Full wwPDB EM Validation Report (i)

May 12, 2024 – 01:52 pm BST

PDB ID	:	6S1O
EMDB ID	:	EMD-10082
Title	:	Human polymerase delta holoenzyme Conformer 3
Authors	:	Lancey, C.; Hamdan, S.M.; De Biasio, A.
Deposited on	:	2019-06-19
Resolution	:	8.10 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 (1)) were used in the production of this report:

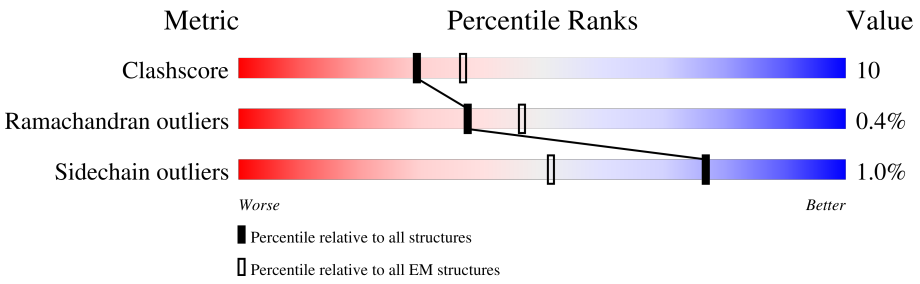
EMDB validation analysis	:	0.0.1.dev92
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 8.10 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	1107	14% 77% 13% • 9%
2	B	469	12% 77% 14% 8%
3	C	474	• 28% • 70%
4	D	137	• 36% 11% •• 52%
5	E	264	16% 72% 23% 5%
5	F	264	9% 78% 16% 6%
5	G	264	13% 75% 20% 6%
6	P	25	36% 48% 8% 8%

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Mol	Chain	Length	Quality of chain
7	T	38	24% 45% • 29%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	DOC	P	25	-	-	X	-
9	SF4	A	1202	-	-	X	-

2 Entry composition (i)

There are 10 unique types of molecules in this entry. The entry contains 19726 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 delta catalytic subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1010	7926	5028	1405	1447	46	1	0

- Molecule 2 is a protein called DNA polymerase delta subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	431	3304	2103	553	630	18	0	0

- Molecule 3 is a protein called DNA polymerase delta subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	143	1130	715	196	214	5	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-7	MET	-	initiating methionine	UNP Q15054
C	-6	TRP	-	expression tag	UNP Q15054
C	-5	SER	-	expression tag	UNP Q15054
C	-4	HIS	-	expression tag	UNP Q15054
C	-3	PRO	-	expression tag	UNP Q15054
C	-2	GLN	-	expression tag	UNP Q15054
C	-1	PHE	-	expression tag	UNP Q15054
C	0	GLU	-	expression tag	UNP Q15054
C	1	LYS	-	expression tag	UNP Q15054

- Molecule 4 is a protein called DNA polymerase delta subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	66	554	359	97	94	4	0	0

There are 31 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-29	MET	-	initiating methionine	UNP Q9HCU8
D	-28	HIS	-	expression tag	UNP Q9HCU8
D	-27	HIS	-	expression tag	UNP Q9HCU8
D	-26	HIS	-	expression tag	UNP Q9HCU8
D	-25	HIS	-	expression tag	UNP Q9HCU8
D	-24	HIS	-	expression tag	UNP Q9HCU8
D	-23	HIS	-	expression tag	UNP Q9HCU8
D	-22	SER	-	expression tag	UNP Q9HCU8
D	-21	ARG	-	expression tag	UNP Q9HCU8
D	-20	ALA	-	expression tag	UNP Q9HCU8
D	-19	TRP	-	expression tag	UNP Q9HCU8
D	-18	ARG	-	expression tag	UNP Q9HCU8
D	-17	HIS	-	expression tag	UNP Q9HCU8
D	-16	PRO	-	expression tag	UNP Q9HCU8
D	-15	GLN	-	expression tag	UNP Q9HCU8
D	-14	PHE	-	expression tag	UNP Q9HCU8
D	-13	GLY	-	expression tag	UNP Q9HCU8
D	-12	GLY	-	expression tag	UNP Q9HCU8
D	-11	HIS	-	expression tag	UNP Q9HCU8
D	-10	HIS	-	expression tag	UNP Q9HCU8
D	-9	HIS	-	expression tag	UNP Q9HCU8
D	-8	HIS	-	expression tag	UNP Q9HCU8
D	-7	HIS	-	expression tag	UNP Q9HCU8
D	-6	HIS	-	expression tag	UNP Q9HCU8
D	-5	GLU	-	expression tag	UNP Q9HCU8
D	-4	ASN	-	expression tag	UNP Q9HCU8
D	-3	LEU	-	expression tag	UNP Q9HCU8
D	-2	TYR	-	expression tag	UNP Q9HCU8
D	-1	PHE	-	expression tag	UNP Q9HCU8
D	0	GLN	-	expression tag	UNP Q9HCU8
D	1	SER	-	expression tag	UNP Q9HCU8

- Molecule 5 is a protein called Proliferating cell nuclear antigen.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	251	1924	1211	314	383	16	0	0
			Total	C	N	O	S		
5	F	249	1913	1205	312	380	16	0	0
			Total	C	N	O	S		
5	G	249	1913	1204	314	379	16	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	-2	GLY	-	expression tag	UNP P12004
E	-1	PRO	-	expression tag	UNP P12004
E	0	HIS	-	expression tag	UNP P12004
F	-2	GLY	-	expression tag	UNP P12004
F	-1	PRO	-	expression tag	UNP P12004
F	0	HIS	-	expression tag	UNP P12004
G	-2	GLY	-	expression tag	UNP P12004
G	-1	PRO	-	expression tag	UNP P12004
G	0	HIS	-	expression tag	UNP P12004

- Molecule 6 is a DNA chain called DNA primer.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
6	P	23	469	225	84	137	23	0	0

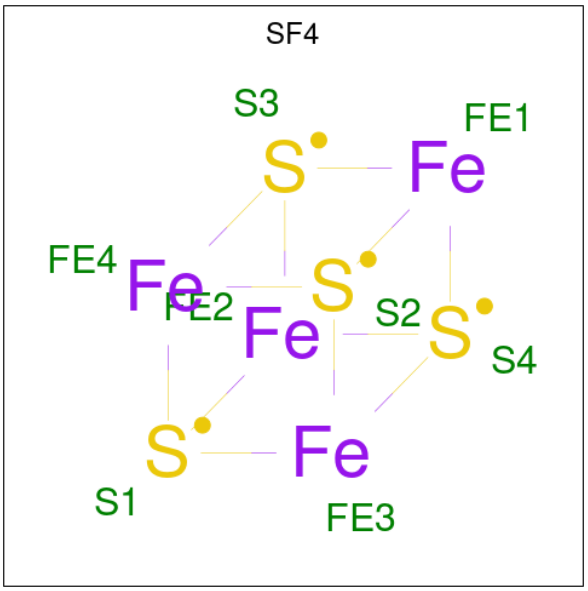
- Molecule 7 is a DNA chain called DNA template.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
7	T	27	555	266	100	162	27	0	0

- Molecule 8 is ZINC ION (three-letter code: ZN) (formula: Zn).

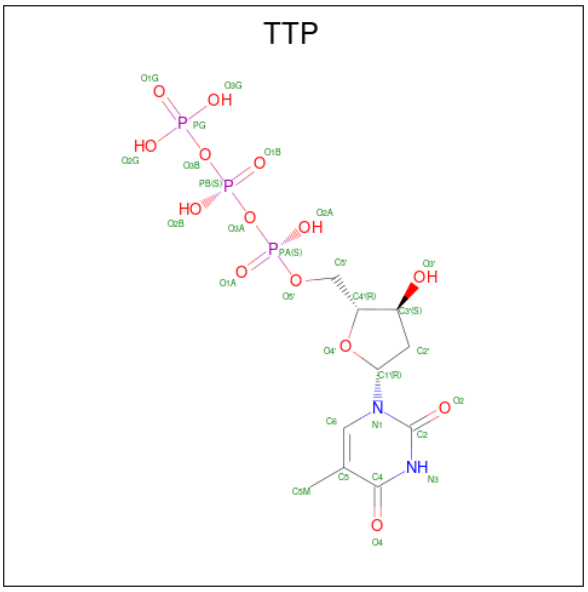
Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
8	A	1	1	1	0

- Molecule 9 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).



Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
9	A	1	8	4	4	0

- Molecule 10 is THYMIDINE-5'-TRIPHOSPHATE (three-letter code: TTP) (formula: $C_{10}H_{17}N_2O_{14}P_3$).



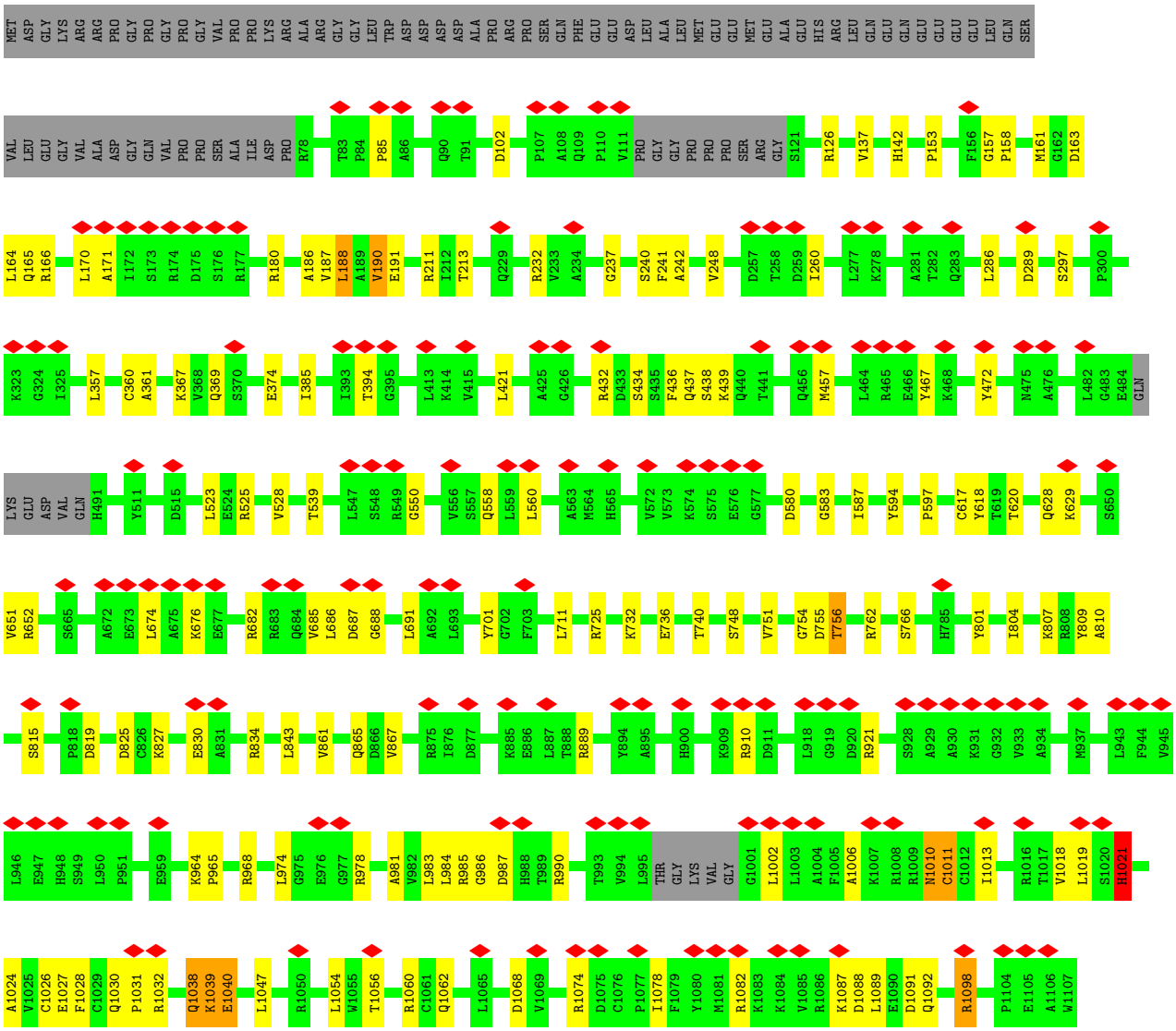
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
10	T	1	29	10	2	14	3	0

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.

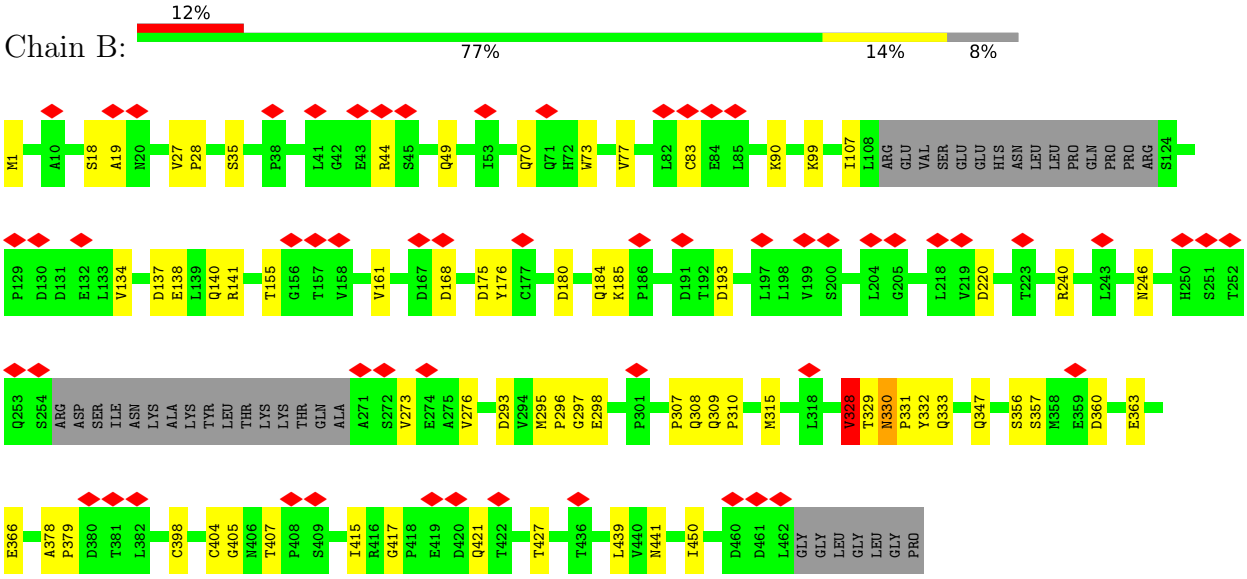
- Molecule 1: DNA polymerase delta catalytic subunit

Chain A:



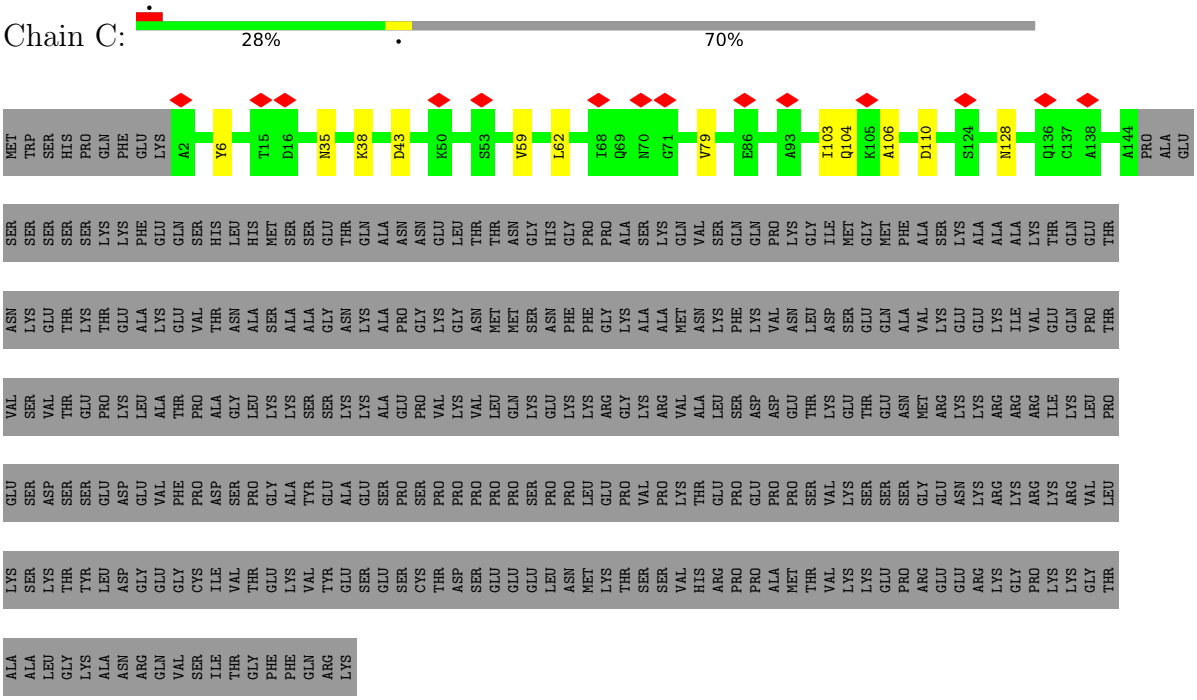
- Molecule 2: DNA polymerase delta subunit 2

Chain B:



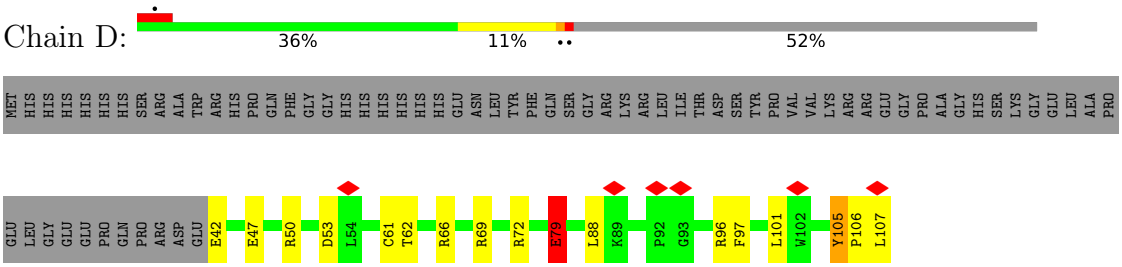
- Molecule 3: DNA polymerase delta subunit 3

Chain C:



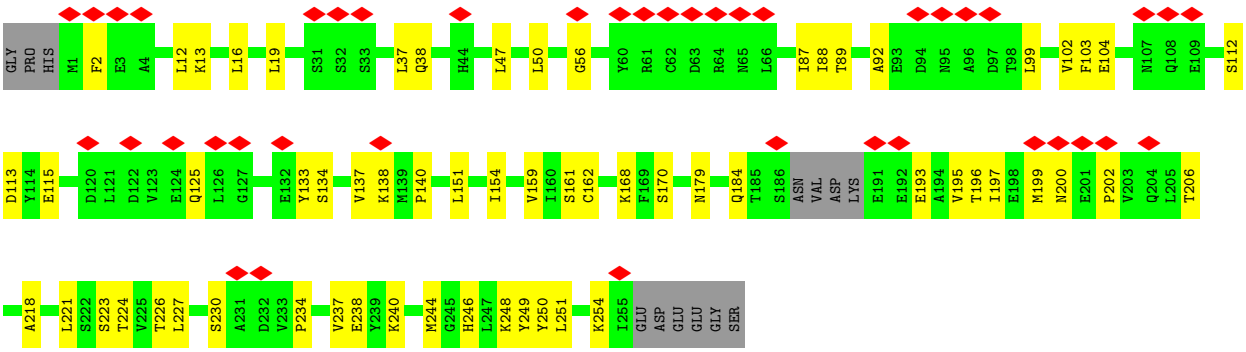
- Molecule 4: DNA polymerase delta subunit 4

Chain D:



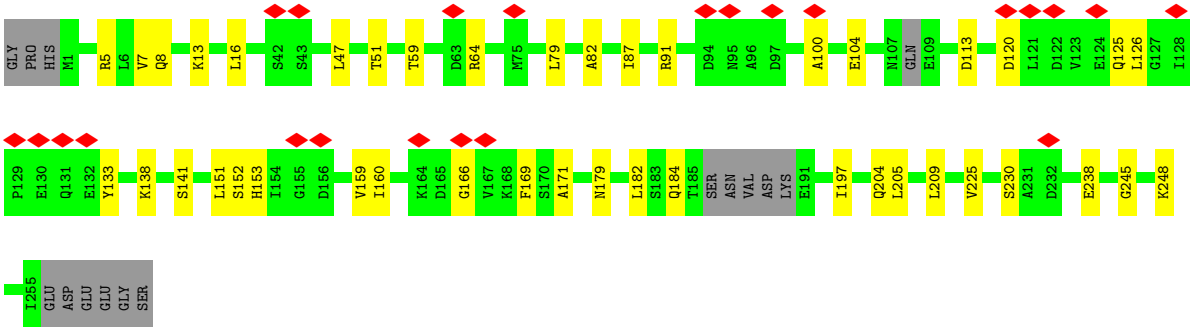
- Molecule 5: Proliferating cell nuclear antigen

Chain E:



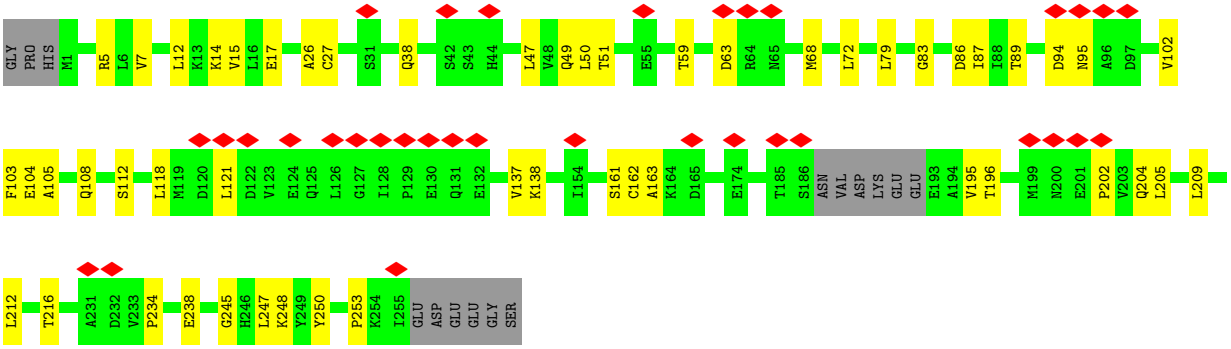
- Molecule 5: Proliferating cell nuclear antigen

Chain F:



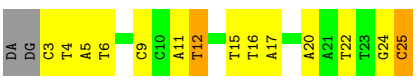
- Molecule 5: Proliferating cell nuclear antigen

Chain G:



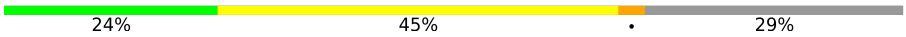
- Molecule 6: DNA primer

Chain P:



- Molecule 7: DNA template

Chain T:


24%
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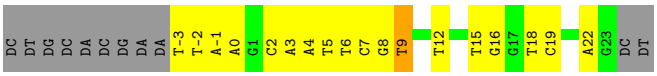
DC
DT
DG
DC
DA
DC
DG
DA
DA
T-3
T-2
A-1
A0
G1
C2
A3
A4
T5
T6
C7
G8
T9
T12
T15
G16
G17
T18
C19
A22
G23
DC
DT

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	8571	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 ($e^-/Å^2$)	35	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	600	Depositor
Magnification	130000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.037	Depositor
Minimum map value	-0.015	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.007	Depositor
Map size (Å)	388.80002, 388.80002, 388.80002	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.08, 1.08, 1.08	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, SF4, TTP, DOC

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	0.39	0/8094	0.64	0/10971
2	B	0.41	0/3380	0.61	0/4604
3	C	0.36	0/1149	0.58	0/1553
4	D	0.42	0/574	0.69	0/783
5	E	0.31	0/1949	0.61	0/2632
5	F	0.35	0/1937	0.62	0/2614
5	G	0.32	0/1938	0.59	0/2617
6	P	0.86	6/505 (1.2%)	1.04	0/777
7	T	0.80	4/622 (0.6%)	0.95	0/958
All	All	0.41	10/20148 (0.0%)	0.65	0/27509

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	P	20	DA	C1'-N9	-6.56	1.38	1.47
6	P	9	DC	C1'-N1	6.10	1.57	1.49
6	P	12	DT	C1'-N1	5.38	1.56	1.49
7	T	19	DC	C1'-N1	5.36	1.56	1.49
6	P	15	DT	C1'-N1	5.21	1.56	1.49
6	P	6	DT	C1'-N1	5.18	1.55	1.49
7	T	18	DT	C1'-N1	5.16	1.55	1.49
7	T	12	DT	C1'-N1	5.15	1.55	1.49
7	T	9	DT	C1'-N1	5.10	1.55	1.49
6	P	16	DT	C1'-N1	5.09	1.55	1.49

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	7926	0	7967	176	0
2	B	3304	0	3255	63	0
3	C	1130	0	1138	7	0
4	D	554	0	537	12	0
5	E	1924	0	1930	34	0
5	F	1913	0	1922	36	0
5	G	1913	0	1928	32	0
6	P	469	0	261	21	0
7	T	555	0	307	64	0
8	A	1	0	0	0	0
9	A	8	0	0	2	0
10	T	29	0	10	0	0
All	All	19726	0	19255	396	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 10.

All (396) 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)
7:T:4:DA:C2’	7:T:5:DT:H72	1.18	1.62
7:T:4:DA:H2”	7:T:5:DT:C5	1.41	1.56
1:A:861:VAL:CG1	1:A:985:ARG:HD3	1.40	1.51
7:T:4:DA:H2”	7:T:5:DT:C7	1.35	1.51
1:A:861:VAL:HG11	1:A:985:ARG:NE	1.27	1.50
1:A:688:GLY:HA2	1:A:691:LEU:CD2	1.43	1.49
1:A:861:VAL:HG11	1:A:985:ARG:CZ	1.45	1.45
1:A:861:VAL:CG1	1:A:985:ARG:CD	1.93	1.44
1:A:861:VAL:HG13	1:A:985:ARG:CD	1.49	1.42
7:T:4:DA:C2’	7:T:5:DT:C7	1.93	1.36
1:A:550:GLY:HA3	7:T:0:DA:OP2	1.30	1.29
7:T:6:DT:H2”	7:T:7:DC:C5	1.71	1.26
2:B:308:GLN:O	2:B:329:THR:HB	1.28	1.22
7:T:6:DT:H2”	7:T:7:DC:C6	1.76	1.21
2:B:330:ASN:HB3	2:B:331:PRO:CD	1.68	1.19

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:807:LYS:HD3	6:P:24:DG:C4'	1.72	1.17
7:T:3:DA:H2"	7:T:4:DA:H5"	1.19	1.14
7:T:6:DT:C2'	7:T:7:DC:C5	2.31	1.13
1:A:807:LYS:HD3	6:P:24:DG:H4'	1.24	1.10
1:A:861:VAL:CG1	1:A:985:ARG:NE	2.08	1.09
1:A:688:GLY:O	1:A:691:LEU:HG	1.53	1.08
1:A:756:THR:HG21	6:P:25:DOC:H3'2	1.36	1.08
1:A:688:GLY:HA2	1:A:691:LEU:HD21	1.06	1.06
1:A:688:GLY:HA2	1:A:691:LEU:HD23	1.36	1.05
1:A:688:GLY:CA	1:A:691:LEU:CD2	2.38	1.00
2:B:308:GLN:O	2:B:329:THR:CB	2.10	1.00
7:T:4:DA:H2"	7:T:5:DT:C6	1.95	0.99
2:B:330:ASN:HB3	2:B:331:PRO:HD3	1.00	0.99
1:A:861:VAL:CG1	1:A:985:ARG:CZ	2.39	0.99
7:T:4:DA:C2'	7:T:5:DT:C5	2.35	0.97
1:A:756:THR:CG2	6:P:25:DOC:H3'2	1.94	0.97
1:A:861:VAL:HG11	1:A:985:ARG:CD	1.76	0.95
7:T:15:DT:H2"	7:T:16:DG:C8	2.02	0.95
1:A:1018:VAL:CB	5:F:125:GLN:CB	2.45	0.94
1:A:688:GLY:CA	1:A:691:LEU:HD21	1.96	0.94
1:A:861:VAL:HG13	1:A:985:ARG:HD2	1.48	0.91
2:B:330:ASN:CB	2:B:331:PRO:HD3	1.96	0.91
1:A:1026:CYS:O	1:A:1030:GLN:HG3	1.69	0.90
2:B:308:GLN:OE1	2:B:330:ASN:ND2	2.04	0.90
7:T:6:DT:C2'	7:T:7:DC:C6	2.51	0.90
1:A:861:VAL:HG12	1:A:985:ARG:HD3	1.54	0.89
1:A:1018:VAL:CB	5:F:125:GLN:HB2	2.03	0.88
2:B:310:PRO:N	2:B:329:THR:HG22	1.90	0.87
1:A:861:VAL:HG13	1:A:985:ARG:HD3	1.07	0.87
7:T:4:DA:H2'	7:T:5:DT:H72	0.87	0.87
1:A:550:GLY:HA3	7:T:0:DA:P	2.16	0.86
1:A:861:VAL:HG11	1:A:985:ARG:NH1	1.92	0.85
1:A:580:ASP:OD2	7:T:3:DA:P	2.35	0.85
1:A:1027:GLU:HA	1:A:1030:GLN:CD	1.96	0.85
6:P:24:DG:H2"	6:P:25:DOC:H5'	1.57	0.84
7:T:6:DT:H2"	7:T:7:DC:H5	1.41	0.84
1:A:164:LEU:HB3	1:A:190:VAL:HG11	1.59	0.84
2:B:295:MET:HG3	2:B:328:VAL:HG23	1.58	0.84
1:A:1027:GLU:HA	1:A:1030:GLN:HG3	1.59	0.83
1:A:1027:GLU:HA	1:A:1030:GLN:CG	2.08	0.82
1:A:921:ARG:NH1	6:P:22:DT:OP1	2.12	0.81

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:295:MET:HG2	2:B:329:THR:O	1.80	0.81
7:T:3:DA:C2'	7:T:4:DA:H5"	2.06	0.81
6:P:11:DA:C2	7:T:16:DG:N2	2.49	0.81
1:A:755:ASP:OD2	6:P:25:DOC:OP1	2.00	0.80
1:A:188:LEU:HA	1:A:213:THR:O	1.82	0.79
7:T:15:DT:C2'	7:T:16:DG:C8	2.67	0.78
1:A:1038:GLN:HE22	2:B:273:VAL:HA	1.48	0.78
1:A:438:SER:OG	7:T:0:DA:H5"	1.83	0.78
1:A:807:LYS:HD3	6:P:24:DG:O4'	1.83	0.77
7:T:3:DA:H2"	7:T:4:DA:C5'	2.11	0.77
7:T:6:DT:C1'	7:T:7:DC:C5	2.67	0.77
1:A:1006:ALA:HB2	5:F:126:LEU:CD2	2.15	0.76
7:T:4:DA:H2'	7:T:5:DT:C7	1.84	0.76
1:A:807:LYS:CD	6:P:24:DG:H4'	2.11	0.76
2:B:309:GLN:C	2:B:329:THR:HG22	2.07	0.75
1:A:688:GLY:CA	1:A:691:LEU:HD23	2.13	0.75
1:A:968:ARG:NH2	7:T:7:DC:OP1	2.19	0.75
1:A:1078:ILE:HG13	9:A:1202:SF4:S1	2.26	0.75
1:A:1028:PHE:CB	5:F:64:ARG:HG2	2.17	0.74
7:T:6:DT:C1'	7:T:7:DC:C6	2.72	0.73
1:A:188:LEU:N	1:A:188:LEU:HD23	2.04	0.73
1:A:861:VAL:CG1	1:A:985:ARG:NH1	2.50	0.73
1:A:164:LEU:HB3	1:A:190:VAL:HG21	1.72	0.72
1:A:756:THR:HG21	6:P:25:DOC:C3'	2.16	0.72
7:T:6:DT:H1'	7:T:7:DC:C6	2.24	0.72
1:A:550:GLY:CA	7:T:0:DA:OP2	2.25	0.72
1:A:436:PHE:HZ	7:T:0:DA:OP1	1.70	0.72
1:A:1006:ALA:HB2	5:F:126:LEU:HD23	1.69	0.72
1:A:755:ASP:CG	6:P:25:DOC:OP1	2.28	0.71
5:F:166:GLY:HA3	5:F:182:LEU:O	1.90	0.71
7:T:6:DT:H2"	7:T:7:DC:H6	1.48	0.70
7:T:6:DT:C2'	7:T:7:DC:H5	1.91	0.69
2:B:310:PRO:CD	2:B:329:THR:CG2	2.70	0.69
2:B:310:PRO:HD3	2:B:329:THR:HG21	1.74	0.69
1:A:1028:PHE:CB	5:F:64:ARG:CG	2.72	0.68
1:A:1018:VAL:CB	5:F:125:GLN:HB3	2.22	0.68
1:A:1024:ALA:HB2	1:A:1098:ARG:HB3	1.76	0.68
5:E:103:PHE:HB2	5:E:112:SER:HB2	1.75	0.68
7:T:-1:DA:H2"	7:T:0:DA:H5'	1.75	0.67
5:E:234:PRO:HA	5:E:251:LEU:O	1.94	0.67
7:T:5:DT:H1'	7:T:6:DT:H5'	1.75	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:F:166:GLY:HA2	5:F:197:ILE:HD13	1.77	0.66
2:B:295:MET:HG3	2:B:328:VAL:CG2	2.25	0.66
7:T:5:DT:H2"	7:T:6:DT:H5'	1.75	0.66
1:A:1027:GLU:CA	1:A:1030:GLN:HG3	2.24	0.66
5:G:27:CYS:HB3	5:G:121:LEU:HD21	1.78	0.66
1:A:1091:ASP:OD1	1:A:1092:GLN:N	2.29	0.66
1:A:1026:CYS:O	1:A:1030:GLN:CG	2.44	0.65
2:B:308:GLN:HB2	2:B:330:ASN:HB2	1.78	0.65
1:A:525:ARG:O	1:A:682:ARG:NH2	2.29	0.65
1:A:1002:LEU:HD21	5:F:47:LEU:HB2	1.79	0.65
2:B:330:ASN:CB	2:B:331:PRO:CD	2.56	0.64
5:E:238:GLU:HG3	5:E:248:LYS:HG2	1.80	0.64
4:D:53:ASP:OD2	4:D:66:ARG:NH2	2.31	0.64
5:G:47:LEU:HB3	5:G:250:TYR:HB2	1.80	0.63
2:B:310:PRO:HD3	2:B:329:THR:CG2	2.29	0.63
1:A:756:THR:CG2	6:P:25:DOC:C3'	2.74	0.63
1:A:981:ALA:O	1:A:985:ARG:HG3	1.98	0.63
6:P:17:DA:N6	7:T:8:DG:O6	2.32	0.62
1:A:1006:ALA:CB	5:F:126:LEU:CD2	2.78	0.61
5:E:87:ILE:HB	5:E:104:GLU:HB2	1.82	0.61
1:A:188:LEU:HD23	1:A:188:LEU:H	1.65	0.61
2:B:310:PRO:N	2:B:329:THR:CG2	2.63	0.61
1:A:1006:ALA:CB	5:F:126:LEU:HD23	2.31	0.60
4:D:42:GLU:OE2	4:D:96:ARG:NH2	2.34	0.60
1:A:583:GLY:O	1:A:725:ARG:NH1	2.34	0.60
1:A:674:LEU:HD13	1:A:686:LEU:HB2	1.82	0.60
1:A:1088:ASP:HA	1:A:1091:ASP:OD2	2.02	0.60
1:A:439:LYS:NZ	7:T:2:DC:OP2	2.32	0.60
5:F:5:ARG:HB3	5:F:59:THR:HB	1.84	0.60
1:A:432:ARG:HH21	1:A:434:SER:HB2	1.66	0.60
1:A:688:GLY:O	1:A:691:LEU:CG	2.41	0.59
2:B:310:PRO:HA	2:B:328:VAL:O	2.01	0.59
7:T:-3:DT:C2'	7:T:-2:DT:H71	2.32	0.59
1:A:1013:ILE:HD12	1:A:1024:ALA:HB1	1.84	0.59
7:T:-3:DT:H2"	7:T:-2:DT:H71	1.85	0.59
1:A:186:ALA:HB3	1:A:188:LEU:CD2	2.33	0.59
1:A:187:VAL:HG22	1:A:187:VAL:O	2.02	0.59
1:A:525:ARG:HG2	1:A:682:ARG:HH22	1.67	0.59
4:D:61:CYS:SG	4:D:72:ARG:NH2	2.75	0.59
1:A:357:LEU:HD11	1:A:374:GLU:HG2	1.85	0.59
1:A:986:GLY:O	1:A:990:ARG:N	2.36	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:73:TRP:NE1	2:B:175:ASP:OD2	2.33	0.58
7:T:5:DT:C2'	7:T:6:DT:H5'	2.32	0.58
5:E:226:THR:HB	5:E:238:GLU:HB2	1.83	0.58
6:P:17:DA:N6	7:T:8:DG:C6	2.71	0.58
1:A:1062:GLN:NE2	1:A:1068:ASP:O	2.37	0.58
1:A:1039:LYS:O	1:A:1040:GLU:HG2	2.04	0.58
2:B:184:GLN:HB2	2:B:398:CYS:HB3	1.85	0.58
5:F:7:VAL:HA	5:F:87:ILE:HG23	1.86	0.58
1:A:186:ALA:HB3	1:A:188:LEU:HD21	1.86	0.58
2:B:1:MET:HG2	2:B:441:ASN:HD22	1.69	0.58
2:B:310:PRO:HG3	2:B:329:THR:HG23	1.85	0.58
1:A:161:MET:O	1:A:165:GLN:NE2	2.37	0.57
5:G:234:PRO:HA	5:G:253:PRO:HD3	1.87	0.57
1:A:983:LEU:O	1:A:990:ARG:NH1	2.38	0.57
5:E:133:TYR:HA	5:E:230:SER:HB2	1.85	0.57
5:G:104:GLU:HB3	5:G:108:GLN:HE22	1.69	0.57
5:F:5:ARG:NH2	5:F:104:GLU:OE1	2.38	0.56
2:B:134:VAL:HG11	2:B:141:ARG:HH11	1.70	0.56
1:A:1056:THR:HG23	1:A:1060:ARG:HH21	1.70	0.56
5:F:152:SER:HA	5:F:209:LEU:HD13	1.86	0.56
5:G:238:GLU:HG3	5:G:248:LYS:HG2	1.85	0.56
2:B:296:PRO:CD	2:B:329:THR:HA	2.36	0.56
1:A:628:GLN:HB3	1:A:629:LYS:HD3	1.86	0.56
1:A:688:GLY:C	1:A:691:LEU:HG	2.24	0.56
3:C:35:ASN:HA	3:C:38:LYS:HD2	1.88	0.56
5:E:237:VAL:HG22	5:E:249:TYR:HB2	1.86	0.56
7:T:8:DG:H2"	7:T:9:DT:C6	2.40	0.56
1:A:587:ILE:HD13	1:A:732:LYS:HD3	1.88	0.56
1:A:539:THR:HA	1:A:558:GLN:HE21	1.69	0.55
5:G:89:THR:HB	5:G:102:VAL:HB	1.87	0.55
1:A:1027:GLU:HA	1:A:1030:GLN:NE2	2.21	0.55
5:F:113:ASP:OD1	5:F:113:ASP:N	2.40	0.55
2:B:307:PRO:O	2:B:309:GLN:NE2	2.37	0.55
1:A:153:PRO:HD2	1:A:158:PRO:HG2	1.88	0.55
1:A:1006:ALA:HB2	5:F:126:LEU:HD21	1.87	0.55
5:E:47:LEU:HB3	5:E:250:TYR:HD2	1.73	0.55
5:E:113:ASP:OD1	5:E:113:ASP:N	2.40	0.54
2:B:356:SER:OG	2:B:357:SER:N	2.40	0.54
1:A:1030:GLN:N	1:A:1031:PRO:CD	2.71	0.54
5:G:51:THR:O	5:G:245:GLY:HA3	2.08	0.54
4:D:66:ARG:NH1	4:D:97:PHE:O	2.41	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:47:GLU:OE1	4:D:50:ARG:NH1	2.41	0.54
5:E:161:SER:HB3	5:E:168:LYS:HB2	1.90	0.54
5:G:162:CYS:O	5:G:202:PRO:HA	2.08	0.54
2:B:296:PRO:HD2	2:B:329:THR:HA	1.91	0.53
2:B:404:CYS:SG	2:B:405:GLY:N	2.79	0.53
3:C:110:ASP:OD1	3:C:110:ASP:N	2.42	0.53
2:B:298:GLU:HG3	2:B:347:GLN:HE21	1.73	0.53
5:E:2:PHE:HB3	5:E:92:ALA:HB3	1.91	0.53
1:A:580:ASP:OD2	7:T:3:DA:OP1	2.26	0.53
1:A:164:LEU:CB	1:A:190:VAL:HG21	2.38	0.52
1:A:394:THR:HG22	1:A:457:MET:HB2	1.91	0.52
5:E:89:THR:HB	5:E:102:VAL:HB	1.90	0.52
5:F:91:ARG:HB3	5:F:100:ALA:HB3	1.90	0.52
7:T:5:DT:C1'	7:T:6:DT:H5'	2.39	0.52
3:C:59:VAL:HG12	3:C:103:ILE:HG22	1.92	0.52
5:G:7:VAL:HA	5:G:87:ILE:HG23	1.92	0.52
7:T:6:DT:N1	7:T:7:DC:C5	2.78	0.52
1:A:142:HIS:NE2	1:A:289:ASP:OD1	2.38	0.52
1:A:171:ALA:H	1:A:180:ARG:HG3	1.75	0.52
1:A:687:ASP:O	1:A:691:LEU:HD23	2.09	0.52
5:G:137:VAL:HA	5:G:196:THR:O	2.09	0.52
5:G:103:PHE:HB2	5:G:112:SER:HB2	1.92	0.52
1:A:232:ARG:HH12	1:A:242:ALA:HB3	1.75	0.52
1:A:102:ASP:HB3	1:A:126:ARG:HB2	1.92	0.51
5:G:38:GLN:HG2	5:G:49:GLN:HG2	1.92	0.51
1:A:164:LEU:HB3	1:A:190:VAL:CG1	2.37	0.51
5:E:184:GLN:HG3	5:E:197:ILE:HD12	1.93	0.51
1:A:617:CYS:HB3	1:A:620:THR:HG22	1.91	0.50
1:A:736:GLU:HG3	1:A:751:VAL:HG23	1.94	0.50
2:B:296:PRO:HD2	2:B:329:THR:CA	2.41	0.50
1:A:191:GLU:HB3	1:A:211:ARG:HB3	1.93	0.50
5:E:206:THR:HG23	5:E:254:LYS:HB2	1.92	0.50
5:F:16:LEU:HD22	5:F:79:LEU:HD12	1.93	0.50
7:T:6:DT:C5	7:T:7:DC:N4	2.79	0.50
1:A:865:GLN:NE2	1:A:985:ARG:HH11	2.10	0.50
7:T:6:DT:C6	7:T:7:DC:N4	2.79	0.50
1:A:984:LEU:HA	1:A:987:ASP:HB2	1.94	0.50
5:E:16:LEU:HA	5:E:19:LEU:HB2	1.94	0.50
2:B:310:PRO:CA	2:B:329:THR:HG22	2.42	0.50
5:F:184:GLN:NE2	5:F:197:ILE:O	2.43	0.50
1:A:1021:HIS:C	1:A:1021:HIS:CD2	2.85	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:G:105:ALA:O	5:G:108:GLN:NE2	2.46	0.49
7:T:15:DT:C4	7:T:16:DG:C6	2.99	0.49
1:A:587:ILE:HD12	1:A:754:GLY:HA3	1.94	0.49
7:T:-3:DT:H2"	7:T:-2:DT:C6	2.47	0.49
1:A:974:LEU:HD22	1:A:978:ARG:HD3	1.95	0.49
5:G:68:MET:HB3	5:G:118:LEU:HD11	1.94	0.49
2:B:309:GLN:HA	2:B:329:THR:HG21	1.94	0.49
5:G:161:SER:HB3	5:G:204:GLN:HE21	1.78	0.49
2:B:99:LYS:H	2:B:155:THR:HB	1.77	0.49
5:G:138:LYS:O	5:G:195:VAL:HA	2.12	0.49
1:A:1039:LYS:O	1:A:1040:GLU:CG	2.61	0.48
7:T:6:DT:C6	7:T:7:DC:C4	3.01	0.48
2:B:18:SER:OG	2:B:19:ALA:N	2.45	0.48
7:T:7:DC:H2"	7:T:8:DG:C8	2.48	0.48
1:A:248:VAL:HG11	1:A:560:LEU:HD11	1.95	0.48
1:A:421:LEU:H	1:A:421:LEU:HD22	1.78	0.48
1:A:964:LYS:HG3	1:A:965:PRO:HD3	1.95	0.48
2:B:49:GLN:NE2	4:D:62:THR:OG1	2.45	0.48
5:G:205:LEU:HD13	5:G:253:PRO:HG3	1.95	0.48
7:T:4:DA:C2'	7:T:5:DT:C6	2.83	0.48
1:A:1039:LYS:O	1:A:1040:GLU:CB	2.62	0.48
2:B:240:ARG:NH2	2:B:293:ASP:OD2	2.37	0.48
5:F:13:LYS:NZ	5:F:82:ALA:O	2.43	0.48
5:F:160:ILE:O	5:F:204:GLN:HA	2.13	0.48
1:A:861:VAL:HG12	1:A:985:ARG:NH1	2.29	0.48
1:A:804:ILE:HG21	1:A:968:ARG:HD3	1.95	0.48
5:E:240:LYS:HD3	5:E:246:HIS:HB3	1.96	0.47
1:A:1047:LEU:HB3	1:A:1089:LEU:HD13	1.96	0.47
2:B:276:VAL:HG11	2:B:315:MET:HB3	1.95	0.47
5:E:218:ALA:HA	5:E:221:LEU:HD23	1.96	0.47
5:E:162:CYS:O	5:E:202:PRO:HA	2.14	0.47
1:A:1054:LEU:HD23	2:B:107:ILE:HD13	1.96	0.47
2:B:296:PRO:HD2	2:B:329:THR:C	2.35	0.47
5:F:120:ASP:OD1	5:F:120:ASP:N	2.43	0.47
5:F:169:PHE:O	5:F:179:ASN:HA	2.14	0.47
1:A:688:GLY:HA2	1:A:691:LEU:CG	2.34	0.47
1:A:1088:ASP:O	1:A:1091:ASP:OD1	2.32	0.47
5:E:12:LEU:HD23	5:E:88:ILE:HG21	1.96	0.47
5:E:138:LYS:O	5:E:195:VAL:HA	2.15	0.47
3:C:6:TYR:OH	3:C:43:ASP:OD2	2.32	0.47
1:A:436:PHE:CE1	7:T:-1:DA:H4'	2.50	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:810:ALA:HA	1:A:825:ASP:O	2.15	0.47
7:T:5:DT:H1'	7:T:6:DT:C5'	2.45	0.47
5:F:159:VAL:HA	5:F:205:LEU:O	2.16	0.46
2:B:309:GLN:C	2:B:329:THR:CG2	2.80	0.46
4:D:50:ARG:HG3	4:D:101:LEU:HD21	1.96	0.46
5:F:51:THR:O	5:F:245:GLY:HA3	2.16	0.46
1:A:467:TYR:O	1:A:472:TYR:OH	2.32	0.46
5:G:50:LEU:HD13	5:G:247:LEU:HD13	1.97	0.46
5:E:140:PRO:HG3	5:E:193:GLU:HA	1.98	0.46
2:B:439:LEU:HG	2:B:450:ILE:HD11	1.98	0.46
1:A:360:CYS:SG	1:A:361:ALA:N	2.84	0.46
7:T:-3:DT:H2'	7:T:-2:DT:H71	1.97	0.46
2:B:83:CYS:HB3	2:B:140:GLN:HE22	1.80	0.45
3:C:104:GLN:NE2	3:C:106:ALA:O	2.49	0.45
5:G:94:ASP:OD1	5:G:94:ASP:N	2.50	0.45
2:B:310:PRO:CA	2:B:328:VAL:O	2.63	0.45
5:G:5:ARG:HB3	5:G:59:THR:HB	1.99	0.45
1:A:163:ASP:HA	1:A:166:ARG:HB2	1.98	0.45
1:A:1098:ARG:HG2	1:A:1098:ARG:NH2	2.31	0.45
1:A:580:ASP:OD2	7:T:2:DC:O3'	2.35	0.45
2:B:378:ALA:HA	2:B:379:PRO:HA	1.81	0.45
6:P:4:DT:H2"	6:P:5:DA:C8	2.52	0.45
1:A:164:LEU:HB3	1:A:190:VAL:CG2	2.46	0.45
5:E:56:GLY:HA3	5:E:244:MET:HA	1.99	0.45
1:A:843:LEU:HD22	1:A:867:VAL:HG11	1.99	0.45
5:E:134:SER:HA	5:E:200:ASN:HD21	1.81	0.45
5:E:137:VAL:HA	5:E:196:THR:O	2.16	0.45
2:B:70:GLN:HG2	2:B:77:VAL:HG11	1.99	0.45
2:B:246:ASN:H	2:B:297:GLY:HA3	1.82	0.45
1:A:436:PHE:HZ	7:T:0:DA:P	2.41	0.44
1:A:804:ILE:HG21	1:A:968:ARG:CG	2.46	0.44
1:A:438:SER:OG	7:T:0:DA:C5'	2.61	0.44
1:A:594:TYR:HB2	1:A:801:TYR:HB3	2.00	0.44
2:B:161:VAL:HG23	2:B:176:TYR:HB3	2.00	0.44
5:F:133:TYR:HA	5:F:230:SER:HB2	1.99	0.44
5:G:79:LEU:HA	5:G:103:PHE:HZ	1.82	0.44
1:A:187:VAL:O	1:A:187:VAL:HG13	2.18	0.44
1:A:736:GLU:OE2	1:A:751:VAL:N	2.39	0.44
2:B:328:VAL:C	2:B:329:THR:HG23	2.38	0.44
1:A:815:SER:OG	1:A:819:ASP:OD2	2.35	0.44
1:A:1006:ALA:CB	5:F:126:LEU:HD21	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1078:ILE:HD13	1:A:1078:ILE:HA	1.83	0.44
4:D:79:GLU:OE1	4:D:79:GLU:HA	2.13	0.44
5:E:13:LYS:HB3	5:E:13:LYS:HE2	1.80	0.44
5:F:151:LEU:HD22	5:F:171:ALA:HB3	1.99	0.44
1:A:830:GLU:HG3	1:A:965:PRO:HB3	1.99	0.44
2:B:193:ASP:N	2:B:193:ASP:OD1	2.49	0.44
5:G:12:LEU:HA	5:G:15:VAL:HB	2.00	0.44
5:G:63:ASP:OD1	5:G:63:ASP:N	2.43	0.44
1:A:1011:CYS:SG	1:A:1018:VAL:N	2.91	0.43
1:A:1011:CYS:SG	1:A:1018:VAL:CA	3.06	0.43
2:B:137:ASP:OD1	2:B:138:GLU:N	2.45	0.43
7:T:6:DT:C6	7:T:7:DC:C5	3.06	0.43
1:A:807:LYS:CD	6:P:24:DG:O4'	2.60	0.43
1:A:1098:ARG:CG	1:A:1098:ARG:HH21	2.32	0.43
2:B:296:PRO:HD2	2:B:329:THR:O	2.18	0.43
2:B:328:VAL:HG11	2:B:332:TYR:CE1	2.53	0.43
5:F:141:SER:HB3	5:F:225:VAL:HG13	2.01	0.43
5:G:26:ALA:HB3	5:G:72:LEU:HD21	1.99	0.43
1:A:617:CYS:SG	1:A:618:TYR:N	2.92	0.43
1:A:861:VAL:CG1	1:A:985:ARG:HH11	2.31	0.43
2:B:366:GLU:HG3	2:B:415:ILE:HD13	1.99	0.43
1:A:421:LEU:HD22	1:A:421:LEU:N	2.33	0.43
1:A:682:ARG:HA	1:A:685:VAL:HG22	2.00	0.43
1:A:756:THR:HG23	6:P:25:DOC:H3'2	1.93	0.43
5:F:238:GLU:HG3	5:F:248:LYS:HG2	2.00	0.43
7:T:15:DT:H2"	7:T:16:DG:H8	1.70	0.43
4:D:66:ARG:HG2	4:D:88:LEU:HD11	2.00	0.43
5:G:83:GLY:N	5:G:86:ASP:OD2	2.52	0.43
1:A:1030:GLN:N	1:A:1031:PRO:HD2	2.34	0.43
1:A:137:VAL:HG22	1:A:286:LEU:HB2	2.00	0.42
1:A:437:GLN:O	7:T:-1:DA:O4'	2.36	0.42
1:A:740:THR:HA	1:A:748:SER:HA	2.02	0.42
3:C:62:LEU:HD12	3:C:79:VAL:HG22	2.01	0.42
7:T:6:DT:N1	7:T:7:DC:C4	2.87	0.42
1:A:594:TYR:HE2	1:A:762:ARG:HH11	1.67	0.42
1:A:550:GLY:CA	7:T:0:DA:P	2.99	0.42
1:A:618:TYR:OH	1:A:711:LEU:O	2.31	0.42
1:A:834:ARG:HH21	1:A:921:ARG:HH11	1.65	0.42
1:A:865:GLN:HE21	1:A:985:ARG:HD3	1.84	0.42
2:B:407:THR:HG21	2:B:427:THR:HB	2.01	0.42
1:A:1039:LYS:N	1:A:1039:LYS:HD3	2.33	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:61:CYS:HB2	4:D:69:ARG:HH21	1.85	0.42
2:B:90:LYS:HA	2:B:90:LYS:HD3	1.86	0.42
1:A:1018:VAL:CB	5:F:125:GLN:CG	2.98	0.42
2:B:360:ASP:OD1	2:B:363:GLU:N	2.50	0.42
3:C:128:ASN:N	3:C:128:ASN:OD1	2.51	0.42
6:P:5:DA:C2	7:T:22:DA:C2	3.08	0.42
7:T:4:DA:C3'	7:T:5:DT:C7	2.86	0.42
2:B:35:SER:O	2:B:333:GLN:NE2	2.53	0.41
5:F:7:VAL:HG23	5:F:8:GLN:HG3	2.02	0.41
5:G:14:LYS:HA	5:G:17:GLU:HB2	2.02	0.41
2:B:310:PRO:HG3	2:B:329:THR:CG2	2.49	0.41
5:E:159:VAL:HG13	5:E:170:SER:HB3	2.03	0.41
1:A:260:ILE:HG22	1:A:297:SER:HB2	2.01	0.41
1:A:367:LYS:HE3	1:A:369:GLN:HE21	1.85	0.41
1:A:1082:ARG:HH22	4:D:107:LEU:HA	1.86	0.41
2:B:417:GLY:N	2:B:421:GLN:O	2.51	0.41
1:A:523:LEU:HD12	1:A:528:VAL:HB	2.02	0.41
2:B:185:LYS:HE3	2:B:185:LYS:HB2	1.86	0.41
5:G:212:LEU:O	5:G:216:THR:OG1	2.29	0.41
1:A:1010:ASN:HB2	1:A:1098:ARG:CZ	2.51	0.41
2:B:168:ASP:OD1	2:B:168:ASP:N	2.47	0.41
5:E:223:SER:OG	5:E:224:THR:N	2.53	0.41
5:F:16:LEU:HA	5:F:16:LEU:HD12	1.84	0.41
1:A:157:GLY:HA3	1:A:237:GLY:HA2	2.03	0.41
1:A:385:ILE:HG21	1:A:421:LEU:HD12	2.02	0.41
1:A:597:PRO:HD2	1:A:766:SER:HA	2.02	0.41
1:A:682:ARG:O	1:A:686:LEU:HG	2.20	0.41
1:A:1011:CYS:SG	1:A:1018:VAL:HA	2.61	0.41
5:E:227:LEU:HD13	5:E:237:VAL:HG12	2.03	0.41
5:G:162:CYS:SG	5:G:163:ALA:N	2.94	0.41
1:A:240:SER:HA	1:A:241:PHE:HA	1.62	0.41
1:A:1078:ILE:CG1	9:A:1202:SF4:S1	2.99	0.41
1:A:1087:LYS:HD3	1:A:1087:LYS:HA	1.89	0.41
2:B:27:VAL:HA	2:B:28:PRO:HD3	1.93	0.41
5:E:38:GLN:HE21	5:E:125:GLN:NE2	2.19	0.41
5:E:99:LEU:O	5:E:115:GLU:HA	2.21	0.41
5:E:151:LEU:HA	5:E:154:ILE:HD12	2.03	0.41
1:A:186:ALA:C	1:A:188:LEU:HD23	2.41	0.40
4:D:105:TYR:O	4:D:107:LEU:N	2.54	0.40
6:P:3:DC:H2"	6:P:4:DT:C6	2.56	0.40
1:A:170:LEU:HD23	1:A:180:ARG:HB3	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:E:37:LEU:HB3	5:E:50:LEU:HB3	2.04	0.40
5:E:179:ASN:OD1	5:E:179:ASN:N	2.54	0.40
5:F:138:LYS:HE3	5:F:138:LYS:HB3	1.96	0.40
5:G:95:ASN:OD1	5:G:95:ASN:N	2.52	0.40
5:G:209:LEU:HD23	5:G:212:LEU:HD12	2.03	0.40
1:A:651:VAL:HG12	1:A:652:ARG:HG2	2.04	0.40
5:E:162:CYS:HB3	5:E:199:MET:HE1	2.03	0.40
5:G:138:LYS:HB3	5:G:196:THR:HG22	2.02	0.40
6:P:11:DA:H2"	6:P:12:DT:C6	2.55	0.40
1:A:188:LEU:CA	1:A:213:THR:O	2.62	0.40
1:A:809:TYR:CZ	1:A:827:LYS:HG3	2.57	0.40
5:G:102:VAL:HG12	5:G:104:GLU:HG3	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	1003/1107 (91%)	931 (93%)	68 (7%)	4 (0%)	34 72
2	B	425/469 (91%)	395 (93%)	28 (7%)	2 (0%)	29 69
3	C	141/474 (30%)	131 (93%)	10 (7%)	0	100 100
4	D	64/137 (47%)	49 (77%)	12 (19%)	3 (5%)	2 21
5	E	247/264 (94%)	239 (97%)	8 (3%)	0	100 100
5	F	243/264 (92%)	236 (97%)	7 (3%)	0	100 100
5	G	245/264 (93%)	229 (94%)	16 (6%)	0	100 100
All	All	2368/2979 (80%)	2210 (93%)	149 (6%)	9 (0%)	38 72

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	330	ASN
4	D	79	GLU
1	A	85	PRO
2	B	328	VAL
1	A	756	THR
1	A	1021	HIS
1	A	1040	GLU
4	D	106	PRO
4	D	105	TYR

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	857/944 (91%)	842 (98%)	15 (2%)	59	77
2	B	367/403 (91%)	363 (99%)	4 (1%)	73	84
3	C	125/413 (30%)	125 (100%)	0	100	100
4	D	59/120 (49%)	58 (98%)	1 (2%)	60	78
5	E	217/230 (94%)	217 (100%)	0	100	100
5	F	216/230 (94%)	215 (100%)	1 (0%)	88	93
5	G	217/230 (94%)	217 (100%)	0	100	100
All	All	2058/2570 (80%)	2037 (99%)	21 (1%)	77	86

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	188	LEU
1	A	190	VAL
1	A	676	LYS
1	A	701	TYR
1	A	889	ARG
1	A	910	ARG
1	A	1010	ASN
1	A	1011	CYS
1	A	1019	LEU

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Mol	Chain	Res	Type
1	A	1021	HIS
1	A	1032	ARG
1	A	1038	GLN
1	A	1039	LYS
1	A	1074	ARG
1	A	1098	ARG
2	B	44	ARG
2	B	180	ASP
2	B	220	ASP
2	B	328	VAL
4	D	79	GLU
5	F	153	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	165	GLN
1	A	369	GLN
1	A	430	ASN
1	A	558	GLN
1	A	726	GLN
1	A	842	ASN
1	A	865	GLN
1	A	1021	HIS
1	A	1038	GLN
1	A	1043	HIS
1	A	1092	GLN
2	B	21	ASN
2	B	70	GLN
2	B	140	GLN
2	B	330	ASN
2	B	347	GLN
3	C	116	ASN
5	E	125	GLN
5	F	65	ASN
5	F	125	GLN
5	G	108	GLN
5	G	204	GLN
5	G	246	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
6	DOC	P	25	7,6	16,19,20	0.93	0	20,26,29	1.32	2 (10%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	DOC	P	25	7,6	-	2/7/18/19	0/2/2/2

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	P	25	DOC	C3'-C2'-C1'	2.93	106.17	102.78
6	P	25	DOC	C4'-O4'-C1'	2.04	111.73	109.81

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	P	25	DOC	C3'-C4'-C5'-O5'
6	P	25	DOC	O4'-C4'-C5'-O5'

There are no ring outliers.

1 monomer is involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	P	25	DOC	8	0

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 3 ligands modelled in this entry, 1 is monoatomic - leaving 2 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
9	SF4	A	1202	1	0,12,12	-	-	-		
10	TTP	T	101	-	26,30,30	4.25	14 (53%)	39,47,47	2.08	14 (35%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	SF4	A	1202	1	-	-	0/6/5/5
10	TTP	T	101	-	-	3/22/34/34	0/2/2/2

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	T	101	TTP	C2'-C3'	-11.62	1.22	1.52
10	T	101	TTP	C6-C5	8.25	1.48	1.34
10	T	101	TTP	O4'-C4'	-7.82	1.27	1.45
10	T	101	TTP	C2-N3	6.39	1.49	1.38
10	T	101	TTP	C2-N1	6.16	1.48	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	T	101	TTP	C1'-N1	-5.26	1.34	1.48
10	T	101	TTP	C3'-C4'	4.39	1.65	1.53
10	T	101	TTP	C6-N1	3.69	1.44	1.38
10	T	101	TTP	O4'-C1'	3.43	1.50	1.42
10	T	101	TTP	C4-N3	3.29	1.44	1.38
10	T	101	TTP	O3'-C3'	2.99	1.49	1.43
10	T	101	TTP	O4-C4	-2.86	1.18	1.23
10	T	101	TTP	O2-C2	-2.74	1.18	1.23
10	T	101	TTP	C4-C5	2.41	1.48	1.44

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
10	T	101	TTP	C4-N3-C2	-6.05	119.52	127.35
10	T	101	TTP	C5-C4-N3	4.93	119.52	115.31
10	T	101	TTP	N3-C2-N1	4.57	120.96	114.89
10	T	101	TTP	O4-C4-C5	-3.85	120.44	124.90
10	T	101	TTP	C6-C5-C4	2.76	120.34	118.03
10	T	101	TTP	C5M-C5-C6	-2.63	119.33	122.85
10	T	101	TTP	C5-C6-N1	-2.54	120.73	123.34
10	T	101	TTP	O2-C2-N1	-2.43	119.56	122.79
10	T	101	TTP	C6-N1-C2	-2.33	118.94	121.30
10	T	101	TTP	C2'-C1'-N1	-2.28	108.51	113.77
10	T	101	TTP	O4'-C1'-N1	2.15	111.71	107.86
10	T	101	TTP	C3'-C2'-C1'	2.13	107.87	102.54
10	T	101	TTP	PB-O3A-PA	-2.07	125.73	132.83
10	T	101	TTP	PB-O3B-PG	-2.03	125.86	132.83

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	T	101	TTP	O4'-C4'-C5'-O5'
10	T	101	TTP	C3'-C4'-C5'-O5'
10	T	101	TTP	PA-O3A-PB-O1B

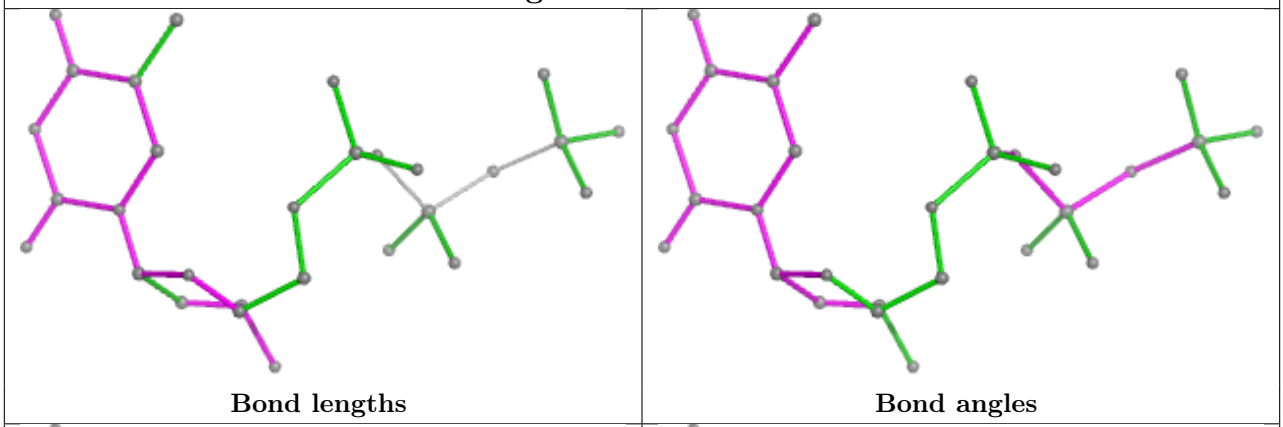
There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	A	1202	SF4	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand TTP T 101



Bond lengths **Bond angles**

Torsions **Rings**

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.

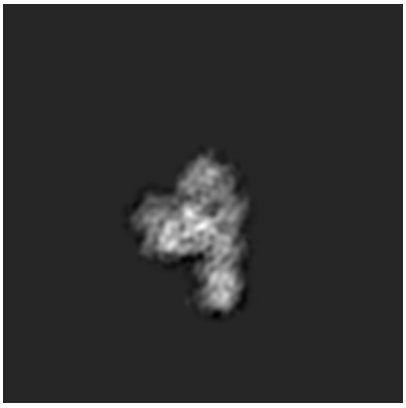
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-10082. 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.

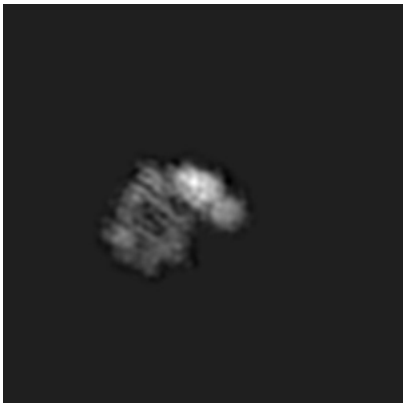
6.1 Orthogonal projections (i)

6.1.1 Primary map



X

Y



Z

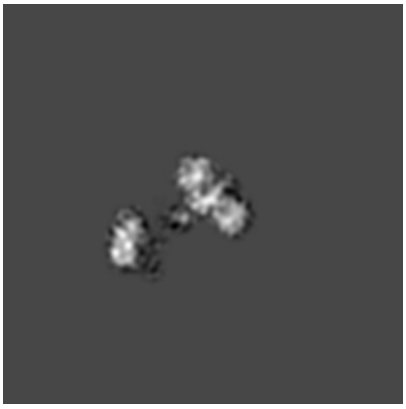
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map

X Index: 180

Y Index: 180



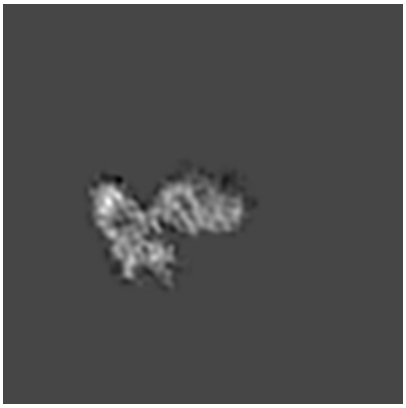
Z Index: 180

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

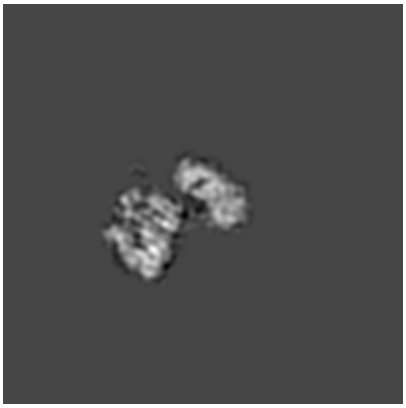
6.3 Largest variance slices (i)

6.3.1 Primary map

X Index: 180



Y Index: 199

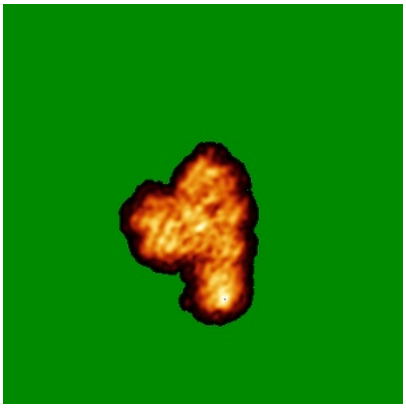


Z Index: 165

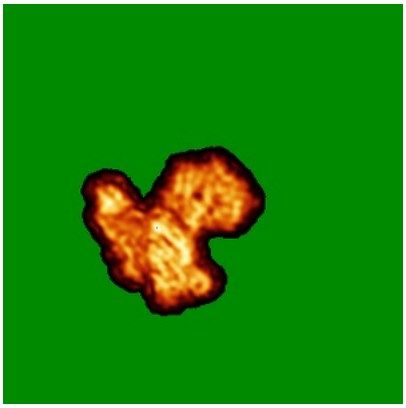
The images above show the largest variance slices of the map in three orthogonal directions.

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

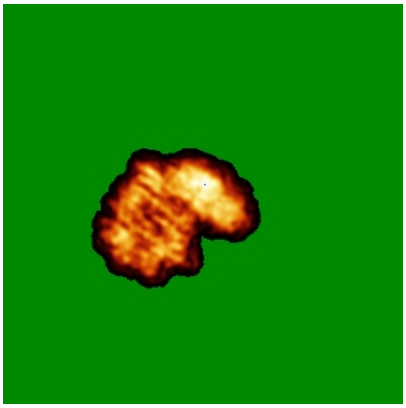
6.4.1 Primary map



X



Y

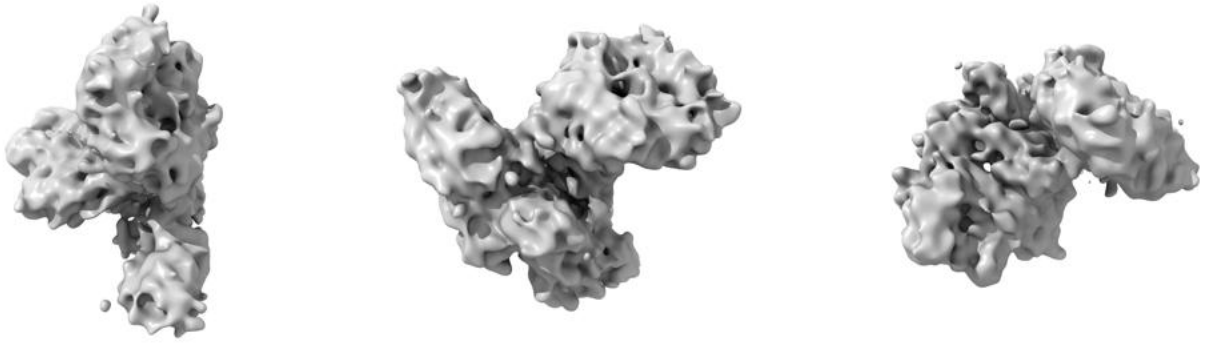


Z

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



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.007. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

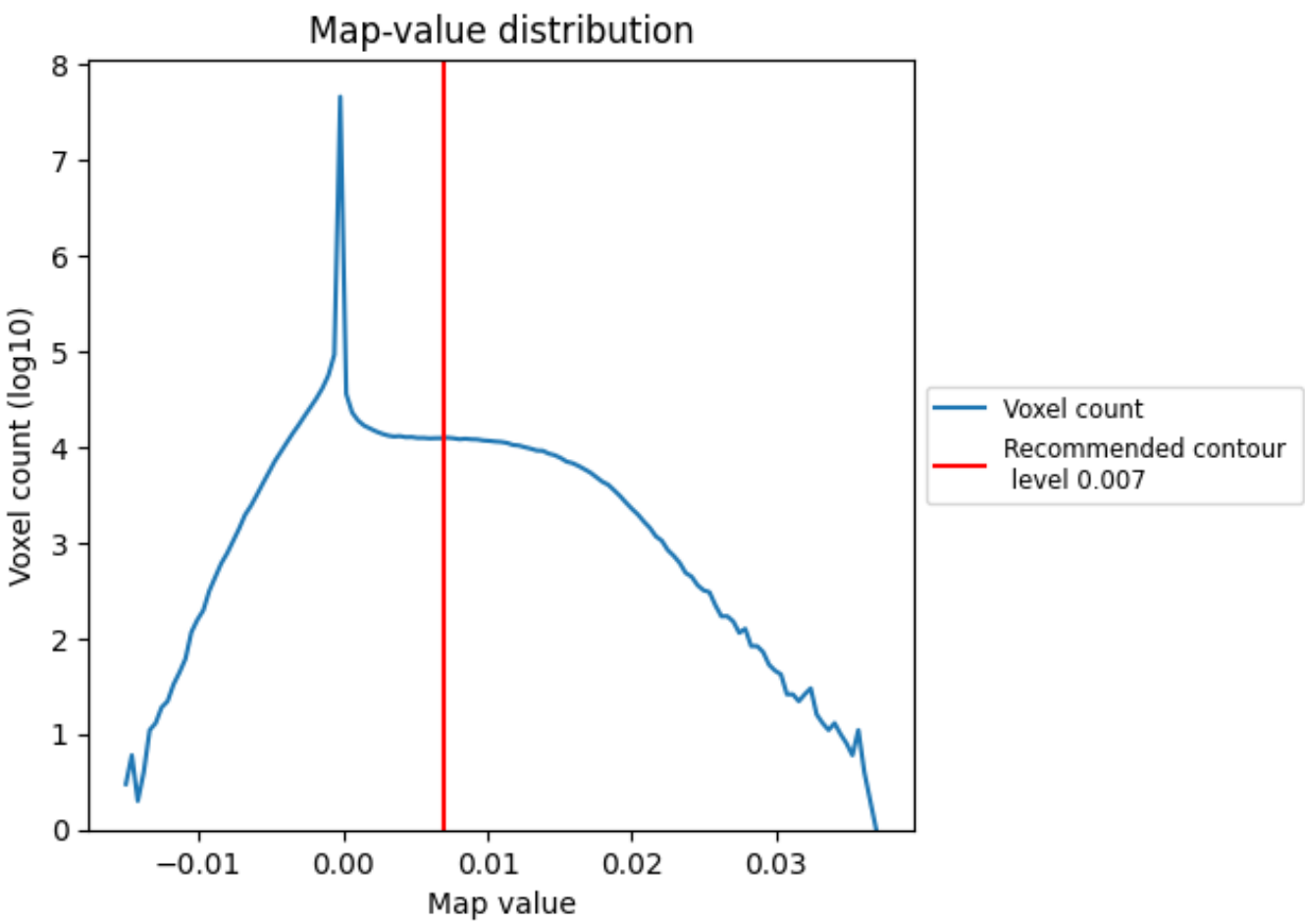
6.6 Mask visualisation (i)

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

7 Map analysis (i)

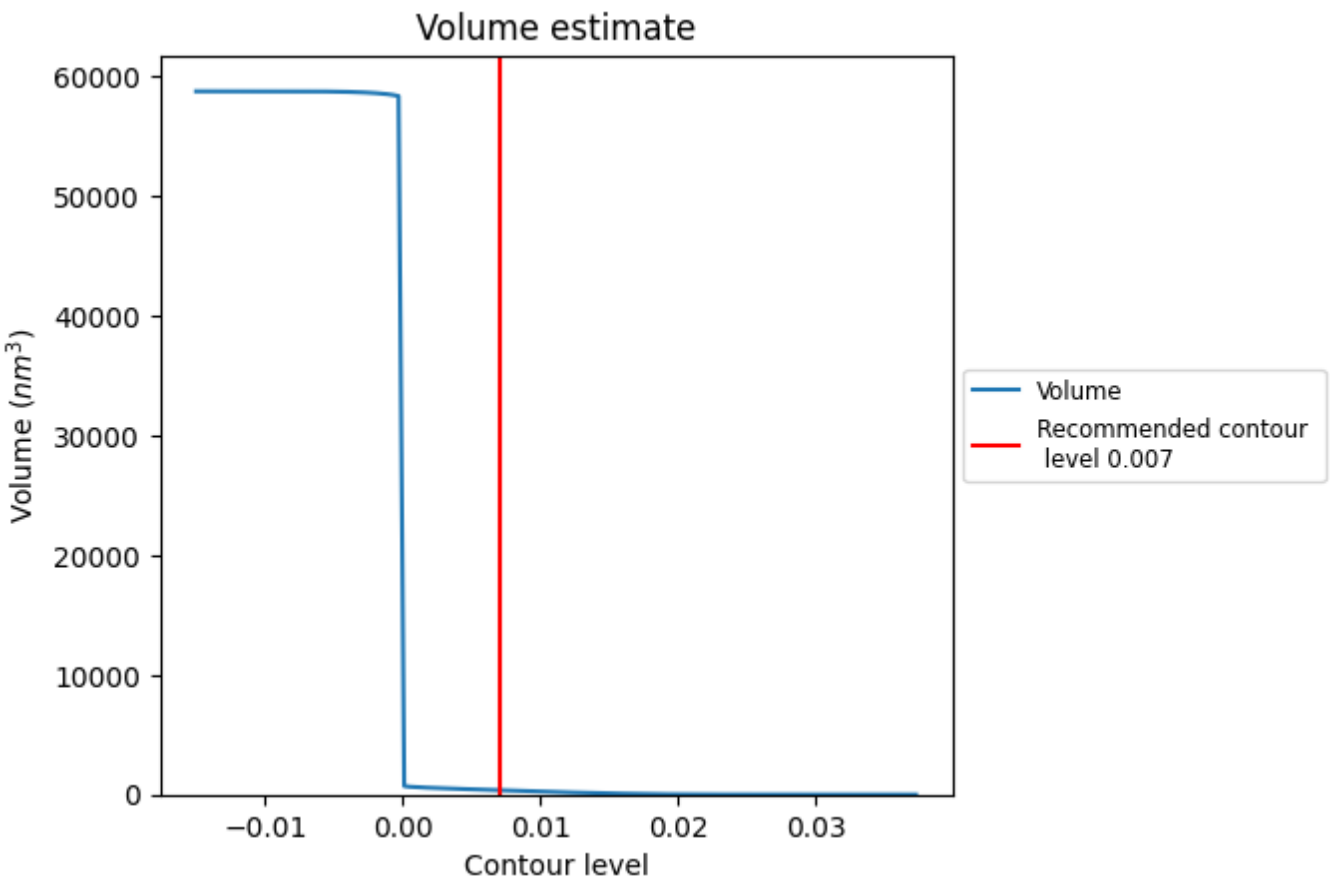
This section contains the results of statistical analysis of the map.

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.

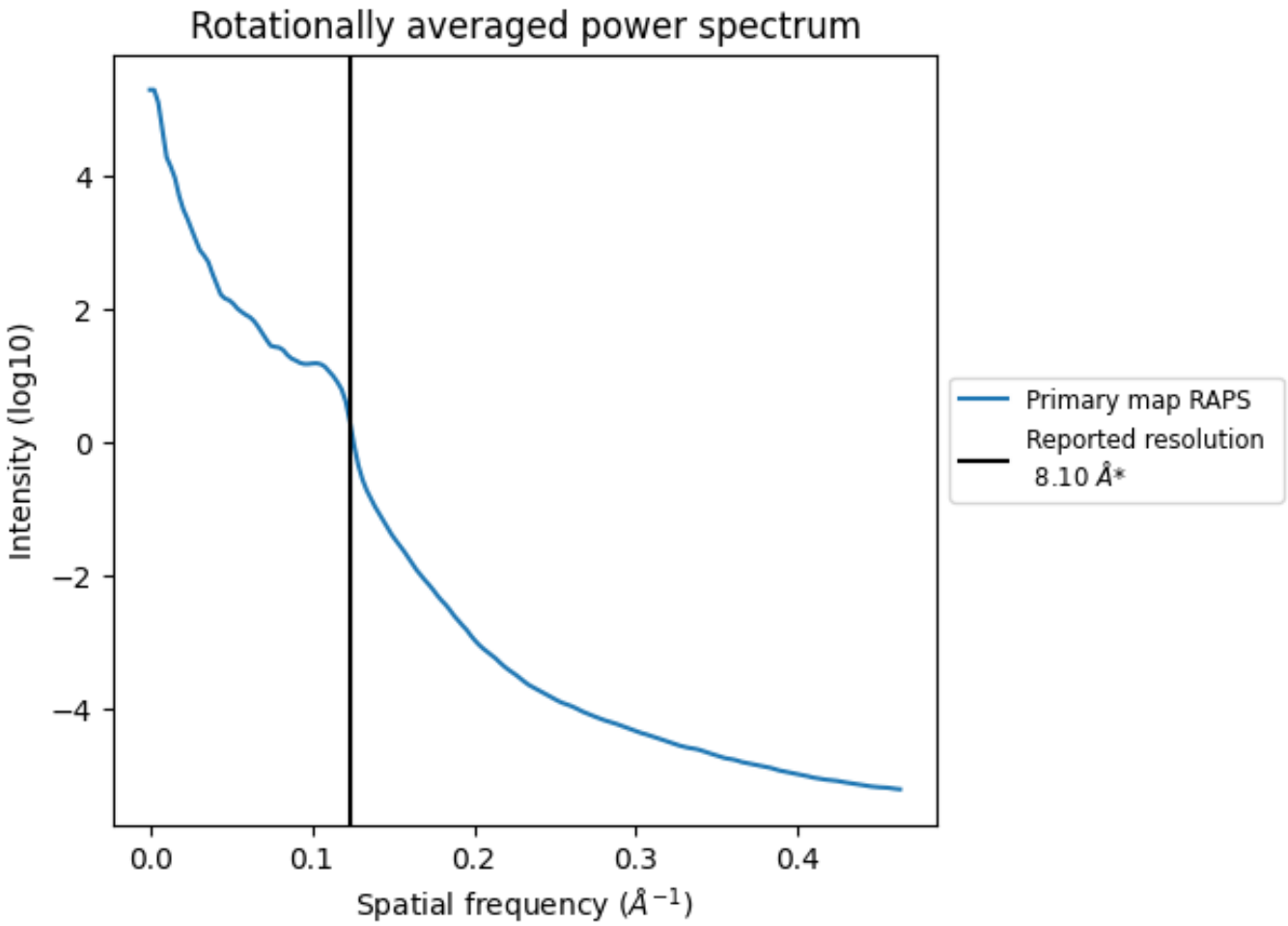
7.2 Volume estimate (i)



The volume at the recommended contour level is 364 nm^3; this corresponds to an approximate mass of 329 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)

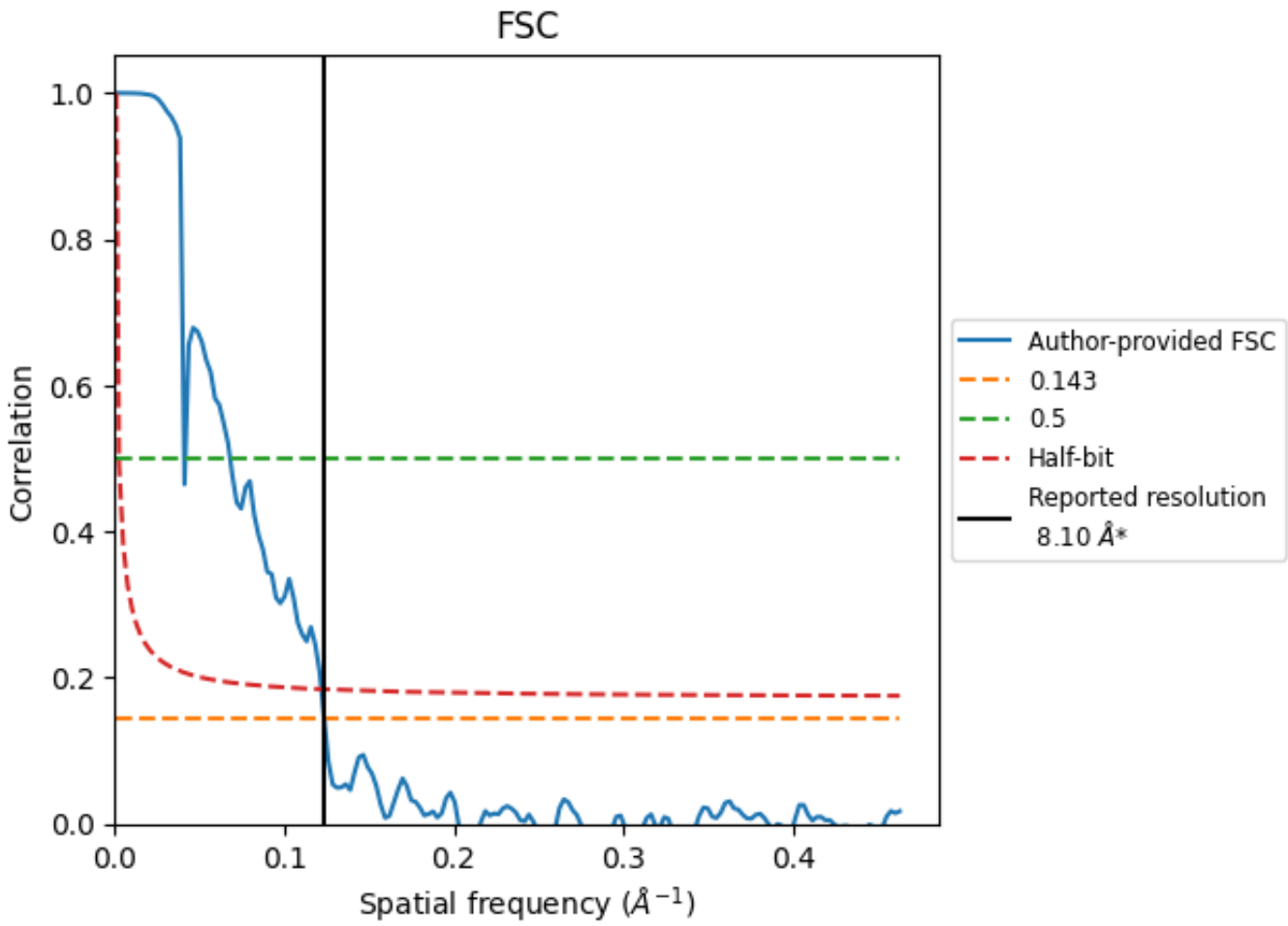


*Reported resolution corresponds to spatial frequency of 0.123 Å^{-1}

8 Fourier-Shell correlation (i)

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

8.1 FSC (i)



*Reported resolution corresponds to spatial frequency of 0.123 Å^{-1}

8.2 Resolution estimates (i)

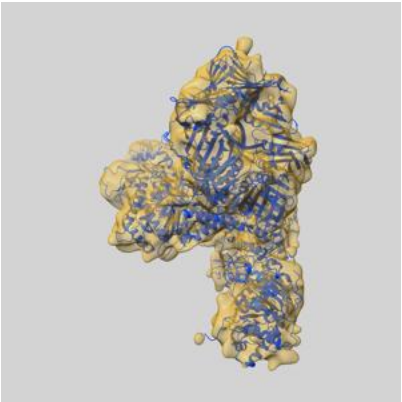
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	8.10	-	-
Author-provided FSC curve	8.10	24.39	8.20
Unmasked-calculated*	-	-	-

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

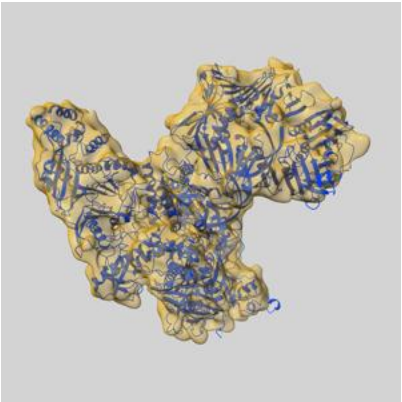
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-10082 and PDB model 6S1O. Per-residue inclusion information can be found in section 3 on page 8.

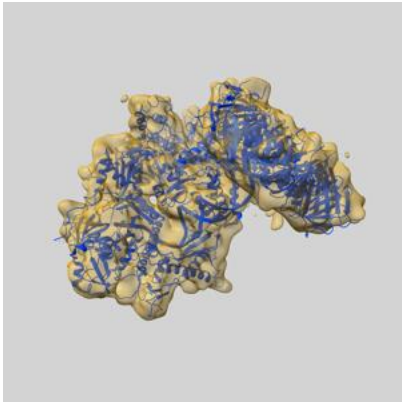
9.1 Map-model overlay (i)



X



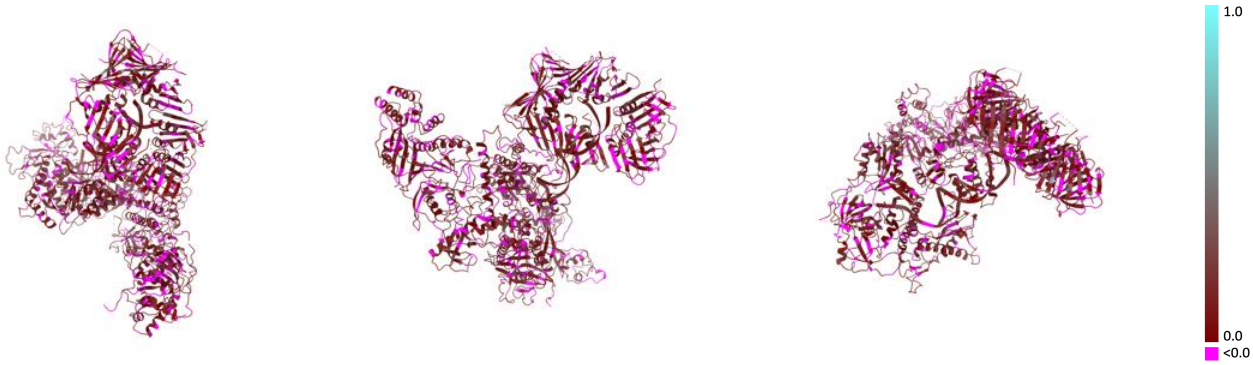
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.007 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.

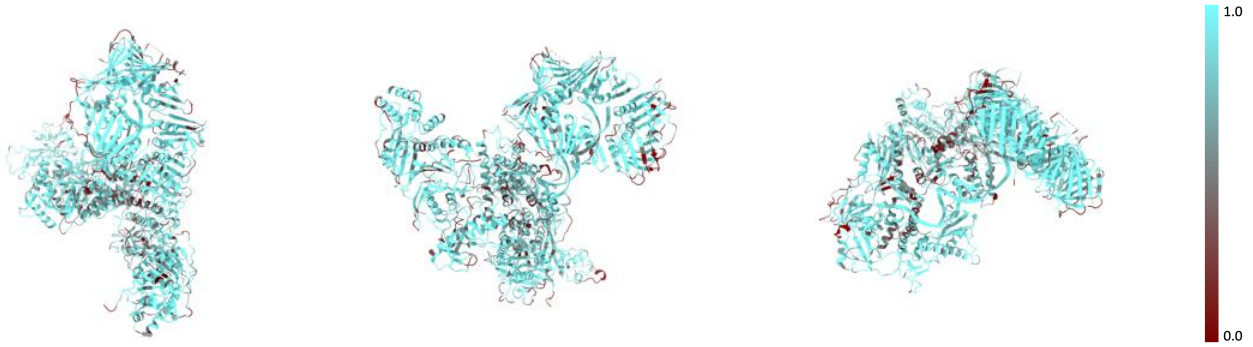
9.2 Q-score mapped to coordinate model (i)



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.

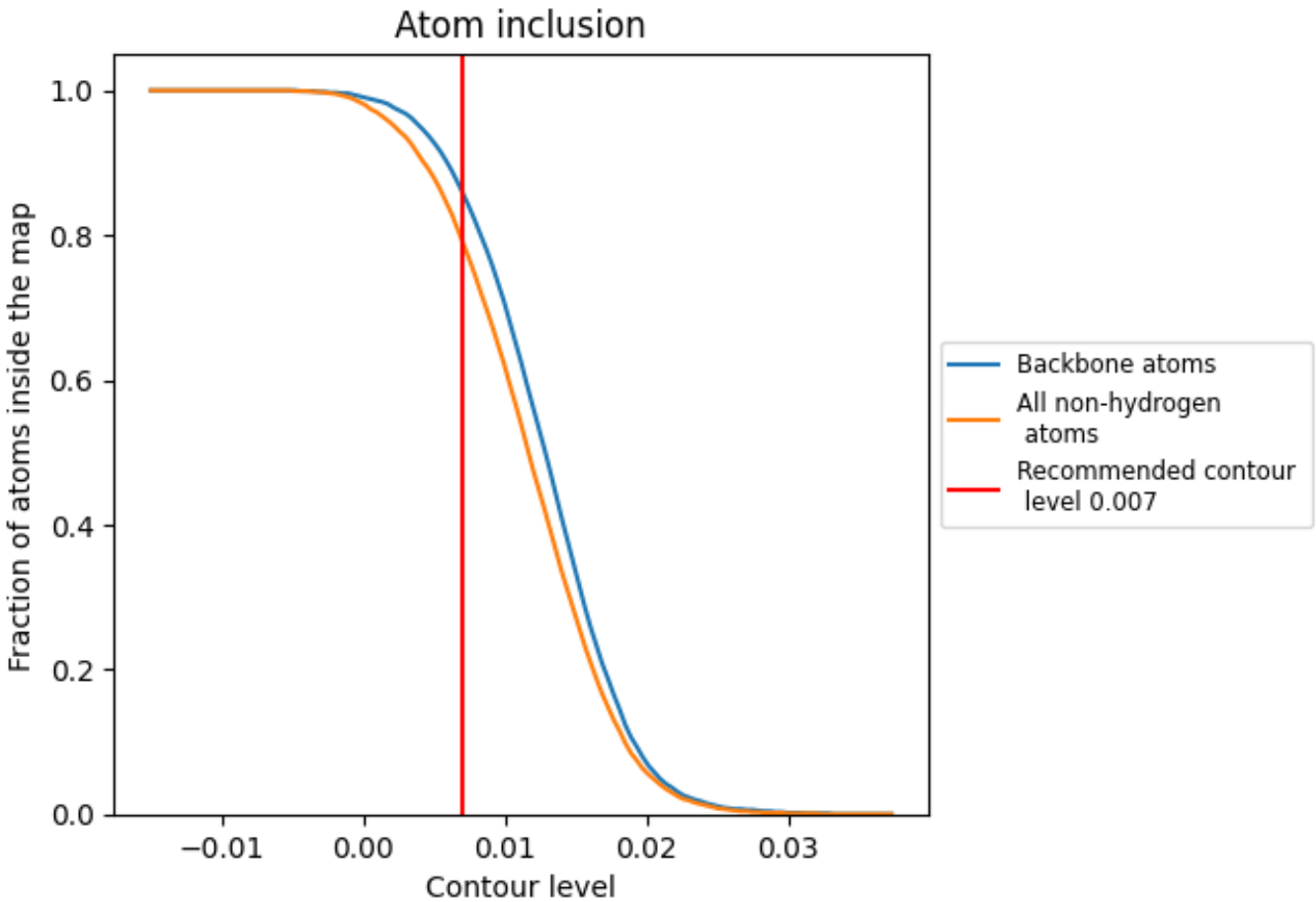
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.007).

9.4 Atom inclusion (i)



At the recommended contour level, 86% of all backbone atoms, 79% 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 (0.007) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7910	0.0940
A	0.7570	0.0990
B	0.7840	0.0890
C	0.8510	0.0830
D	0.8400	0.1130
E	0.7780	0.0760
F	0.8320	0.1020
G	0.8170	0.0660
P	0.8250	0.1340
T	0.9310	0.1470