Full wwPDB EM Validation Report ⓘ

Dec 10, 2022 – 09:15 am GMT

PDB ID	:	5FKW
EMDB ID	:	EMD-3202
Title	:	cryo-EM structure of the E. coli replicative DNA polymerase complex bound to DNA (DNA polymerase III alpha, beta, epsilon)
Authors	:	Fernandez-Leiro, R.; Conrad, J.; Scheres, S.H.W.; Lamers, M.H.
Deposited on	:	2015-10-20
Resolution	:	7.30 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

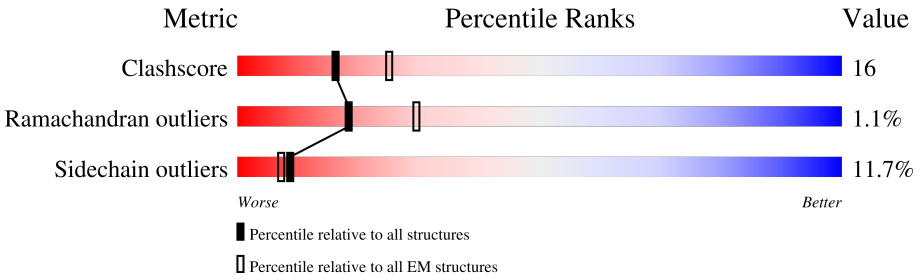
EMDB validation analysis	:	0.0.1.dev43
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.3

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 7.30 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	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	1160	8% 51% 25% • • 20%
2	B	366	9% 66% 28% 5%
2	C	366	5% 67% 29% •
3	D	243	37% 60% 27% • 10%
4	P	25	12% 44% 56%
5	T	29	14% 31% 59% 10%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 15726 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called DNA POLYMERASE III ALPHA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	927	Total	C	N	O	S	0	0
			7274	4630	1240	1363	41		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	921	LEU	ALA	engineered mutation	UNP P10443
A	923	LEU	MET	engineered mutation	UNP P10443

- Molecule 2 is a protein called DNA POLYMERASE III BETA.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	366	Total	C	N	O	S	0	0
			2844	1786	498	541	19		
2	C	366	Total	C	N	O	S	0	0
			2844	1786	498	541	19		

- Molecule 3 is a protein called DNA POLYMERASE III EPSILON.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	219	Total	C	N	O	S	0	0
			1717	1090	299	319	9		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	183	LEU	THR	engineered mutation	UNP P03007
D	185	LEU	MET	engineered mutation	UNP P03007
D	186	PRO	ALA	engineered mutation	UNP P03007
D	187	LEU	PHE	engineered mutation	UNP P03007

- Molecule 4 is a DNA chain called PRIMER-TEMPLATE DUPLEX DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	P	25	Total	C	N	O	P	0	0
			522	246	105	146	25		

- Molecule 5 is a DNA chain called PRIMER-TEMPLATE DUPLEX DNA.

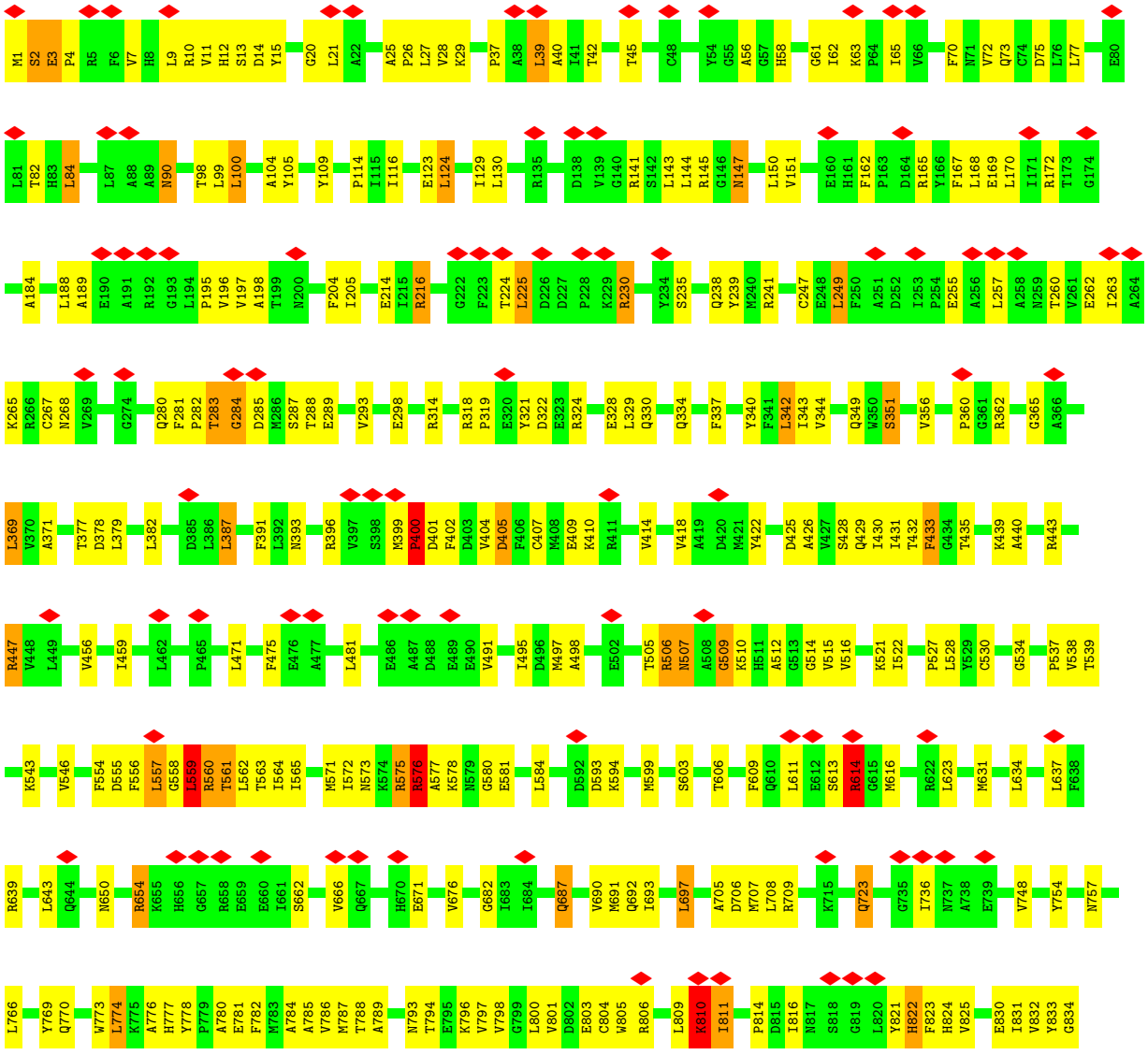
Mol	Chain	Residues	Atoms					AltConf	Trace
5	T	26	Total	C	N	O	P	0	0
			525	251	88	160	26		

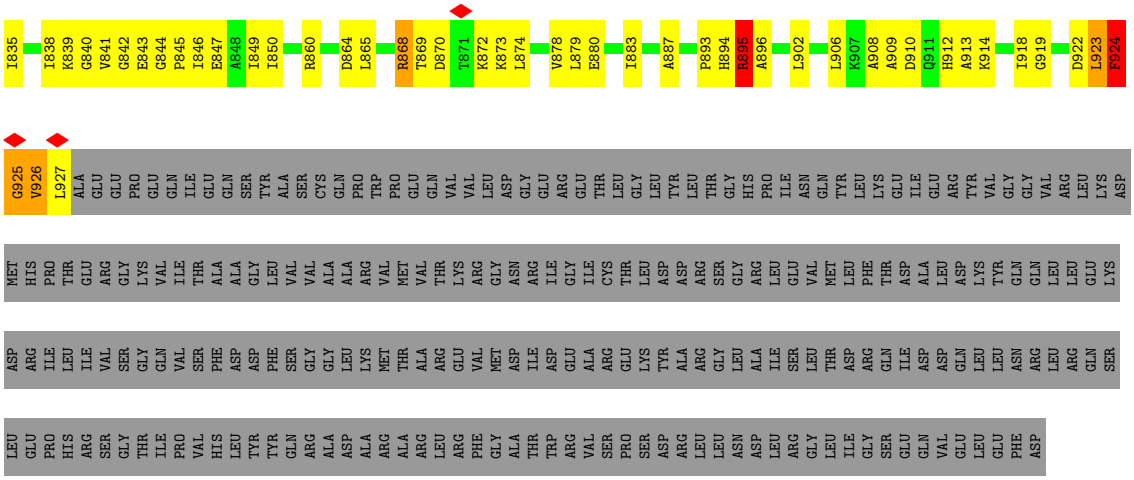
3 Residue-property plots (i)

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

• Molecule 1: DNA POLYMERASE III ALPHA

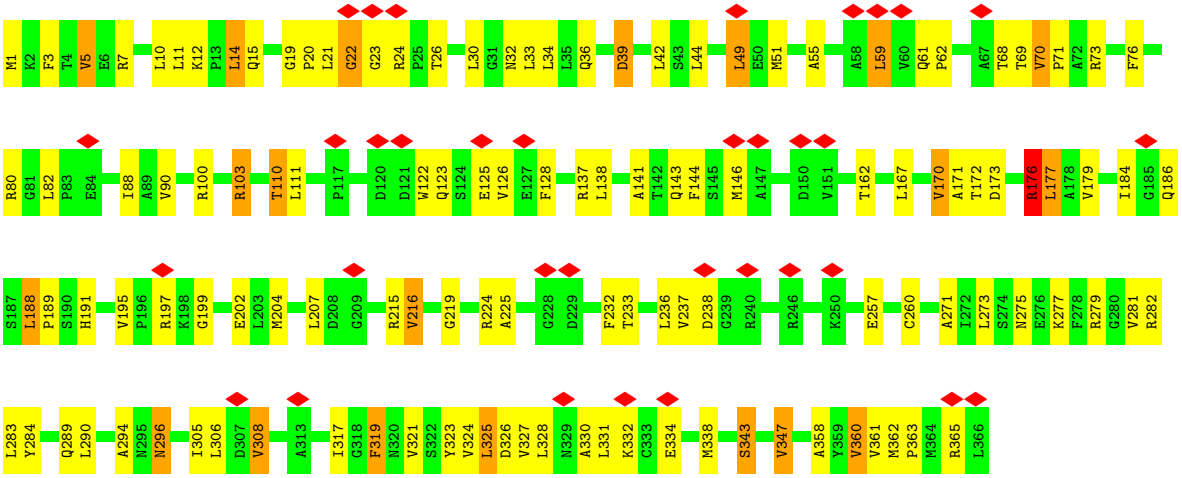
Chain A:





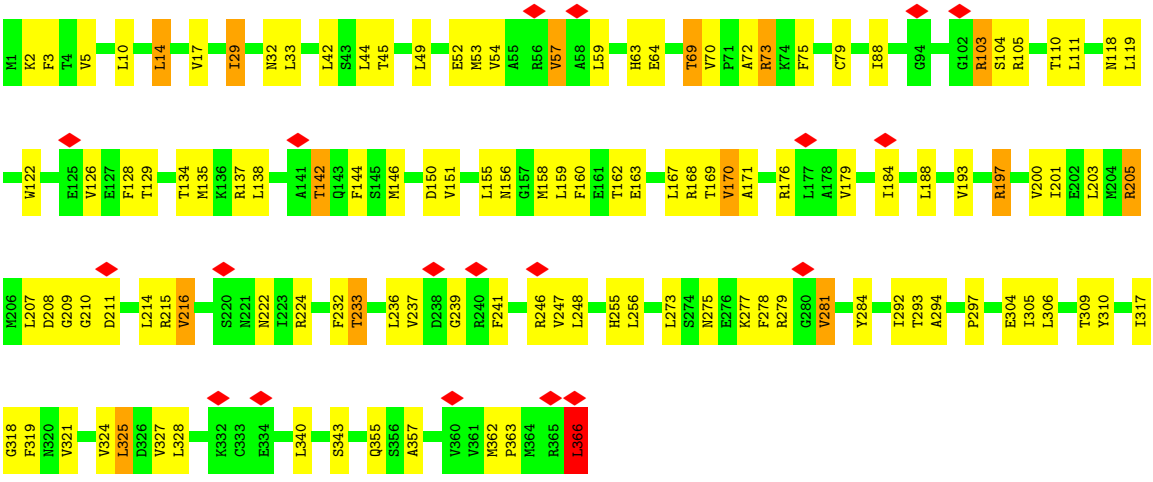
• Molecule 2: DNA POLYMERASE III BETA

Chain B:



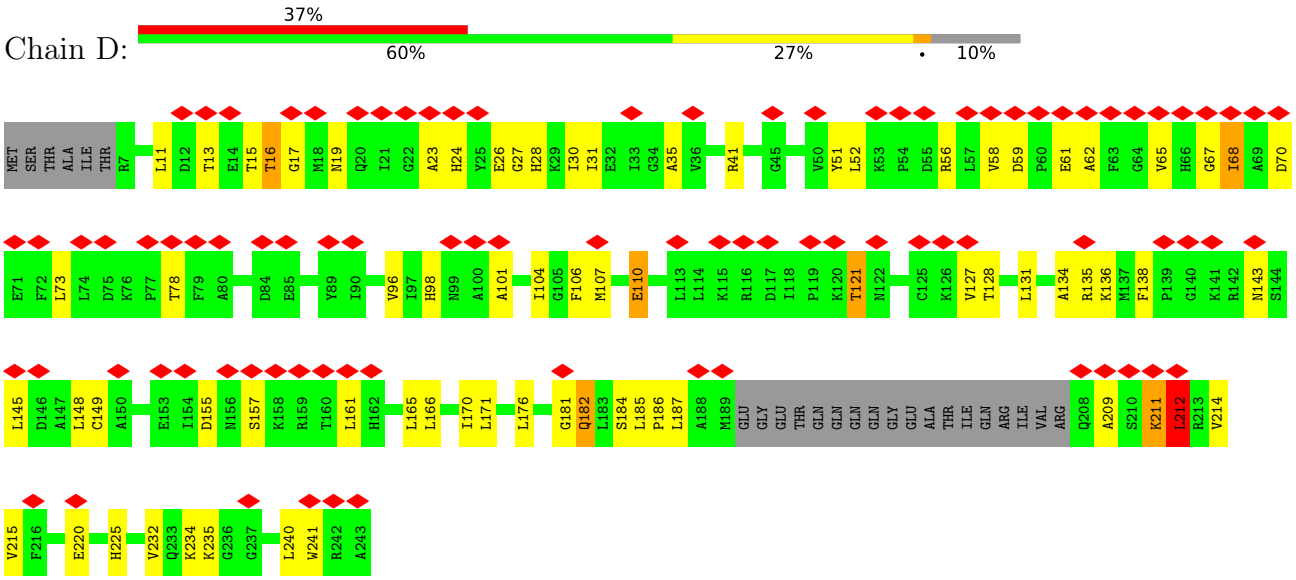
• Molecule 2: DNA POLYMERASE III BETA

Chain C:



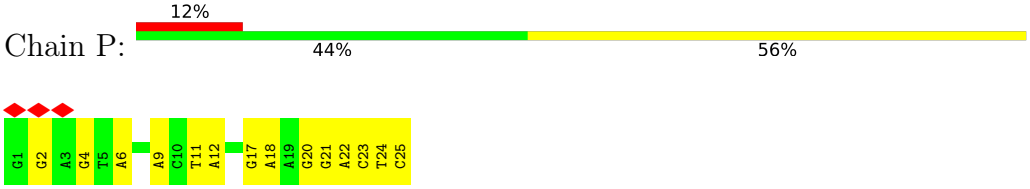
• Molecule 3: DNA POLYMERASE III EPSILON

Chain D:



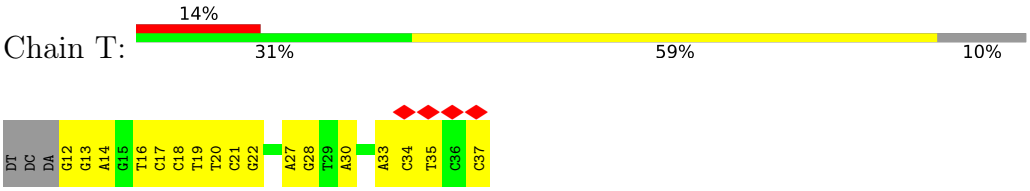
• Molecule 4: PRIMER-TEMPLATE DUPLEX DNA

Chain P:



• Molecule 5: PRIMER-TEMPLATE DUPLEX DNA

Chain T:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	40582	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	Not provided	
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	40	Depositor
Minimum defocus (nm)	2000	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	28409	Depositor
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	0.163	Depositor
Minimum map value	-0.071	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.010	Depositor
Recommended contour level	0.045	Depositor
Map size (Å)	225.28, 225.28, 225.28	wwPDB
Map dimensions	128, 128, 128	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.76, 1.76, 1.76	Depositor

5 Model quality

5.1 Standard geometry

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	0.57	2/7427 (0.0%)	0.85	11/10040 (0.1%)
2	B	0.54	0/2893	0.94	6/3915 (0.2%)
2	C	0.55	0/2893	0.94	3/3915 (0.1%)
3	D	0.56	1/1747 (0.1%)	0.80	3/2358 (0.1%)
4	P	0.42	0/588	0.89	0/907
5	T	0.46	0/585	0.98	0/899
All	All	0.55	3/16133 (0.0%)	0.89	23/22034 (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
1	A	0	11
2	B	0	1
3	D	0	4
All	All	0	16

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	687	GLN	CD-NE2	9.65	1.56	1.32
3	D	110	GLU	CD-OE2	6.77	1.33	1.25
1	A	687	GLN	CD-OE1	5.48	1.36	1.24

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	614	ARG	NE-CZ-NH1	7.76	124.18	120.30
1	A	924	PHE	N-CA-C	7.16	130.33	111.00
3	D	212	LEU	N-CA-C	6.92	129.69	111.00
3	D	212	LEU	N-CA-CB	-6.74	96.93	110.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	924	PHE	N-CA-CB	-6.17	99.50	110.60
3	D	212	LEU	CB-CA-C	-6.04	98.73	110.20
2	C	73	ARG	NE-CZ-NH1	6.03	123.31	120.30
1	A	337	PHE	N-CA-C	5.98	127.15	111.00
2	C	366	LEU	CA-CB-CG	5.84	128.73	115.30
1	A	230	ARG	NE-CZ-NH1	5.47	123.03	120.30
2	B	365	ARG	NE-CZ-NH1	5.47	123.03	120.30
2	B	39	ASP	CB-CA-C	5.37	121.13	110.40
1	A	506	ARG	NE-CZ-NH1	5.34	122.97	120.30
1	A	447	ARG	NE-CZ-NH1	5.30	122.95	120.30
2	B	306	LEU	CA-CB-CG	5.23	127.33	115.30
1	A	433	PHE	N-CA-C	5.19	125.02	111.00
2	B	176	ARG	NE-CZ-NH1	5.15	122.87	120.30
1	A	241	ARG	NE-CZ-NH2	-5.13	117.73	120.30
1	A	241	ARG	NE-CZ-NH1	5.09	122.85	120.30
2	B	215	ARG	NE-CZ-NH1	5.04	122.82	120.30
2	B	197	ARG	NE-CZ-NH1	5.03	122.81	120.30
1	A	860	ARG	NE-CZ-NH1	5.02	122.81	120.30
2	C	168	ARG	NE-CZ-NH1	5.00	122.80	120.30

There are no chirality outliers.

All (16) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	2	SER	Peptide
1	A	400	PRO	Peptide
1	A	433	PHE	Peptide
1	A	509	GLY	Peptide
1	A	559	LEU	Mainchain,Peptide
1	A	576	ARG	Mainchain
1	A	895	ARG	Peptide
1	A	923	LEU	Mainchain,Peptide
1	A	924	PHE	Mainchain
2	B	21	LEU	Peptide
3	D	211	LYS	Mainchain,Peptide
3	D	67	GLY	Mainchain,Peptide

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	7274	0	7219	282	0
2	B	2844	0	2861	66	0
2	C	2844	0	2861	61	0
3	D	1717	0	1715	54	0
4	P	522	0	280	40	0
5	T	525	0	295	31	0
All	All	15726	0	15231	493	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 16.

All (493) 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:810:LYS:HA	1:A:811:ILE:CG1	1.45	1.46
1:A:810:LYS:CA	1:A:811:ILE:HG12	1.69	1.22
1:A:810:LYS:CA	1:A:811:ILE:CG1	2.24	1.15
1:A:810:LYS:CB	1:A:811:ILE:HG12	1.78	1.12
1:A:399:MET:CE	1:A:401:ASP:HB2	1.83	1.08
1:A:560:ARG:O	1:A:562:LEU:N	1.87	1.08
1:A:810:LYS:HA	1:A:811:ILE:CD1	1.84	1.06
2:B:30:LEU:HD11	2:B:49:LEU:HD13	1.42	1.02
1:A:558:GLY:O	1:A:560:ARG:N	1.94	1.01
1:A:564:ILE:HG23	1:A:785:ALA:HB1	1.41	0.99
1:A:810:LYS:HA	1:A:811:ILE:HG12	1.31	0.96
4:P:22:DA:H2"	4:P:23:DC:C5	2.01	0.95
5:T:17:DC:H2'	5:T:18:DC:C6	2.01	0.93
1:A:810:LYS:HA	1:A:811:ILE:CB	1.92	0.92
3:D:11:LEU:HD13	3:D:35:ALA:HB2	1.48	0.92
1:A:399:MET:HE1	1:A:401:ASP:HB2	1.52	0.90
2:C:33:LEU:O	2:C:69:THR:HA	1.71	0.89
1:A:909:ALA:O	1:A:912:HIS:HB3	1.73	0.89
1:A:810:LYS:H	1:A:811:ILE:HD13	1.35	0.88
1:A:773:TRP:NE1	1:A:777:HIS:CE1	2.42	0.88
1:A:399:MET:HE2	1:A:401:ASP:HB2	1.54	0.87
4:P:25:DC:N3	5:T:13:DG:O6	2.09	0.86
2:C:33:LEU:HD12	2:C:70:VAL:HG23	1.58	0.85
2:B:30:LEU:HD21	2:B:49:LEU:HD22	1.58	0.85
1:A:810:LYS:N	1:A:811:ILE:HD13	1.92	0.85

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:P:12:DA:C2	5:T:27:DA:C2	2.66	0.83
1:A:564:ILE:HG23	1:A:785:ALA:CB	2.09	0.82
1:A:809:LEU:O	1:A:810:LYS:HG3	1.80	0.82
1:A:810:LYS:HA	1:A:811:ILE:HD13	1.60	0.81
2:C:317:ILE:HD12	2:C:343:SER:HA	1.63	0.81
1:A:810:LYS:CA	1:A:811:ILE:CD1	2.56	0.80
1:A:773:TRP:CD1	1:A:777:HIS:CE1	2.70	0.79
1:A:676:VAL:HG11	1:A:693:ILE:HG13	1.66	0.78
1:A:810:LYS:N	1:A:811:ILE:CD1	2.47	0.77
2:C:29:ILE:HG23	2:C:111:LEU:HD23	1.65	0.77
3:D:17:GLY:HA2	3:D:62:ALA:HB2	1.64	0.77
1:A:430:ILE:O	1:A:512:ALA:HA	1.84	0.77
1:A:879:LEU:CD1	1:A:906:LEU:HD21	2.16	0.76
1:A:143:LEU:HD22	1:A:184:ALA:HB1	1.67	0.76
4:P:9:DA:C2	5:T:30:DA:C2	2.73	0.76
1:A:810:LYS:CA	1:A:811:ILE:HD13	2.15	0.75
4:P:20:DG:H2"	4:P:21:DG:C8	2.21	0.75
1:A:639:ARG:NH2	1:A:754:TYR:O	2.18	0.75
2:B:281:VAL:HG22	2:B:294:ALA:HB2	1.68	0.74
2:C:281:VAL:HG23	2:C:294:ALA:HB2	1.69	0.73
4:P:22:DA:H2"	4:P:23:DC:C6	2.23	0.73
2:B:279:ARG:HB3	2:B:321:VAL:HG12	1.68	0.72
1:A:810:LYS:HB3	1:A:811:ILE:HG12	1.70	0.72
1:A:822:HIS:HA	1:A:834:GLY:HA3	1.71	0.72
1:A:573:ASN:O	1:A:576:ARG:HB3	1.89	0.72
1:A:650:ASN:O	1:A:654:ARG:HG2	1.90	0.71
1:A:340:TYR:CE2	1:A:402:PHE:CD2	2.79	0.71
1:A:814:PRO:HA	1:A:833:TYR:HB2	1.72	0.70
2:C:17:VAL:HG22	2:C:53:MET:HG3	1.74	0.70
1:A:268:ASN:OD1	3:D:225:HIS:HA	1.92	0.70
2:B:283:LEU:HG	2:B:290:LEU:HD11	1.73	0.70
1:A:908:ALA:HB2	2:C:151:VAL:HG21	1.74	0.69
3:D:96:VAL:HG22	3:D:128:THR:HB	1.72	0.69
1:A:893:PRO:HG2	1:A:894:HIS:CD2	2.28	0.69
1:A:614:ARG:HH11	1:A:614:ARG:HG2	1.56	0.68
1:A:606:THR:HG21	1:A:803:GLU:OE2	1.94	0.68
1:A:810:LYS:H	1:A:811:ILE:CD1	2.05	0.67
1:A:845:PRO:HB3	1:A:874:LEU:HD23	1.77	0.67
2:B:179:VAL:HB	2:B:358:ALA:HB3	1.77	0.67
2:C:275:ASN:HD22	2:C:297:PRO:CD	2.08	0.67
1:A:170:LEU:HD11	1:A:196:VAL:HB	1.77	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:564:ILE:HD11	1:A:789:ALA:CB	2.24	0.67
1:A:823:PHE:CE1	1:A:833:TYR:HA	2.30	0.66
1:A:564:ILE:HD11	1:A:789:ALA:HB2	1.76	0.66
2:B:126:VAL:HG22	2:B:189:PRO:HG2	1.76	0.66
3:D:16:THR:HG23	3:D:31:ILE:CG2	2.25	0.66
2:B:15:GLN:HA	2:B:76:PHE:CZ	2.31	0.66
2:C:224:ARG:HA	2:C:232:PHE:O	1.95	0.66
1:A:356:VAL:HG22	1:A:410:LYS:HD2	1.77	0.66
1:A:784:ALA:O	1:A:788:THR:HG23	1.96	0.65
1:A:431:ILE:HB	1:A:539:THR:O	1.97	0.65
1:A:841:VAL:HG22	1:A:878:VAL:HG13	1.78	0.65
1:A:810:LYS:CA	1:A:811:ILE:CB	2.71	0.65
1:A:510:LYS:HB3	5:T:17:DC:H2"	1.79	0.65
1:A:593:ASP:CG	1:A:777:HIS:CE1	2.70	0.65
1:A:407:CYS:SG	1:A:562:LEU:HB2	2.37	0.64
3:D:107:MET:CE	3:D:121:THR:HG21	2.26	0.64
1:A:3:GLU:H	1:A:4:PRO:HD3	1.62	0.64
1:A:798:VAL:O	1:A:801:VAL:HG22	1.98	0.64
1:A:559:LEU:HD11	1:A:609:PHE:CE1	2.32	0.64
3:D:17:GLY:CA	3:D:62:ALA:HB2	2.28	0.64
1:A:528:LEU:HD13	1:A:537:PRO:HB2	1.80	0.64
1:A:558:GLY:C	1:A:560:ARG:N	2.50	0.64
1:A:773:TRP:O	1:A:777:HIS:HB2	1.98	0.63
1:A:14:ASP:O	1:A:216:ARG:NH2	2.31	0.63
2:B:10:LEU:HD11	2:B:44:LEU:HD11	1.81	0.63
3:D:24:HIS:NE2	3:D:101:ALA:O	2.31	0.63
1:A:778:TYR:O	1:A:780:ALA:N	2.30	0.63
3:D:16:THR:HG23	3:D:31:ILE:HG21	1.81	0.63
2:C:292:ILE:HD12	2:C:304:GLU:HB2	1.81	0.62
2:B:7:ARG:NH2	2:B:80:ARG:O	2.32	0.62
2:B:224:ARG:HA	2:B:232:PHE:O	2.00	0.62
1:A:255:GLU:HG3	3:D:214:VAL:HG22	1.81	0.62
1:A:63:LYS:NZ	1:A:268:ASN:OD1	2.33	0.61
2:C:318:GLY:HA3	2:C:366:LEU:HD11	1.82	0.61
4:P:6:DA:C2	5:T:33:DA:C2	2.88	0.61
1:A:58:HIS:CE1	3:D:235:LYS:HB3	2.35	0.61
3:D:15:THR:HG22	3:D:30:ILE:HA	1.82	0.61
1:A:784:ALA:HB1	1:A:823:PHE:HB2	1.82	0.61
1:A:925:GLY:O	1:A:926:VAL:HB	2.01	0.61
1:A:321:TYR:CD2	1:A:382:LEU:HD12	2.36	0.61
2:C:281:VAL:CG2	2:C:294:ALA:HB2	2.31	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:864:ASP:O	1:A:868:ARG:HD3	2.01	0.60
1:A:559:LEU:HD21	1:A:609:PHE:CE1	2.36	0.60
1:A:894:HIS:O	1:A:896:ALA:N	2.30	0.60
2:B:144:PHE:CD1	2:B:326:ASP:HB3	2.37	0.60
4:P:23:DC:H2"	4:P:24:DT:H71	1.83	0.60
1:A:910:ASP:O	1:A:913:ALA:N	2.35	0.60
1:A:62:ILE:HD11	3:D:240:LEU:HD12	1.84	0.60
3:D:96:VAL:HA	3:D:128:THR:O	2.02	0.60
4:P:17:DG:C2	5:T:22:DG:C2	2.90	0.60
4:P:20:DG:C5	4:P:21:DG:O6	2.55	0.59
1:A:430:ILE:HD11	1:A:516:VAL:HB	1.85	0.59
2:B:176:ARG:HB3	2:B:361:VAL:HG12	1.84	0.59
2:B:172:THR:HB	2:B:177:LEU:HD12	1.82	0.59
4:P:20:DG:C4	4:P:21:DG:C5	2.91	0.59
3:D:23:ALA:HB3	3:D:26:GLU:HB2	1.84	0.59
1:A:788:THR:HG22	1:A:822:HIS:CG	2.38	0.59
3:D:184:SER:O	3:D:186:PRO:HD3	2.02	0.59
4:P:20:DG:C4	4:P:21:DG:C6	2.91	0.59
1:A:362:ARG:HD2	1:A:377:THR:HG22	1.83	0.59
1:A:810:LYS:HB2	1:A:811:ILE:HG12	1.80	0.58
2:B:33:LEU:O	2:B:69:THR:HA	2.03	0.58
2:C:205:ARG:NH1	5:T:34:DC:OP1	2.35	0.58
1:A:447:ARG:HD3	5:T:21:DC:OP1	2.03	0.58
1:A:399:MET:HE1	1:A:401:ASP:CB	2.29	0.58
1:A:830:GLU:O	1:A:831:ILE:HD13	2.03	0.58
1:A:843:GLU:O	1:A:846:ILE:HG12	2.03	0.58
1:A:773:TRP:CE2	1:A:777:HIS:CE1	2.92	0.58
1:A:804:CYS:HB3	1:A:809:LEU:HB3	1.85	0.58
1:A:100:LEU:HG	1:A:124:LEU:HD23	1.86	0.57
4:P:17:DG:N2	5:T:22:DG:C2	2.72	0.57
3:D:134:ALA:CB	3:D:148:LEU:HD11	2.34	0.57
3:D:145:LEU:HD11	3:D:171:LEU:HA	1.85	0.57
4:P:11:DT:O2	5:T:28:DG:N2	2.38	0.57
1:A:794:THR:HG22	1:A:839:LYS:HD3	1.87	0.57
1:A:283:THR:O	1:A:284:GLY:O	2.22	0.57
5:T:20:DT:C4	5:T:21:DC:N4	2.72	0.57
1:A:565:ILE:HG12	1:A:774:LEU:HD23	1.86	0.57
1:A:865:LEU:O	1:A:869:THR:HG22	2.05	0.57
1:A:564:ILE:CG1	1:A:789:ALA:HB2	2.35	0.57
1:A:676:VAL:HG22	1:A:692:GLN:HB3	1.87	0.57
3:D:16:THR:HG22	3:D:58:VAL:HA	1.85	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:11:LEU:HD11	2:B:80:ARG:HA	1.86	0.57
1:A:168:LEU:HD13	1:A:189:ALA:HB2	1.86	0.56
1:A:204:PHE:O	1:A:239:TYR:HA	2.05	0.56
1:A:247:CYS:HA	1:A:257:LEU:HD11	1.88	0.56
2:B:317:ILE:HD11	2:B:363:PRO:HB3	1.87	0.56
2:C:275:ASN:HD22	2:C:297:PRO:HD3	1.69	0.56
3:D:31:ILE:HB	3:D:73:LEU:HD13	1.86	0.56
1:A:399:MET:CE	1:A:401:ASP:CB	2.72	0.56
1:A:650:ASN:O	1:A:654:ARG:CG	2.52	0.56
2:B:7:ARG:CZ	2:B:82:LEU:O	2.54	0.56
2:B:184:ILE:HG21	2:B:188:LEU:HD22	1.88	0.56
3:D:68:ILE:CG2	3:D:73:LEU:HD11	2.36	0.56
1:A:506:ARG:O	1:A:507:ASN:HB3	2.05	0.55
4:P:20:DG:C2	4:P:21:DG:C6	2.94	0.55
1:A:314:ARG:O	1:A:318:ARG:HB2	2.05	0.55
1:A:773:TRP:CZ2	1:A:777:HIS:CD2	2.94	0.55
3:D:27:GLY:O	3:D:56:ARG:HD2	2.06	0.55
1:A:25:ALA:HB3	1:A:26:PRO:HD3	1.89	0.55
1:A:814:PRO:CA	1:A:833:TYR:HB2	2.37	0.55
2:B:126:VAL:HG13	2:B:189:PRO:HD2	1.89	0.55
1:A:399:MET:HE2	1:A:401:ASP:CB	2.31	0.55
1:A:803:GLU:O	1:A:806:ARG:HG2	2.07	0.55
2:B:281:VAL:HG22	2:B:294:ALA:CB	2.34	0.55
2:C:33:LEU:HD11	2:C:72:ALA:HA	1.87	0.55
4:P:20:DG:N3	4:P:21:DG:C5	2.75	0.55
1:A:510:LYS:O	5:T:18:DC:H5'	2.07	0.55
1:A:793:ASN:O	1:A:797:VAL:HG23	2.07	0.55
4:P:20:DG:H2"	4:P:21:DG:N7	2.22	0.55
1:A:429:GLN:O	1:A:538:VAL:HA	2.06	0.55
2:C:158:MET:HG3	2:C:170:VAL:O	2.07	0.54
1:A:13:SER:HA	1:A:27:LEU:HD11	1.89	0.54
3:D:135:ARG:HA	3:D:143:ASN:HD22	1.72	0.54
1:A:816:ILE:HG13	1:A:887:ALA:HB1	1.88	0.54
1:A:849:ILE:HG12	1:A:874:LEU:HD11	1.90	0.54
2:C:32:ASN:HB3	2:C:69:THR:HG23	1.89	0.54
1:A:3:GLU:N	1:A:4:PRO:CD	2.71	0.54
1:A:225:LEU:O	1:A:230:ARG:NH1	2.41	0.54
1:A:814:PRO:HG3	1:A:833:TYR:CD2	2.43	0.54
2:B:273:LEU:O	2:B:296:ASN:HB3	2.08	0.54
1:A:794:THR:O	1:A:798:VAL:HG23	2.08	0.54
2:C:33:LEU:HD13	2:C:75:PHE:CD2	2.43	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:32:ASN:HA	2:B:71:PRO:HA	1.89	0.54
2:C:279:ARG:O	2:C:321:VAL:HG12	2.08	0.54
5:T:13:DG:H2"	5:T:14:DA:C8	2.43	0.54
1:A:835:ILE:O	1:A:838:ILE:HG22	2.08	0.54
1:A:564:ILE:CD1	1:A:789:ALA:HB2	2.38	0.54
2:C:17:VAL:HG22	2:C:53:MET:CG	2.37	0.54
1:A:459:ILE:CD1	1:A:491:VAL:HG22	2.38	0.53
1:A:205:ILE:O	1:A:239:TYR:HB2	2.09	0.53
1:A:235:SER:H	1:A:238:GLN:HE21	1.57	0.53
1:A:691:MET:HA	1:A:705:ALA:HB1	1.89	0.53
2:B:22:GLY:O	2:B:24:ARG:N	2.36	0.53
1:A:690:VAL:HG22	1:A:748:VAL:HG13	1.91	0.53
1:A:782:PHE:O	1:A:786:VAL:HG23	2.08	0.53
1:A:15:TYR:CD1	1:A:505:THR:HG21	2.44	0.52
1:A:105:TYR:O	1:A:534:GLY:HA3	2.10	0.52
2:C:45:THR:HA	2:C:53:MET:O	2.09	0.52
3:D:52:LEU:O	3:D:73:LEU:HB3	2.09	0.52
1:A:11:VAL:HG21	1:A:39:LEU:HD21	1.91	0.52
4:P:2:DG:N2	5:T:37:DC:O2	2.43	0.52
1:A:425:ASP:O	1:A:522:ILE:HG22	2.09	0.52
1:A:838:ILE:HG23	1:A:841:VAL:HB	1.91	0.52
1:A:623:LEU:HD22	1:A:637:LEU:HD13	1.91	0.52
2:B:146:MET:HG2	2:B:171:ALA:HB1	1.92	0.52
1:A:288:THR:HG23	1:A:342:LEU:HD22	1.91	0.52
2:C:128:PHE:CE2	2:C:216:VAL:HG13	2.45	0.52
1:A:426:ALA:HA	1:A:521:LYS:HA	1.92	0.52
2:B:305:ILE:HB	2:C:103:ARG:HB2	1.92	0.52
2:C:284:TYR:HE1	2:C:293:THR:HG1	1.58	0.52
1:A:576:ARG:HD2	1:A:581:GLU:O	2.09	0.52
1:A:841:VAL:HG12	1:A:842:GLY:O	2.10	0.52
2:C:208:ASP:O	2:C:210:GLY:N	2.38	0.51
1:A:429:GLN:HB2	1:A:538:VAL:HG12	1.92	0.51
2:B:103:ARG:HB2	2:C:305:ILE:HB	1.93	0.51
2:B:260:CYS:N	2:B:334:GLU:O	2.38	0.51
2:C:2:LYS:O	2:C:63:HIS:HA	2.10	0.51
1:A:405:ASP:OD2	1:A:557:LEU:HD12	2.11	0.51
2:B:284:TYR:O	2:B:290:LEU:HD12	2.09	0.51
2:C:129:THR:HG22	2:C:215:ARG:HB2	1.93	0.51
4:P:21:DG:C2	4:P:22:DA:C5	2.99	0.51
1:A:611:LEU:HA	1:A:616:MET:HG2	1.93	0.51
2:B:141:ALA:O	2:B:330:ALA:HB1	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:471:LEU:HD11	1:A:498:ALA:HB1	1.92	0.51
2:B:122:TRP:CE3	2:B:219:GLY:HA3	2.46	0.51
4:P:20:DG:C6	4:P:21:DG:O6	2.63	0.51
1:A:576:ARG:O	1:A:580:GLY:N	2.44	0.51
1:A:880:GLU:O	1:A:883:ILE:HG22	2.11	0.51
2:B:321:VAL:HG22	2:B:325:LEU:HD22	1.93	0.51
3:D:134:ALA:HB1	3:D:148:LEU:HD11	1.93	0.51
1:A:9:LEU:HA	1:A:40:ALA:HB3	1.91	0.50
1:A:62:ILE:CD1	3:D:240:LEU:HD12	2.40	0.50
1:A:168:LEU:HB2	1:A:196:VAL:HG12	1.93	0.50
1:A:576:ARG:HG3	1:A:577:ALA:N	2.26	0.50
2:B:7:ARG:NE	2:B:82:LEU:O	2.43	0.50
3:D:98:HIS:CE1	3:D:131:LEU:HD13	2.46	0.50
3:D:11:LEU:CD1	3:D:35:ALA:HB2	2.33	0.50
4:P:20:DG:H1'	4:P:21:DG:C8	2.46	0.50
1:A:3:GLU:N	1:A:4:PRO:HD3	2.21	0.50
1:A:443:ARG:HH12	4:P:21:DG:H5"	1.75	0.50
2:C:205:ARG:HD3	5:T:34:DC:OP1	2.12	0.50
1:A:82:THR:HG22	1:A:141:ARG:HG3	1.94	0.50
1:A:324:ARG:HD2	1:A:328:GLU:OE2	2.12	0.50
4:P:20:DG:C2	4:P:21:DG:N1	2.79	0.50
1:A:104:ALA:HB1	1:A:114:PRO:HB2	1.94	0.50
1:A:379:LEU:HG	1:A:766:LEU:HD22	1.94	0.50
1:A:849:ILE:HG13	1:A:874:LEU:HD21	1.94	0.50
1:A:923:LEU:HD13	2:C:247:VAL:HG13	1.94	0.50
1:A:923:LEU:HD21	2:C:362:MET:SD	2.52	0.50
1:A:3:GLU:H	1:A:4:PRO:CD	2.25	0.49
1:A:10:ARG:CZ	1:A:169:GLU:OE2	2.60	0.49
1:A:318:ARG:NH1	1:A:322:ASP:OD2	2.45	0.49
2:B:177:LEU:HB3	2:B:360:VAL:HG13	1.94	0.49
2:B:3:PHE:CZ	2:B:90:VAL:HG21	2.47	0.49
2:C:292:ILE:HD12	2:C:304:GLU:CB	2.42	0.49
4:P:20:DG:C2'	4:P:21:DG:C8	2.94	0.49
2:B:176:ARG:HG2	2:B:323:TYR:CD2	2.47	0.49
5:T:18:DC:H2"	5:T:19:DT:C6	2.47	0.49
1:A:167:PHE:CE2	1:A:263:ILE:HD11	2.47	0.49
3:D:138:PHE:O	3:D:143:ASN:ND2	2.42	0.49
1:A:927:LEU:HD13	1:A:927:LEU:O	2.12	0.49
3:D:30:ILE:CG2	3:D:52:LEU:HD12	2.43	0.49
4:P:23:DC:H2"	4:P:24:DT:OP2	2.12	0.49
2:B:275:ASN:HD21	2:B:277:LYS:HE2	1.78	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:510:LYS:HB3	5:T:17:DC:C2'	2.42	0.48
1:A:109:TYR:HB3	1:A:114:PRO:HA	1.95	0.48
1:A:387:LEU:HD23	1:A:691:MET:HE1	1.95	0.48
1:A:391:PHE:CZ	1:A:402:PHE:HA	2.48	0.48
1:A:825:VAL:HG23	1:A:825:VAL:O	2.14	0.48
2:C:255:HIS:O	2:C:310:TYR:HA	2.12	0.48
4:P:22:DA:C2'	4:P:23:DC:C5	2.88	0.48
1:A:265:LYS:O	3:D:225:HIS:HB2	2.14	0.48
2:B:10:LEU:O	2:B:14:LEU:HB2	2.13	0.48
1:A:378:ASP:HB2	1:A:766:LEU:CD2	2.44	0.48
1:A:475:PHE:HZ	1:A:495:ILE:HD13	1.78	0.48
1:A:443:ARG:NH1	4:P:21:DG:H5"	2.29	0.48
1:A:506:ARG:O	1:A:507:ASN:CB	2.61	0.48
1:A:809:LEU:O	1:A:810:LYS:CG	2.59	0.48
1:A:172:ARG:O	1:A:249:LEU:HD11	2.13	0.48
1:A:780:ALA:HB3	1:A:781:GLU:OE2	2.14	0.48
1:A:429:GLN:HB3	1:A:512:ALA:HB2	1.95	0.48
1:A:515:VAL:N	1:A:554:PHE:O	2.39	0.47
1:A:530:CYS:SG	1:A:537:PRO:HA	2.54	0.47
1:A:631:MET:SD	1:A:769:TYR:HD1	2.37	0.47
1:A:289:GLU:O	1:A:293:VAL:HG23	2.14	0.47
1:A:840:GLY:O	4:P:18:DA:OP1	2.32	0.47
1:A:662:SER:O	1:A:682:GLY:HA3	2.14	0.47
1:A:825:VAL:HG12	1:A:830:GLU:O	2.14	0.47
2:B:68:THR:OG1	2:B:110:THR:HG23	2.14	0.47
5:T:12:DG:C4	5:T:13:DG:N7	2.82	0.47
1:A:528:LEU:CD2	1:A:539:THR:HG22	2.44	0.47
1:A:844:GLY:O	1:A:847:GLU:HG2	2.14	0.47
2:B:170:VAL:HB	2:B:179:VAL:HA	1.96	0.47
2:C:134:THR:HG21	2:C:184:ILE:HD11	1.97	0.47
2:C:159:LEU:HD23	2:C:170:VAL:CG1	2.44	0.47
3:D:30:ILE:HG22	3:D:52:LEU:HD12	1.96	0.47
4:P:4:DG:N2	5:T:35:DT:O2	2.48	0.47
1:A:77:LEU:CD2	1:A:150:LEU:HD21	2.45	0.47
5:T:16:DT:H1'	5:T:17:DC:H5'	1.97	0.47
5:T:17:DC:C4	5:T:18:DC:N4	2.83	0.47
1:A:324:ARG:CG	1:A:369:LEU:HD12	2.44	0.47
2:B:5:VAL:HG13	2:B:59:LEU:HD12	1.96	0.47
2:C:146:MET:HG2	2:C:171:ALA:HB1	1.97	0.47
5:T:17:DC:H2'	5:T:18:DC:C5	2.46	0.47
4:P:21:DG:C2	4:P:22:DA:C4	3.03	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:405:ASP:HB2	1:A:557:LEU:HB2	1.97	0.46
2:C:3:PHE:CB	2:C:59:LEU:HD21	2.44	0.46
1:A:708:LEU:HD13	1:A:723:GLN:HG2	1.96	0.46
3:D:31:ILE:HD12	3:D:68:ILE:HG21	1.97	0.46
1:A:98:THR:HA	1:A:527:PRO:HG3	1.96	0.46
1:A:318:ARG:N	1:A:319:PRO:HD2	2.30	0.46
2:C:321:VAL:HG22	2:C:325:LEU:HD22	1.96	0.46
1:A:405:ASP:CB	1:A:557:LEU:HB2	2.46	0.46
1:A:796:LYS:O	1:A:800:LEU:HG	2.16	0.46
2:B:20:PRO:HD3	2:B:202:GLU:CD	2.36	0.46
1:A:130:LEU:HD11	1:A:162:PHE:CD2	2.50	0.46
1:A:676:VAL:HG13	1:A:692:GLN:HB2	1.98	0.46
5:T:16:DT:C5	5:T:17:DC:C4	3.04	0.46
2:C:159:LEU:HD23	2:C:170:VAL:HG13	1.98	0.46
1:A:61:GLY:HA2	3:D:232:VAL:CG1	2.46	0.46
1:A:918:ILE:HG23	2:C:278:PHE:HA	1.97	0.46
3:D:181:GLY:O	3:D:182:GLN:CB	2.64	0.46
1:A:804:CYS:O	1:A:809:LEU:HB2	2.16	0.45
1:A:847:GLU:HA	1:A:850:ILE:HG12	1.98	0.45
2:C:317:ILE:HD11	2:C:363:PRO:HB3	1.97	0.45
1:A:429:GLN:CB	1:A:538:VAL:HG12	2.46	0.45
1:A:797:VAL:O	1:A:801:VAL:HG13	2.16	0.45
2:C:160:PHE:CE2	2:C:169:THR:HG22	2.52	0.45
1:A:599:MET:CE	1:A:776:ALA:HB2	2.46	0.45
2:C:256:LEU:HA	2:C:309:THR:O	2.16	0.45
2:C:44:LEU:O	2:C:54:VAL:HA	2.17	0.45
3:D:181:GLY:O	3:D:182:GLN:HB2	2.16	0.45
1:A:365:GLY:HA2	1:A:391:PHE:CD2	2.52	0.45
2:C:179:VAL:O	2:C:357:ALA:HA	2.17	0.45
1:A:572:ILE:O	1:A:575:ARG:HB2	2.17	0.45
2:C:129:THR:HG22	2:C:215:ARG:CB	2.47	0.45
5:T:16:DT:C6	5:T:17:DC:C5	3.05	0.45
1:A:365:GLY:HA2	1:A:391:PHE:CE2	2.51	0.45
4:P:20:DG:C5	4:P:21:DG:C6	3.05	0.45
1:A:170:LEU:HD11	1:A:196:VAL:CG2	2.47	0.45
1:A:910:ASP:OD1	1:A:913:ALA:HB3	2.17	0.45
1:A:214:GLU:OE1	1:A:230:ARG:NH2	2.50	0.45
1:A:428:SER:O	1:A:516:VAL:HG12	2.17	0.45
2:C:2:LYS:O	2:C:64:GLU:N	2.49	0.45
1:A:902:LEU:O	1:A:906:LEU:HG	2.17	0.44
2:B:128:PHE:CZ	2:B:216:VAL:HG22	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:P:17:DG:C2	5:T:22:DG:N2	2.86	0.44
1:A:170:LEU:HB2	1:A:198:ALA:HA	1.99	0.44
1:A:409:GLU:HG3	1:A:410:LYS:HG2	1.99	0.44
1:A:512:ALA:HB3	1:A:556:PHE:CZ	2.53	0.44
2:B:128:PHE:CE1	2:B:216:VAL:HG13	2.52	0.44
1:A:197:VAL:HG22	1:A:260:THR:HG22	1.99	0.44
1:A:330:GLN:O	1:A:334:GLN:HG3	2.17	0.44
1:A:400:PRO:O	1:A:401:ASP:C	2.54	0.44
1:A:614:ARG:HG2	1:A:614:ARG:NH1	2.30	0.44
2:C:122:TRP:CE2	2:C:222:ASN:HB2	2.52	0.44
3:D:161:LEU:HD22	3:D:165:LEU:HD23	1.98	0.44
1:A:204:PHE:CE1	1:A:239:TYR:HB3	2.52	0.44
1:A:343:ILE:HG12	1:A:422:TYR:OH	2.17	0.44
1:A:443:ARG:HH12	4:P:21:DG:H4'	1.82	0.44
1:A:459:ILE:HD11	1:A:491:VAL:HG22	1.99	0.44
2:B:173:ASP:OD2	2:B:176:ARG:HD2	2.18	0.44
3:D:28:HIS:HA	3:D:56:ARG:HD3	2.00	0.44
5:T:12:DG:C6	5:T:13:DG:O6	2.70	0.44
1:A:13:SER:O	1:A:20:GLY:HA3	2.18	0.44
1:A:73:GLN:N	1:A:116:ILE:O	2.48	0.44
1:A:393:ASN:ND2	1:A:706:ASP:OD2	2.51	0.44
2:B:321:VAL:HA	2:B:324:VAL:CG1	2.48	0.44
1:A:371:ALA:HB1	1:A:377:THR:HG23	2.00	0.43
1:A:147:ASN:O	1:A:151:VAL:HG23	2.18	0.43
1:A:129:ILE:HG12	1:A:165:ARG:HG2	2.00	0.43
1:A:514:GLY:HA3	1:A:555:ASP:HA	2.00	0.43
1:A:687:GLN:CG	1:A:709:ARG:HD2	2.48	0.43
2:B:15:GLN:HA	2:B:76:PHE:CE1	2.53	0.43
2:B:33:LEU:N	2:B:70:VAL:O	2.43	0.43
2:B:44:LEU:HB2	2:B:55:ALA:HB3	2.00	0.43
2:C:144:PHE:CZ	2:C:327:VAL:HA	2.53	0.43
1:A:432:THR:O	1:A:509:GLY:HA3	2.19	0.43
1:A:351:SER:O	1:A:356:VAL:HB	2.19	0.43
1:A:870:ASP:OD1	1:A:873:LYS:HD3	2.19	0.43
1:A:914:LYS:O	1:A:918:ILE:HG12	2.18	0.43
2:C:142:THR:CG2	2:C:158:MET:SD	3.07	0.43
3:D:185:LEU:O	3:D:187:LEU:N	2.51	0.43
4:P:20:DG:C1'	4:P:21:DG:C8	3.02	0.43
1:A:459:ILE:HD13	1:A:491:VAL:HG22	2.00	0.43
2:C:319:PHE:CD1	2:C:363:PRO:HA	2.54	0.43
1:A:475:PHE:CZ	1:A:495:ILE:HD13	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:19:GLY:N	2:B:20:PRO:HD2	2.34	0.43
2:B:61:GLN:HB3	2:B:62:PRO:CD	2.49	0.43
1:A:90:ASN:C	1:A:90:ASN:HD22	2.22	0.42
1:A:105:TYR:O	1:A:534:GLY:CA	2.66	0.42
2:C:155:LEU:HD23	2:C:241:PHE:CE1	2.53	0.42
1:A:593:ASP:CG	1:A:777:HIS:HE1	2.19	0.42
1:A:838:ILE:HG21	1:A:841:VAL:HG21	2.01	0.42
2:B:162:THR:HG22	2:B:188:LEU:HD23	2.02	0.42
2:B:321:VAL:HA	2:B:324:VAL:HG12	2.01	0.42
1:A:72:VAL:CG2	1:A:84:LEU:HB2	2.49	0.42
1:A:801:VAL:O	1:A:805:TRP:CD1	2.72	0.42
1:A:835:ILE:HD11	1:A:849:ILE:HD12	2.00	0.42
3:D:41:ARG:NH2	3:D:176:LEU:O	2.44	0.42
1:A:391:PHE:CE2	1:A:402:PHE:HD1	2.37	0.42
1:A:543:LYS:HD3	4:P:24:DT:O3'	2.19	0.42
2:B:11:LEU:HD12	2:B:11:LEU:HA	1.85	0.42
2:B:362:MET:HE1	3:D:184:SER:HA	2.01	0.42
3:D:61:GLU:O	3:D:65:VAL:HG23	2.19	0.42
1:A:781:GLU:N	1:A:781:GLU:CD	2.73	0.42
2:B:290:LEU:HB2	2:B:308:VAL:HG21	2.00	0.42
1:A:344:VAL:HG22	1:A:554:PHE:CE1	2.54	0.42
2:B:51:MET:CE	2:B:199:GLY:HA2	2.49	0.42
2:C:197:ARG:O	2:C:201:ILE:HG12	2.20	0.42
1:A:4:PRO:HG2	1:A:37:PRO:HG3	2.01	0.42
1:A:195:PRO:HB3	3:D:215:VAL:HG23	2.02	0.42
2:B:128:PHE:HB3	2:B:188:LEU:HD11	2.02	0.42
2:C:52:GLU:N	2:C:233:THR:O	2.53	0.42
1:A:105:TYR:HB3	1:A:530:CYS:HB2	2.00	0.42
1:A:340:TYR:CD2	1:A:402:PHE:CD2	3.08	0.42
1:A:440:ALA:HA	1:A:443:ARG:NH2	2.35	0.42
1:A:811:ILE:HD12	1:A:831:ILE:HG13	2.00	0.42
1:A:821:TYR:O	1:A:835:ILE:HG22	2.20	0.42
2:B:347:VAL:HG13	2:B:361:VAL:O	2.19	0.42
2:B:34:LEU:HD21	2:B:36:GLN:HE21	1.85	0.42
2:B:271:ALA:CB	2:B:321:VAL:HG11	2.50	0.42
3:D:16:THR:HG22	3:D:58:VAL:HG22	2.01	0.42
3:D:30:ILE:HD12	3:D:110:GLU:HG3	2.01	0.42
1:A:12:HIS:NE2	1:A:42:THR:O	2.52	0.42
1:A:170:LEU:HD11	1:A:196:VAL:CB	2.46	0.42
1:A:344:VAL:HG22	1:A:554:PHE:HE1	1.85	0.42
1:A:824:HIS:O	1:A:832:VAL:HG22	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:879:LEU:HD11	1:A:906:LEU:HD21	1.95	0.42
2:C:10:LEU:HD13	2:C:57:VAL:HG11	2.01	0.42
5:T:16:DT:C5	5:T:17:DC:N4	2.88	0.42
5:T:20:DT:C5	5:T:21:DC:N4	2.88	0.42
1:A:801:VAL:O	1:A:805:TRP:HD1	2.03	0.41
2:B:317:ILE:HD12	2:B:343:SER:HA	2.02	0.41
3:D:15:THR:HG21	3:D:106:PHE:CD1	2.55	0.41
1:A:324:ARG:HG3	1:A:369:LEU:HD12	2.02	0.41
3:D:51:TYR:HB3	3:D:73:LEU:HD23	2.01	0.41
1:A:599:MET:HE2	1:A:776:ALA:HB2	2.02	0.41
2:C:150:ASP:H	2:C:156:ASN:HD21	1.68	0.41
1:A:409:GLU:OE1	1:A:563:THR:HG23	2.21	0.41
2:C:135:MET:HG2	2:C:214:LEU:HD21	2.02	0.41
1:A:65:ILE:HG23	1:A:267:CYS:HB3	2.02	0.41
1:A:561:THR:O	1:A:564:ILE:HB	2.20	0.41
1:A:870:ASP:OD2	1:A:872:LYS:HB2	2.21	0.41
2:C:159:LEU:N	2:C:170:VAL:O	2.51	0.41
1:A:61:GLY:HA2	3:D:232:VAL:HG12	2.02	0.41
1:A:809:LEU:HB3	1:A:811:ILE:HD11	2.01	0.41
1:A:822:HIS:CD2	1:A:823:PHE:CD2	3.08	0.41
1:A:4:PRO:CG	1:A:37:PRO:HG3	2.50	0.41
1:A:356:VAL:HG22	1:A:410:LYS:CD	2.49	0.41
2:B:32:ASN:HB3	2:B:69:THR:HG22	2.03	0.41
2:B:319:PHE:HB3	2:B:363:PRO:HA	2.01	0.41
3:D:149:CYS:SG	3:D:170:ILE:HG23	2.61	0.41
1:A:45:THR:HG22	1:A:45:THR:O	2.20	0.41
1:A:918:ILE:HD13	2:C:278:PHE:CD1	2.56	0.41
1:A:70:PHE:N	1:A:84:LEU:O	2.54	0.41
1:A:360:PRO:HG3	1:A:562:LEU:HD21	2.03	0.41
1:A:616:MET:HE1	1:A:634:LEU:O	2.21	0.41
1:A:918:ILE:HG22	1:A:919:GLY:HA3	2.02	0.41
2:B:277:LYS:HE2	2:B:277:LYS:HB2	1.94	0.41
3:D:166:LEU:O	3:D:170:ILE:HG12	2.21	0.41
4:P:20:DG:C1'	4:P:21:DG:N7	2.84	0.41
1:A:344:VAL:HG11	1:A:404:VAL:HG21	2.03	0.41
1:A:435:THR:O	1:A:506:ARG:CZ	2.69	0.41
1:A:443:ARG:HH12	4:P:21:DG:C5'	2.34	0.41
1:A:787:MET:HG2	1:A:800:LEU:CD1	2.51	0.41
1:A:918:ILE:HB	1:A:919:GLY:HA3	2.03	0.41
1:A:766:LEU:O	1:A:770:GLN:HG3	2.21	0.40
2:C:14:LEU:HD23	2:C:79:CYS:CB	2.51	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:P:20:DG:N2	4:P:21:DG:C2	2.89	0.40
1:A:28:VAL:HG11	1:A:56:ALA:HB1	2.02	0.40
1:A:58:HIS:HE1	3:D:235:LYS:HB3	1.85	0.40
1:A:787:MET:CE	1:A:797:VAL:HG13	2.51	0.40
2:C:33:LEU:N	2:C:70:VAL:O	2.54	0.40
5:T:16:DT:C2	5:T:17:DC:C2	3.09	0.40
1:A:340:TYR:OH	1:A:402:PHE:HB2	2.21	0.40
1:A:559:LEU:HD22	1:A:559:LEU:HA	1.94	0.40
1:A:697:LEU:HD11	1:A:736:ILE:HG21	2.04	0.40
1:A:558:GLY:HA3	5:T:16:DT:OP1	2.22	0.40
1:A:564:ILE:HD13	1:A:564:ILE:HG21	1.92	0.40
2:B:225:ALA:HB3	2:B:232:PHE:HB3	2.03	0.40
4:P:20:DG:N3	4:P:21:DG:C6	2.90	0.40
3:D:15:THR:HA	3:D:31:ILE:HG12	2.03	0.40
3:D:68:ILE:HG23	3:D:73:LEU:HD11	2.02	0.40
3:D:104:ILE:HD11	3:D:127:VAL:CG1	2.52	0.40
4:P:18:DA:OP2	4:P:18:DA:H8	2.04	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	925/1160 (80%)	856 (92%)	57 (6%)	12 (1%)	12	48
2	B	364/366 (100%)	341 (94%)	20 (6%)	3 (1%)	19	60
2	C	364/366 (100%)	344 (94%)	18 (5%)	2 (0%)	29	69
3	D	215/243 (88%)	198 (92%)	13 (6%)	4 (2%)	8	38
All	All	1868/2135 (88%)	1739 (93%)	108 (6%)	21 (1%)	18	52

All (21) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	284	GLY
1	A	559	LEU
1	A	561	THR
1	A	895	ARG
1	A	924	PHE
2	B	23	GLY
3	D	68	ILE
3	D	212	LEU
1	A	507	ASN
1	A	925	GLY
2	C	209	GLY
2	C	239	GLY
1	A	811	ILE
1	A	926	VAL
3	D	182	GLN
3	D	209	ALA
1	A	575	ARG
1	A	810	LYS
1	A	2	SER
2	B	22	GLY
2	B	343	SER

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	765/965 (79%)	694 (91%)	71 (9%)	9 28
2	B	313/313 (100%)	263 (84%)	50 (16%)	2 13
2	C	313/313 (100%)	265 (85%)	48 (15%)	2 14
3	D	180/200 (90%)	165 (92%)	15 (8%)	11 34
All	All	1571/1791 (88%)	1387 (88%)	184 (12%)	9 20

All (184) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET

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Mol	Chain	Res	Type
1	A	3	GLU
1	A	7	VAL
1	A	21	LEU
1	A	29	LYS
1	A	39	LEU
1	A	75	ASP
1	A	84	LEU
1	A	90	ASN
1	A	99	LEU
1	A	100	LEU
1	A	123	GLU
1	A	124	LEU
1	A	144	LEU
1	A	145	ARG
1	A	147	ASN
1	A	188	LEU
1	A	216	ARG
1	A	224	THR
1	A	225	LEU
1	A	249	LEU
1	A	262	GLU
1	A	280	GLN
1	A	281	PHE
1	A	282	PRO
1	A	283	THR
1	A	285	ASP
1	A	287	SER
1	A	298	GLU
1	A	329	LEU
1	A	342	LEU
1	A	349	GLN
1	A	351	SER
1	A	369	LEU
1	A	387	LEU
1	A	396	ARG
1	A	400	PRO
1	A	405	ASP
1	A	414	VAL
1	A	418	VAL
1	A	439	LYS
1	A	456	VAL
1	A	481	LEU

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Mol	Chain	Res	Type
1	A	497	MET
1	A	546	VAL
1	A	557	LEU
1	A	559	LEU
1	A	560	ARG
1	A	571	MET
1	A	576	ARG
1	A	578	LYS
1	A	584	LEU
1	A	594	LYS
1	A	603	SER
1	A	613	SER
1	A	614	ARG
1	A	643	LEU
1	A	654	ARG
1	A	666	VAL
1	A	671	GLU
1	A	697	LEU
1	A	707	MET
1	A	723	GLN
1	A	757	ASN
1	A	774	LEU
1	A	810	LYS
1	A	822	HIS
1	A	868	ARG
1	A	895	ARG
1	A	922	ASP
1	A	924	PHE
2	B	1	MET
2	B	5	VAL
2	B	12	LYS
2	B	14	LEU
2	B	26	THR
2	B	39	ASP
2	B	42	LEU
2	B	49	LEU
2	B	59	LEU
2	B	70	VAL
2	B	73	ARG
2	B	88	ILE
2	B	100	ARG
2	B	103	ARG

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Mol	Chain	Res	Type
2	B	110	THR
2	B	111	LEU
2	B	123	GLN
2	B	125	GLU
2	B	137	ARG
2	B	138	LEU
2	B	143	GLN
2	B	167	LEU
2	B	170	VAL
2	B	176	ARG
2	B	177	LEU
2	B	186	GLN
2	B	188	LEU
2	B	191	HIS
2	B	195	VAL
2	B	204	MET
2	B	207	LEU
2	B	216	VAL
2	B	233	THR
2	B	236	LEU
2	B	237	VAL
2	B	238	ASP
2	B	257	GLU
2	B	282	ARG
2	B	289	GLN
2	B	296	ASN
2	B	308	VAL
2	B	319	PHE
2	B	325	LEU
2	B	327	VAL
2	B	328	LEU
2	B	331	LEU
2	B	332	LYS
2	B	338	MET
2	B	347	VAL
2	B	360	VAL
2	C	5	VAL
2	C	14	LEU
2	C	29	ILE
2	C	42	LEU
2	C	49	LEU
2	C	57	VAL

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Mol	Chain	Res	Type
2	C	69	THR
2	C	73	ARG
2	C	88	ILE
2	C	103	ARG
2	C	104	SER
2	C	105	ARG
2	C	110	THR
2	C	118	ASN
2	C	119	LEU
2	C	126	VAL
2	C	137	ARG
2	C	138	LEU
2	C	142	THR
2	C	162	THR
2	C	163	GLU
2	C	167	LEU
2	C	170	VAL
2	C	176	ARG
2	C	188	LEU
2	C	193	VAL
2	C	197	ARG
2	C	200	VAL
2	C	203	LEU
2	C	205	ARG
2	C	207	LEU
2	C	211	ASP
2	C	216	VAL
2	C	233	THR
2	C	236	LEU
2	C	237	VAL
2	C	246	ARG
2	C	248	LEU
2	C	273	LEU
2	C	277	LYS
2	C	281	VAL
2	C	306	LEU
2	C	324	VAL
2	C	325	LEU
2	C	328	LEU
2	C	340	LEU
2	C	355	GLN
2	C	366	LEU

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Mol	Chain	Res	Type
3	D	13	THR
3	D	16	THR
3	D	19	ASN
3	D	59	ASP
3	D	70	ASP
3	D	78	THR
3	D	121	THR
3	D	136	LYS
3	D	155	ASP
3	D	157	SER
3	D	211	LYS
3	D	212	LEU
3	D	220	GLU
3	D	234	LYS
3	D	241	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (29) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	90	ASN
1	A	147	ASN
1	A	237	GLN
1	A	238	GLN
1	A	280	GLN
1	A	413	GLN
1	A	511	HIS
1	A	566	ASN
1	A	650	ASN
1	A	695	GLN
1	A	723	GLN
1	A	777	HIS
1	A	822	HIS
1	A	824	HIS
1	A	894	HIS
1	A	920	GLN
2	B	16	GLN
2	B	36	GLN
2	B	156	ASN
2	B	212	ASN
2	B	275	ASN
2	B	288	ASN
2	B	329	ASN

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Mol	Chain	Res	Type
2	B	348	GLN
2	C	61	GLN
2	C	156	ASN
2	C	348	GLN
2	C	355	GLN
3	D	98	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

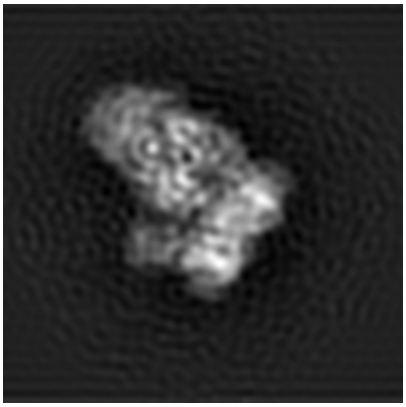
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-3202. These allow visual inspection of the internal detail of the map and identification of artifacts.

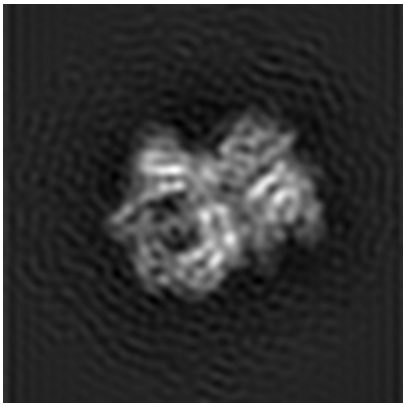
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

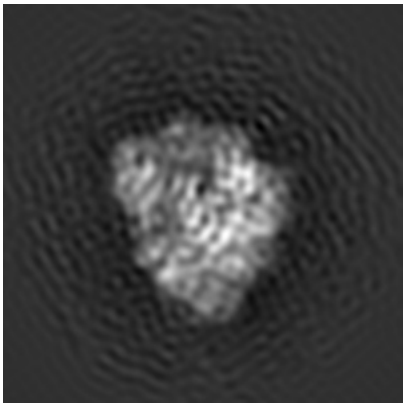
6.1.1 Primary map



X



Y

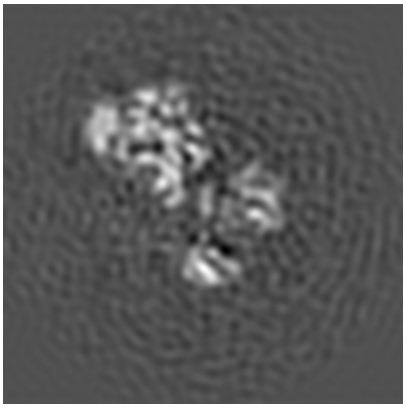


Z

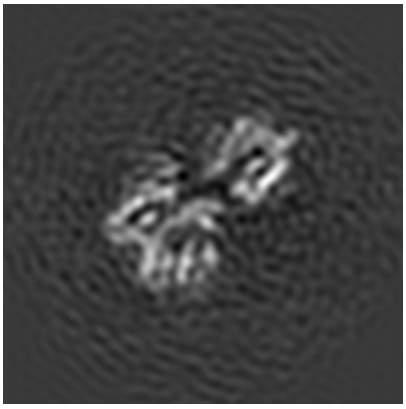
The images above show the map projected in three orthogonal directions.

6.2 Central slices

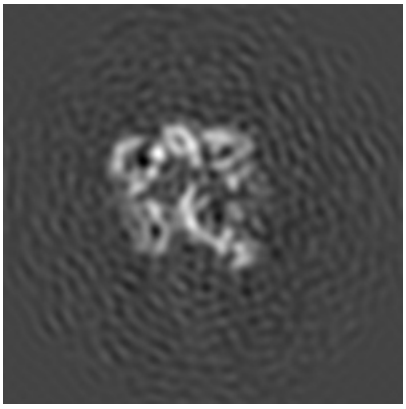
6.2.1 Primary map



X Index: 64



Y Index: 64

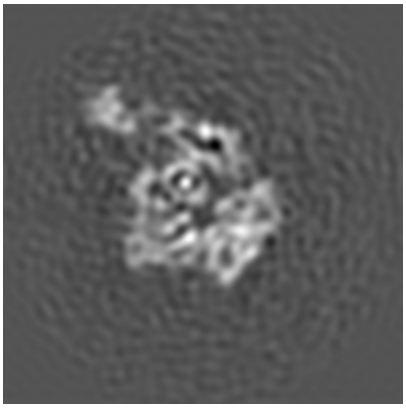


Z Index: 64

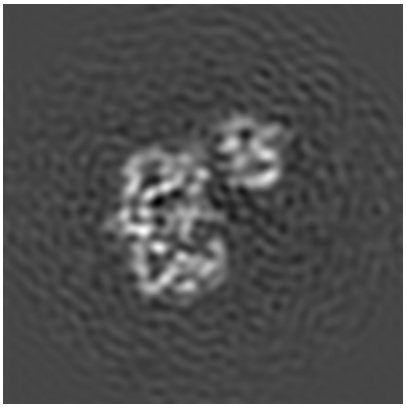
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

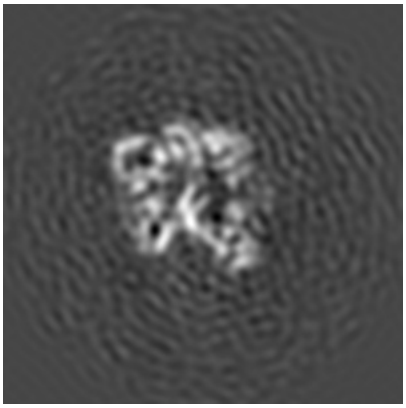
6.3.1 Primary map



X Index: 74



Y Index: 70

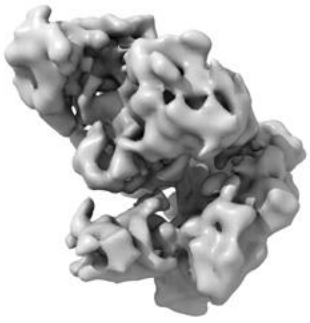


Z Index: 65

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

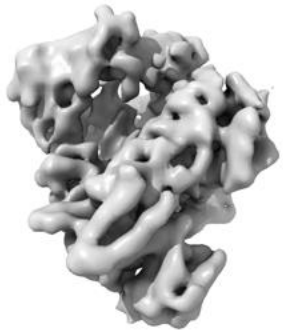
6.4 Orthogonal surface views (i)

6.4.1 Primary map



X

Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.045. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

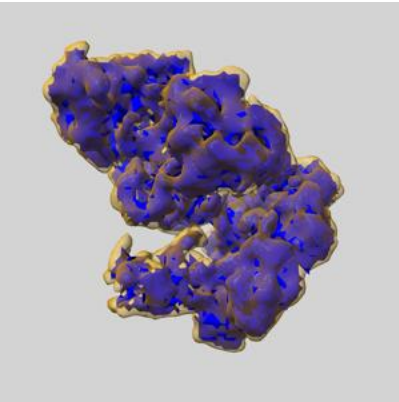
6.5 Mask visualisation (i)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

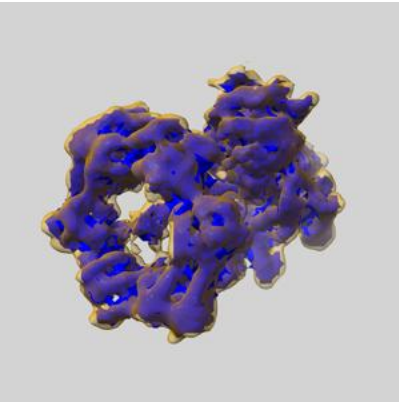
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

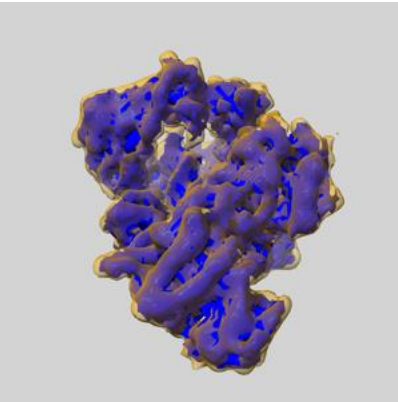
6.5.1 emd_3202_msk.map (i)



X



Y

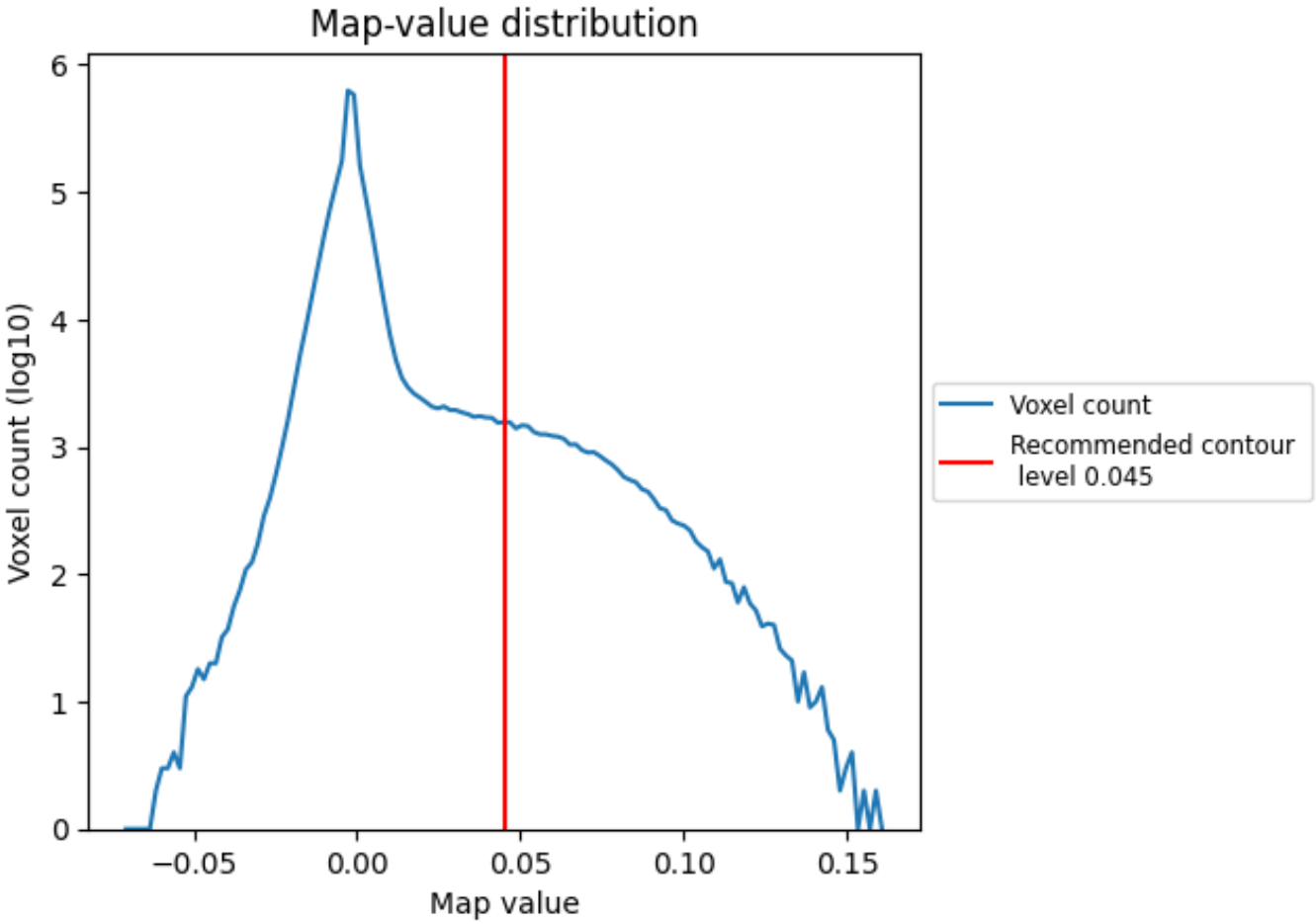


Z

7 Map analysis

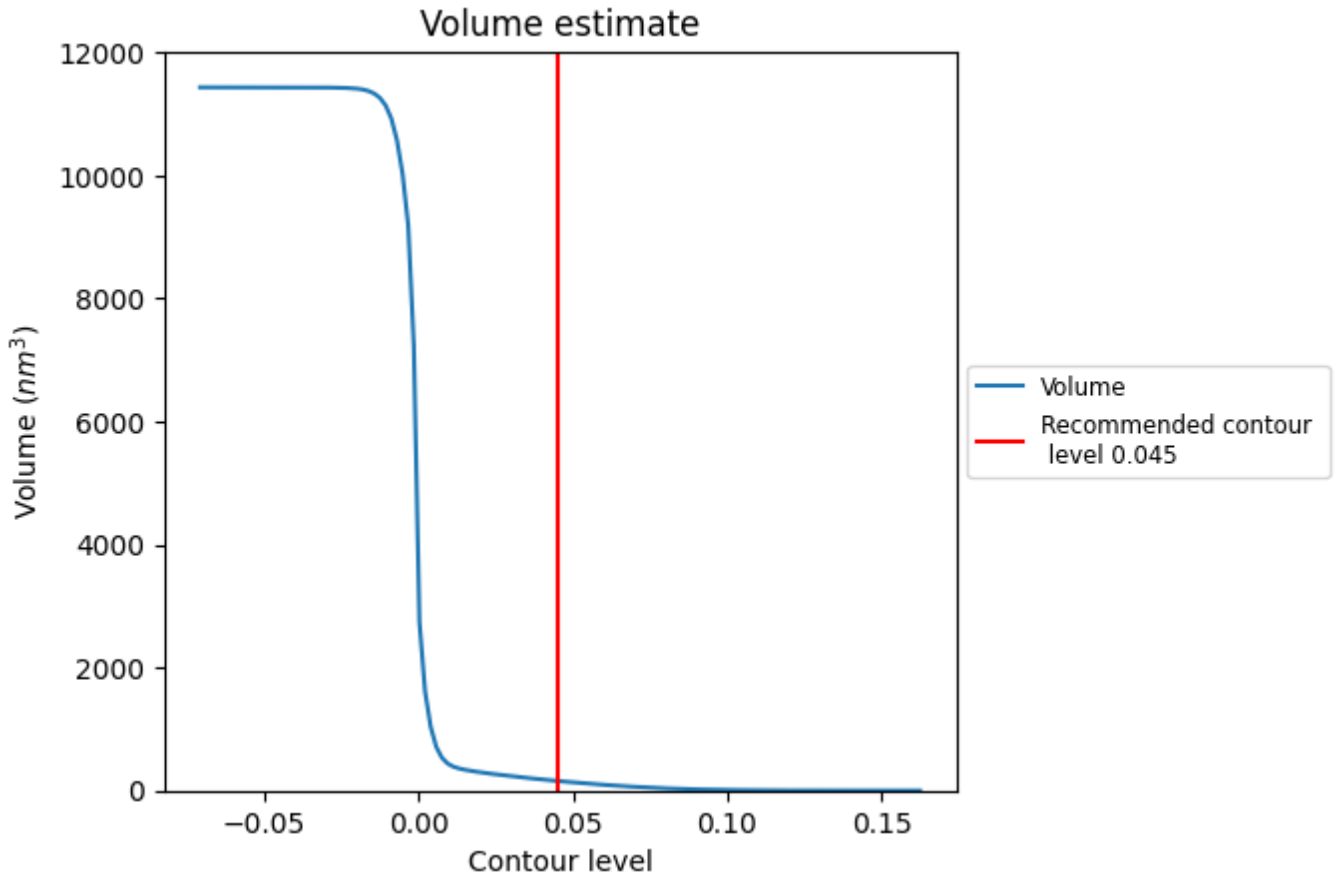
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

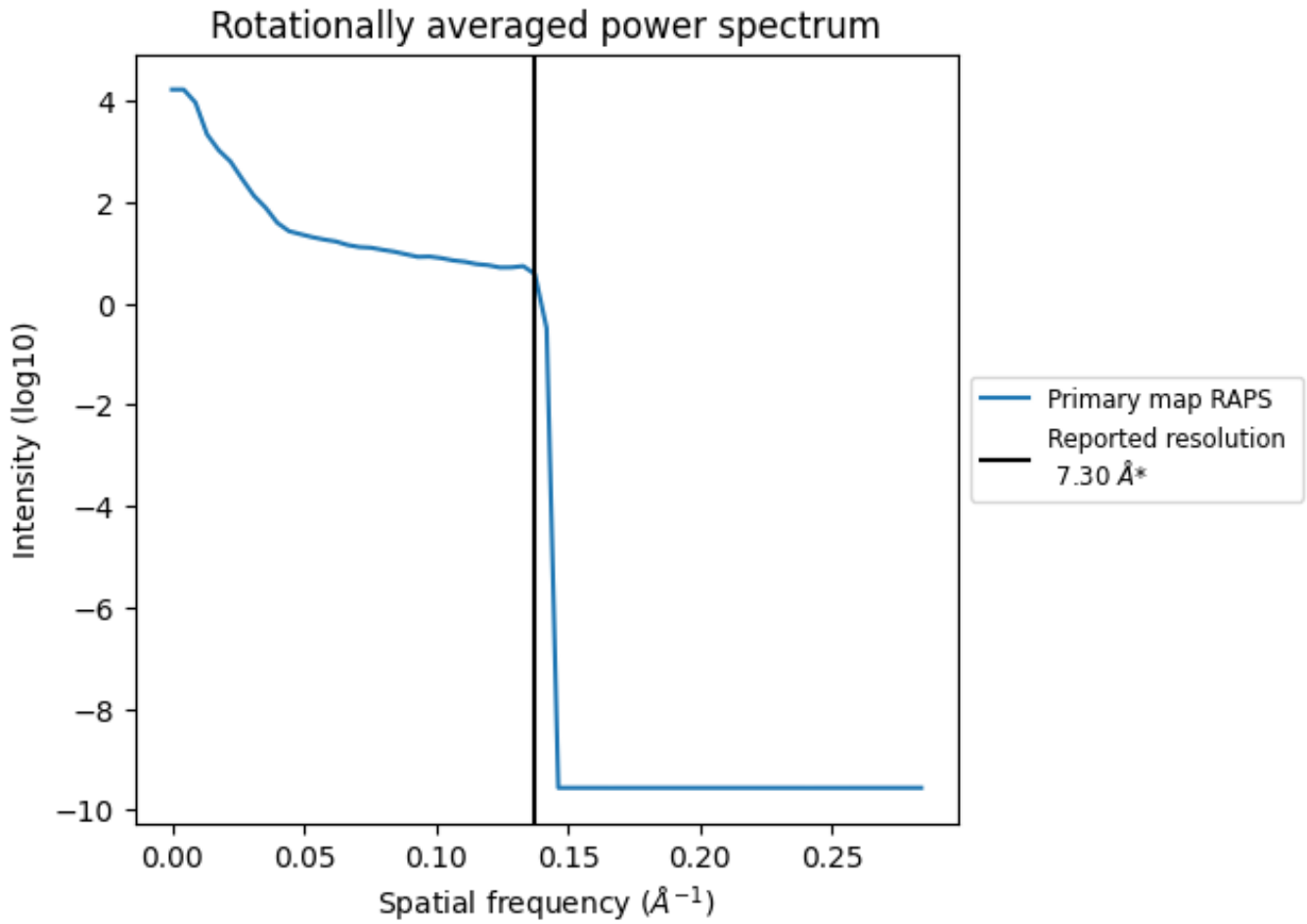
7.2 Volume estimate (i)



The volume at the recommended contour level is 156 nm^3; this corresponds to an approximate mass of 141 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)

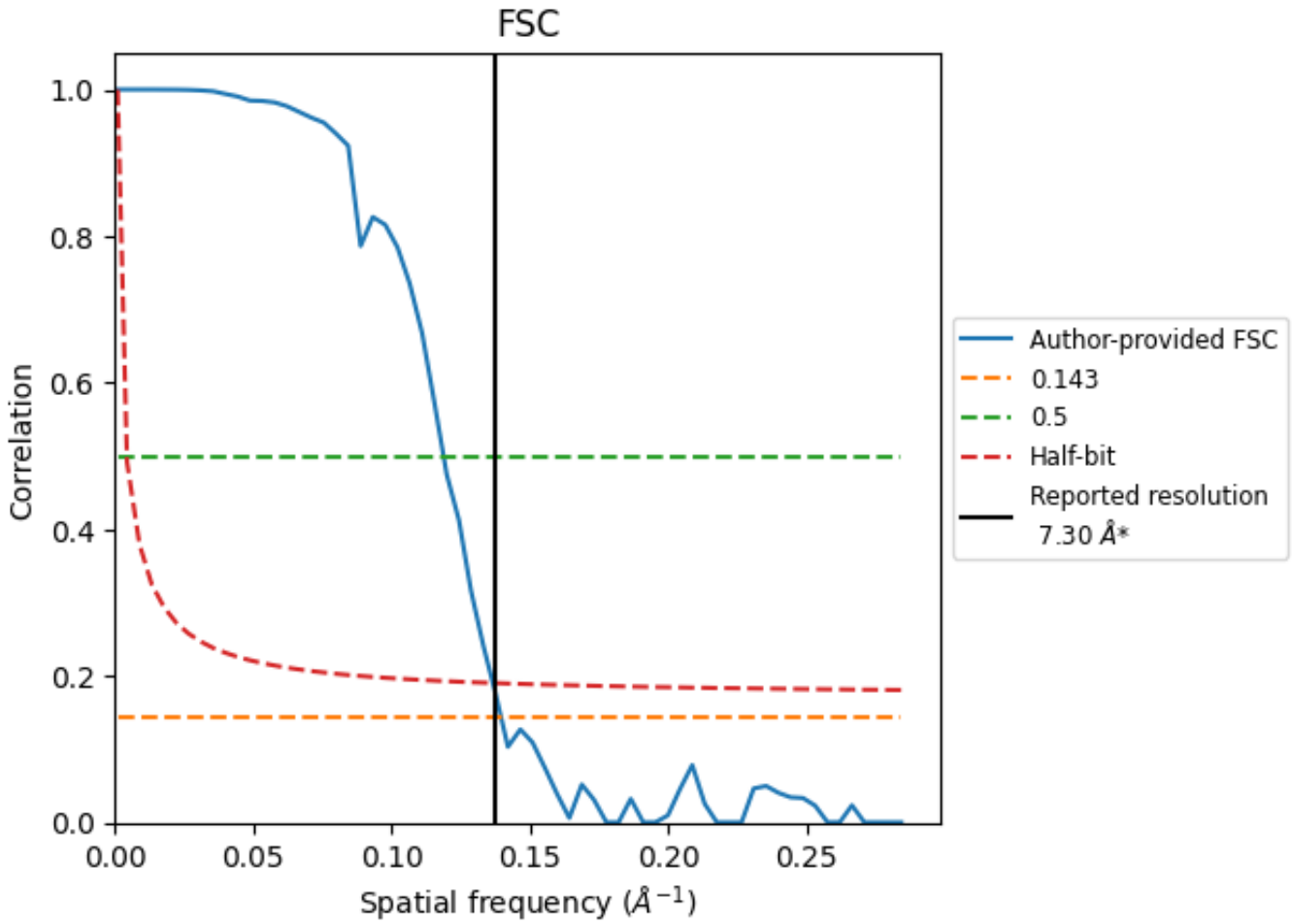


*Reported resolution corresponds to spatial frequency of 0.137 Å^{-1}

8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.137 Å^{-1}

8.2 Resolution estimates (i)

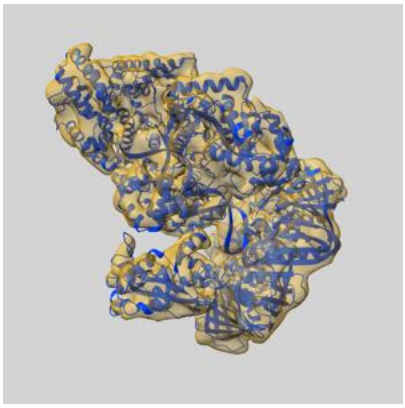
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	7.30	-	-
Author-provided FSC curve	7.16	8.42	7.32
Unmasked-calculated*	-	-	-

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

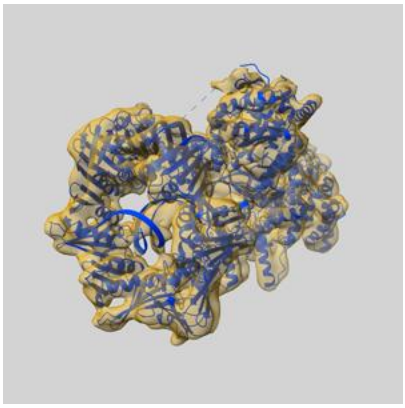
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-3202 and PDB model 5FKW. Per-residue inclusion information can be found in section 3 on page 5.

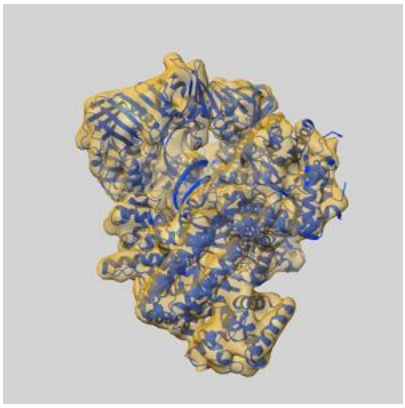
9.1 Map-model overlay



X



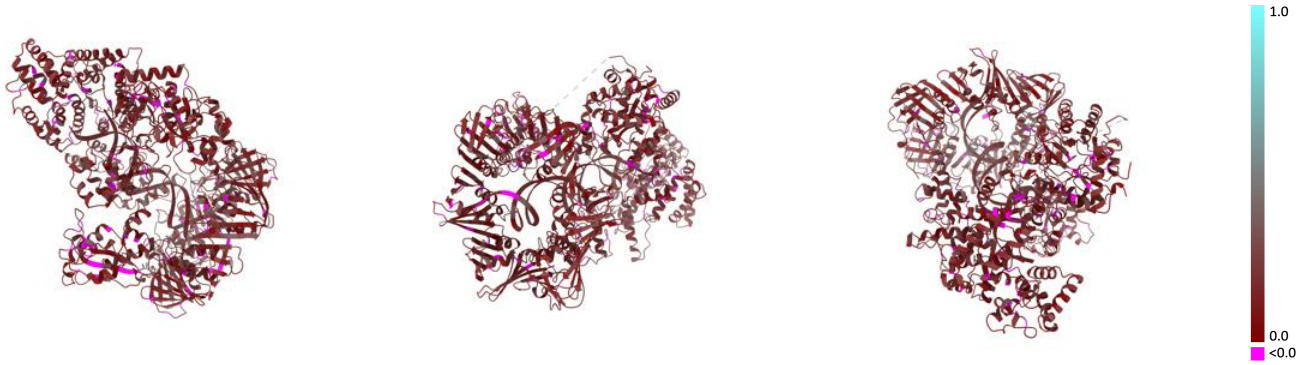
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.045 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.

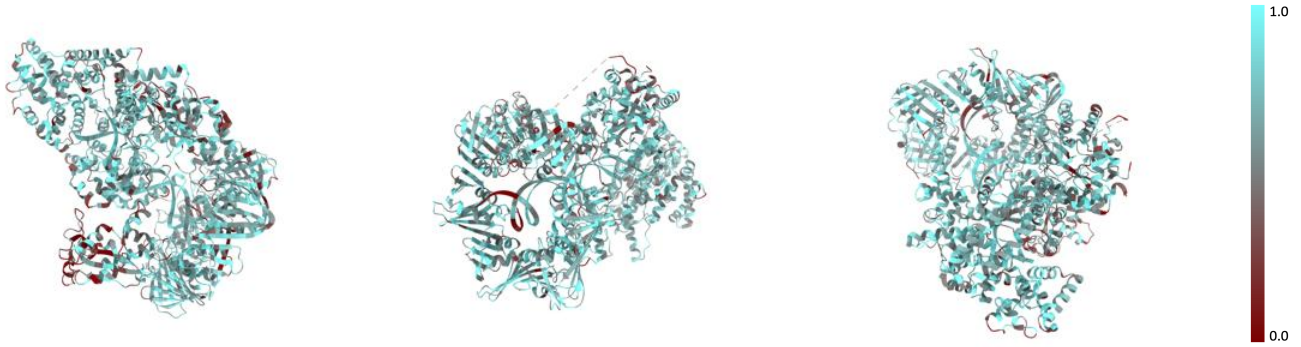
9.2 Q-score mapped to coordinate model (i)



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.

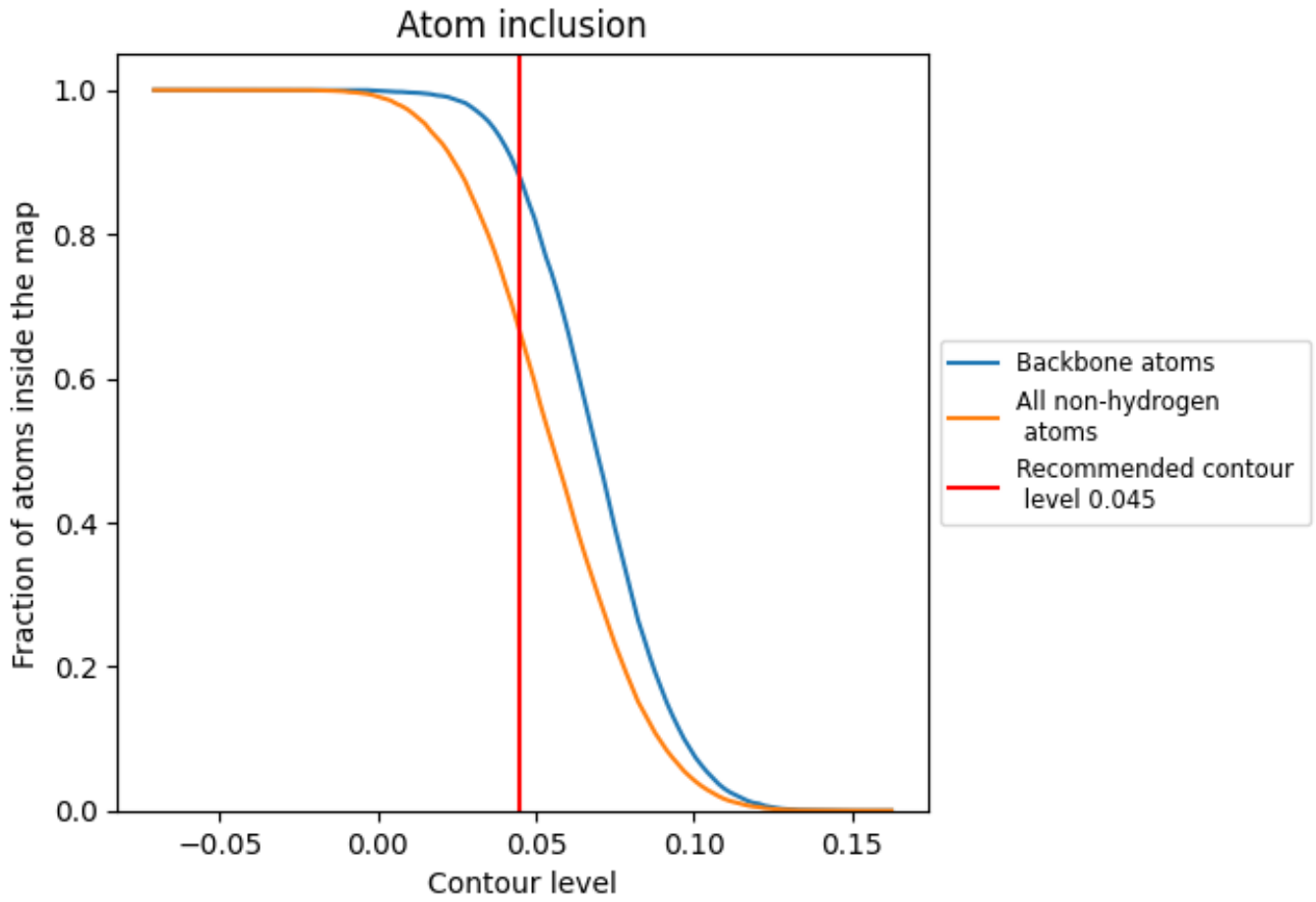
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.045).

9.4 Atom inclusion (i)



At the recommended contour level, 88% of all backbone atoms, 66% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.045) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6644	0.1670
A	0.6814	0.1610
B	0.6723	0.1720
C	0.7182	0.1710
D	0.4739	0.1460
P	0.6954	0.2170
T	0.6857	0.2180