Full wwPDB EM Validation Report (i)

May 25, 2025 – 09:07 PM EDT

PDB ID	:	6OEO / pdb_00006oeo
EMDB ID	:	EMD-20032
Title	:	Cryo-EM structure of mouse RAG1/2 NFC complex (DNA1)
Authors	:	Chen, X.; Cui, Y.; Zhou, Z.H.; Yang, W.; Gellert, M.
Deposited on	:	2019-03-27
Resolution	:	3.69 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:

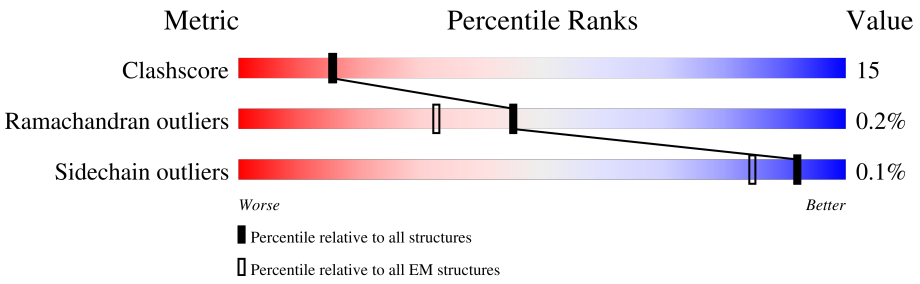
EMDB validation analysis	:	0.0.1.dev118
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (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 3.69 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	1040	• 40% 18% 42%
1	C	1040	• 42% 18% 41%
2	B	527	• 46% 20% 34%
2	D	527	• 47% 18% 34%
3	F	50	6% 26% 64% • 8%
4	I	50	8% 20% 70% • 8%
5	G	61	15% 34% 59% 7%
6	J	61	13% 38% 54% • 7%

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Mol	Chain	Length	Quality of chain
7	N	163	20% 33% 67%

2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 19516 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 V(D)J recombination-activating protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	608	4818	3034	857	892	35	1	0
1	C	616	4863	3063	863	903	34	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	962	GLN	GLU	engineered mutation	UNP P15919
C	962	GLN	GLU	engineered mutation	UNP P15919

- Molecule 2 is a protein called V(D)J recombination-activating protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	346	2673	1709	455	490	19	0	0
2	D	346	2674	1709	455	491	19	0	0

- Molecule 3 is a DNA chain called DNA (46-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	F	46	938	447	170	276	45	0	0

- Molecule 4 is a DNA chain called DNA (46-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
4	I	46	936	446	172	272	46	0	0

- Molecule 5 is a DNA chain called DNA (57-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
5	G	57	1154	552	200	346	56	0	0

- Molecule 6 is a DNA chain called DNA (57-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
6	J	57	1171	556	224	334	57	0	0

- Molecule 7 is a protein called High mobility group protein B1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	N	54	283	171	54	57	1	0	0

- Molecule 8 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		AltConf
			Total	Ca	
8	A	2	2	2	0
8	C	2	Total	Ca	0
			2	2	

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

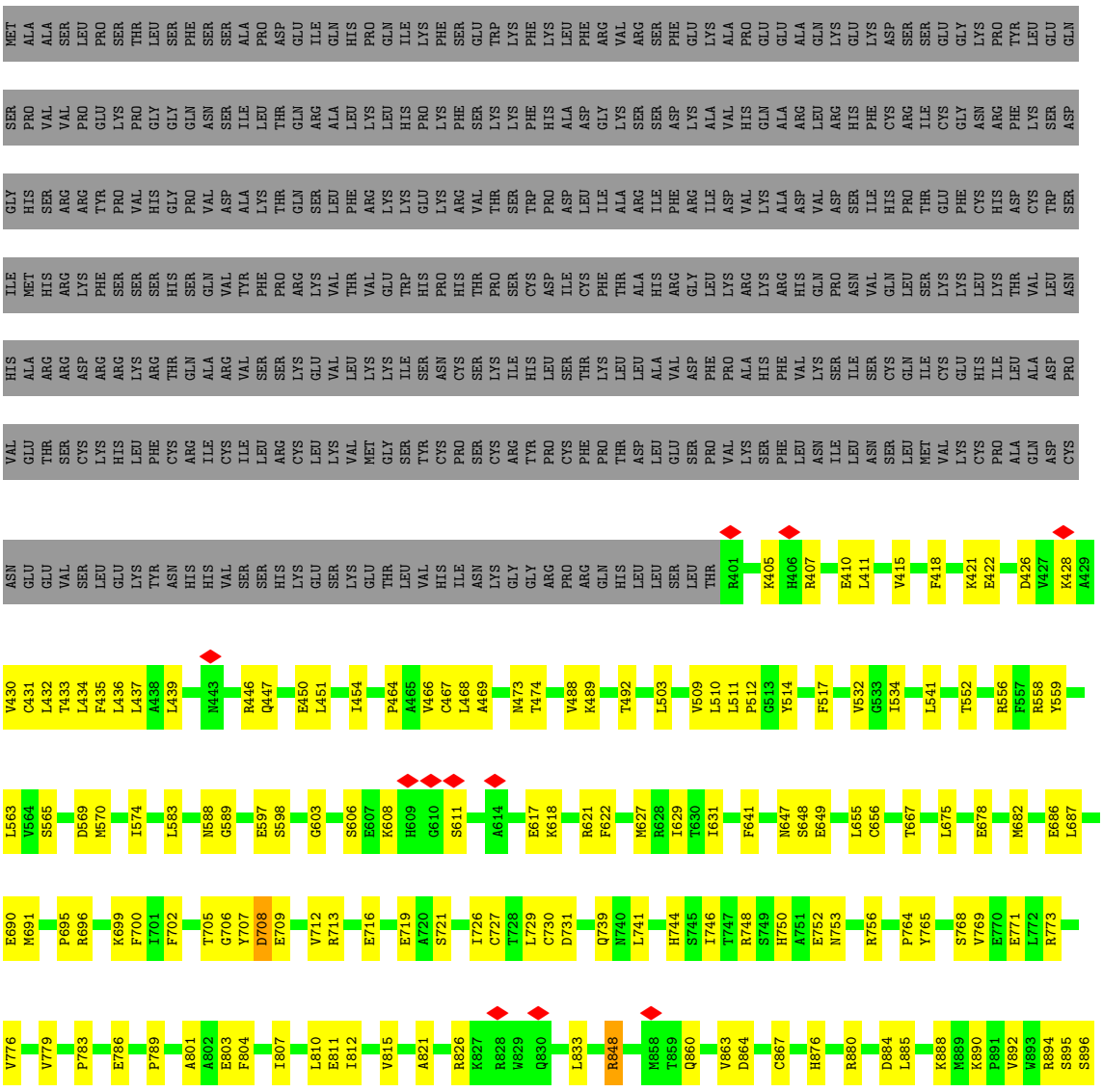
Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
9	A	1	1	1	0
9	C	1	Total	Zn	0
			1	1	

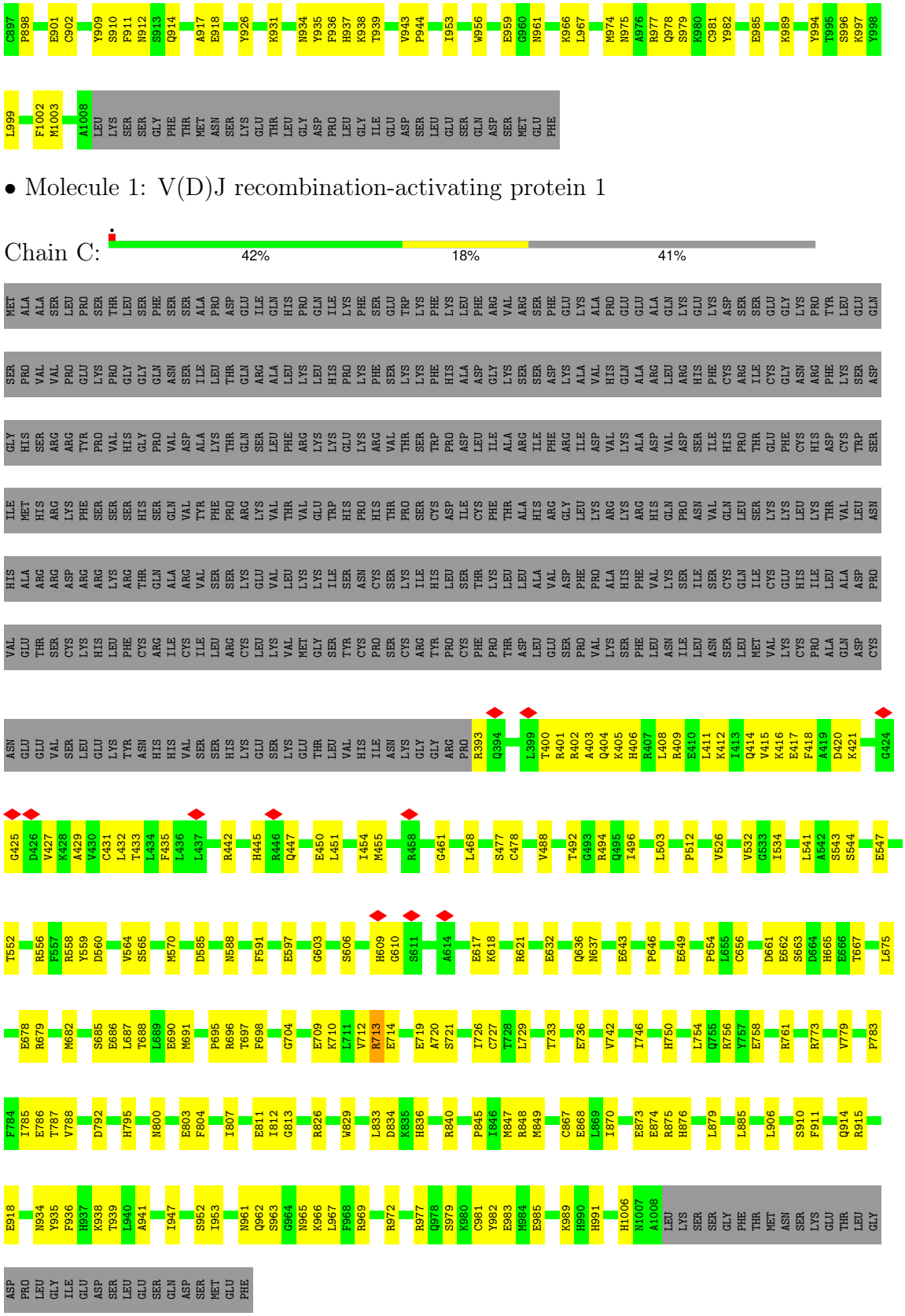
3 Residue-property plots (i)

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: V(D)J recombination-activating protein 1

Chain A: 40% 18% 42%





• Molecule 1: V(D)J recombination-activating protein 1

• Molecule 2: V(D)J recombination-activating protein 2

Chain B: 46% 20% 34%

M1 S2 L3 Q4 V8 I12 Q16 N23 F24 F29 Q33 P37 K38 R39 S40 C41 V45 F46 N53 H54 L55 F62 D65 S66 L69 A76 T77 C78 G82 SER ILE ASP SER ASP K88 I92 I93 H94 D105 K106 I107 A113

K119 V120 R123 C124 K127 P136 R137 I142 R148 G157 T169 E170 K171 W172 N173 V182 D186 F187 G190 Y195 I196 L197 L200 V208 R212 N213 D214 T215 V216 L219 R229 P230 A231 N232 L233 Y234 R235 I236 D239 L240 P241 L242

P245 A246 V247 N248 C249 T250 V251 L252 G255 I256 S257 T264 D269 I273 V274 G275 Q278 L279 Q282 M285 L289 V290 S291 L292 G293 E298 I299 M302 E303 W307 T308 S309 K312 H313 S314 K315 I316 W317 G323 I327 F328 P332 K336 Q337

A338 F343 Y344 F345 L348 R349 C350 S351 GLU GLU ASP LEU SER GLU ASP GLN LYS ILE VAL SER ASN SER GLN THR SER THR GLU ASP PRO GLY ASP SER THR PRO PHE GLU ASP SER GLU GLU PHE CYS PHE SER ALA GLU ALA THR SER PHE ASP GLY ASP ASP GLU PHE ASP THR

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

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

LEU ARG ARG LEU PHE ASP

- Molecule 2: V(D)J recombination-activating protein 2

Chain D: 47% 18% 34%

M1 Q4 V8 I12 I15 Q16 L21 M22 F29 Q33 R39 T43 G44 I50 N53 H54 L55 K56 L57 K58 S63 K64 D65 S66 C67 Y68 L69 P70 P71 L72 C78 G82 SER ILE ASP SER ASP K88 I92 G96 D105 I109

M110 A113 R123 C124 P134 E135 P136 R137 I142 D143 V144 R148 V154 L155 G158 R159 Q166 T169 N173 L179 P180 F183 D186 G190 L197 P198 E199 L200 L204 R212 N213 D214 T215 V216 N232 L233 Y234 D239 L240 P241

C249 T250 V251 I262 L263 T264 Q265 T266 N267 N268 F271 V274 G275 G276 Y277 Q278 L279 Q282 K283 R284 V290 S291 L292 G293 D294 M302 E303 W307 K312 H313 S314 K315 I316 N324 G325 T326 I327 N335 K336 M339 F345 L348 R349 C350 S351 GLU GLU

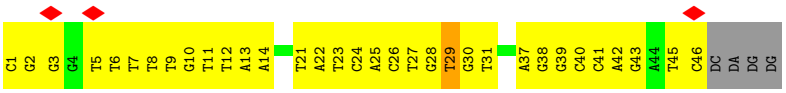
ASP LEU SER GLU ASP GLN LYS ILE VAL SER ASN SER GLN THR SER THR GLU ASP PRO GLY ASP SER THR PRO PHE GLU ASP SER GLU GLU PHE CYS PHE SER ALA GLU ALA THR SER PHE ASP GLY ASP ASP GLU PHE ASP THR TYR ASN GLU ASP ASP GLU ASP ASP GLU SER VAL THR

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

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

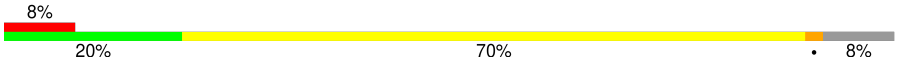
- Molecule 3: DNA (46-MER)

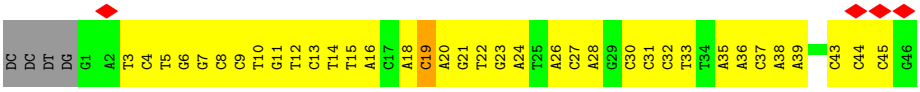
Chain F: 6% 26% 64% 8%



- Molecule 4: DNA (46-MER)

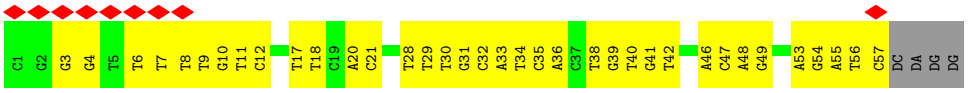
Chain I:





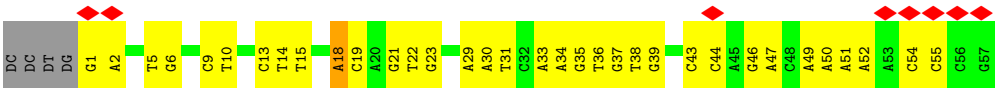
- Molecule 5: DNA (57-MER)

Chain G:



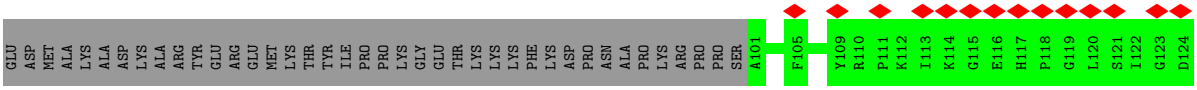
- Molecule 6: DNA (57-MER)

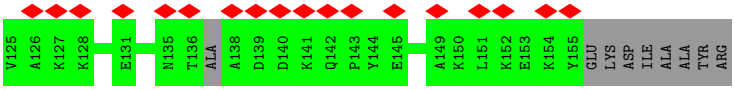
Chain J:



- Molecule 7: High mobility group protein B1

Chain N:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	109388	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	42	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.194	Depositor
Minimum map value	-0.111	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.006	Depositor
Recommended contour level	0.0308	Depositor
Map size (Å)	299.6, 299.6, 299.6	wwPDB
Map dimensions	280, 280, 280	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.07, 1.07, 1.07	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: CA, 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	0.25	0/4922	0.46	1/6645 (0.0%)
1	C	0.26	0/4965	0.43	0/6706
2	B	0.21	0/2741	0.40	0/3719
2	D	0.25	0/2742	0.42	0/3720
3	F	0.25	0/1052	0.51	1/1624 (0.1%)
4	I	0.27	0/1049	0.53	2/1614 (0.1%)
5	G	0.24	0/1291	0.44	0/1991
6	J	0.26	0/1316	0.45	1/2028 (0.0%)
7	N	0.12	0/284	0.27	0/393
All	All	0.25	0/20362	0.44	5/28440 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	953	ILE	N-CA-C	-6.71	107.34	113.71
4	I	19	DC	C4'-C3'-O3'	-5.54	101.69	110.00
6	J	18	DA	C4'-C3'-O3'	5.53	118.30	110.00
3	F	29	DT	C4'-C3'-O3'	5.40	118.11	110.00
4	I	19	DC	N1-C1'-C2'	5.02	121.03	113.50

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4818	0	4729	136	0
1	C	4863	0	4758	147	0
2	B	2673	0	2610	69	0
2	D	2674	0	2613	71	0
3	F	938	0	516	43	0
4	I	936	0	517	41	0
5	G	1154	0	642	40	0
6	J	1171	0	639	35	0
7	N	283	0	172	0	0
8	A	2	0	0	0	0
8	C	2	0	0	0	0
9	A	1	0	0	0	0
9	C	1	0	0	0	0
All	All	19516	0	17196	533	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 15.

All (533) 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:803:GLU:HG2	1:A:936:PHE:CE1	1.75	1.20
1:C:848:ARG:HH11	6:J:18:DA:H5”	1.10	1.13
1:C:400:THR:HG22	1:C:401:ARG:H	1.05	1.12
1:A:803:GLU:HG2	1:A:936:PHE:HE1	1.31	0.91
1:C:400:THR:CG2	1:C:401:ARG:H	1.85	0.88
3:F:28:DG:H2’	4:I:18:DA:C2	2.09	0.88
1:C:400:THR:HG22	1:C:401:ARG:N	1.83	0.88
2:D:134:PRO:HB2	2:D:137:ARG:HH12	1.41	0.86
1:C:848:ARG:NH1	6:J:18:DA:H5”	1.89	0.86
1:A:741:LEU:HD13	1:A:917:ALA:HB1	1.60	0.83
3:F:28:DG:H2’	4:I:18:DA:H2	1.41	0.81
2:D:276:GLY:H	2:D:284:ARG:HB3	1.46	0.80
1:C:848:ARG:HH11	6:J:18:DA:C5’	1.93	0.80
1:A:867:CYS:SG	1:A:876:HIS:ND1	2.58	0.77
1:A:690:GLU:HA	1:A:695:PRO:HA	1.66	0.76
1:C:468:LEU:HB2	1:C:503:LEU:HD11	1.66	0.76
1:C:402:ARG:HA	1:C:405:LYS:HD3	1.69	0.74
6:J:14:DT:H2’	6:J:15:DT:C6	2.22	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:186:ASP:O	2:B:190:GLY:N	2.21	0.73
1:C:709:GLU:OE1	1:C:938:LYS:NZ	2.21	0.73
1:C:632:GLU:HA	1:C:637:ASN:HA	1.69	0.73
2:D:4:GLN:NE2	2:D:53:ASN:OD1	2.21	0.73
2:D:283:LYS:NZ	2:D:314:SER:OG	2.23	0.71
2:D:1:MET:N	2:D:349:ARG:O	2.23	0.71
2:D:66:SER:OG	2:D:124:CYS:SG	2.48	0.71
1:C:803:GLU:HG3	1:C:936:PHE:CE1	2.26	0.71
3:F:28:DG:H5"	3:F:28:DG:H8	1.56	0.71
4:I:18:DA:H2'	4:I:19:DC:H5"	1.72	0.70
1:A:588:ASN:HA	1:A:696:ARG:HG3	1.73	0.70
1:A:532:VAL:HG21	1:A:558:ARG:HE	1.57	0.70
1:A:405:LYS:HE3	6:J:44:DC:H5'	1.72	0.69
1:C:691:MET:O	1:C:696:ARG:NH1	2.26	0.69
1:A:709:GLU:OE1	1:A:938:LYS:NZ	2.26	0.68
1:C:803:GLU:HG3	1:C:936:PHE:HE1	1.58	0.68
2:D:16:GLN:NE2	2:D:33:GLN:O	2.26	0.68
1:C:585:ASP:O	1:C:696:ARG:NH2	2.27	0.68
1:A:691:MET:HB3	1:A:696:ARG:HD3	1.75	0.68
1:A:730:CYS:O	1:A:748:ARG:NH2	2.26	0.68
1:C:558:ARG:NH1	1:C:560:ASP:OD2	2.27	0.67
2:D:137:ARG:HD3	2:D:158:GLY:H	1.58	0.67
2:B:2:SER:HB2	2:B:349:ARG:HB2	1.76	0.67
1:C:420:ASP:HB2	1:C:425:GLY:HA2	1.77	0.67
3:F:13:DA:H2'	3:F:14:DA:C8	2.31	0.66
1:C:547:GLU:OE2	2:D:159:ARG:NH1	2.29	0.66
1:C:836:HIS:NE2	1:C:868:GLU:OE2	2.28	0.66
5:G:55:DA:H2'	5:G:56:DT:C6	2.30	0.66
2:D:8:VAL:HG11	2:D:12:ILE:HD12	1.76	0.66
1:C:534:ILE:HG21	1:C:985:GLU:HG2	1.77	0.66
2:B:23:ASN:HD22	2:B:323:GLY:HA3	1.61	0.65
4:I:21:DG:H2"	4:I:22:DT:H71	1.79	0.65
1:C:870:ILE:HD12	1:C:875:ARG:HB2	1.78	0.65
3:F:41:DC:H2"	3:F:42:DA:N7	2.11	0.65
1:A:931:LYS:HE3	4:I:13:DC:H4'	1.79	0.64
1:C:621:ARG:NH1	1:C:961:ASN:OD1	2.26	0.64
1:C:541:LEU:HD12	2:D:173:ASN:HD22	1.61	0.64
1:C:758:GLU:OE2	1:C:761:ARG:NH2	2.29	0.63
2:B:4:GLN:NE2	2:B:53:ASN:OD1	2.31	0.63
3:F:10:DG:H2"	3:F:11:DT:H2'	1.78	0.63
1:A:415:VAL:HG12	1:C:415:VAL:HG11	1.79	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:754:LEU:HD23	1:C:783:PRO:HD2	1.80	0.63
2:D:212:ARG:O	2:D:214:ASP:N	2.27	0.63
2:B:197:LEU:HD21	2:B:200:LEU:HD12	1.81	0.63
2:B:212:ARG:NE	2:B:293:GLY:O	2.31	0.63
1:A:848:ARG:HB2	3:F:29:DT:H72	1.81	0.63
2:D:232:ASN:ND2	2:D:234:TYR:OH	2.32	0.63
1:C:906:LEU:HD11	1:C:947:ILE:HG21	1.82	0.62
2:D:22:MET:HG3	2:D:29:PHE:HB2	1.82	0.62
2:B:212:ARG:O	2:B:214:ASP:N	2.29	0.62
3:F:22:DA:H2"	3:F:23:DT:H5"	1.81	0.62
1:A:848:ARG:CB	3:F:29:DT:H72	2.30	0.62
4:I:43:DC:H4'	4:I:44:DC:OP1	1.99	0.62
1:A:422:GLU:O	1:C:393:ARG:NH1	2.32	0.62
2:B:105:ASP:HB3	2:B:136:PRO:HG3	1.82	0.61
1:C:840:ARG:NH1	1:C:868:GLU:OE2	2.33	0.61
3:F:28:DG:C6	4:I:19:DC:C4	2.88	0.61
1:A:436:LEU:HD21	1:A:451:LEU:HD22	1.82	0.61
5:G:28:DT:H2'	5:G:29:DT:C6	2.35	0.61
6:J:18:DA:H2'	6:J:19:DC:H5"	1.82	0.61
1:C:713:ARG:CD	1:C:721:SER:HA	2.31	0.61
1:A:647:ASN:ND2	1:A:959:GLU:OE1	2.34	0.61
2:B:208:VAL:HG21	2:B:273:ILE:HD11	1.82	0.61
2:B:219:LEU:HD11	2:B:256:ILE:HG22	1.83	0.61
4:I:31:DC:H2'	4:I:32:DC:C6	2.35	0.60
1:C:690:GLU:HA	1:C:695:PRO:HA	1.83	0.60
2:D:249:CYS:SG	2:D:250:THR:N	2.74	0.60
6:J:9:DC:H2"	6:J:10:DT:H5"	1.84	0.60
1:C:756:ARG:HB3	1:C:779:VAL:HG11	1.82	0.60
4:I:3:DT:H4'	4:I:4:DC:OP1	2.01	0.60
4:I:26:DA:H2"	4:I:27:DC:H5"	1.81	0.60
3:F:37:DA:H2"	3:F:38:DG:C8	2.36	0.60
1:A:716:GLU:O	1:A:753:ASN:ND2	2.28	0.60
1:A:729:LEU:HB3	1:A:746:ILE:HG23	1.84	0.60
4:I:22:DT:H2"	4:I:23:DG:C8	2.37	0.60
1:C:429:ALA:O	1:C:432:LEU:HG	2.02	0.60
1:C:404:GLN:O	1:C:408:LEU:HG	2.01	0.59
5:G:55:DA:H3'	5:G:56:DT:H71	1.83	0.59
1:A:811:GLU:OE2	1:A:926:TYR:OH	2.20	0.59
1:C:679:ARG:HH22	1:C:786:GLU:HB3	1.67	0.59
4:I:5:DT:H2"	4:I:6:DG:C8	2.38	0.59
1:A:803:GLU:CG	1:A:936:PHE:CE1	2.69	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:16:GLN:NE2	2:B:33:GLN:O	2.36	0.59
2:B:127:LYS:NZ	2:B:187:PHE:O	2.36	0.59
3:F:38:DG:H2"	3:F:39:DG:C8	2.38	0.59
2:B:233:LEU:HD23	2:B:255:GLY:HA2	1.85	0.59
3:F:38:DG:H2"	3:F:39:DG:H8	1.67	0.59
2:B:170:GLU:OE1	2:B:170:GLU:N	2.36	0.58
1:C:411:LEU:O	1:C:415:VAL:HG22	2.04	0.58
1:A:435:PHE:CE1	1:C:432:LEU:HB3	2.39	0.58
1:A:848:ARG:CB	3:F:29:DT:C7	2.82	0.58
2:B:232:ASN:ND2	2:B:234:TYR:OH	2.37	0.58
5:G:9:DT:H2"	5:G:10:DG:C8	2.39	0.58
4:I:27:DC:H2"	4:I:28:DA:C8	2.40	0.57
1:C:427:VAL:O	1:C:431:CYS:HB2	2.05	0.57
1:C:688:THR:HG22	1:C:697:THR:HG22	1.87	0.57
1:A:432:LEU:O	1:A:436:LEU:HG	2.04	0.57
5:G:35:DC:H2"	5:G:36:DA:C8	2.40	0.57
6:J:5:DT:H2"	6:J:6:DG:N7	2.20	0.57
2:B:186:ASP:O	2:B:190:GLY:CA	2.53	0.57
1:C:773:ARG:NE	2:D:39:ARG:HE	2.02	0.57
4:I:5:DT:H2"	4:I:6:DG:N7	2.19	0.57
1:A:978:GLN:O	5:G:38:DT:H5'	2.04	0.57
1:A:606:SER:HB3	1:A:617:GLU:HG2	1.86	0.57
1:C:409:ARG:HA	1:C:412:LYS:HB3	1.86	0.56
1:A:569:ASP:OD1	1:A:570:MET:N	2.38	0.56
2:B:289:LEU:HD22	2:B:302:MET:HB3	1.87	0.56
6:J:38:DT:H2'	6:J:39:DG:C8	2.41	0.56
1:C:412:LYS:O	1:C:416:LYS:HB3	2.06	0.56
1:C:665:HIS:ND1	1:C:714:GLU:OE2	2.38	0.56
1:A:517:PHE:HB2	1:A:687:LEU:HD11	1.88	0.56
2:B:66:SER:OG	2:B:124:CYS:SG	2.57	0.56
1:C:792:ASP:OD2	1:C:795:HIS:ND1	2.36	0.56
2:B:216:VAL:HG23	2:B:236:ILE:HB	1.87	0.56
5:G:29:DT:H2'	5:G:30:DT:H71	1.87	0.56
1:A:867:CYS:HG	1:A:876:HIS:CE1	2.23	0.55
1:C:720:ALA:HB3	5:G:46:DA:H5'	1.87	0.55
2:D:197:LEU:HD22	2:D:200:LEU:HD12	1.87	0.55
5:G:39:DG:H2'	6:J:18:DA:C2	2.41	0.55
1:A:864:ASP:OD1	1:A:880:ARG:NE	2.39	0.55
3:F:28:DG:H8	3:F:28:DG:C5'	2.19	0.55
1:A:975:ASN:ND2	6:J:23:DG:OP1	2.28	0.55
2:D:186:ASP:O	2:D:190:GLY:N	2.40	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:685:SER:OG	1:C:686:GLU:N	2.37	0.55
3:F:10:DG:H1'	3:F:11:DT:H5'	1.87	0.55
1:C:713:ARG:HD3	1:C:720:ALA:C	2.32	0.55
1:A:434:LEU:HD11	1:C:408:LEU:HD13	1.89	0.55
4:I:18:DA:H3'	4:I:19:DC:C5'	2.37	0.54
2:D:307:TRP:O	2:D:312:LYS:NZ	2.39	0.54
4:I:19:DC:H1'	4:I:20:DA:C5	2.43	0.54
2:D:212:ARG:HB2	2:D:292:LEU:HD21	1.90	0.54
2:B:275:GLY:O	2:B:317:TRP:NE1	2.38	0.54
1:A:739:GLN:OE1	1:A:739:GLN:N	2.40	0.54
1:C:526:VAL:HA	2:D:169:THR:HG22	1.89	0.54
4:I:14:DT:H2'	4:I:15:DT:C6	2.43	0.54
1:C:552:THR:HG21	1:C:667:THR:HG21	1.90	0.54
3:F:37:DA:H2"	3:F:38:DG:H8	1.72	0.54
4:I:9:DC:H2"	4:I:10:DT:H5"	1.90	0.54
5:G:28:DT:H2"	5:G:29:DT:O5'	2.08	0.54
1:A:705:THR:HG21	1:A:956:TRP:HB3	1.88	0.53
3:F:21:DT:H2"	3:F:22:DA:H8	1.73	0.53
1:C:591:PHE:HB2	1:C:698:PHE:CD1	2.43	0.53
1:C:713:ARG:NE	1:C:721:SER:HA	2.24	0.53
2:D:326:THR:HG22	2:D:349:ARG:HD3	1.89	0.53
4:I:31:DC:H2'	4:I:32:DC:H6	1.72	0.53
4:I:15:DT:H2'	4:I:16:DA:H8	1.73	0.53
1:A:848:ARG:HB2	3:F:29:DT:C7	2.39	0.53
2:D:8:VAL:HG23	2:D:55:LEU:HD11	1.91	0.53
5:G:17:DT:H2'	5:G:18:DT:C6	2.43	0.53
1:A:446:ARG:HH12	1:C:461:GLY:HA3	1.73	0.53
1:C:488:VAL:O	1:C:492:THR:HG22	2.09	0.53
1:A:534:ILE:HG21	1:A:985:GLU:HG2	1.91	0.53
1:A:649:GLU:OE2	1:A:994:TYR:OH	2.20	0.53
1:C:429:ALA:O	1:C:433:THR:HG23	2.09	0.53
1:C:813:GLY:HA2	1:C:829:TRP:CE2	2.44	0.53
6:J:36:DT:H2'	6:J:37:DG:C8	2.44	0.53
2:D:154:VAL:HG21	2:D:216:VAL:HG21	1.91	0.52
1:A:803:GLU:CG	1:A:936:PHE:HE1	2.14	0.52
3:F:39:DG:H1'	3:F:40:DC:H5'	1.91	0.52
6:J:22:DT:H2'	6:J:23:DG:C8	2.45	0.52
2:B:137:ARG:HH11	2:B:157:GLY:HA3	1.73	0.52
4:I:27:DC:H2"	4:I:28:DA:H5"	1.92	0.52
3:F:26:DC:H2"	3:F:27:DT:C6	2.44	0.52
1:A:418:PHE:HA	1:A:421:LYS:HG2	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:713:ARG:HH11	1:C:713:ARG:HB2	1.74	0.52
2:B:212:ARG:NH2	2:B:269:ASP:OD2	2.43	0.52
6:J:13:DC:H2"	6:J:14:DT:H71	1.90	0.52
2:D:324:ASN:O	2:D:326:THR:HG23	2.09	0.52
1:C:411:LEU:HA	1:C:414:GLN:HE21	1.75	0.51
5:G:55:DA:H2'	5:G:56:DT:H6	1.74	0.51
4:I:18:DA:C2'	4:I:19:DC:H5"	2.39	0.51
1:A:621:ARG:NH2	1:A:961:ASN:OD1	2.43	0.51
2:B:290:VAL:HG23	2:B:299:ILE:HG13	1.92	0.51
1:C:1006:HIS:O	1:C:1006:HIS:ND1	2.43	0.51
1:A:556:ARG:NH1	1:A:678:GLU:OE2	2.43	0.51
1:C:691:MET:HB3	1:C:696:ARG:HD2	1.93	0.51
2:D:271:PHE:HB2	2:D:290:VAL:CG2	2.41	0.51
4:I:44:DC:H2"	4:I:45:DC:C6	2.45	0.51
1:A:708:ASP:OD1	1:A:708:ASP:N	2.43	0.51
2:B:327:ILE:HB	2:B:348:LEU:HB3	1.91	0.51
1:A:804:PHE:O	1:A:807:ILE:HG22	2.10	0.51
1:C:873:GLU:HA	1:C:876:HIS:HD2	1.74	0.51
1:A:848:ARG:HB3	3:F:29:DT:C7	2.40	0.51
2:D:279:LEU:HB2	2:D:282:GLN:HG2	1.93	0.51
2:D:50:ILE:HD13	2:D:55:LEU:HB3	1.93	0.50
1:A:821:ALA:O	1:A:826:ARG:NH1	2.42	0.50
2:B:328:PHE:HE1	2:B:345:PHE:HB3	1.76	0.50
1:C:811:GLU:OE2	1:C:875:ARG:NH1	2.34	0.50
1:C:726:ILE:HG13	1:C:727:CYS:H	1.76	0.50
1:A:729:LEU:HG	1:A:789:PRO:HB2	1.93	0.50
2:B:8:VAL:HG23	2:B:55:LEU:HD11	1.93	0.50
2:D:78:CYS:HB3	2:D:142:ILE:HG23	1.93	0.50
1:A:996:SER:OG	1:A:997:LYS:N	2.43	0.50
1:A:901:GLU:HG2	1:A:902:CYS:SG	2.52	0.50
2:B:289:LEU:HD23	2:B:289:LEU:H	1.76	0.50
2:B:69:LEU:HD23	2:B:69:LEU:H	1.76	0.50
1:C:934:ASN:OD1	1:C:935:TYR:N	2.44	0.50
2:D:166:GLN:OE1	2:D:166:GLN:N	2.45	0.50
1:A:726:ILE:HG13	1:A:727:CYS:N	2.27	0.50
1:A:433:THR:O	1:A:437:LEU:HG	2.11	0.49
1:C:420:ASP:O	1:C:425:GLY:N	2.38	0.49
1:C:609:HIS:C	3:F:28:DG:H2"	2.36	0.49
6:J:54:DC:H2"	6:J:55:DC:C5	2.47	0.49
1:A:426:ASP:O	1:A:430:VAL:HG12	2.12	0.49
2:B:77:THR:HA	2:B:92:ILE:O	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:729:LEU:HD23	1:C:746:ILE:HD12	1.94	0.49
2:B:76:ALA:HB1	2:B:142:ILE:HG22	1.95	0.49
1:A:451:LEU:HD11	1:C:451:LEU:HD11	1.94	0.49
2:B:113:ALA:HB2	2:B:123:ARG:HE	1.77	0.49
1:C:532:VAL:HG11	1:C:558:ARG:HH21	1.78	0.49
1:C:547:GLU:N	1:C:547:GLU:OE1	2.45	0.49
1:A:489:LYS:NZ	5:G:31:DG:OP1	2.42	0.49
1:C:556:ARG:HE	1:C:675:LEU:HD21	1.76	0.49
2:D:78:CYS:SG	2:D:92:ILE:HB	2.52	0.49
6:J:2:DA:H5'	6:J:2:DA:C8	2.47	0.49
1:A:860:GLN:HA	1:A:863:VAL:HG12	1.95	0.49
2:D:212:ARG:NE	2:D:294:ASP:HA	2.27	0.49
5:G:11:DT:H4'	5:G:12:DC:OP1	2.13	0.49
1:A:552:THR:HG21	1:A:667:THR:HG21	1.95	0.49
1:A:695:PRO:C	1:A:696:ARG:HD2	2.38	0.49
1:A:716:GLU:O	1:A:783:PRO:HB3	2.12	0.49
2:D:113:ALA:HB2	2:D:123:ARG:HD2	1.95	0.49
2:D:148:ARG:HH22	2:D:241:PRO:HA	1.78	0.49
3:F:5:DT:H2'	3:F:6:DT:H71	1.95	0.49
1:A:488:VAL:O	1:A:492:THR:HG22	2.13	0.48
1:A:563:LEU:HD13	1:A:700:PHE:CE2	2.48	0.48
1:C:812:ILE:HD12	1:C:833:LEU:HB2	1.94	0.48
1:C:873:GLU:HA	1:C:876:HIS:CD2	2.48	0.48
2:D:143:ASP:OD1	2:D:144:VAL:N	2.47	0.48
1:A:532:VAL:HG21	1:A:558:ARG:NE	2.27	0.48
1:A:686:GLU:HG2	1:A:699:LYS:HG2	1.94	0.48
1:C:564:VAL:HG12	1:C:687:LEU:HD21	1.94	0.48
1:A:410:GLU:HG2	1:A:411:LEU:H	1.78	0.48
1:A:447:GLN:OE1	1:A:447:GLN:N	2.42	0.48
2:B:41:CYS:HG	2:B:46:PHE:HE1	1.60	0.48
2:D:109:ILE:O	2:D:124:CYS:HA	2.13	0.48
6:J:29:DA:H2"	6:J:30:DA:C8	2.49	0.48
1:C:661:ASP:OD1	1:C:663:SER:N	2.38	0.48
4:I:13:DC:H2"	4:I:14:DT:H71	1.96	0.48
5:G:31:DG:H2"	5:G:32:DC:H5"	1.96	0.48
1:A:431[B]:CYS:SG	1:C:435:PHE:HD1	2.37	0.48
1:A:454:ILE:HD13	1:C:494:ARG:HH12	1.79	0.48
1:A:884:ASP:OD1	1:A:885:LEU:N	2.47	0.48
1:C:477:SER:OG	1:C:478:CYS:N	2.45	0.48
1:C:559:TYR:OH	1:C:597:GLU:OE2	2.27	0.48
1:C:654:PRO:HG3	1:C:991:HIS:HB3	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:21:DT:H2"	3:F:22:DA:C8	2.49	0.48
1:C:867:CYS:HB3	1:C:876:HIS:ND1	2.29	0.47
1:C:965:ASN:HD21	1:C:969:ARG:HH22	1.62	0.47
1:C:966:LYS:HG3	1:C:967:LEU:HD12	1.96	0.47
2:D:15:ILE:HG21	2:D:345:PHE:CE1	2.49	0.47
1:A:678:GLU:O	1:A:682:MET:HG2	2.13	0.47
1:C:411:LEU:HA	1:C:414:GLN:HG2	1.96	0.47
1:C:750:HIS:NE2	1:C:785:ILE:O	2.48	0.47
2:D:327:ILE:HD11	2:D:348:LEU:HD12	1.96	0.47
1:A:570:MET:O	1:A:574:ILE:HG23	2.14	0.47
2:B:285:MET:HE3	2:B:312:LYS:HA	1.96	0.47
1:C:503:LEU:HD12	1:C:503:LEU:HA	1.65	0.47
1:C:804:PHE:O	1:C:807:ILE:HG22	2.14	0.47
4:I:6:DG:H4'	4:I:7:DG:OP1	2.14	0.47
1:A:892:VAL:HG21	1:A:909:TYR:CD1	2.50	0.47
1:C:643:GLU:HG2	1:C:646:PRO:HA	1.97	0.47
3:F:24:DC:H2"	3:F:25:DA:C8	2.50	0.47
1:A:603:GLY:HA2	1:A:618:LYS:HA	1.96	0.47
1:A:752:GLU:OE2	1:A:756:ARG:NH2	2.47	0.47
2:D:155:LEU:HB3	2:D:183:PHE:HB2	1.97	0.47
5:G:39:DG:C8	5:G:39:DG:C3'	2.98	0.47
1:A:541:LEU:HD13	2:B:173:ASN:HB3	1.97	0.47
2:B:33:GLN:NE2	2:B:37:PRO:HA	2.30	0.47
1:C:867:CYS:HB3	1:C:876:HIS:CE1	2.49	0.47
1:C:977:ARG:NH1	1:C:982:TYR:HB3	2.29	0.47
2:B:29:PHE:HZ	2:B:120:VAL:HG11	1.80	0.47
1:C:989:LYS:NZ	4:I:24:DA:OP1	2.47	0.47
3:F:7:DT:H2"	3:F:8:DT:O5'	2.15	0.47
5:G:6:DT:H2'	5:G:7:DT:C6	2.50	0.47
5:G:53:DA:H1'	5:G:54:DG:O4'	2.15	0.47
1:A:727:CYS:HB2	1:A:937:HIS:CD2	2.49	0.47
1:A:731:ASP:OD1	1:A:731:ASP:N	2.48	0.47
1:A:801:ALA:HA	1:A:804:PHE:CZ	2.49	0.47
1:C:560:ASP:O	1:C:564:VAL:HG13	2.15	0.47
5:G:28:DT:H4'	5:G:29:DT:OP1	2.13	0.47
1:A:776:VAL:O	1:A:779:VAL:HG12	2.14	0.46
1:A:474:THR:HG22	1:A:474:THR:O	2.15	0.46
2:B:303:GLU:H	2:B:303:GLU:CD	2.22	0.46
2:B:169:THR:HA	2:B:172:TRP:HB2	1.98	0.46
2:D:105:ASP:HB3	2:D:136:PRO:HG3	1.97	0.46
2:D:199:GLU:OE1	2:D:199:GLU:N	2.46	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:267:ASN:OD1	2:D:268:ASN:N	2.48	0.46
4:I:15:DT:C2	4:I:16:DA:C8	3.03	0.46
2:D:113:ALA:HB2	2:D:123:ARG:HB2	1.97	0.46
1:A:559:TYR:OH	1:A:597:GLU:OE2	2.25	0.46
1:A:622:PHE:HB3	1:A:656:CYS:SG	2.55	0.46
2:B:241:PRO:HD2	2:B:245:PRO:HA	1.97	0.46
1:C:447:GLN:HA	1:C:450:GLU:HG3	1.98	0.46
2:D:110:MET:SD	2:D:124:CYS:HB3	2.55	0.46
1:C:847:MET:HE2	5:G:40:DT:H72	1.98	0.46
1:C:414:GLN:O	1:C:417:GLU:HG2	2.16	0.46
1:C:512:PRO:HA	1:C:565:SER:OG	2.16	0.46
1:C:679:ARG:NH2	1:C:786:GLU:HB3	2.31	0.46
5:G:39:DG:H8	5:G:39:DG:H5"	1.80	0.46
6:J:54:DC:H2"	6:J:55:DC:H5	1.80	0.46
2:B:233:LEU:HD11	2:B:252:LEU:HB2	1.97	0.46
2:B:279:LEU:HB2	2:B:282:GLN:HB2	1.98	0.46
1:C:867:CYS:HB3	1:C:876:HIS:HD1	1.81	0.46
1:C:885:LEU:HD21	1:C:915:ARG:HH11	1.80	0.46
1:A:509:VAL:HG23	1:A:514:TYR:CE2	2.51	0.46
1:A:719:GLU:OE2	1:A:773:ARG:HD2	2.16	0.46
1:C:874:GLU:N	1:C:874:GLU:OE1	2.47	0.46
6:J:21:DG:H2"	6:J:22:DT:H71	1.98	0.46
1:A:648:SER:OG	1:A:649:GLU:N	2.48	0.45
2:B:45:VAL:HG11	2:B:62:PHE:HE1	1.80	0.45
2:B:78:CYS:SG	2:B:92:ILE:HB	2.56	0.45
1:C:588:ASN:HB2	1:C:696:ARG:HA	1.97	0.45
1:C:952:SER:OG	1:C:953:ILE:N	2.47	0.45
2:D:66:SER:OG	2:D:67:CYS:N	2.49	0.45
2:D:179:LEU:HA	2:D:180:PRO:HD3	1.84	0.45
5:G:39:DG:C8	5:G:39:DG:H3'	2.51	0.45
6:J:46:DG:H1'	6:J:47:DA:H5'	1.99	0.45
2:D:262:ILE:HB	2:D:274:VAL:HG12	1.98	0.45
6:J:38:DT:H2"	6:J:39:DG:OP1	2.14	0.45
1:A:439:LEU:HD21	1:A:447:GLN:HB2	1.98	0.45
1:A:773:ARG:CZ	2:B:39:ARG:HE	2.29	0.45
1:A:895:SER:OG	1:A:896:SER:N	2.50	0.45
2:D:43:THR:OG1	2:D:44:GLY:N	2.49	0.45
1:A:510:LEU:HD13	1:A:999:LEU:HD21	1.98	0.45
1:A:812:ILE:CD1	1:A:833:LEU:HB2	2.47	0.45
2:D:327:ILE:HG12	2:D:348:LEU:HB2	1.98	0.45
2:B:230:PRO:HB2	2:B:232:ASN:OD1	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:309:SER:O	2:B:313:HIS:HB2	2.16	0.45
4:I:4:DC:H2"	4:I:5:DT:C6	2.51	0.45
1:A:750:HIS:CD2	1:A:786:GLU:HA	2.51	0.45
1:C:800:ASN:HD21	1:C:939:THR:HG21	1.81	0.45
3:F:1:DC:H2"	3:F:2:DG:C8	2.51	0.45
5:G:6:DT:H2'	5:G:7:DT:C5	2.52	0.45
6:J:49:DA:H2"	6:J:50:DA:C8	2.50	0.45
1:A:979:SER:C	1:A:981:CYS:H	2.25	0.45
1:C:713:ARG:HH11	1:C:713:ARG:CG	2.29	0.45
1:C:914:GLN:O	1:C:918:GLU:HG2	2.17	0.45
3:F:42:DA:H1'	3:F:43:DG:C8	2.52	0.45
2:B:24:PHE:HB2	2:B:29:PHE:HE1	1.82	0.45
1:C:712:VAL:HG23	1:C:787:THR:HG21	1.98	0.45
3:F:9:DT:H2"	3:F:10:DG:H5"	1.98	0.45
3:F:13:DA:H4'	3:F:14:DA:OP1	2.16	0.45
6:J:30:DA:H2"	6:J:31:DT:H5'	1.99	0.45
1:A:418:PHE:HD1	1:A:421:LYS:HZ2	1.64	0.45
2:D:65:ASP:OD2	2:D:123:ARG:NH2	2.46	0.45
2:D:265:GLN:HB2	2:D:271:PHE:CE2	2.52	0.45
2:D:302:MET:HE3	2:D:303:GLU:H	1.81	0.45
3:F:11:DT:H4'	3:F:12:DT:H5'	1.99	0.45
4:I:21:DG:C2'	4:I:22:DT:H71	2.44	0.45
6:J:5:DT:H2"	6:J:6:DG:C8	2.51	0.45
2:B:119:LYS:HD2	2:B:119:LYS:HA	1.74	0.45
1:C:910:SER:OG	1:C:911:PHE:N	2.49	0.45
1:A:450:GLU:CD	1:C:454:ILE:HG12	2.42	0.44
1:A:708:ASP:O	1:A:712:VAL:HG12	2.16	0.44
1:C:418:PHE:HA	1:C:421:LYS:HE2	1.99	0.44
3:F:2:DG:H2"	3:F:3:DG:N7	2.33	0.44
1:A:511:LEU:HD21	1:A:989:LYS:HG3	2.00	0.44
1:A:583:LEU:HD23	1:A:583:LEU:HA	1.84	0.44
1:A:890:LYS:HZ3	1:A:894:ARG:HG2	1.83	0.44
1:C:727:CYS:SG	1:C:729:LEU:HB2	2.58	0.44
1:C:773:ARG:NH2	2:D:39:ARG:HH21	2.16	0.44
1:A:768:SER:OG	1:A:769:VAL:N	2.49	0.44
2:B:332:PRO:HA	2:B:343:PHE:CD1	2.52	0.44
1:C:636:GLN:OE1	1:C:636:GLN:N	2.50	0.44
6:J:13:DC:C2'	6:J:14:DT:H71	2.46	0.44
2:B:247:VAL:O	2:B:248:ASN:ND2	2.50	0.44
1:C:972:ARG:HG3	1:C:983:GLU:OE2	2.18	0.44
4:I:18:DA:C3'	4:I:19:DC:H5"	2.48	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:464:PRO:HA	1:A:467:CYS:SG	2.57	0.44
1:C:445:HIS:CE1	6:J:43:DC:H5'	2.53	0.44
5:G:48:DA:H2"	5:G:49:DG:H5"	1.98	0.44
2:B:182:VAL:HG23	2:B:195:TYR:HB2	2.00	0.44
1:C:400:THR:CG2	1:C:401:ARG:N	2.54	0.44
1:C:417:GLU:HA	1:C:420:ASP:OD2	2.17	0.44
1:C:461:GLY:HA2	1:C:496:ILE:HA	2.00	0.44
1:C:742:VAL:HG12	1:C:941:ALA:HB2	1.99	0.44
4:I:30:DC:H2"	4:I:31:DC:C5	2.53	0.44
5:G:34:DT:C2	5:G:35:DC:C5	3.06	0.44
1:A:559:TYR:CD1	1:A:655:LEU:HD21	2.52	0.44
1:C:704:GLY:O	1:C:788:VAL:HG22	2.18	0.44
3:F:28:DG:C2	4:I:19:DC:C2	3.06	0.44
5:G:9:DT:H2"	5:G:10:DG:H8	1.81	0.44
5:G:39:DG:C8	5:G:39:DG:H5"	2.53	0.44
2:B:65:ASP:OD1	2:B:65:ASP:N	2.51	0.44
1:C:687:LEU:O	1:C:697:THR:HA	2.18	0.44
1:A:451:LEU:HA	1:A:454:ILE:HG22	2.00	0.43
1:A:914:GLN:O	1:A:918:GLU:HG2	2.18	0.43
2:B:29:PHE:CZ	2:B:120:VAL:HG11	2.53	0.43
2:D:69:LEU:HD23	2:D:69:LEU:H	1.83	0.43
2:D:315:LYS:HG3	2:D:316:ILE:HG23	2.00	0.43
3:F:41:DC:H2"	3:F:42:DA:C8	2.52	0.43
5:G:32:DC:H2"	5:G:33:DA:H8	1.83	0.43
5:G:41:DG:H2"	5:G:42:DT:H5"	2.00	0.43
2:B:107:ILE:HB	2:B:127:LYS:O	2.17	0.43
1:C:826:ARG:HA	1:C:829:TRP:CE3	2.52	0.43
1:C:834:ASP:CG	1:C:845:PRO:HB3	2.43	0.43
2:D:197:LEU:HD11	2:D:249:CYS:HB2	2.00	0.43
3:F:28:DG:C8	3:F:28:DG:C3'	3.02	0.43
6:J:1:DG:H2"	6:J:2:DA:C8	2.54	0.43
1:A:910:SER:OG	1:A:911:PHE:N	2.50	0.43
1:A:943:VAL:N	1:A:944:PRO:HD2	2.34	0.43
1:C:544:SER:OG	1:C:547:GLU:OE1	2.30	0.43
2:D:56:LYS:HG3	2:D:58:LYS:HG3	2.00	0.43
2:D:271:PHE:HB2	2:D:290:VAL:HG22	2.00	0.43
4:I:14:DT:H2'	4:I:15:DT:H71	1.99	0.43
1:A:977:ARG:HE	1:A:982:TYR:HB3	1.84	0.43
2:B:148:ARG:NH2	2:B:241:PRO:HA	2.34	0.43
1:C:678:GLU:O	1:C:682:MET:HG2	2.19	0.43
1:C:849:MET:HE2	1:C:849:MET:HB3	1.86	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:4:GLN:HE21	2:D:53:ASN:CG	2.25	0.43
2:D:63:SER:OG	2:D:65:ASP:OD1	2.23	0.43
1:A:556:ARG:HH11	1:A:675:LEU:HD23	1.84	0.43
1:A:589:GLY:HA3	1:A:631:ILE:HD11	2.01	0.43
1:A:627:MET:HE3	1:A:627:MET:HB2	1.91	0.43
1:A:713:ARG:NH1	1:A:721:SER:HA	2.33	0.43
1:A:744:HIS:ND1	1:A:937:HIS:HE1	2.17	0.43
1:C:879:LEU:HA	1:C:879:LEU:HD23	1.79	0.43
6:J:2:DA:H5'	6:J:2:DA:H8	1.84	0.43
1:A:608:LYS:HD2	1:A:611:SER:HA	2.01	0.43
1:C:603:GLY:HA2	1:C:618:LYS:HA	2.01	0.43
2:D:197:LEU:HD23	2:D:200:LEU:H	1.84	0.43
2:D:348:LEU:HD23	2:D:348:LEU:HA	1.86	0.43
5:G:31:DG:H2"	5:G:32:DC:C6	2.54	0.43
6:J:33:DA:H2'	6:J:34:DA:C8	2.54	0.43
1:A:974:MET:O	1:A:975:ASN:ND2	2.51	0.43
1:C:649:GLU:HG2	1:C:963:SER:CB	2.48	0.43
1:C:713:ARG:HG2	1:C:719:GLU:O	2.18	0.43
2:D:72:LEU:HD12	2:D:96:GLY:HA3	2.01	0.43
1:A:629:ILE:HB	1:A:641:PHE:HB3	2.01	0.42
1:A:707:TYR:C	1:A:708:ASP:O	2.62	0.42
2:B:219:LEU:HD13	2:B:233:LEU:HB3	2.01	0.42
5:G:48:DA:H2"	5:G:49:DG:C8	2.54	0.42
1:A:768:SER:N	1:A:771:GLU:OE2	2.51	0.42
2:B:249:CYS:SG	2:B:250:THR:N	2.92	0.42
1:C:754:LEU:HD23	1:C:754:LEU:HA	1.86	0.42
5:G:56:DT:H2'	5:G:57:DC:C6	2.55	0.42
1:A:764:PRO:HG2	1:A:765:TYR:CD1	2.54	0.42
2:B:94:HIS:HD2	2:B:107:ILE:HD11	1.85	0.42
1:C:543:SER:O	1:C:543:SER:OG	2.30	0.42
2:B:264:THR:HB	2:B:327:ILE:HD11	2.01	0.42
1:C:570:MET:HE2	1:C:570:MET:HB3	1.86	0.42
2:D:278:GLN:HB2	2:D:282:GLN:HB2	2.00	0.42
5:G:53:DA:H5'	5:G:53:DA:C8	2.55	0.42
1:A:556:ARG:HE	1:A:675:LEU:HD21	1.84	0.42
5:G:32:DC:H2"	5:G:33:DA:C8	2.55	0.42
1:A:468:LEU:HB2	1:A:503:LEU:HD11	2.01	0.42
1:A:559:TYR:HE2	1:A:702:PHE:HE2	1.68	0.42
1:A:726:ILE:HG13	1:A:727:CYS:H	1.84	0.42
3:F:28:DG:C8	3:F:28:DG:H3'	2.55	0.42
1:A:428:LYS:HE2	1:C:442:ARG:NH1	2.35	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:308:THR:OG1	2:B:309:SER:N	2.52	0.42
1:C:773:ARG:NH1	5:G:47:DC:OP1	2.53	0.42
1:A:469:ALA:HB2	1:A:999:LEU:HD12	2.01	0.42
1:A:473:ASN:HB3	1:A:1003:MET:HE3	2.02	0.42
1:A:966:LYS:HG3	1:A:967:LEU:HD12	2.02	0.42
6:J:21:DG:C2'	6:J:22:DT:H71	2.50	0.42
1:A:559:TYR:HE2	1:A:702:PHE:CE2	2.38	0.42
1:C:979:SER:C	1:C:981:CYS:H	2.28	0.42
2:B:229:ARG:HD2	2:B:278:GLN:O	2.20	0.41
2:B:289:LEU:HB3	2:B:302:MET:HE3	2.00	0.41
2:B:291:SER:HB2	2:B:298:GLU:HG3	2.01	0.41
2:D:21:LEU:HD23	2:D:21:LEU:HA	1.86	0.41
2:D:70:PRO:O	2:D:72:LEU:HD22	2.19	0.41
1:A:934:ASN:ND2	4:I:15:DT:OP1	2.53	0.41
2:D:239:ASP:C	2:D:241:PRO:HD3	2.44	0.41
2:D:263:LEU:HD23	2:D:263:LEU:H	1.84	0.41
4:I:36:DA:H2"	4:I:37:DC:C6	2.54	0.41
1:A:810:LEU:HD11	1:A:815:VAL:HG21	2.02	0.41
1:A:935:TYR:O	1:A:939:THR:HG23	2.20	0.41
2:B:186:ASP:O	2:B:190:GLY:HA2	2.21	0.41
2:B:307:TRP:HB2	2:B:312:LYS:HG3	2.01	0.41
1:C:733:THR:OG1	1:C:736:GLU:HB2	2.21	0.41
1:C:962:GLN:O	1:C:962:GLN:NE2	2.53	0.41
3:F:1:DC:H2"	3:F:2:DG:H8	1.83	0.41
2:D:66:SER:HG	2:D:124:CYS:HG	1.47	0.41
4:I:11:DG:H2"	4:I:12:DT:H71	2.01	0.41
5:G:3:DG:H2"	5:G:4:DG:C8	2.55	0.41
1:A:598:SER:HB2	1:A:706:GLY:HA3	2.03	0.41
2:B:314:SER:OG	2:B:315:LYS:N	2.54	0.41
1:C:445:HIS:HE2	6:J:43:DC:P	2.42	0.41
3:F:23:DT:H2"	3:F:24:DC:C6	2.56	0.41
4:I:7:DG:C5	4:I:8:DC:C4	3.09	0.41
6:J:35:DG:H3'	6:J:36:DT:H71	2.03	0.41
1:A:895:SER:HB3	1:A:898:PRO:HB3	2.03	0.41
2:B:8:VAL:HG11	2:B:12:ILE:HD12	2.02	0.41
1:C:402:ARG:O	1:C:405:LYS:HB2	2.21	0.41
1:C:406:HIS:NE2	3:F:8:DT:H5"	2.36	0.41
3:F:30:DG:H2"	3:F:31:DT:H5"	2.02	0.41
4:I:32:DC:C6	4:I:33:DT:H72	2.55	0.41
5:G:48:DA:H2"	5:G:49:DG:H8	1.86	0.41
1:A:422:GLU:CD	1:C:393:ARG:HH22	2.29	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:512:PRO:HA	1:A:565:SER:OG	2.21	0.41
2:B:229:ARG:O	2:B:257:SER:OG	2.30	0.41
2:B:239:ASP:O	2:B:241:PRO:HD3	2.20	0.41
1:C:403:ALA:HA	1:C:406:HIS:CD2	2.55	0.41
1:C:610:GLY:HA3	4:I:18:DA:C2	2.55	0.41
1:C:662:GLU:OE2	1:C:710:LYS:NZ	2.36	0.41
6:J:51:DA:H2"	6:J:52:DA:C8	2.56	0.41
1:C:606:SER:HB3	1:C:617:GLU:HG3	2.03	0.41
2:D:250:THR:HG22	2:D:251:VAL:O	2.21	0.41
5:G:20:DA:H2"	5:G:21:DC:C6	2.56	0.41
6:J:36:DT:H4'	6:J:37:DG:OP1	2.21	0.41
1:A:686:GLU:OE2	1:A:699:LYS:HD3	2.21	0.40
1:C:403:ALA:HB1	3:F:8:DT:H5'	2.02	0.40
2:D:204:LEU:HD12	2:D:204:LEU:HA	1.91	0.40
1:C:556:ARG:HB3	1:C:656:CYS:SG	2.62	0.40
3:F:45:DT:H2"	3:F:46:DC:C5	2.55	0.40
1:A:888:LYS:C	1:A:912:ASN:HD21	2.28	0.40
5:G:39:DG:N2	6:J:19:DC:H5"	2.36	0.40
1:A:407:ARG:HA	5:G:8:DT:H72	2.04	0.40
1:A:466:VAL:HG22	1:A:1002:PHE:CE2	2.56	0.40
1:C:455:MET:HE2	1:C:455:MET:HB3	1.84	0.40
4:I:35:DA:H2"	4:I:36:DA:C8	2.57	0.40
4:I:38:DA:C4	4:I:39:DA:C8	3.10	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	607/1040 (58%)	562 (93%)	44 (7%)	1 (0%)	44 72
1	C	614/1040 (59%)	558 (91%)	56 (9%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	342/527 (65%)	317 (93%)	24 (7%)	1 (0%)	37	67
2	D	342/527 (65%)	308 (90%)	33 (10%)	1 (0%)	37	67
7	N	50/163 (31%)	47 (94%)	3 (6%)	0	100	100
All	All	1955/3297 (59%)	1792 (92%)	160 (8%)	3 (0%)	45	72

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	708	ASP
2	D	213	ASN
2	B	213	ASN

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	517/933 (55%)	516 (100%)	1 (0%)	92	96
1	C	520/933 (56%)	519 (100%)	1 (0%)	92	96
2	B	293/469 (62%)	293 (100%)	0	100	100
2	D	294/469 (63%)	294 (100%)	0	100	100
7	N	9/139 (6%)	9 (100%)	0	100	100
All	All	1633/2943 (56%)	1631 (100%)	2 (0%)	92	96

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	848	ARG
1	C	713	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (30) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	515	HIS
1	A	633	HIS
1	A	750	HIS
1	A	850	ASN
1	A	934	ASN
1	A	990	HIS
2	B	4	GLN
2	B	23	ASN
2	B	27	GLN
2	B	33	GLN
2	B	53	ASN
2	B	248	ASN
1	C	414	GLN
1	C	495	GLN
1	C	498	GLN
1	C	515	HIS
1	C	581	GLN
1	C	633	HIS
1	C	753	ASN
1	C	800	ASN
1	C	876	HIS
1	C	990	HIS
2	D	4	GLN
2	D	23	ASN
2	D	33	GLN
2	D	47	HIS
2	D	53	ASN
2	D	117	ASN
2	D	173	ASN
2	D	232	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 6 ligands modelled in this entry, 6 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

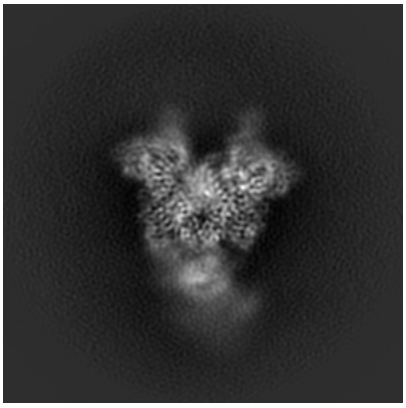
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-20032. These allow visual inspection of the internal detail of the map and identification of artifacts.

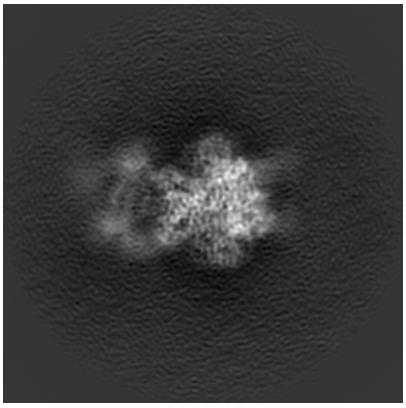
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections (i)

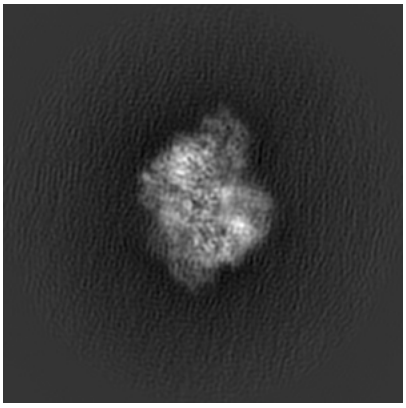
6.1.1 Primary map



X



Y

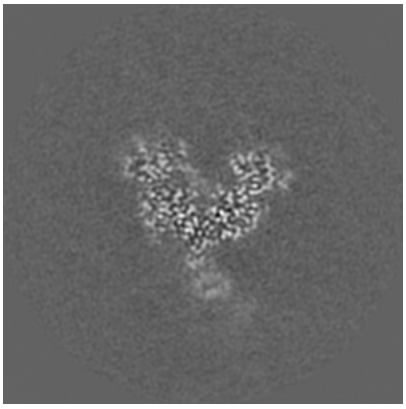


Z

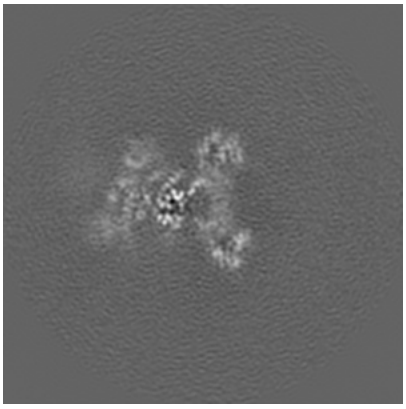
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

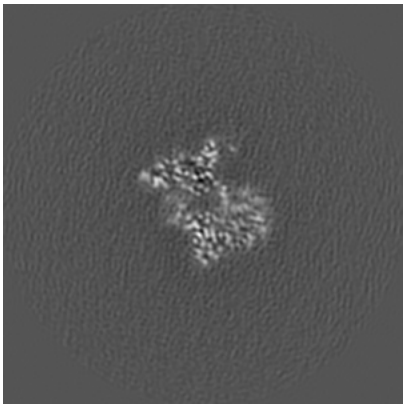
6.2.1 Primary map



X Index: 140



Y Index: 140

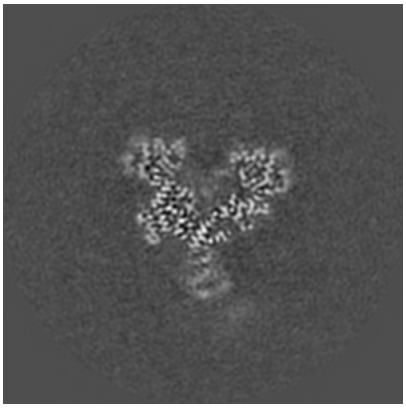


Z Index: 140

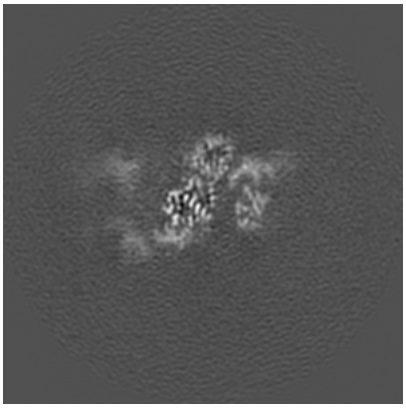
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

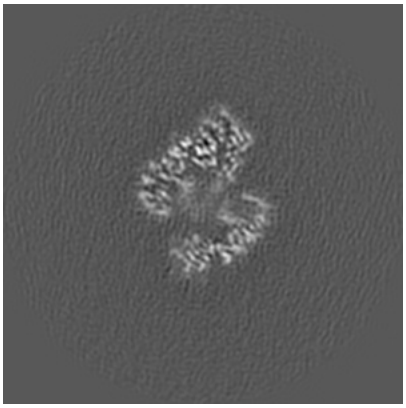
6.3.1 Primary map



X Index: 144



Y Index: 125

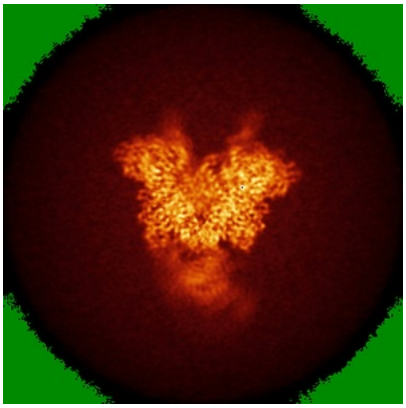


Z Index: 157

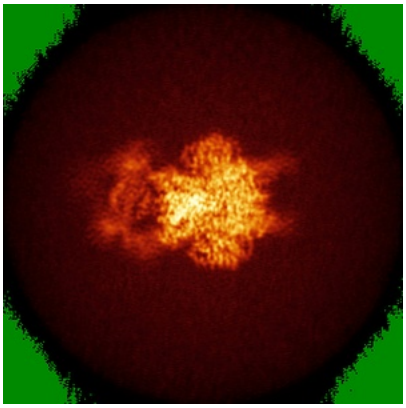
The images above show the largest variance slices of the map in three orthogonal directions.

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

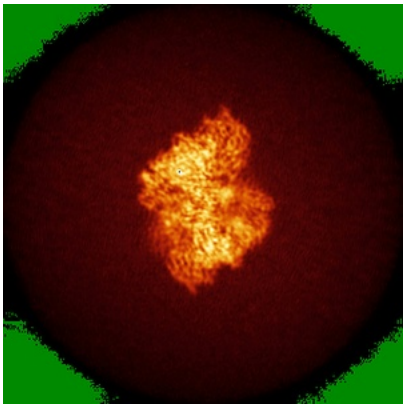
6.4.1 Primary map



X



Y

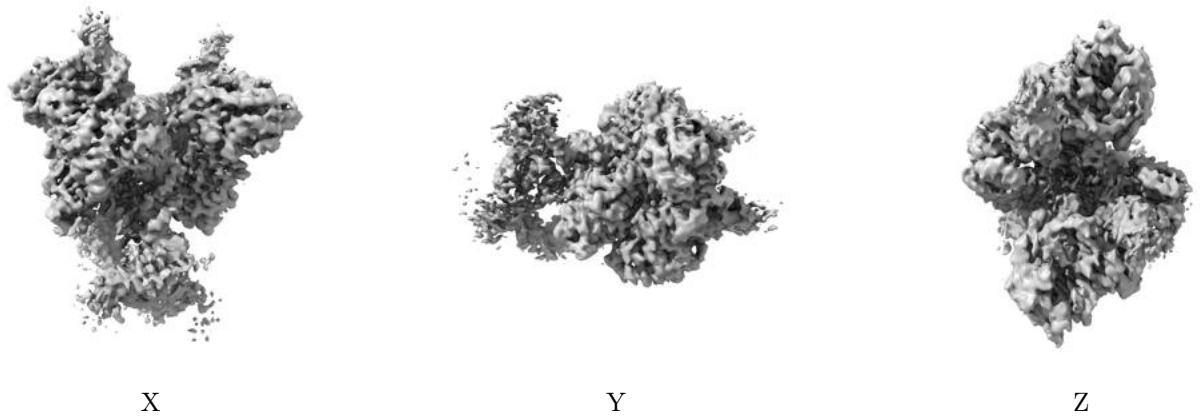


Z

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

6.5 Orthogonal surface views (i)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0308. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

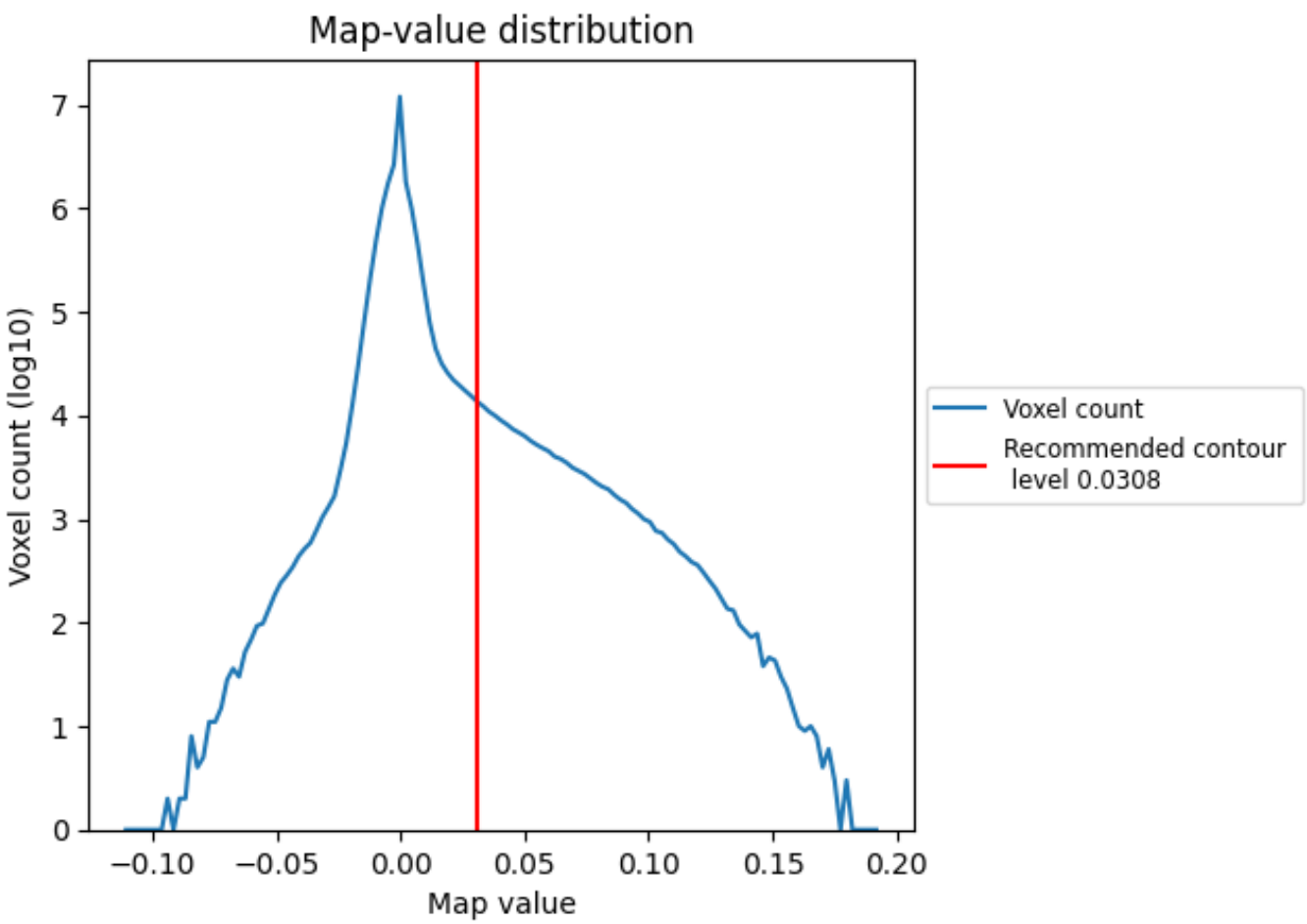
6.6 Mask visualisation (i)

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

7 Map analysis (i)

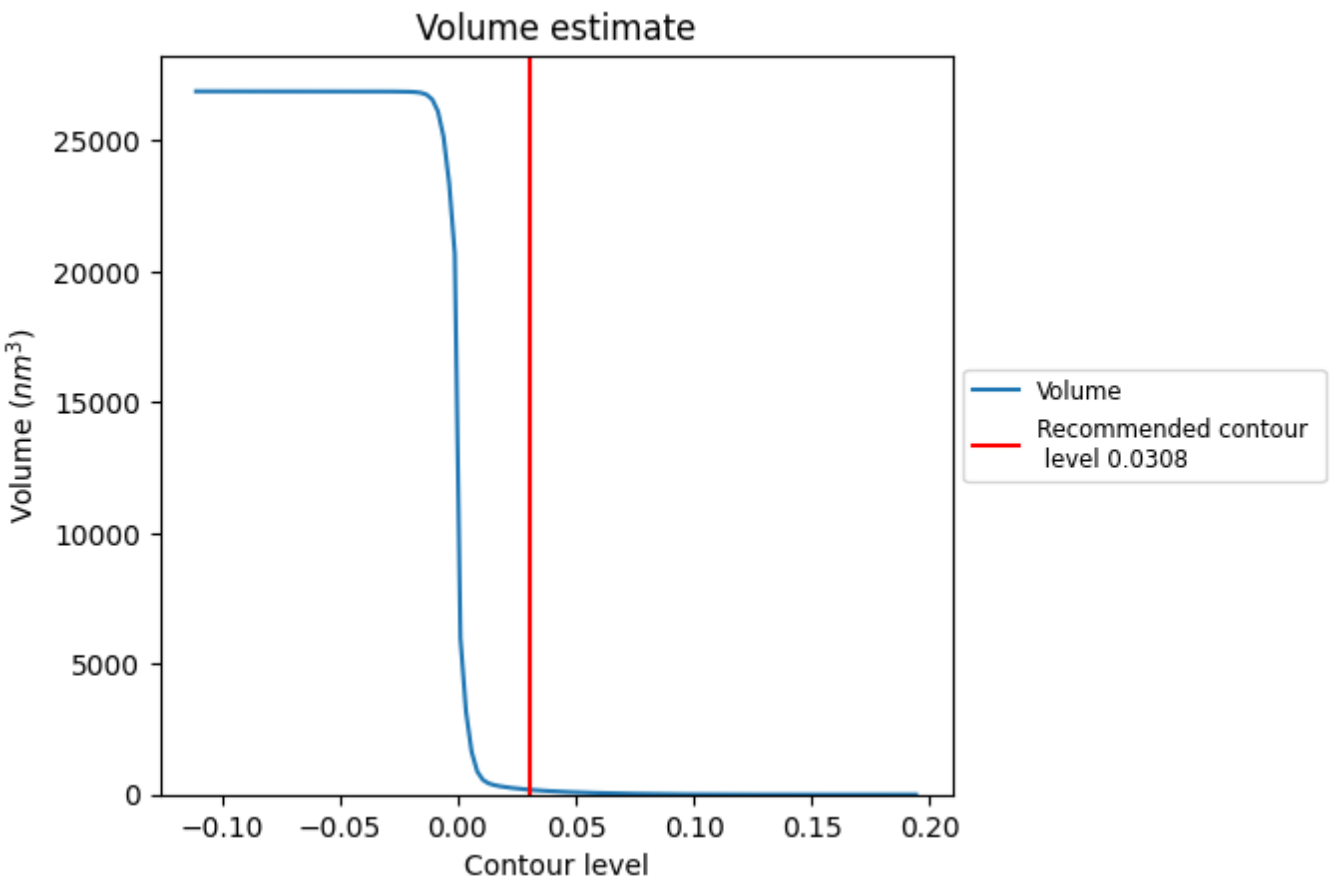
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution (i)



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

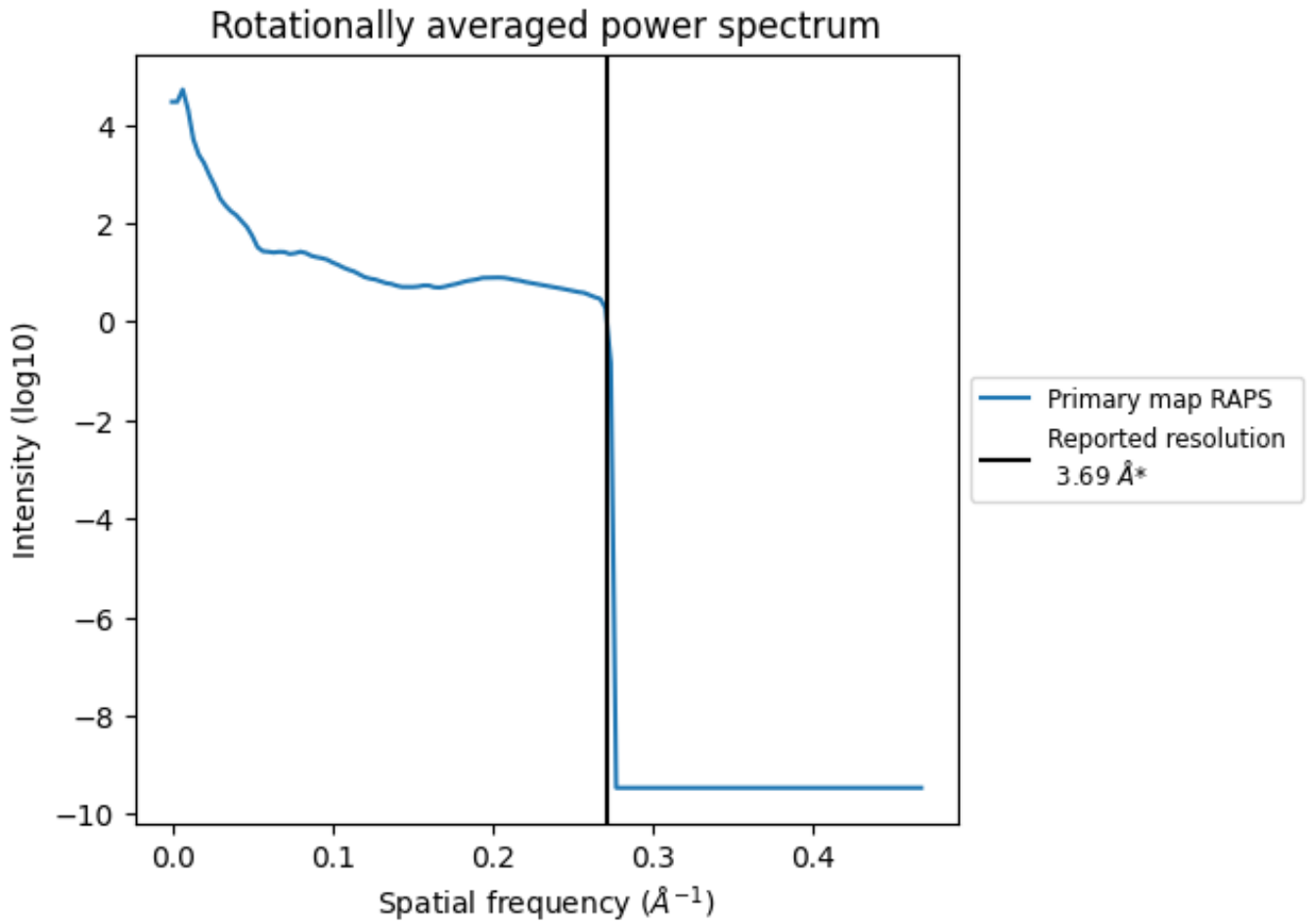
7.2 Volume estimate (i)



The volume at the recommended contour level is 182 nm^3; this corresponds to an approximate mass of 165 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 0.271 Å^{-1}

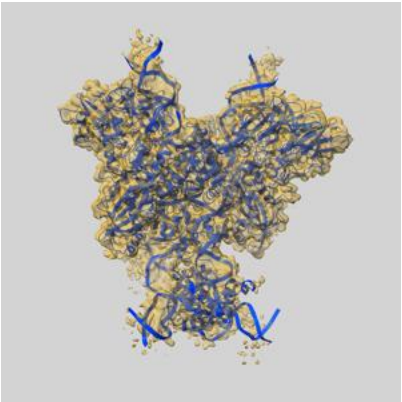
8 Fourier-Shell correlation (i)

This section was not generated. No FSC curve or half-maps provided.

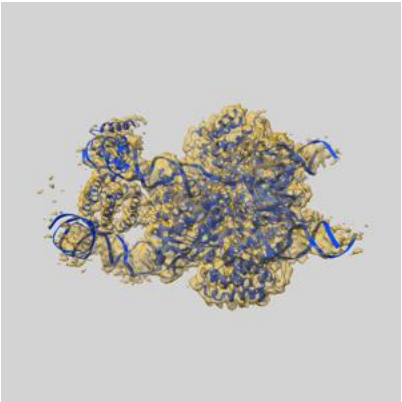
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-20032 and PDB model 6OEO. Per-residue inclusion information can be found in section 3 on page 6.

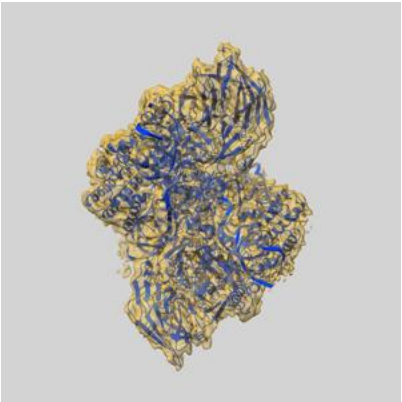
9.1 Map-model overlay (i)



X



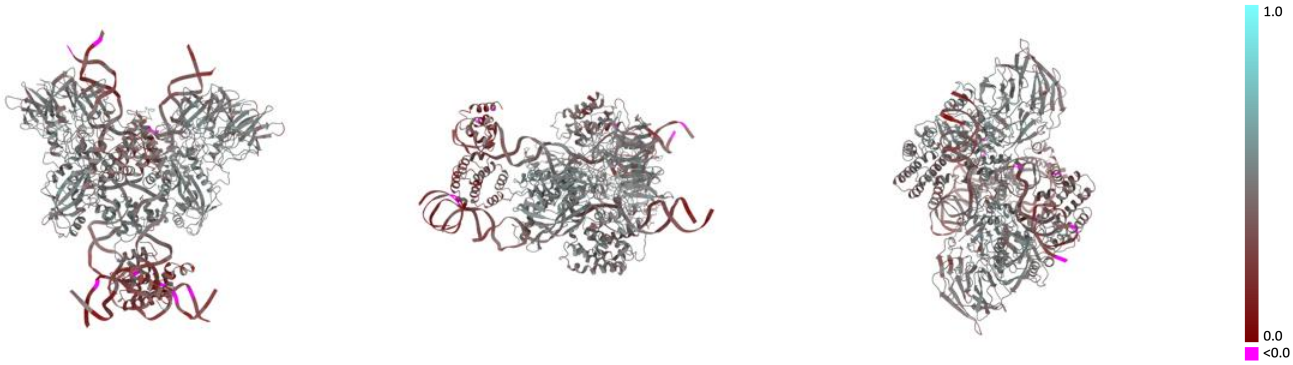
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.0308 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.

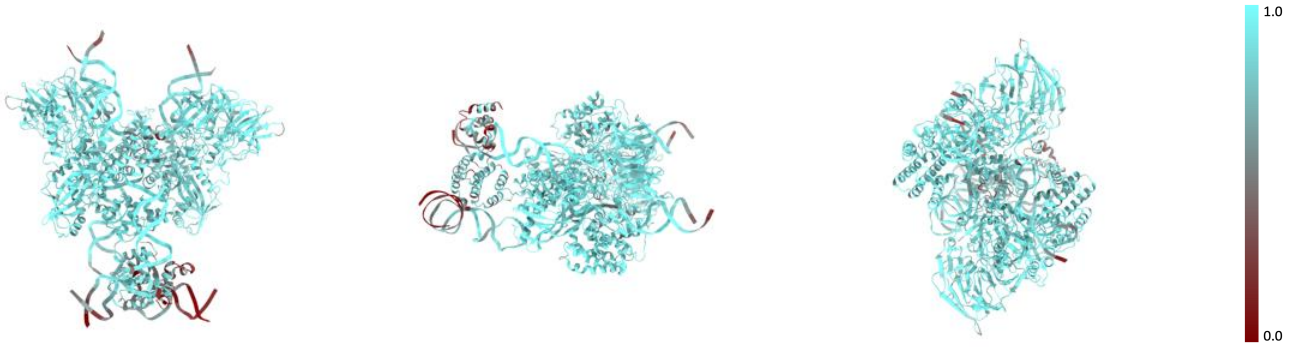
9.2 Q-score mapped to coordinate model (i)



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.

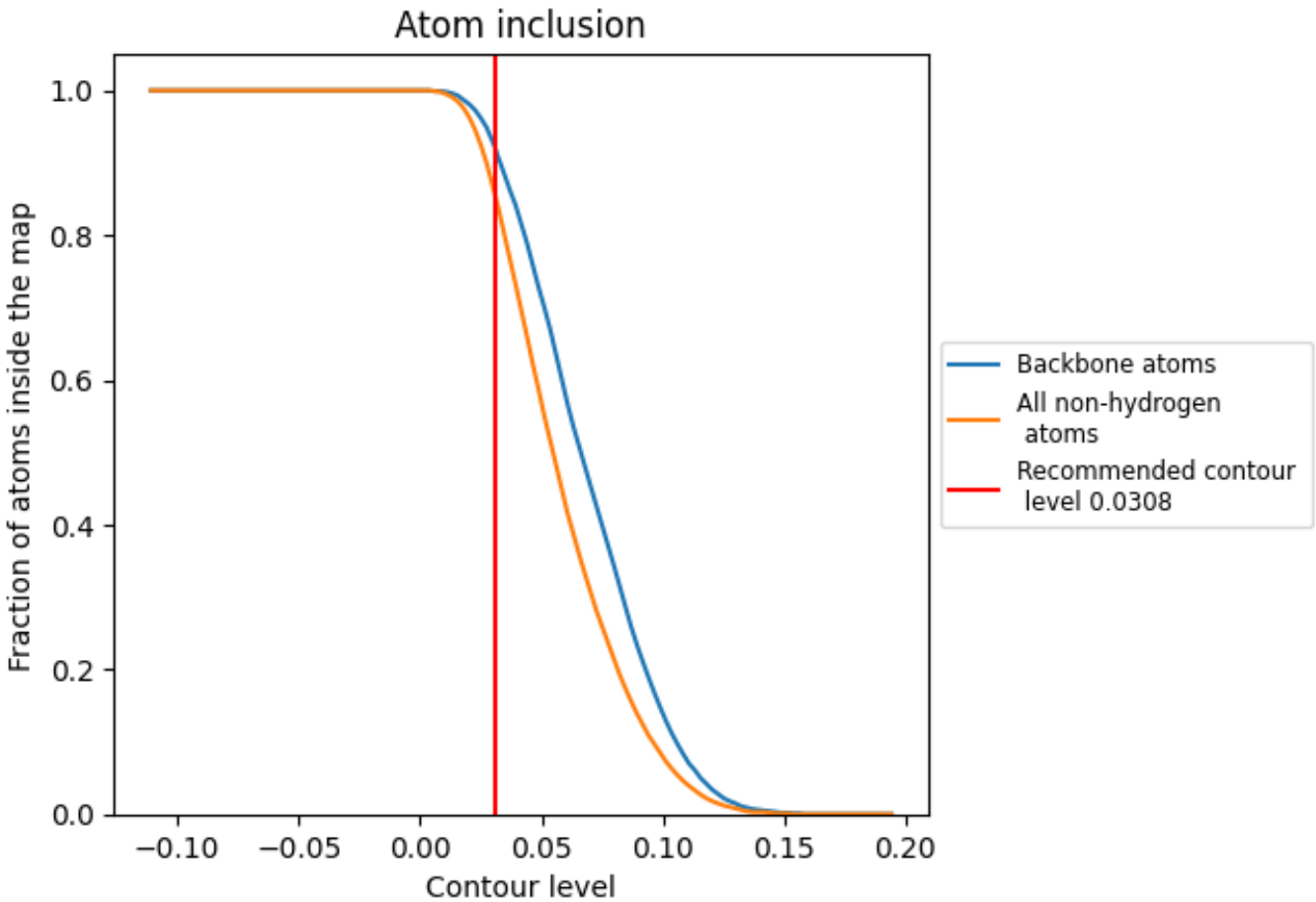
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.0308).

9.4 Atom inclusion (i)



At the recommended contour level, 92% of all backbone atoms, 86% 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 (0.0308) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8570	0.4250
A	0.8810	0.4530
B	0.8850	0.4660
C	0.8980	0.4620
D	0.9020	0.4800
F	0.8180	0.3150
G	0.7280	0.2970
I	0.8070	0.2970
J	0.7330	0.2860
N	0.4310	0.2630