D:160:VAL:HG13	2:D:164:SER:HA	1.97	0.46
2:D:162:ALA:HB3	2:D:181:ALA:HB1	1.97	0.46
4:E:544:VAL:N	4:E:568:ALA:HB2	2.30	0.46
1:A:882:HIS:O	1:A:886:GLN:HG3	2.15	0.46
3:C:3:MET:O	3:C:6:VAL:HG12	2.15	0.46
4:F:268:ASN:O	4:F:272:VAL:HG23	2.15	0.46
5:G:73:CYS:O	5:G:88:LEU:N	2.47	0.46
8:J:31:U:H2'	8:J:32:C:H6	1.80	0.46
1:A:39:ASN:HD21	6:H:1:A:H61	1.61	0.46
1:A:143:LYS:O	1:A:147:VAL:HG13	2.16	0.46
4:F:239:THR:HB	4:F:384:LEU:HB3	1.97	0.46
4:F:374:ASP:HA	4:F:399:ILE:HB	1.97	0.46
2:D:101:ASP:OD1	2:D:102:ALA:N	2.48	0.46
4:E:34:VAL:HG23	4:E:39:HIS:O	2.14	0.46
4:E:394:LYS:HG2	4:E:395:HIS:CE1	2.49	0.46
1:A:73:LYS:HE2	1:A:116:ARG:HH12	1.81	0.46
4:F:268:ASN:HD21	4:F:438:LEU:HB2	1.80	0.46
4:F:371:VAL:N	4:F:395:HIS:O	2.45	0.46
4:F:460:LYS:HA	4:F:460:LYS:HD2	1.70	0.46
2:D:58:LYS:HG3	2:D:59:LEU:N	2.30	0.46
2:D:151:SER:O	2:D:151:SER:OG	2.25	0.46
4:E:492:GLN:HG3	4:E:518:GLN:NE2	2.31	0.46
4:F:240:LEU:HD23	4:F:424:SER:HB3	1.98	0.46
2:B:62:MET:HE2	2:B:62:MET:HB3	1.85	0.46
4:E:188:THR:HG23	4:E:189:LYS:H	1.81	0.46
4:F:239:THR:OG1	4:F:240:LEU:N	2.48	0.46
4:E:359:THR:HG22	4:E:360:VAL:H	1.80	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:368:ALA:O	4:E:393:ALA:HA	2.16	0.46
4:E:492:GLN:HA	4:E:495:VAL:HB	1.98	0.46
5:G:18:THR:H	5:G:22:ALA:HB3	1.81	0.46
7:I:31:C:H2'	7:I:32:A:C8	2.50	0.46
1:A:846:ASP:OD1	1:A:849:LYS:HG3	2.16	0.46
2:D:13:ALA:O	2:D:17:THR:HG23	2.16	0.46
4:E:407:ALA:O	4:E:409:ARG:N	2.47	0.46
4:E:479:VAL:HB	4:E:491:PRO:HG2	1.98	0.46
4:F:20:ILE:HD13	4:F:114:TRP:CD1	2.51	0.46
4:F:442:ARG:HA	4:F:465:LYS:NZ	2.30	0.46
1:A:51:THR:OG1	6:H:2:U:OP1	2.32	0.45
1:A:304:ASP:OD1	1:A:304:ASP:N	2.45	0.45
4:F:289:SER:OG	4:F:443:ARG:NH2	2.28	0.45
4:E:555:SER:CB	4:E:560:ARG:HD3	2.44	0.45
4:F:3:GLY:HA3	4:F:24:PHE:HE2	1.82	0.45
5:G:95:ASN:O	5:G:99:ARG:HG3	2.17	0.45
3:C:70:LYS:HD3	3:C:70:LYS:O	2.16	0.45
4:E:332:ARG:NH2	4:E:358:CYS:HA	2.30	0.45
1:A:162:TRP:HA	1:A:168:ASN:HD22	1.82	0.45
4:F:331:SER:O	4:F:357:PHE:N	2.49	0.45
4:F:371:VAL:HG13	4:F:373:PHE:CE1	2.51	0.45
4:F:309:CYS:SG	4:F:378:MET:HE2	2.57	0.45
4:F:406:PRO:HA	4:F:422:PHE:HZ	1.81	0.45
2:D:97:LYS:HB3	2:D:97:LYS:HE2	1.77	0.45
4:E:271:LYS:HE2	4:E:436:MET:HE3	1.97	0.45
4:F:155:ARG:HA	4:F:222:GLY:H	1.81	0.45
4:F:242:PRO:C	4:F:276:LYS:HZ2	2.24	0.45
4:F:386:VAL:HG22	4:F:390:ARG:HH21	1.82	0.45
8:J:48:C:H2'	8:J:49:C:C6	2.52	0.45
1:A:2:ALA:O	1:A:4:ALA:N	2.49	0.45
1:A:689:TYR:O	1:A:693:VAL:HG23	2.17	0.45
2:D:31:SER:O	2:D:35:LEU:HG	2.16	0.45
4:F:464:HIS:HB3	4:F:465:LYS:NZ	2.31	0.45
1:A:60:ASP:N	1:A:60:ASP:OD1	2.49	0.45
2:D:26:VAL:HG22	2:D:35:LEU:HD22	1.99	0.45
4:F:268:ASN:ND2	4:F:436:MET:HB3	2.32	0.45
4:E:414:LYS:HB3	4:E:414:LYS:HE3	1.74	0.45
5:G:77:THR:HG21	5:G:86:LYS:HZ3	1.80	0.45
4:F:293:ILE:HG12	4:F:324:TYR:HD2	1.82	0.45
8:J:35:U:H2'	8:J:36:A:C8	2.52	0.45
1:A:904:SER:HB2	4:F:95:ASN:HB2	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:52:ASP:OD1	2:D:52:ASP:N	2.50	0.44
2:D:67:MET:O	2:D:70:MET:HG2	2.17	0.44
4:F:305:VAL:HB	4:F:373:PHE:CE1	2.52	0.44
2:B:129:MET:HE3	2:B:129:MET:HB3	1.82	0.44
4:E:269:TYR:HA	4:E:272:VAL:HG22	1.99	0.44
4:F:114:TRP:HB3	4:F:141:THR:HG21	1.99	0.44
3:C:77:ASP:HB2	2:D:92:PHE:HD2	1.82	0.44
4:F:452:VAL:HG22	4:F:457:TYR:CE2	2.52	0.44
4:F:562:ASN:HA	4:F:565:ILE:HG13	1.99	0.44
4:E:152:ALA:HB2	4:E:167:TRP:HZ3	1.83	0.44
4:E:220:ASN:ND2	4:E:221:VAL:HG22	2.32	0.44
4:E:379:ALA:O	4:E:423:ASN:ND2	2.50	0.44
4:E:69:SER:HG	4:E:70:TYR:H	1.64	0.44
4:E:307:THR:HA	4:E:358:CYS:O	2.18	0.44
4:F:151:ILE:HG13	4:F:226:VAL:HB	1.99	0.44
7:I:22:G:HO2'	7:I:23:C:P	2.39	0.44
1:A:10:ARG:HD2	1:A:10:ARG:HA	1.76	0.44
4:E:21:ARG:NE	4:E:136:GLU:OE2	2.43	0.44
4:E:62:GLN:OE1	4:E:72:CYS:HB2	2.18	0.44
4:F:535:SER:HB2	4:F:537:GLN:HE21	1.82	0.44
4:F:544:VAL:HG11	4:F:567:ARG:HB3	1.99	0.44
5:G:5:SER:CB	5:G:101:MET:HG2	2.48	0.44
5:G:29:LEU:HD12	5:G:29:LEU:HA	1.83	0.44
2:B:148:THR:HG22	2:B:153:LEU:HD12	1.99	0.44
4:E:488:ILE:HG13	4:E:489:ASN:H	1.82	0.44
4:F:188:THR:HG23	4:F:189:LYS:N	2.33	0.44
4:F:347:LYS:O	4:F:350:SER:OG	2.25	0.44
4:E:158:LEU:HD21	4:E:164:HIS:CD2	2.53	0.44
4:E:267:ALA:HA	4:E:270:GLN:HB3	2.00	0.44
4:E:290:HIS:CD2	4:E:320:LYS:HD3	2.53	0.44
2:B:43:ASN:CG	8:J:47:A:O3'	2.60	0.43
3:C:71:LEU:O	3:C:76:LEU:HB2	2.17	0.43
4:F:494:GLY:HA2	4:F:497:ARG:HD2	1.99	0.43
1:A:924:MET:HE3	1:A:924:MET:HB3	1.83	0.43
2:B:48:GLU:HA	2:B:51:ARG:NH2	2.32	0.43
4:E:449:VAL:O	4:E:453:SER:OG	2.30	0.43
4:F:322:LEU:HB3	4:F:346:PHE:HE1	1.82	0.43
4:F:376:ILE:HG12	4:F:376:ILE:O	2.17	0.43
1:A:336:ASP:OD1	1:A:336:ASP:N	2.51	0.43
2:D:22:TYR:HA	2:D:38:LEU:HD13	1.99	0.43
2:D:98:LEU:HD23	2:D:98:LEU:HA	1.85	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:103:VAL:HG12	4:E:107:ASN:ND2	2.33	0.43
4:F:542:ASP:CG	4:F:570:VAL:H	2.27	0.43
3:C:45:THR:O	3:C:45:THR:OG1	2.36	0.43
4:F:368:ALA:HB3	4:F:391:LEU:HD13	2.00	0.43
4:F:371:VAL:HG13	4:F:373:PHE:CZ	2.53	0.43
5:G:111:ARG:NH1	5:G:111:ARG:HA	2.34	0.43
2:D:58:LYS:HE3	2:D:59:LEU:HD12	2.00	0.43
4:E:12:THR:OG1	4:E:13:SER:N	2.50	0.43
4:E:416:THR:HG21	4:E:557:ASN:HD22	1.84	0.43
4:E:546:PHE:HE2	4:E:560:ARG:NH2	2.17	0.43
1:A:522:GLU:OE1	1:A:522:GLU:N	2.33	0.43
4:E:62:GLN:HE21	4:E:62:GLN:HB3	1.64	0.43
4:F:294:GLY:O	4:F:298:TYR:HB3	2.17	0.43
4:F:473:LYS:HB2	4:F:587:PHE:HB3	2.00	0.43
2:B:70:MET:SD	4:E:92:LEU:HG	2.59	0.43
4:F:197:GLU:OE1	4:F:340:VAL:N	2.52	0.43
2:D:156:ILE:HG23	2:D:186:VAL:HG13	2.01	0.43
4:E:406:PRO:HB3	4:E:422:PHE:HE1	1.82	0.43
2:D:61:LYS:HG3	2:D:62:MET:N	2.33	0.43
4:F:219:LEU:HD23	4:F:219:LEU:HA	1.88	0.43
4:F:271:LYS:HA	4:F:274:MET:SD	2.59	0.43
4:F:544:VAL:HG11	4:F:567:ARG:CB	2.49	0.43
4:F:557:ASN:OD1	4:F:558:VAL:HG12	2.18	0.43
5:G:92:LYS:HE2	5:G:92:LYS:HB2	1.84	0.43
2:B:98:LEU:HD12	2:B:98:LEU:HA	1.83	0.42
4:E:334:ILE:HD12	4:E:342:CYS:HB3	2.00	0.42
4:F:329:LYS:HD2	4:F:329:LYS:O	2.18	0.42
1:A:202:VAL:HG12	5:G:4:LEU:HD21	2.01	0.42
1:A:665:GLU:OE1	1:A:665:GLU:N	2.52	0.42
4:F:126:CYS:HB3	4:F:130:LEU:HB3	2.00	0.42
4:F:176:LEU:HD11	4:F:201:GLU:O	2.19	0.42
4:F:479:VAL:N	4:F:491:PRO:HG2	2.14	0.42
4:E:280:LEU:HB2	4:E:399:ILE:HA	2.00	0.42
4:E:419:PRO:HA	4:E:422:PHE:CD2	2.54	0.42
4:F:131:LYS:NZ	4:F:381:ASN:HD21	2.16	0.42
4:F:518:GLN:OE1	4:F:549:THR:OG1	2.37	0.42
8:J:39:A:H2'	8:J:40:U:H6	1.84	0.42
2:B:68:THR:HG23	4:F:53:PRO:HG2	2.00	0.42
4:E:281:GLN:HE22	4:E:402:PRO:HD2	1.84	0.42
4:E:506:TRP:CE2	4:E:573:LEU:HB2	2.53	0.42
1:A:204:VAL:HG12	5:G:4:LEU:HD13	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:527:GLY:O	4:E:528:LEU:HD13	2.20	0.42
4:F:196:GLY:HA3	4:F:217:TYR:CE1	2.55	0.42
4:F:426:CYS:O	4:F:429:MET:HB3	2.20	0.42
5:G:95:ASN:OD1	5:G:98:ASN:ND2	2.52	0.42
5:G:48:LEU:HD13	5:G:51:LEU:HD21	2.00	0.42
4:E:116:ASN:N	4:E:119:ASP:OD2	2.48	0.42
5:G:70:GLU:OE2	5:G:99:ARG:NH2	2.53	0.42
3:C:77:ASP:HA	2:D:96:ARG:HD3	2.01	0.42
2:D:135:TYR:HB2	2:D:182:TRP:CZ2	2.55	0.42
4:E:113:ASP:OD2	4:E:115:THR:OG1	2.37	0.42
4:F:202:LYS:O	4:F:210:VAL:N	2.51	0.42
5:G:70:GLU:OE2	5:G:90:PHE:HB2	2.20	0.42
3:C:75:MET:HE2	3:C:75:MET:HB2	1.89	0.42
4:E:140:ALA:O	4:E:143:GLU:HG3	2.20	0.42
4:F:139:LYS:HA	4:F:139:LYS:HD2	1.88	0.42
4:F:176:LEU:HB2	4:F:485:SER:HB3	2.01	0.42
8:J:40:U:C2	8:J:41:G:C8	3.08	0.42
1:A:894:GLU:O	1:A:898:HIS:CB	2.68	0.42
4:E:139:LYS:HA	4:E:142:GLU:HG2	2.02	0.42
4:E:448:ILE:HG22	4:E:565:ILE:HG23	2.02	0.42
4:E:497:ARG:HA	4:E:500:LEU:HG	2.02	0.42
4:E:544:VAL:H	4:E:568:ALA:HB2	1.84	0.42
4:F:76:LYS:O	4:F:78:PRO:HD3	2.20	0.42
8:J:35:U:H2’	8:J:36:A:H8	1.85	0.42
4:E:279:THR:HA	4:E:398:TYR:H	1.84	0.41
4:F:40:LYS:HB2	4:F:40:LYS:HE2	1.69	0.41
4:F:152:ALA:HB1	4:F:165:LEU:HD11	2.00	0.41
5:G:69:LEU:HD23	5:G:89:TYR:CD2	2.54	0.41
1:A:40:ASP:OD1	1:A:40:ASP:C	2.62	0.41
1:A:572:HIS:O	1:A:576:LEU:HG	2.20	0.41
1:A:709:SER:O	1:A:709:SER:OG	2.33	0.41
2:D:94:MET:HE2	2:D:94:MET:HB3	1.96	0.41
4:E:34:VAL:HG21	4:E:60:VAL:HG11	2.01	0.41
4:E:369:ASP:HA	4:E:394:LYS:H	1.84	0.41
4:F:162:GLU:HG2	4:F:210:VAL:HG22	2.02	0.41
1:A:260:ASP:HB3	1:A:263:LYS:HD2	2.02	0.41
1:A:431:GLU:OE2	1:A:431:GLU:N	2.37	0.41
6:H:1:A:H3’	6:H:2:U:H5”	2.01	0.41
1:A:64:ASN:OD1	1:A:64:ASN:N	2.53	0.41
1:A:898:HIS:O	1:A:898:HIS:ND1	2.53	0.41
2:B:139:LYS:HG3	2:B:140:ASN:OD1	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:25:LEU:HD21	4:E:106:PHE:CE2	2.55	0.41
4:E:280:LEU:HB2	4:E:399:ILE:HG13	2.01	0.41
4:F:377:SER:HA	4:F:422:PHE:HE2	1.86	0.41
4:F:489:ASN:CG	4:F:492:GLN:HG2	2.45	0.41
4:E:319:GLU:HA	4:E:345:LYS:NZ	2.36	0.41
4:F:20:ILE:HG23	4:F:21:ARG:N	2.36	0.41
4:F:73:LYS:O	4:F:76:LYS:HE2	2.20	0.41
4:F:186:ARG:O	4:F:193:VAL:N	2.53	0.41
4:F:412:LEU:HD13	4:F:554:HIS:NE2	2.35	0.41
4:F:418:GLU:CD	4:F:418:GLU:H	2.28	0.41
1:A:144:GLU:O	1:A:148:THR:HG22	2.21	0.41
1:A:836:ARG:NH1	1:A:840:ALA:HB2	2.35	0.41
2:B:43:ASN:HD22	8:J:48:C:P	2.44	0.41
2:D:22:TYR:HD2	2:D:38:LEU:HB3	1.86	0.41
4:E:544:VAL:HG21	4:E:567:ARG:HB3	2.03	0.41
7:I:24:U:H2'	7:I:25:A:C8	2.54	0.41
1:A:760:ASP:OD1	1:A:760:ASP:C	2.63	0.41
5:G:16:ALA:O	5:G:27:ASN:ND2	2.54	0.41
3:C:66:VAL:HG23	3:C:68:ILE:HD12	2.03	0.41
4:E:296:ALA:O	4:E:355:TYR:OH	2.25	0.41
4:E:405:LEU:HD22	4:E:534:ASP:HA	2.02	0.41
4:F:348:VAL:HG12	4:F:349:ASN:OD1	2.20	0.41
4:F:490:ARG:HB2	4:F:491:PRO:HD3	2.02	0.41
7:I:14:A:H2'	7:I:15:G:C8	2.55	0.41
5:G:31:TYR:HB2	5:G:43:ALA:HB3	2.03	0.41
1:A:105:ARG:NH2	1:A:108:GLY:O	2.49	0.40
4:E:61:THR:HG22	4:E:84:CYS:SG	2.61	0.40
4:F:309:CYS:N	4:F:375:GLU:OE2	2.43	0.40
1:A:885:LEU:HD22	1:A:916:TRP:HA	2.03	0.40
4:F:202:LYS:HD2	4:F:202:LYS:HA	1.78	0.40
4:F:373:PHE:N	4:F:373:PHE:CD1	2.89	0.40
5:G:79:THR:HG23	5:G:82:GLY:H	1.85	0.40
1:A:58:GLU:O	1:A:66:ILE:HG22	2.22	0.40
1:A:218:ASP:OD2	10:A:1003:GNP:PB	2.80	0.40
1:A:218:ASP:OD1	10:A:1003:GNP:PG	2.79	0.40
1:A:308:LEU:HD12	1:A:308:LEU:HA	1.90	0.40
3:C:76:LEU:C	2:D:96:ARG:HD3	2.46	0.40
2:D:37:LYS:C	2:D:37:LYS:HD2	2.47	0.40
4:E:153:THR:HG23	4:E:155:ARG:HE	1.85	0.40
4:E:511:PHE:O	4:E:531:GLN:HB3	2.21	0.40
4:F:293:ILE:HG21	4:F:324:TYR:CD2	2.56	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:441:CYS:HB2	4:F:464:HIS:HD1	1.86	0.40
4:F:492:GLN:HE21	4:F:548:GLN:H	1.69	0.40
3:C:3:MET:HG2	3:C:45:THR:HB	2.03	0.40
4:E:13:SER:O	4:E:13:SER:OG	2.37	0.40
4:E:219:LEU:HD11	4:E:225:PHE:CE2	2.50	0.40
4:E:275:GLN:O	4:E:395:HIS:ND1	2.54	0.40
4:E:445:PRO:HA	4:E:465:LYS:HB2	2.02	0.40
4:E:536:SER:O	4:E:567:ARG:NH1	2.54	0.40
4:E:561:PHE:HA	4:E:564:ALA:HB3	2.03	0.40
4:F:32:ASP:HA	4:F:35:ILE:CG1	2.50	0.40
4:F:576:MET:HE3	4:F:581:LEU:HD12	2.02	0.40
8:J:31:U:H2'	8:J:32:C:C6	2.56	0.40
8:J:34:C:H2'	8:J:35:U:C6	2.56	0.40
2:B:48:GLU:HA	2:B:51:ARG:CZ	2.51	0.40
3:C:61:SER:HB3	2:D:116:PRO:HG2	2.03	0.40
4:E:445:PRO:HD2	4:E:569:LYS:O	2.21	0.40
5:G:11:GLN:O	5:G:32:TYR:N	2.49	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	929/932 (100%)	890 (96%)	37 (4%)	2 (0%)	44	73
2	B	188/198 (95%)	177 (94%)	11 (6%)	0	100	100
2	D	185/198 (93%)	175 (95%)	10 (5%)	0	100	100
3	C	76/78 (97%)	68 (90%)	7 (9%)	1 (1%)	10	33
4	E	581/593 (98%)	515 (89%)	65 (11%)	1 (0%)	44	73
4	F	581/593 (98%)	499 (86%)	81 (14%)	1 (0%)	44	73
5	G	111/113 (98%)	93 (84%)	13 (12%)	5 (4%)	2	8

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	2651/2705 (98%)	2417 (91%)	224 (8%)	10 (0%)	32	60

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3	ASP
1	A	846	ASP
3	C	65	ALA
5	G	14	CYS
5	G	33	ASN
5	G	11	GLN
5	G	32	TYR
5	G	59	SER
4	E	220	ASN
4	F	491	PRO

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	822/823 (100%)	774 (94%)	48 (6%)	17	46
2	B	147/167 (88%)	133 (90%)	14 (10%)	7	22
2	D	151/167 (90%)	143 (95%)	8 (5%)	19	49
3	C	73/73 (100%)	72 (99%)	1 (1%)	62	86
4	E	498/516 (96%)	483 (97%)	15 (3%)	36	71
4	F	498/516 (96%)	483 (97%)	15 (3%)	36	71
5	G	94/94 (100%)	77 (82%)	17 (18%)	1	4
All	All	2283/2356 (97%)	2165 (95%)	118 (5%)	22	50

All (118) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	ASP

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Mol	Chain	Res	Type
1	A	20	THR
1	A	49	LEU
1	A	54	CYS
1	A	72	VAL
1	A	75	HIS
1	A	76	THR
1	A	115	SER
1	A	204	VAL
1	A	231	VAL
1	A	235	ASP
1	A	236	SER
1	A	246	THR
1	A	255	SER
1	A	269	ASP
1	A	308	LEU
1	A	335	VAL
1	A	359	VAL
1	A	366	LEU
1	A	372	LEU
1	A	424	VAL
1	A	434	SER
1	A	438	LYS
1	A	463	MET
1	A	499	ASP
1	A	520	SER
1	A	548	ILE
1	A	551	LYS
1	A	556	THR
1	A	607	SER
1	A	667	VAL
1	A	680	THR
1	A	682	SER
1	A	701	THR
1	A	709	SER
1	A	723	LEU
1	A	731	LEU
1	A	754	SER
1	A	776	VAL
1	A	778	SER
1	A	803	THR
1	A	807	LYS
1	A	820	VAL

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Mol	Chain	Res	Type
1	A	835	SER
1	A	845	ASP
1	A	846	ASP
1	A	929	THR
1	A	930	VAL
2	B	7	SER
2	B	34	VAL
2	B	42	LEU
2	B	76	SER
2	B	83	VAL
2	B	93	THR
2	B	98	LEU
2	B	106	ILE
2	B	114	CYS
2	B	142	CYS
2	B	145	THR
2	B	173	SER
2	B	177	SER
2	B	193	SER
3	C	59	LEU
2	D	40	LYS
2	D	76	SER
2	D	77	GLU
2	D	115	VAL
2	D	131	VAL
2	D	179	ASN
2	D	185	ILE
2	D	187	THR
4	E	5	CYS
4	E	12	THR
4	E	35	ILE
4	E	38	SER
4	E	122	LEU
4	E	183	THR
4	E	241	VAL
4	E	259	SER
4	E	331	SER
4	E	372	VAL
4	E	410	THR
4	E	533	VAL
4	E	543	TYR
4	E	547	THR

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Mol	Chain	Res	Type
4	E	554	HIS
4	F	7	LEU
4	F	19	CYS
4	F	20	ILE
4	F	42	VAL
4	F	80	SER
4	F	171	LYS
4	F	199	THR
4	F	318	CYS
4	F	351	THR
4	F	453	SER
4	F	495	VAL
4	F	532	THR
4	F	544	VAL
4	F	570	VAL
4	F	590	LEU
5	G	4	LEU
5	G	5	SER
5	G	7	VAL
5	G	9	LEU
5	G	10	ARG
5	G	11	GLN
5	G	12	MET
5	G	19	THR
5	G	27	ASN
5	G	29	LEU
5	G	33	ASN
5	G	34	THR
5	G	35	THR
5	G	46	SER
5	G	73	CYS
5	G	84	LYS
5	G	102	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	39	ASN
1	A	82	HIS
1	A	191	GLN
1	A	297	ASN
1	A	543	ASN

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Mol	Chain	Res	Type
1	A	698	GLN
1	A	789	GLN
1	A	882	HIS
2	B	19	GLN
3	C	69	ASN
2	D	108	ASN
4	E	243	GLN
4	E	265	ASN
4	E	290	HIS
4	E	557	ASN
4	F	33	HIS
4	F	46	ASN
4	F	51	ASN
4	F	164	HIS
4	F	230	HIS
4	F	268	ASN
4	F	354	GLN
4	F	516	ASN
4	F	559	ASN
5	G	98	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
6	H	3/4 (75%)	2 (66%)	0
7	I	24/25 (96%)	2 (8%)	1 (4%)
8	J	26/27 (96%)	1 (3%)	0
All	All	53/56 (94%)	5 (9%)	1 (1%)

All (5) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
6	H	2	U
6	H	4	A
7	I	14	A
7	I	23	C
8	J	45	C

All (1) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
7	I	22	G

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 9 ligands modelled in this entry, 8 are monoatomic - leaving 1 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	$\#\|Z\| > 2$
10	GNP	A	1003	-	29,34,34	1.84	4 (13%)	33,54,54	2.16	11 (33%)

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
10	GNP	A	1003	-	-	8/14/38/38	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	A	1003	GNP	PB-N3B	5.55	1.77	1.63
10	A	1003	GNP	PG-N3B	5.35	1.77	1.63
10	A	1003	GNP	C5-C6	3.95	1.48	1.41
10	A	1003	GNP	C5-C4	2.42	1.47	1.40

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
10	A	1003	GNP	C2-N3-C4	5.52	121.66	115.36
10	A	1003	GNP	C2-N1-C6	4.03	122.33	115.93
10	A	1003	GNP	C5-C6-N1	-3.92	118.08	123.43
10	A	1003	GNP	C4-C5-C6	-3.69	117.27	120.80
10	A	1003	GNP	O3A-PB-N3B	3.60	116.58	106.59
10	A	1003	GNP	N3-C2-N1	-3.48	122.58	127.22
10	A	1003	GNP	O3G-PG-O1G	-3.25	105.29	113.45
10	A	1003	GNP	C3'-C2'-C1'	3.10	105.64	100.98
10	A	1003	GNP	PB-O3A-PA	-3.00	122.05	132.62
10	A	1003	GNP	O1B-PB-N3B	-2.45	108.17	111.77
10	A	1003	GNP	C4-C5-N7	-2.31	106.99	109.40

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	A	1003	GNP	PB-N3B-PG-O1G
10	A	1003	GNP	PA-O3A-PB-O1B
10	A	1003	GNP	PA-O3A-PB-O2B
10	A	1003	GNP	C5'-O5'-PA-O1A
10	A	1003	GNP	C5'-O5'-PA-O2A
10	A	1003	GNP	O4'-C4'-C5'-O5'
10	A	1003	GNP	C3'-C4'-C5'-O5'
10	A	1003	GNP	C5'-O5'-PA-O3A

There are no ring outliers.

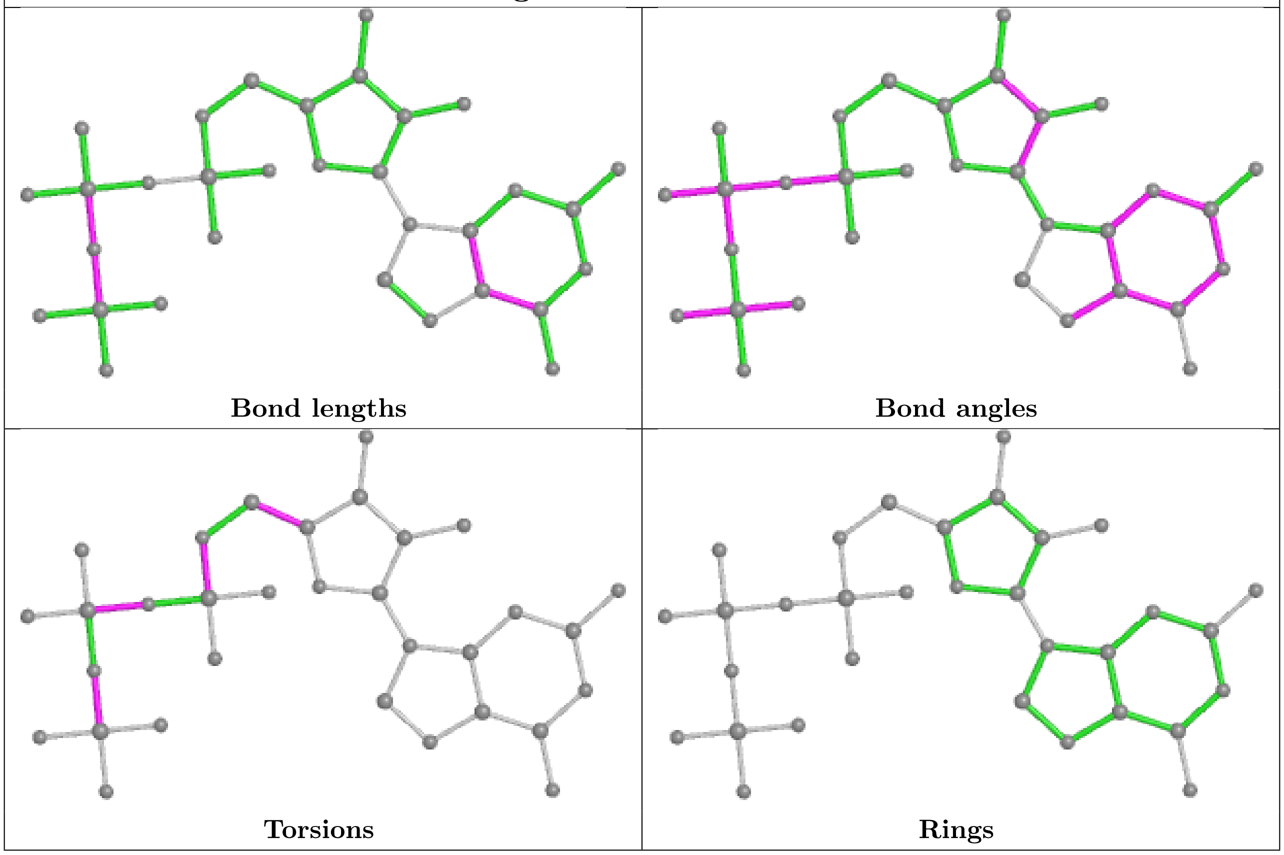
1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	A	1003	GNP	4	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 GNP A 1003



5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

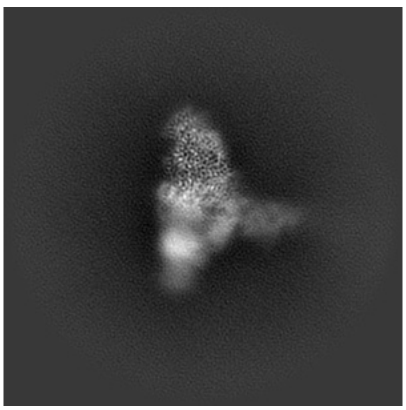
6 Map visualisation (i)

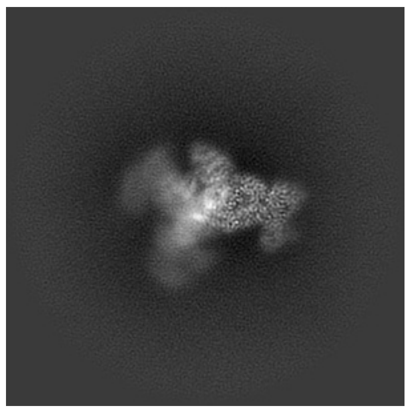
This section contains visualisations of the EMDB entry EMD-64175. These allow visual inspection of the internal detail of the map and identification of artifacts.

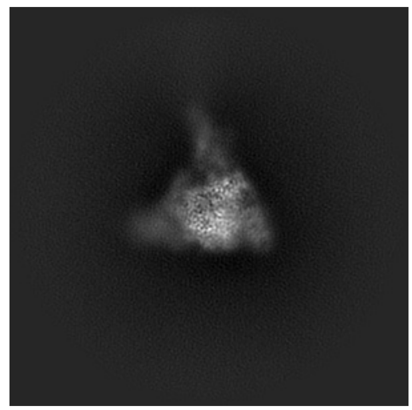
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

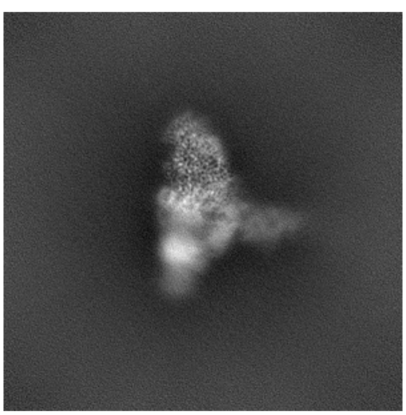
6.1.1 Primary map

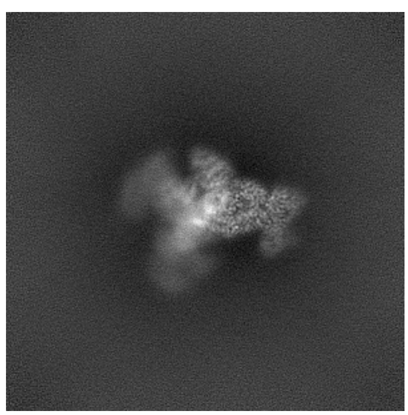

X

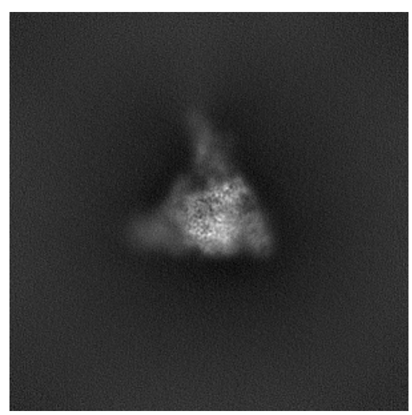

Y


Z

6.1.2 Raw map


X

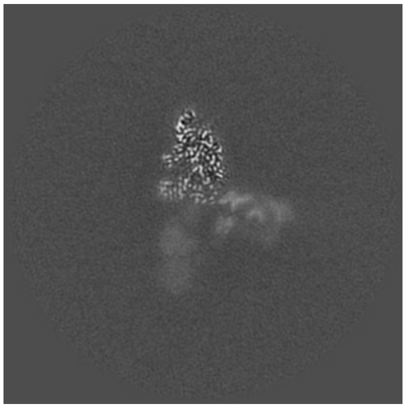

Y


Z

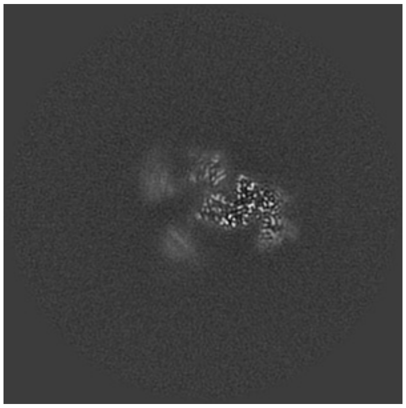
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

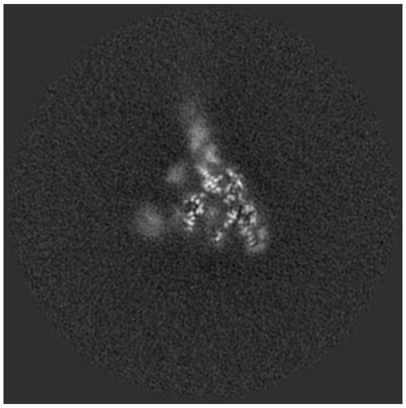
6.2.1 Primary map



X Index: 200

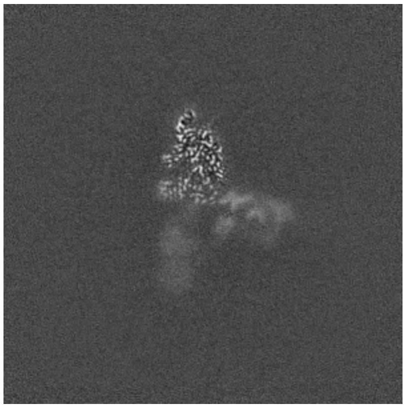


Y Index: 200

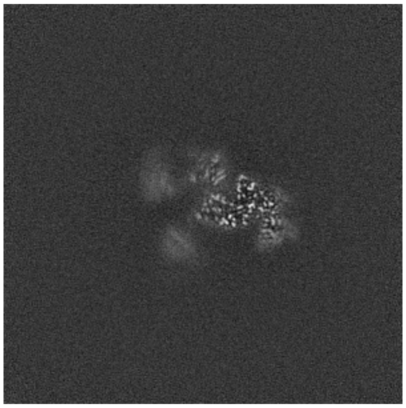


Z Index: 200

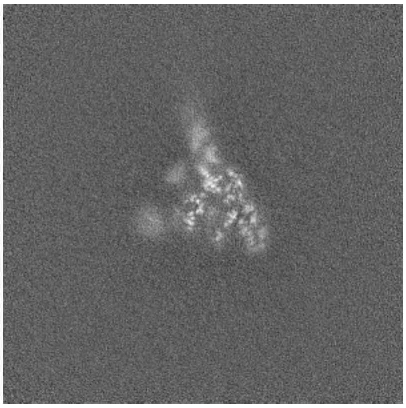
6.2.2 Raw map



X Index: 200



Y Index: 200

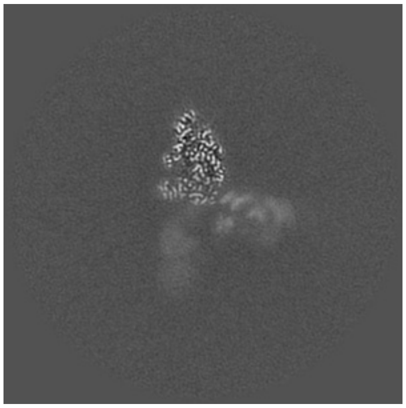


Z Index: 200

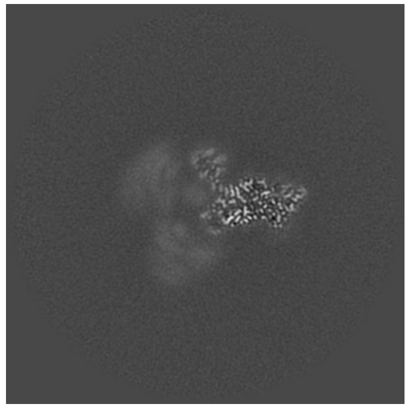
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

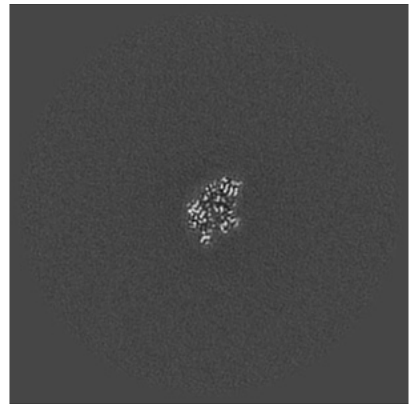
6.3.1 Primary map



X Index: 199

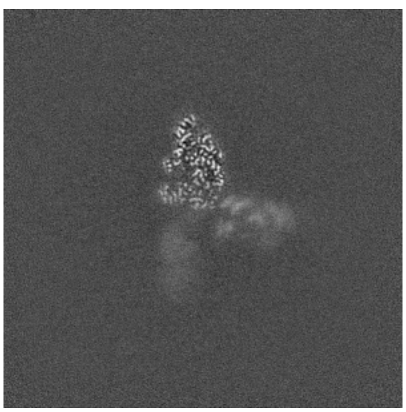


Y Index: 186

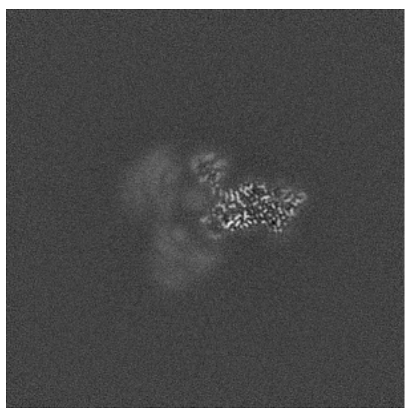


Z Index: 243

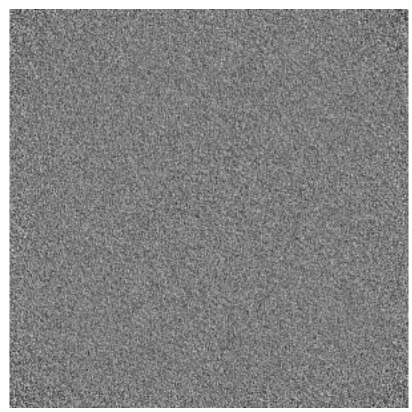
6.3.2 Raw map



X Index: 199



Y Index: 186

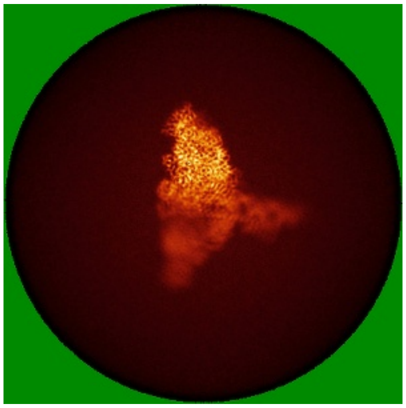


Z Index: 0

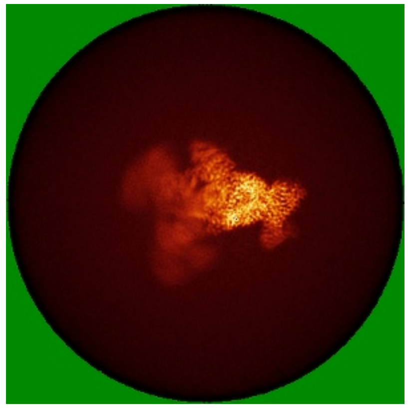
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color)

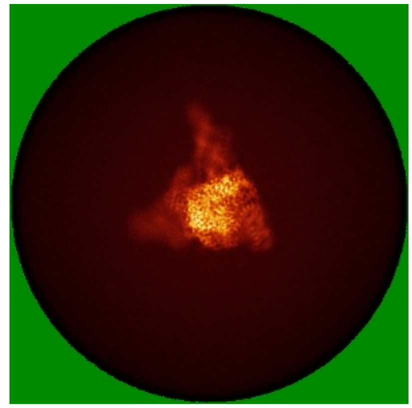
6.4.1 Primary map



X

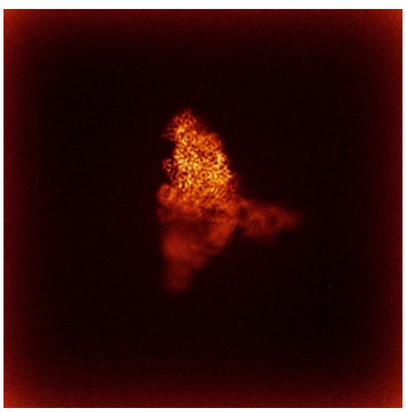


Y

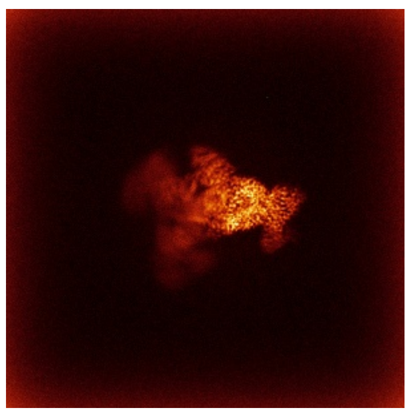


Z

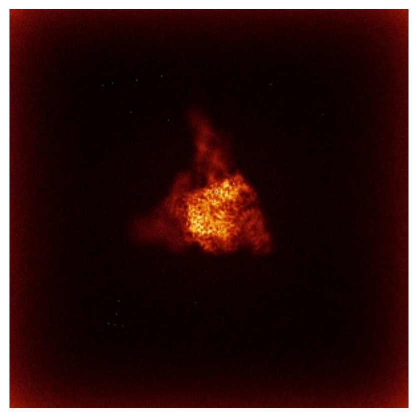
6.4.2 Raw map



X



Y



Z

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

6.5 Orthogonal surface views

6.5.1 Primary map

X

Y

Z

The images above show the 3D surface view of the map at the recommended contour level 0.4. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

X

Y

Z

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

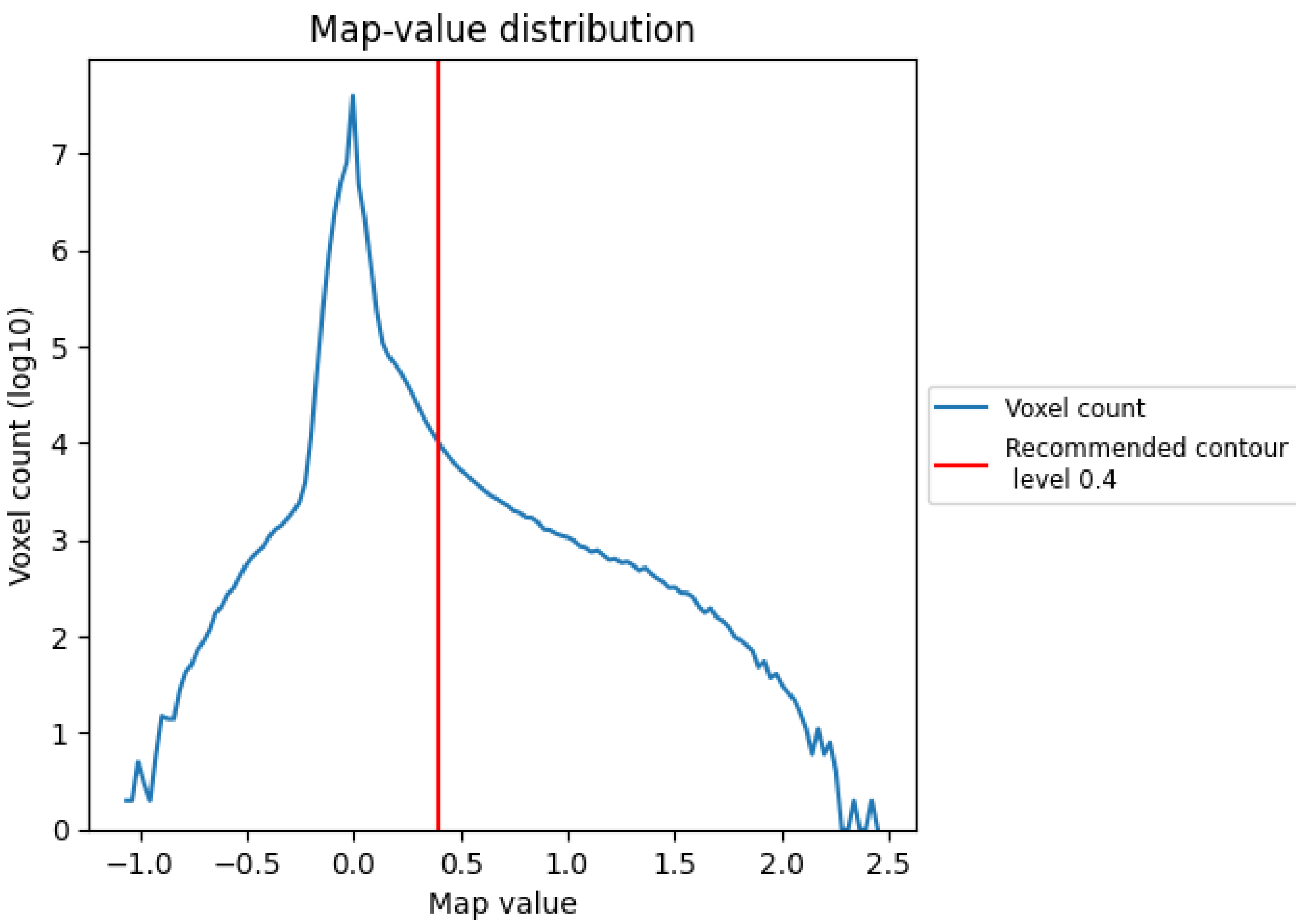
6.6 Mask visualisation

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

7 Map analysis (i)

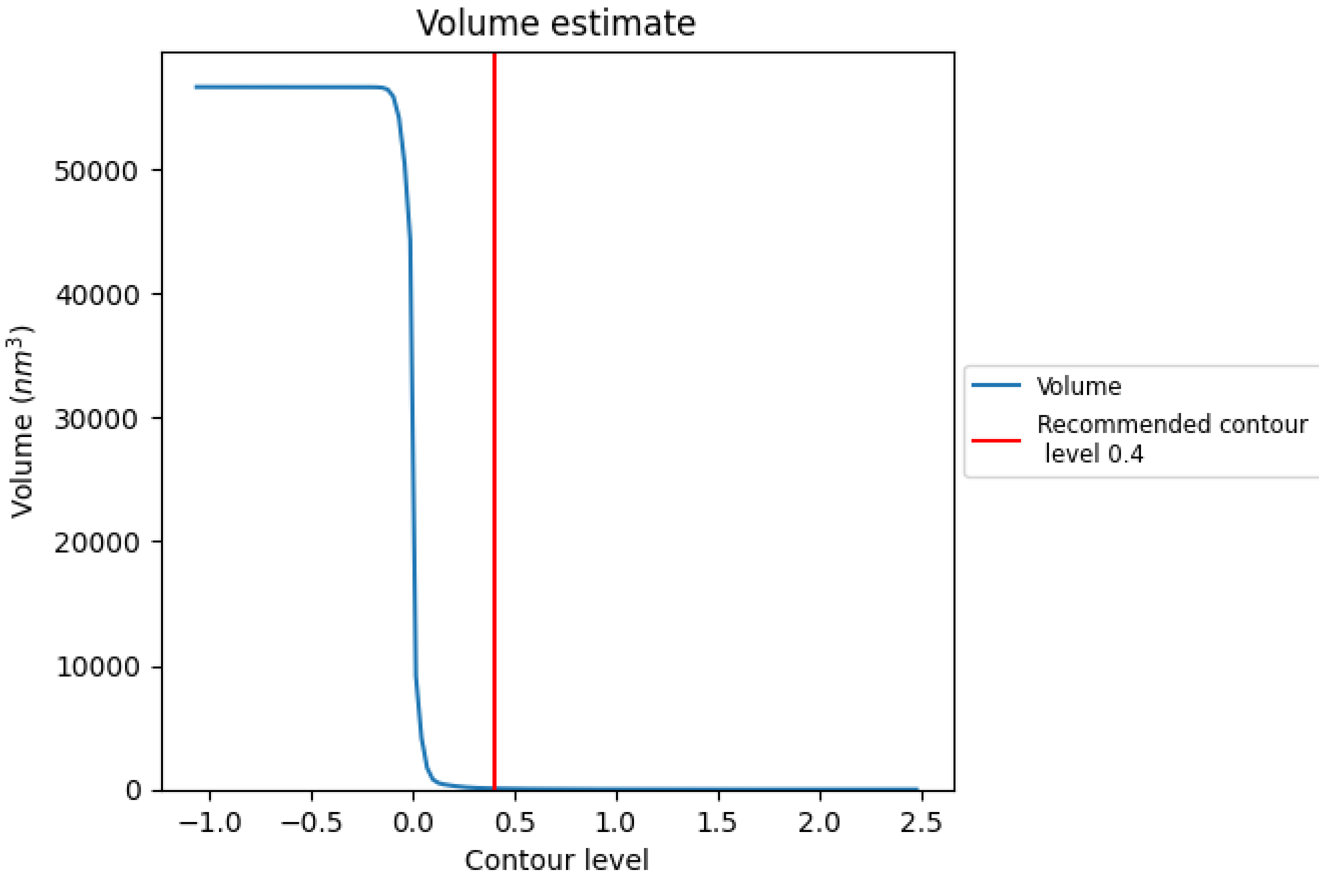
This section contains the results of statistical analysis of the map.

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.

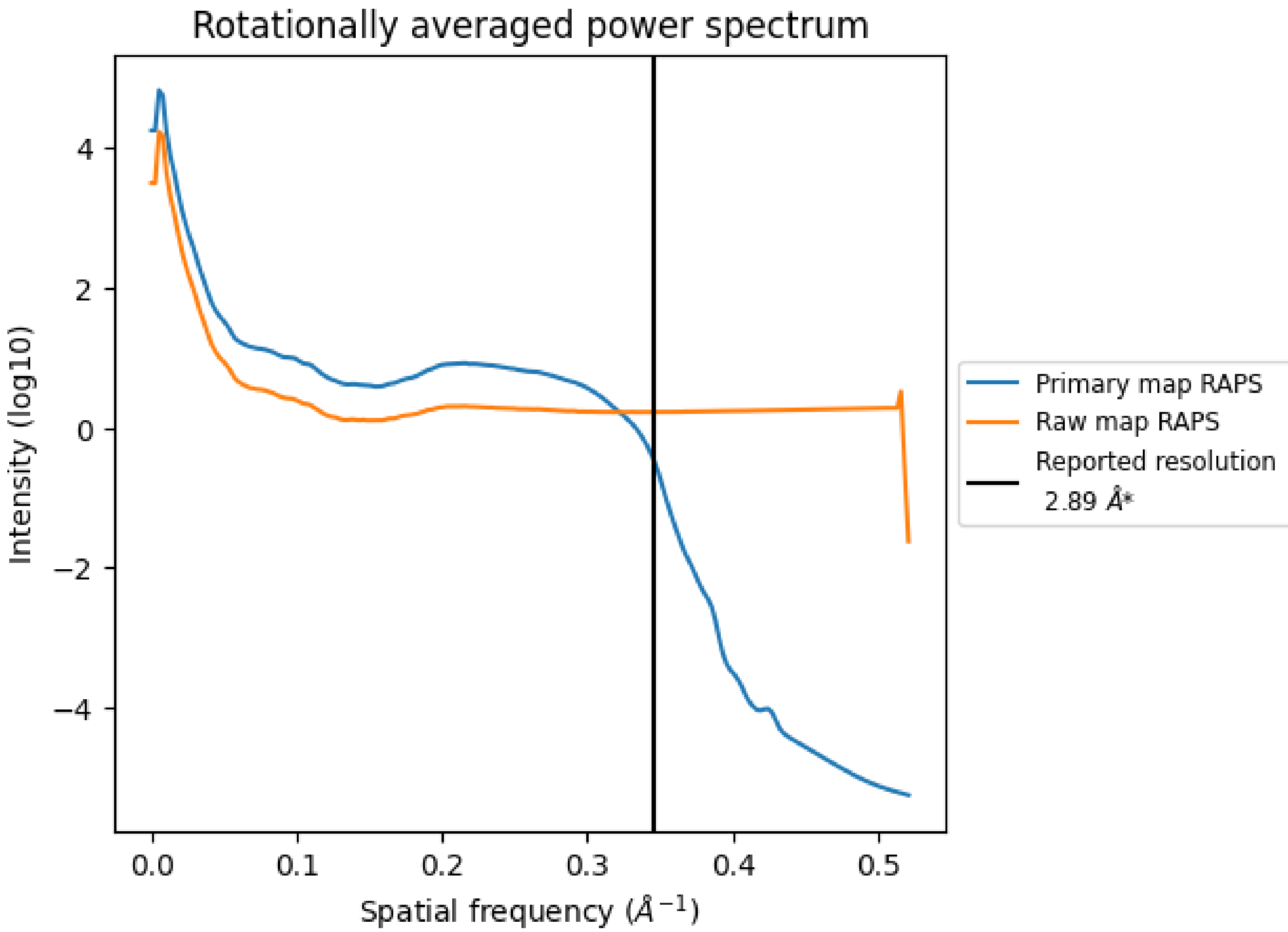
7.2 Volume estimate (i)



The volume at the recommended contour level is 77 nm^3; this corresponds to an approximate mass of 70 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)

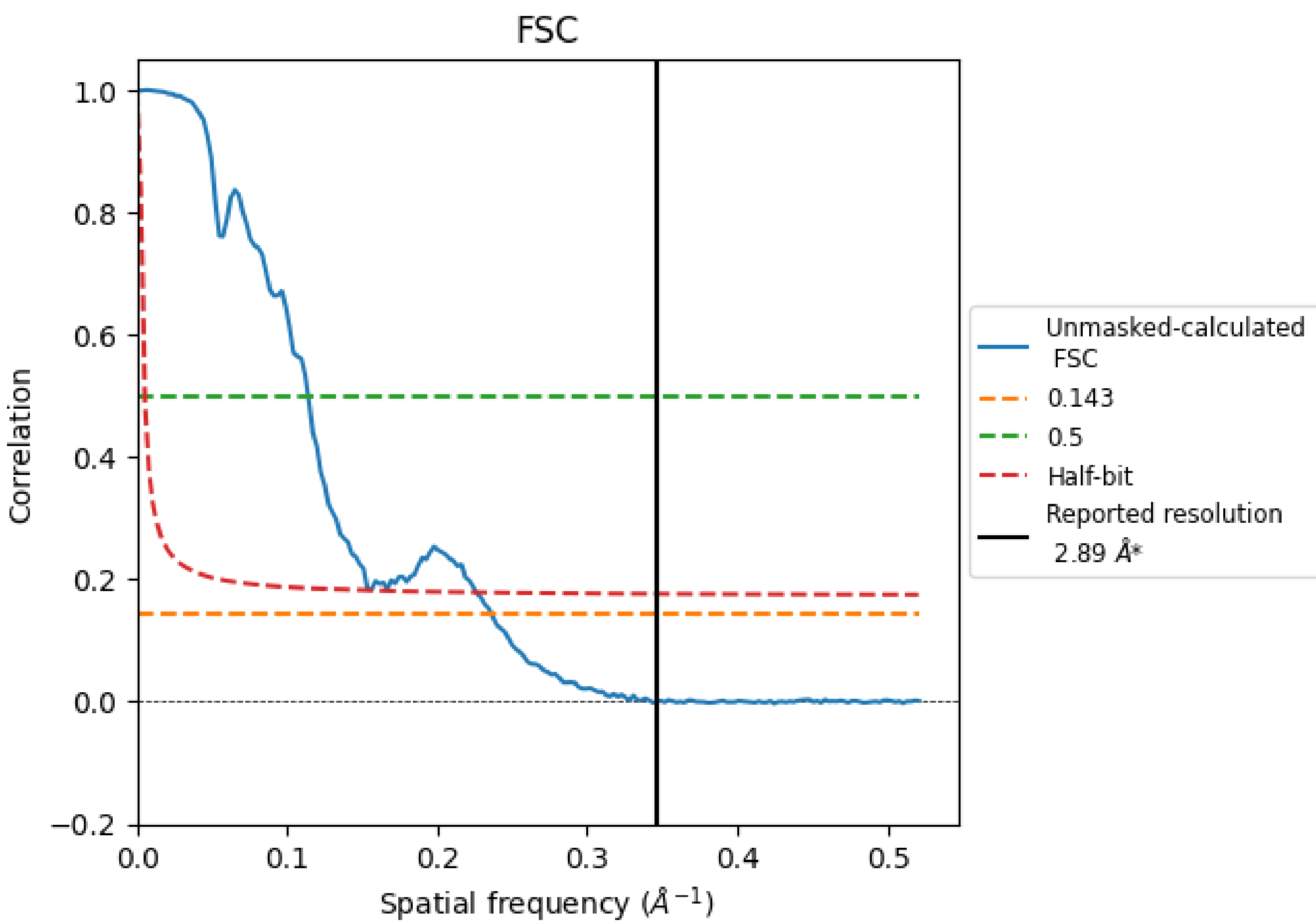


*Reported resolution corresponds to spatial frequency of 0.346 Å^{-1}

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 0.346 $Å^{-1}$

8.2 Resolution estimates (i)

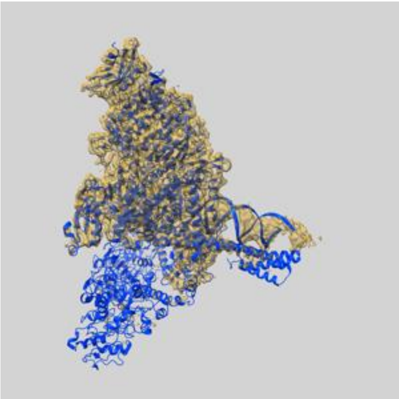
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	-	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.23	8.77	4.42

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

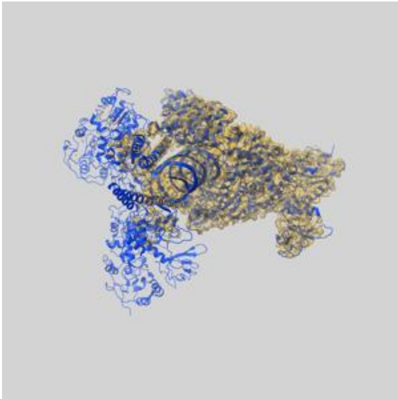
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-64175 and PDB model 9UHT. Per-residue inclusion information can be found in section 3 on page 7.

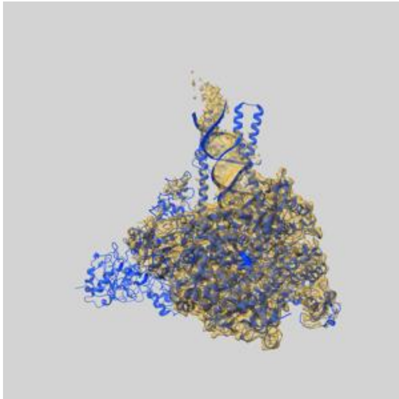
9.1 Map-model overlay (i)



X



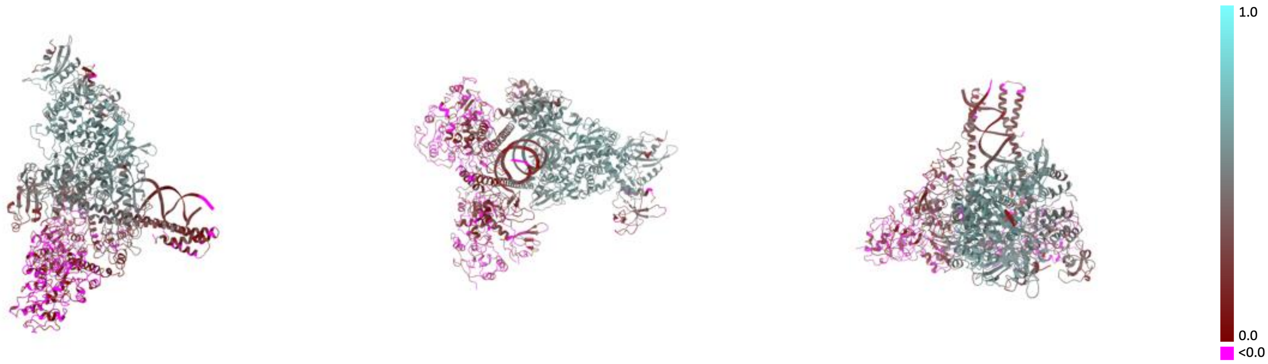
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.4 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.

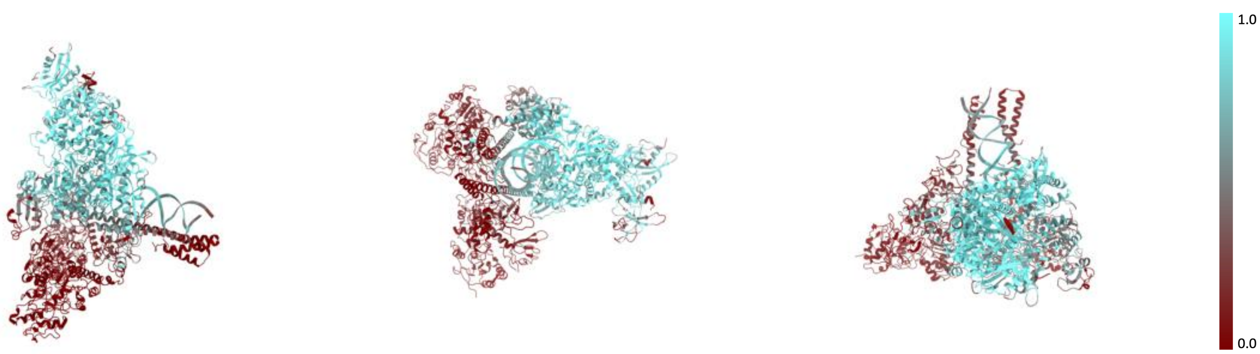
9.2 Q-score mapped to coordinate model (i)



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.

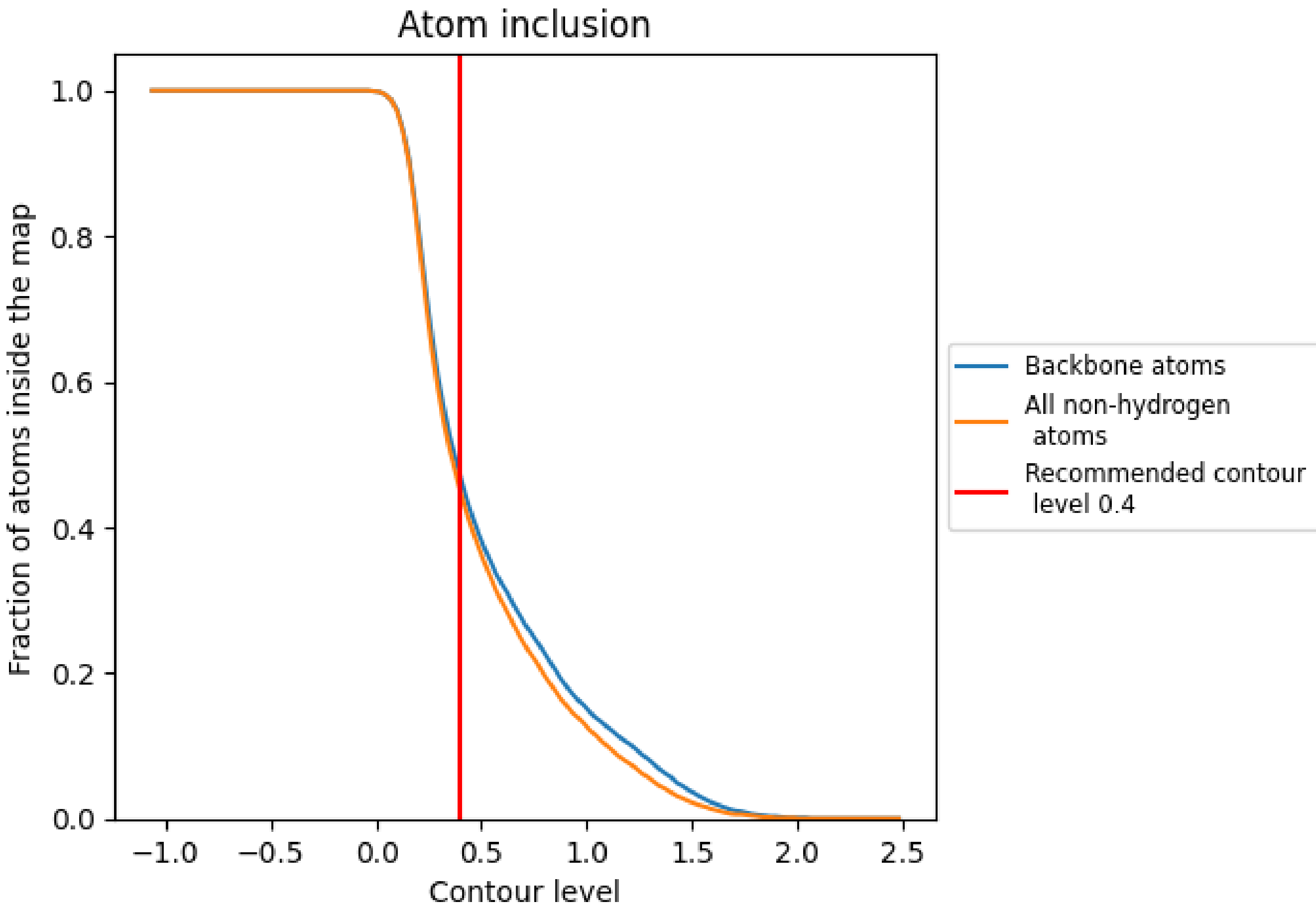
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.4).

9.4 Atom inclusion ⓘ



At the recommended contour level, 47% of all backbone atoms, 45% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4490	0.3170
A	0.8800	0.5680
B	0.5390	0.4120
C	0.6360	0.4450
D	0.3800	0.3380
E	0.0200	0.0740
F	0.0570	0.0740
G	0.4570	0.3200
H	0.2980	0.2690
I	0.7580	0.3410
J	0.7890	0.3850