Full wwPDB EM Validation Report ⓘ

Mar 16, 2025 – 02:12 PM EDT

PDB ID	:	9E2X
EMDB ID	:	EMD-47471
Title	:	Cryo-EM structure of yeast CMG helicase stalled at G4-containing DNA template, state 2
Authors	:	Allwein, B.; Batra, S.; Remus, D.; Hite, R.
Deposited on	:	2024-10-23
Resolution	:	3.50 Å(reported)
Based on initial model	:	.

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:

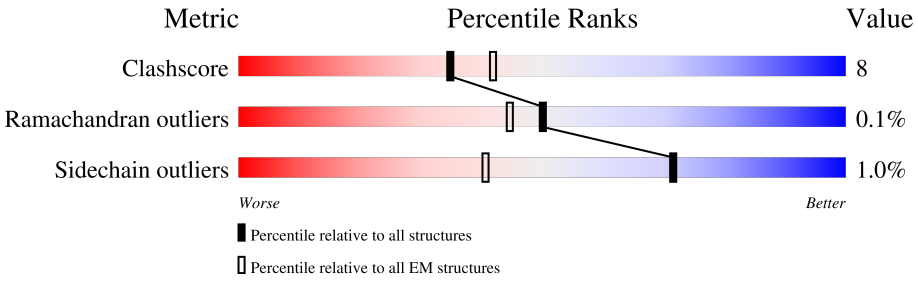
EMDB validation analysis	:	0.0.1.dev117
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.4

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.50 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5%

Mol	Chain	Length	Quality of chain
1	A	208	78% 15% 7%
2	B	213	74% 14% • 11%
3	C	217	67% 12% • 20%
4	D	294	63% 12% 24%
5	E	650	76% 11% 13%
6	F	48	73% 23% •
7	G	20	85% 15%
8	2	868	62% 13% 25%
9	3	971	54% 12% 34%

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Mol	Chain	Length	Quality of chain
10	4	933	53% 12% 35%
11	5	775	69% 14% 17%
12	6	1017	55% 8% 37%
13	7	845	62% 13% 24%
14	X	1238	48% 9% 43%
15	Y	92	77% 22%

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
18	ZN	2	1003	-	-	X	-

2 Entry composition (i)

There are 19 unique types of molecules in this entry. The entry contains 98329 atoms, of which 49013 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 replication complex GINS protein PSF1.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	A	194	3180	999	1592	273	307	9	0	0

- Molecule 2 is a protein called DNA replication complex GINS protein PSF2.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
2	B	189	3191	1014	1614	276	282	5	0	0

- Molecule 3 is a protein called DNA replication complex GINS protein PSF3.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
3	C	174	2813	913	1412	225	257	6	0	0

There are 23 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-22	MET	-	expression tag	UNP Q12146
C	-21	GLY	-	expression tag	UNP Q12146
C	-20	SER	-	expression tag	UNP Q12146
C	-19	SER	-	expression tag	UNP Q12146
C	-18	HIS	-	expression tag	UNP Q12146
C	-17	HIS	-	expression tag	UNP Q12146
C	-16	HIS	-	expression tag	UNP Q12146
C	-15	HIS	-	expression tag	UNP Q12146
C	-14	HIS	-	expression tag	UNP Q12146
C	-13	HIS	-	expression tag	UNP Q12146
C	-12	SER	-	expression tag	UNP Q12146
C	-11	SER	-	expression tag	UNP Q12146
C	-10	GLY	-	expression tag	UNP Q12146
C	-9	LEU	-	expression tag	UNP Q12146
C	-8	VAL	-	expression tag	UNP Q12146

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-7	PRO	-	expression tag	UNP Q12146
C	-6	ARG	-	expression tag	UNP Q12146
C	-5	GLY	-	expression tag	UNP Q12146
C	-4	SER	-	expression tag	UNP Q12146
C	-3	HIS	-	expression tag	UNP Q12146
C	-2	MET	-	expression tag	UNP Q12146
C	-1	ALA	-	expression tag	UNP Q12146
C	0	SER	-	expression tag	UNP Q12146

- Molecule 4 is a protein called DNA replication complex GINS protein SLD5.

Mol	Chain	Residues	Atoms						AltConf	Trace
4	D	222	Total	C	H	N	O	S	0	0
			3671	1170	1844	300	345	12		

- Molecule 5 is a protein called Cell division control protein 45.

Mol	Chain	Residues	Atoms						AltConf	Trace
5	E	566	Total	C	H	N	O	S	0	0
			9119	2920	4552	770	863	14		

- Molecule 6 is a DNA chain called Leading strand DNA template.

Mol	Chain	Residues	Atoms						AltConf	Trace
6	F	48	Total	C	H	N	O	P	0	0
			1548	475	545	182	298	48		

- Molecule 7 is a DNA chain called Lagging strand DNA template.

Mol	Chain	Residues	Atoms						AltConf	Trace
7	G	20	Total	C	H	N	O	P	0	0
			633	194	224	79	116	20		

- Molecule 8 is a protein called DNA replication licensing factor MCM2.

Mol	Chain	Residues	Atoms						AltConf	Trace
8	2	655	Total	C	H	N	O	S	0	0
			10454	3271	5250	933	981	19		

- Molecule 9 is a protein called DNA replication licensing factor MCM3.

Mol	Chain	Residues	Atoms						AltConf	Trace
9	3	644	Total	C	H	N	O	S	0	0
			10097	3173	5073	894	944	13		

- Molecule 10 is a protein called DNA replication licensing factor MCM4.

Mol	Chain	Residues	Atoms						AltConf	Trace
10	4	611	Total	C	H	N	O	S	0	0
			9772	3062	4914	836	932	28		

- Molecule 11 is a protein called Minichromosome maintenance protein 5.

Mol	Chain	Residues	Atoms						AltConf	Trace
11	5	641	Total	C	H	N	O	S	0	0
			10249	3208	5164	882	973	22		

- Molecule 12 is a protein called DNA replication licensing factor MCM6.

Mol	Chain	Residues	Atoms						AltConf	Trace
12	6	642	Total	C	H	N	O	S	0	0
			10130	3189	5068	882	966	25		

- Molecule 13 is a protein called DNA replication licensing factor MCM7.

Mol	Chain	Residues	Atoms						AltConf	Trace
13	7	641	Total	C	H	N	O	S	0	0
			10141	3184	5101	875	953	28		

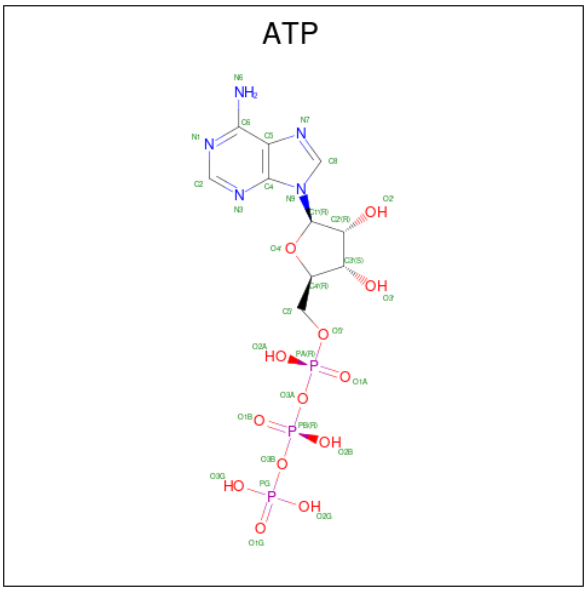
- Molecule 14 is a protein called Topoisomerase 1-associated factor 1.

Mol	Chain	Residues	Atoms						AltConf	Trace
14	X	705	Total	C	H	N	O	S	0	0
			11536	3691	5821	962	1043	19		

- Molecule 15 is a protein called Chromosome segregation in meiosis protein 3.

Mol	Chain	Residues	Atoms						AltConf	Trace
15	Y	92	Total	C	H	N	O	S	0	0
			1537	495	769	138	131	4		

- Molecule 16 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						AltConf
16	2	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
16	3	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
16	5	1	Total	C	H	N	O	P	0
			41	10	10	5	13	3	
16	7	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	

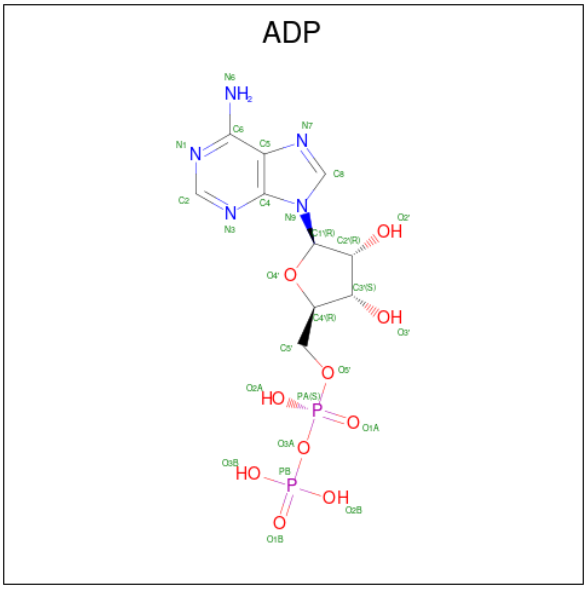
- Molecule 17 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
17	2	1	Total	Mg	0
			1	1	
17	3	1	Total	Mg	0
			1	1	
17	4	1	Total	Mg	0
			1	1	
17	5	1	Total	Mg	0
			1	1	
17	7	1	Total	Mg	0
			1	1	

- Molecule 18 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	AltConf
18	2	1	Total Zn 1 1	0
18	4	1	Total Zn 1 1	0
18	5	1	Total Zn 1 1	0
18	6	1	Total Zn 1 1	0
18	7	1	Total Zn 1 1	0

- Molecule 19 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).



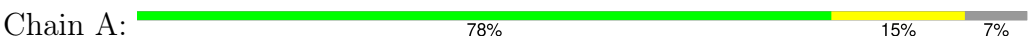
Mol	Chain	Residues	Atoms	AltConf
19	4	1	Total C H N O P 39 10 12 5 10 2	0
19	4	1	Total C H N O P 39 10 12 5 10 2	0

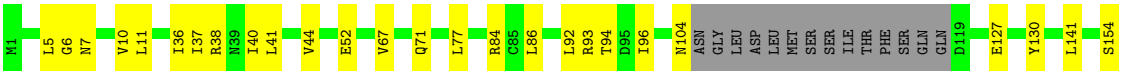
3 Residue-property plots (i)

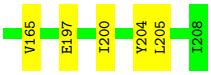
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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. 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 replication complex GINS protein PSF1

Chain A:

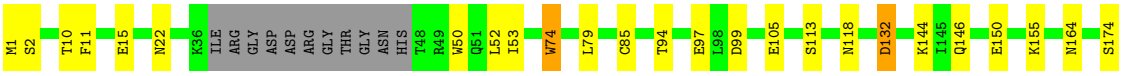


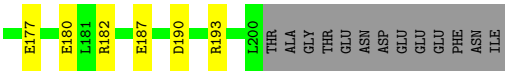




• Molecule 2: DNA replication complex GINS protein PSF2

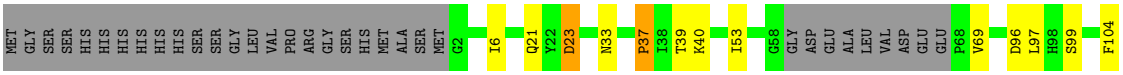
Chain B:





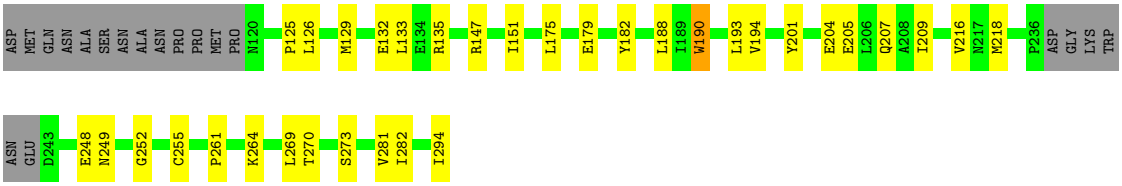
• Molecule 3: DNA replication complex GINS protein PSF3

Chain C:



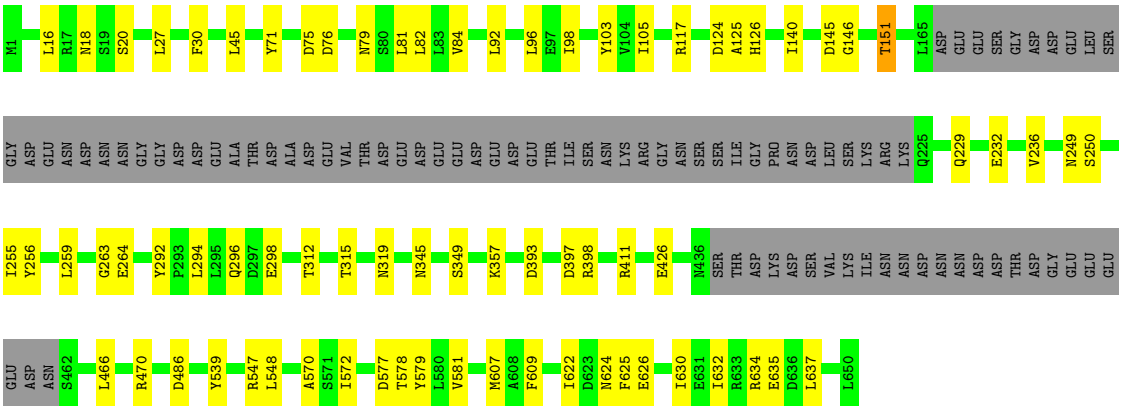
• Molecule 4: DNA replication complex GINS protein SLD5

Chain D:



• Molecule 5: Cell division control protein 45

Chain E:

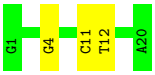


• Molecule 6: Leading strand DNA template

Chain F:

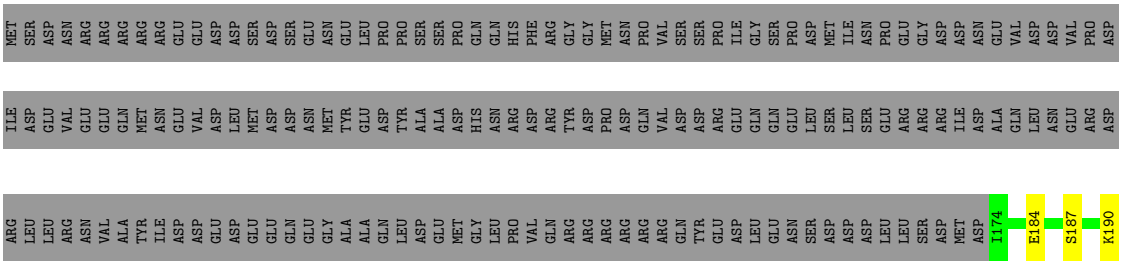
• Molecule 7: Lagging strand DNA template

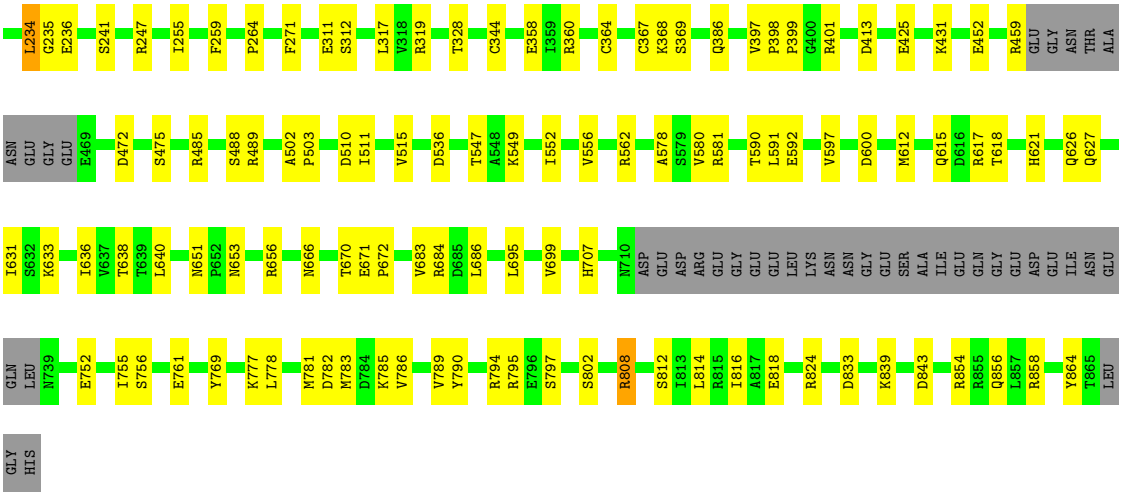
Chain G:



• Molecule 8: DNA replication licensing factor MCM2

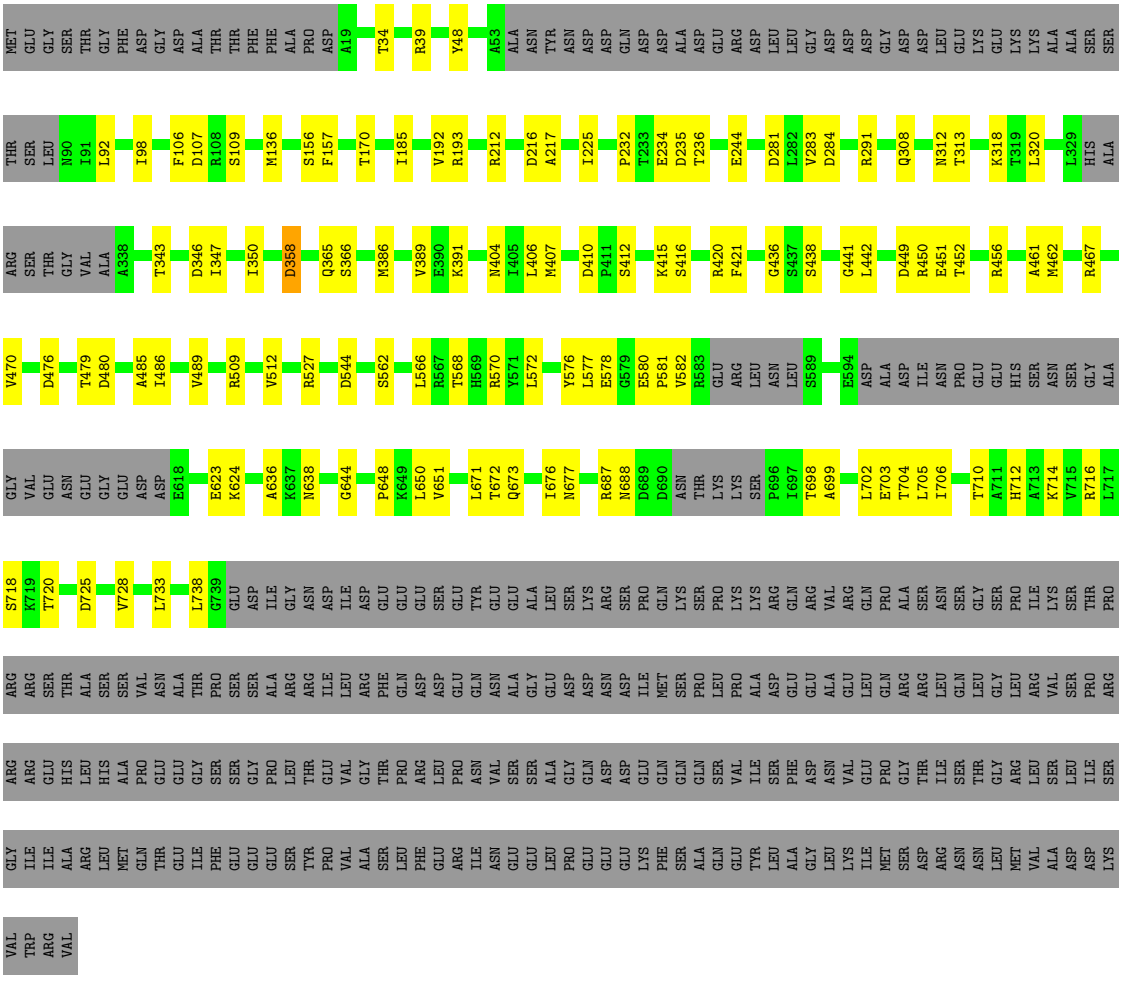
Chain 2:





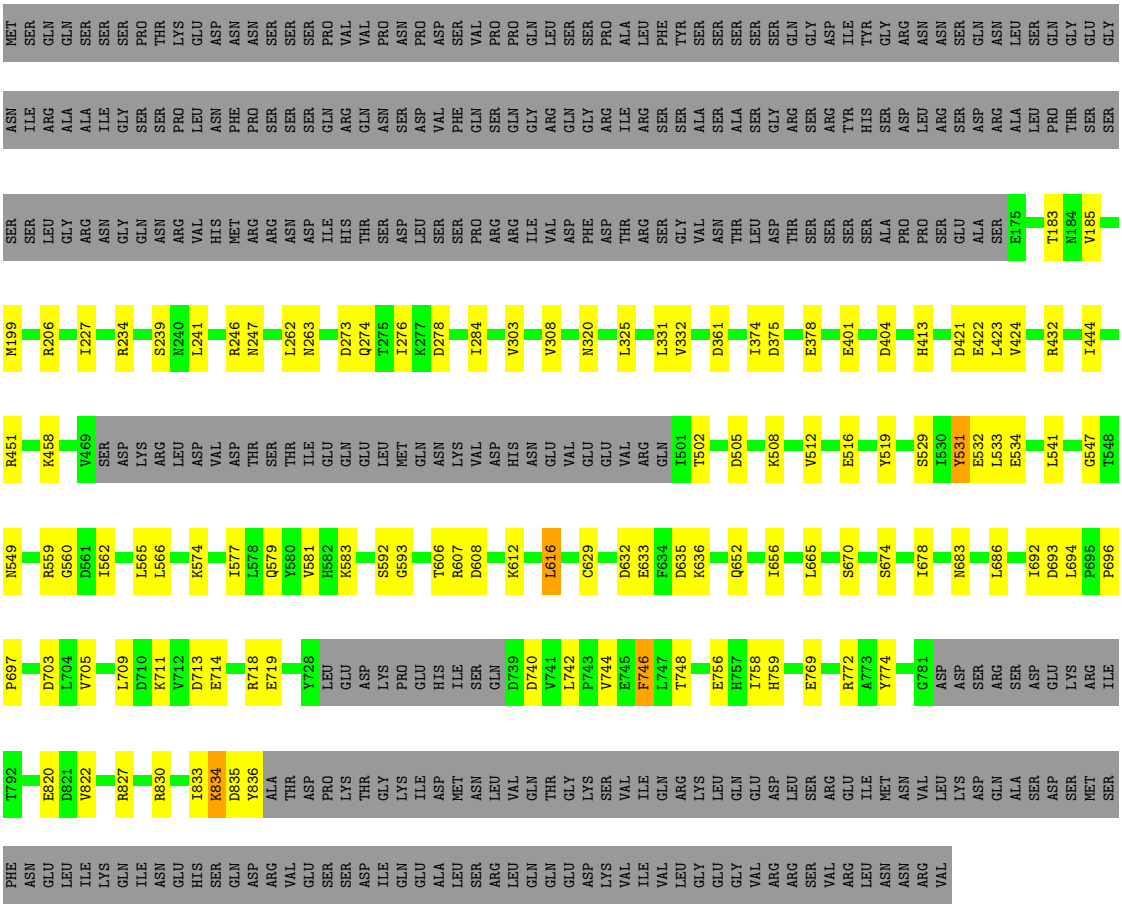
• Molecule 9: DNA replication licensing factor MCM3

Chain 3:



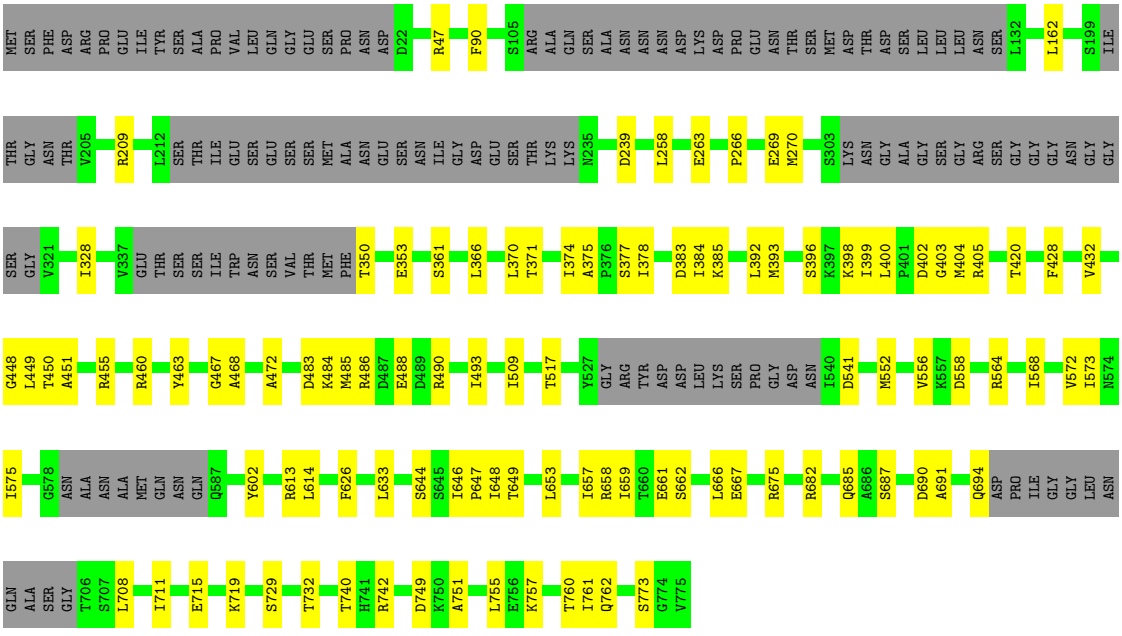
• Molecule 10: DNA replication licensing factor MCM4

Chain 4:



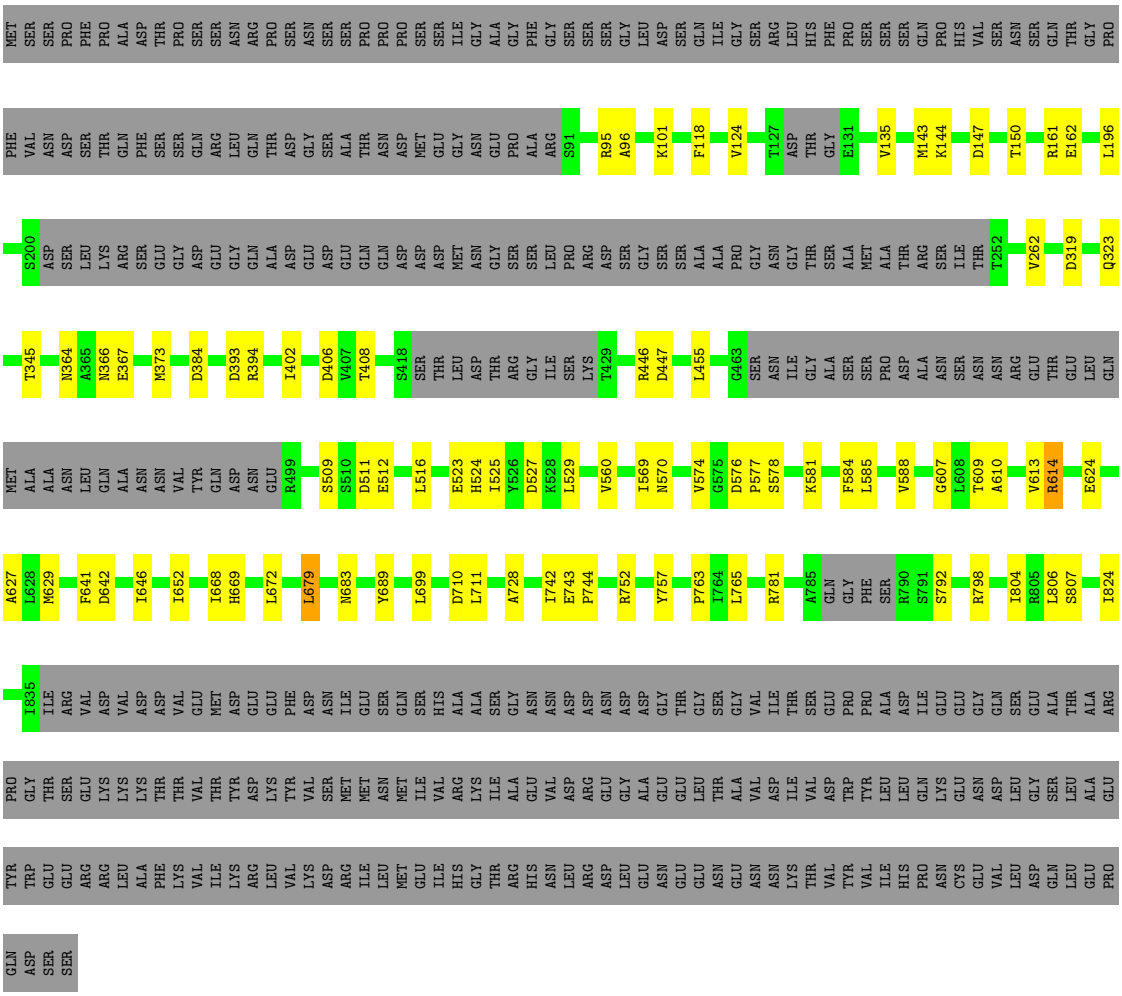
• Molecule 11: Minichromosome maintenance protein 5

Chain 5:



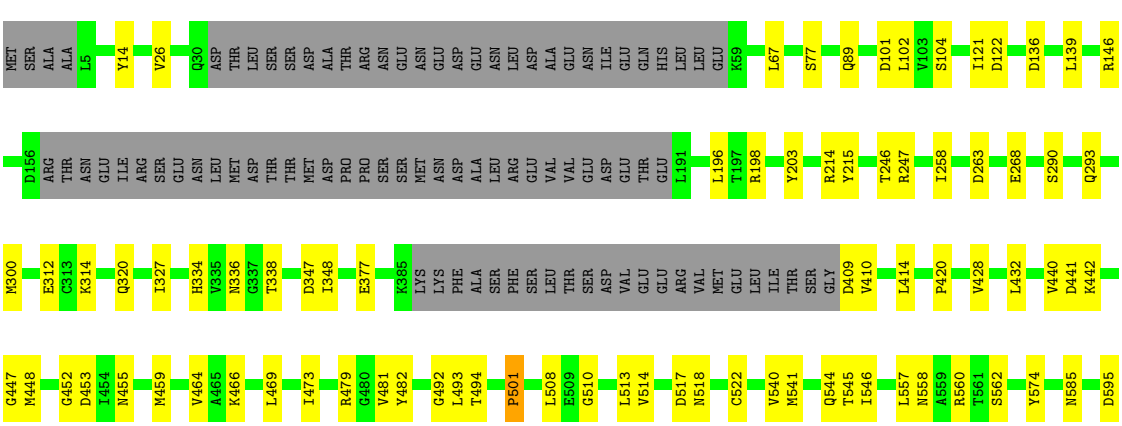
• Molecule 12: DNA replication licensing factor MCM6

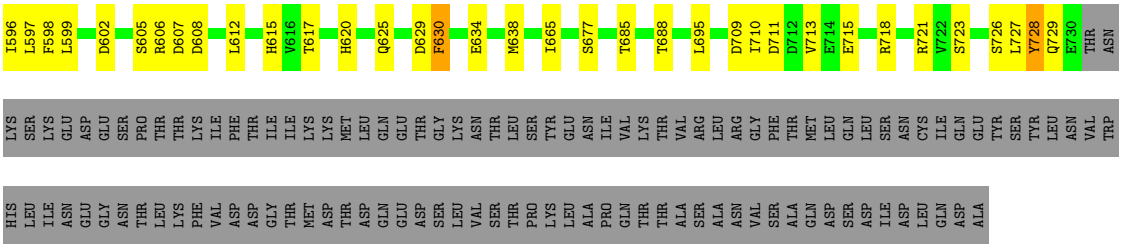
Chain 6:



• Molecule 13: DNA replication licensing factor MCM7

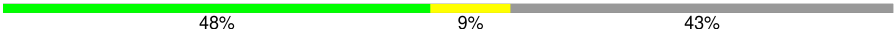
Chain 7:

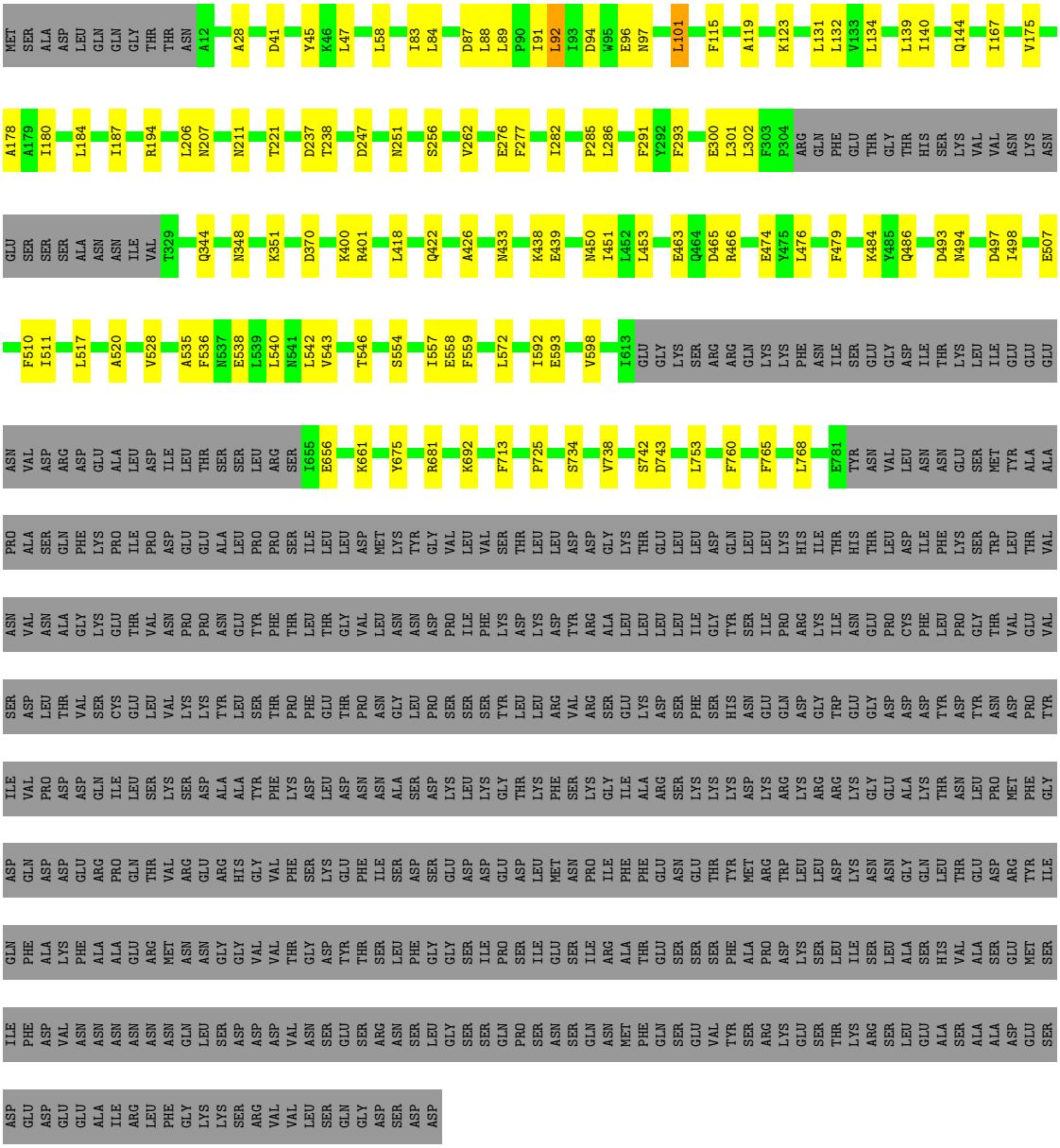




• Molecule 14: Topoisomerase 1-associated factor 1

Chain X:





• Molecule 15: Chromosome segregation in meiosis protein 3

Chain Y:


R48
R49
D62
K63
K70
N71
I78
I91
I92
Q93
F94
L97
K105
G119
L125
R126
E127
Y128
R129
V130
S131
L132
F133
R134
M137
G138
M139

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	40714	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	66	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	29000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.26	0/1608	0.48	0/2163
2	B	0.27	0/1609	0.51	0/2177
3	C	0.55	1/1434 (0.1%)	0.42	0/1938
4	D	0.24	0/1861	0.45	0/2514
5	E	0.25	0/4654	0.47	0/6303
6	F	0.54	0/1125	1.08	5/1741 (0.3%)
7	G	0.57	0/459	0.96	0/705
8	2	0.25	0/5292	0.52	0/7145
9	3	0.25	0/5112	0.51	0/6930
10	4	0.26	0/4931	0.50	0/6666
11	5	0.24	0/5155	0.50	0/6956
12	6	0.25	0/5143	0.51	0/6938
13	7	0.39	1/5120 (0.0%)	0.52	0/6921
14	X	0.24	0/5828	0.45	0/7868
15	Y	0.34	0/784	0.55	1/1049 (0.1%)
All	All	0.30	2/50115 (0.0%)	0.53	6/68014 (0.0%)

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
5	E	0	1
8	2	0	3
10	4	0	3
12	6	0	3
13	7	0	3
14	X	0	1
15	Y	0	4
All	All	0	18

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	37	PRO	N-CD	18.57	1.73	1.47
13	7	501	PRO	N-CD	18.34	1.73	1.47

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	F	34	DC	O4'-C4'-C3'	-9.12	100.53	106.00
6	F	34	DC	O4'-C1'-N1	6.69	112.68	108.00
6	F	34	DC	C4'-C3'-C2'	-5.53	98.13	103.10
15	Y	128	TYR	N-CA-CB	-5.11	101.40	110.60
6	F	27	DA	O4'-C1'-N9	5.08	111.56	108.00
6	F	32	DT	N3-C4-O4	5.03	122.92	119.90

There are no chirality outliers.

All (18) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
8	2	581	ARG	Sidechain
8	2	795	ARG	Sidechain
8	2	808	ARG	Sidechain
10	4	246	ARG	Sidechain
10	4	827	ARG	Sidechain
10	4	830	ARG	Sidechain
12	6	446	ARG	Sidechain
12	6	614	ARG	Sidechain
12	6	752	ARG	Sidechain
13	7	479	ARG	Sidechain
13	7	718	ARG	Sidechain
13	7	721	ARG	Sidechain
5	E	398	ARG	Sidechain
14	X	41	ASP	Peptide
15	Y	129	ARG	Sidechain
15	Y	134	ARG	Sidechain
15	Y	48	ARG	Sidechain
15	Y	49	ARG	Sidechain

5.2 Too-close contacts (i)

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1588	1592	1593	23	0
2	B	1577	1614	1625	36	0
3	C	1401	1412	1415	25	0
4	D	1827	1844	1844	34	0
5	E	4567	4552	4555	54	0
6	F	1003	545	545	11	0
7	G	409	224	224	2	0
8	2	5204	5250	5261	100	0
9	3	5024	5073	5087	111	0
10	4	4858	4914	4924	85	0
11	5	5085	5164	5177	112	0
12	6	5062	5068	5078	61	0
13	7	5040	5101	5101	115	0
14	X	5715	5821	5833	79	0
15	Y	768	769	801	14	0
16	2	31	12	12	2	0
16	3	31	12	12	1	0
16	5	31	10	11	1	0
16	7	31	12	12	1	0
17	2	1	0	0	0	0
17	3	1	0	0	0	0
17	4	1	0	0	0	0
17	5	1	0	0	0	0
17	7	1	0	0	0	0
18	2	1	0	0	2	0
18	4	1	0	0	0	0
18	5	1	0	0	0	0
18	6	1	0	0	0	0
18	7	1	0	0	0	0
19	4	54	24	24	2	0
All	All	49316	49013	49134	763	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 8.

All (763) 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)
11:5:755:LEU:HD13	11:5:761:ILE:CD1	1.48	1.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:2:854:ARG:NH2	8:2:858:ARG:HH22	1.20	1.39
2:B:99:ASP:OD1	2:B:144:LYS:CE	1.75	1.33
3:C:37:PRO:N	3:C:37:PRO:CD	1.73	1.32
2:B:146:GLN:CG	11:5:47:ARG:HH11	1.41	1.32
8:2:854:ARG:NH2	8:2:858:ARG:NH2	1.76	1.29
13:7:501:PRO:N	13:7:501:PRO:CD	1.73	1.27
9:3:456:ARG:NH2	13:7:327:ILE:HG21	1.47	1.26
9:3:456:ARG:NH2	13:7:327:ILE:CG2	1.99	1.23
8:2:344:CYS:SG	8:2:367:CYS:SG	2.44	1.16
10:4:709:LEU:CD1	10:4:711:LYS:HG2	1.78	1.13
5:E:577:ASP:OD1	5:E:634:ARG:CB	1.97	1.13
2:B:146:GLN:HG2	11:5:47:ARG:HH11	1.01	1.12
8:2:670:THR:HG22	8:2:672:PRO:HD2	1.22	1.12
8:2:364:CYS:SG	8:2:369:SER:N	2.21	1.11
14:X:291:PHE:CD2	14:X:474:GLU:HG2	1.86	1.10
8:2:854:ARG:HH21	8:2:858:ARG:NH2	1.38	1.10
11:5:755:LEU:HD13	11:5:761:ILE:HD12	1.09	1.08
11:5:755:LEU:CD1	11:5:761:ILE:HD12	1.82	1.08
2:B:146:GLN:HG2	11:5:47:ARG:NH1	1.69	1.08
9:3:456:ARG:NH2	13:7:327:ILE:CB	2.17	1.07
9:3:462:MET:HG2	9:3:489:VAL:HG11	1.17	1.07
2:B:1:MET:HG2	2:B:2:SER:H	1.19	1.05
2:B:146:GLN:CG	11:5:47:ARG:NH1	2.20	1.05
11:5:755:LEU:HD13	11:5:761:ILE:HD11	1.36	1.05
2:B:99:ASP:OD1	2:B:144:LYS:HE2	1.48	1.05
9:3:456:ARG:HH22	13:7:327:ILE:CG2	1.63	1.05
11:5:755:LEU:CD1	11:5:761:ILE:CD1	2.34	1.04
3:C:105:PHE:CD2	3:C:170:GLU:OE1	2.11	1.04
5:E:577:ASP:OD1	5:E:634:ARG:HB3	1.57	1.03
8:2:854:ARG:HH21	8:2:858:ARG:CZ	1.72	1.03
10:4:709:LEU:HD11	10:4:711:LYS:HG2	1.39	1.03
4:D:255:CYS:SG	4:D:269:LEU:C	2.38	1.02
9:3:456:ARG:HH22	13:7:327:ILE:HG21	0.98	0.99
2:B:99:ASP:OD1	2:B:144:LYS:HE3	1.60	0.99
12:6:523:GLU:OE2	12:6:524:HIS:CD2	2.16	0.99
5:E:577:ASP:OD1	5:E:634:ARG:HB2	1.62	0.96
9:3:456:ARG:NH2	13:7:327:ILE:HB	1.80	0.95
4:D:255:CYS:HG	4:D:269:LEU:C	1.69	0.95
14:X:291:PHE:CG	14:X:474:GLU:HG2	2.00	0.95
8:2:854:ARG:CZ	8:2:858:ARG:NH2	2.31	0.93
8:2:839:LYS:HE3	8:2:843:ASP:OD2	1.68	0.93

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:104:PHE:HB3	3:C:170:GLU:OE2	1.69	0.93
5:E:292:TYR:CZ	5:E:296:GLN:NE2	2.35	0.93
2:B:146:GLN:HG3	11:5:47:ARG:HH11	1.36	0.91
8:2:670:THR:HG22	8:2:672:PRO:CD	2.01	0.90
2:B:105:GLU:OE1	2:B:113:SER:OG	1.90	0.89
12:6:569:ILE:HG23	12:6:710:ASP:OD2	1.73	0.89
9:3:451:GLU:HB2	11:5:460:ARG:HH22	1.39	0.89
19:4:1004:ADP:O3B	12:6:581:LYS:NZ	2.06	0.89
13:7:469:LEU:O	13:7:473:ILE:HG22	1.74	0.88
9:3:462:MET:HG2	9:3:489:VAL:CG1	2.03	0.88
4:D:255:CYS:SG	4:D:269:LEU:O	2.31	0.87
14:X:593:GLU:OE1	14:X:692:LYS:NZ	2.06	0.87
10:4:529:SER:OG	13:7:448:MET:SD	2.33	0.87
9:3:456:ARG:HH21	13:7:327:ILE:HB	1.42	0.84
8:2:670:THR:CG2	8:2:672:PRO:HD2	2.05	0.84
9:3:391:LYS:NZ	13:7:620:HIS:O	2.10	0.84
9:3:456:ARG:HH21	13:7:327:ILE:CG2	1.87	0.84
9:3:456:ARG:HH22	13:7:327:ILE:CD1	1.91	0.84
14:X:45:TYR:OH	14:X:87:ASP:OD1	1.96	0.83
8:2:591:LEU:HD11	8:2:631:ILE:HD12	1.60	0.83
8:2:364:CYS:SG	8:2:368:LYS:N	2.51	0.83
9:3:544:ASP:OD1	9:3:704:THR:OG1	1.95	0.83
12:6:509:SER:OG	12:6:511:ASP:OD1	1.96	0.83
13:7:246:THR:O	13:7:247:ARG:HG3	1.78	0.83
8:2:241:SER:OG	8:2:413:ASP:OD2	1.96	0.82
13:7:558:ASN:OD1	13:7:560:ARG:NH1	2.12	0.82
2:B:79:LEU:HB3	2:B:85:CYS:SG	2.19	0.82
8:2:839:LYS:CE	8:2:843:ASP:OD2	2.28	0.82
2:B:174:SER:OG	2:B:177:GLU:OE1	1.98	0.81
9:3:527:ARG:NH2	11:5:715:GLU:OE1	2.13	0.81
12:6:523:GLU:OE2	12:6:524:HIS:NE2	2.13	0.81
3:C:97:LEU:HD13	3:C:170:GLU:OE2	1.81	0.80
2:B:182:ARG:NH2	4:D:294:ILE:O	2.14	0.80
12:6:161:ARG:HG2	12:6:162:GLU:HG3	1.62	0.80
14:X:144:GLN:N	14:X:144:GLN:OE1	2.14	0.80
14:X:291:PHE:CD2	14:X:474:GLU:CG	2.65	0.79
12:6:584:PHE:O	12:6:588:VAL:HG23	1.83	0.79
14:X:87:ASP:O	14:X:91:ILE:HD12	1.83	0.79
13:7:420:PRO:O	13:7:625:GLN:NE2	2.17	0.78
12:6:406:ASP:OD1	12:6:408:THR:OG1	1.99	0.78
8:2:752:GLU:O	8:2:756:SER:OG	2.01	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:2:591:LEU:CD1	8:2:631:ILE:HD12	2.13	0.78
10:4:531:TYR:OH	10:4:719:GLU:OE1	2.01	0.78
8:2:190:LYS:NZ	14:X:87:ASP:OD2	2.13	0.77
16:2:1001:ATP:O1B	12:6:798:ARG:NH2	2.16	0.77
10:4:274:GLN:NE2	10:4:278:ASP:OD1	2.18	0.76
5:E:624:ASN:OD1	5:E:626:GLU:N	2.18	0.76
13:7:290:SER:O	13:7:293:GLN:NE2	2.18	0.76
5:E:292:TYR:CE2	5:E:296:GLN:NE2	2.54	0.76
2:B:190:ASP:OD1	2:B:193:ARG:NH2	2.18	0.76
8:2:794:ARG:NH2	11:5:558:ASP:OD2	2.19	0.75
11:5:659:ILE:O	11:5:662:SER:OG	2.03	0.75
11:5:375:ALA:HB1	11:5:378:ILE:HD12	1.69	0.75
2:B:1:MET:HG2	2:B:2:SER:N	1.98	0.75
11:5:374:ILE:HD12	11:5:428:PHE:HE1	1.49	0.75
9:3:451:GLU:OE2	11:5:460:ARG:NH1	2.20	0.75
12:6:711:LEU:HD21	12:6:806:LEU:HD11	1.67	0.75
13:7:101:ASP:OD2	13:7:104:SER:OG	2.01	0.74
4:D:98:ILE:HD12	4:D:133:LEU:HD12	1.69	0.74
11:5:449:LEU:HD22	11:5:493:ILE:HD11	1.68	0.74
9:3:462:MET:CG	9:3:489:VAL:HG11	2.10	0.74
5:E:232:GLU:O	5:E:236:VAL:HG23	1.88	0.74
5:E:630:ILE:HD11	5:E:632:ILE:HD11	1.70	0.74
13:7:258:ILE:HD13	13:7:300:MET:HE2	1.69	0.74
8:2:485:ARG:NH2	8:2:769:TYR:OH	2.21	0.73
5:E:76:ASP:OD1	5:E:117:ARG:NH1	2.22	0.73
6:F:47:DG:OP1	9:3:193:ARG:NH1	2.21	0.73
8:2:591:LEU:HD23	8:2:592:GLU:O	1.89	0.73
8:2:549:LYS:NZ	16:2:1001:ATP:O1G	2.15	0.73
9:3:244:GLU:OE1	13:7:14:TYR:OH	2.06	0.73
11:5:755:LEU:CD1	11:5:761:ILE:HD11	2.09	0.73
10:4:574:LYS:NZ	19:4:1001:ADP:O3B	2.22	0.73
2:B:1:MET:CG	2:B:2:SER:H	1.99	0.72
5:E:79:ASN:ND2	5:E:117:ARG:O	2.22	0.72
8:2:785:LYS:O	8:2:789:VAL:HG23	1.90	0.72
8:2:839:LYS:HD2	8:2:843:ASP:OD2	1.90	0.71
11:5:370:LEU:HD11	11:5:602:TYR:CE2	2.24	0.71
13:7:320:GLN:OE1	13:7:320:GLN:N	2.23	0.71
11:5:384:ILE:HD11	11:5:556:VAL:HG22	1.72	0.71
9:3:456:ARG:HH22	13:7:327:ILE:CB	1.93	0.71
4:D:270:THR:O	4:D:273:SER:OG	2.08	0.71
8:2:854:ARG:HH21	8:2:858:ARG:NH1	1.88	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:7:585:ASN:OD1	13:7:585:ASN:O	2.08	0.71
11:5:263:GLU:N	11:5:263:GLU:OE2	2.24	0.70
13:7:122:ASP:OD2	13:7:198:ARG:NH1	2.25	0.70
8:2:656:ARG:NH2	12:6:792:SER:O	2.25	0.70
11:5:209:ARG:NH1	11:5:239:ASP:OD1	2.24	0.70
8:2:510:ASP:OD1	8:2:511:ILE:N	2.25	0.70
8:2:425:GLU:OE2	8:2:459:ARG:NE	2.25	0.69
9:3:365:GLN:NE2	9:3:636:ALA:HB1	2.07	0.69
5:E:249:ASN:OD1	5:E:250:SER:N	2.23	0.69
13:7:605:SER:OG	13:7:607:ASP:OD1	2.09	0.69
4:D:205:GLU:OE2	4:D:205:GLU:N	2.25	0.69
9:3:343:THR:OG1	9:3:346:ASP:OD2	2.06	0.69
9:3:688:ASN:HD22	13:7:606:ARG:HE	1.39	0.69
1:A:6:GLY:O	1:A:10:VAL:HG23	1.93	0.69
8:2:364:CYS:SG	8:2:368:LYS:CA	2.81	0.68
2:B:99:ASP:OD1	2:B:144:LYS:NZ	2.25	0.68
6:F:25:DT:H2"	6:F:26:DG:C8	2.29	0.68
13:7:599:LEU:H	13:7:727:LEU:HD13	1.58	0.68
11:5:729:SER:HG	11:5:732:THR:HG1	0.69	0.68
9:3:366:SER:OG	9:3:651:VAL:O	2.12	0.68
13:7:709:ASP:OD1	13:7:710:ILE:HG22	1.93	0.68
12:6:642:ASP:OD2	12:6:683:ASN:N	2.26	0.68
14:X:194:ARG:NH1	14:X:276:GLU:O	2.26	0.68
5:E:75:ASP:OD1	5:E:76:ASP:N	2.27	0.67
8:2:839:LYS:CD	8:2:843:ASP:OD2	2.43	0.67
14:X:300:GLU:OE1	14:X:300:GLU:N	2.27	0.67
13:7:598:PHE:HA	13:7:727:LEU:HD13	1.76	0.67
5:E:124:ASP:OD1	5:E:125:ALA:N	2.28	0.67
10:4:683:ASN:HD22	10:4:686:LEU:CD1	2.07	0.67
12:6:765:LEU:HD11	12:6:804:ILE:HD12	1.77	0.67
9:3:456:ARG:NH2	13:7:327:ILE:CD1	2.57	0.67
14:X:207:ASN:O	14:X:211:ASN:ND2	2.27	0.66
13:7:420:PRO:C	13:7:625:GLN:HE22	1.98	0.66
9:3:572:LEU:HD11	11:5:613:ARG:NH2	2.11	0.66
13:7:723:SER:O	13:7:727:LEU:HD12	1.96	0.66
11:5:682:ARG:NH1	11:5:685:GLN:OE1	2.28	0.66
13:7:459:MET:HE2	13:7:597:LEU:HD21	1.78	0.66
4:D:209:ILE:O	4:D:218:MET:HE2	1.96	0.66
9:3:712:HIS:ND1	9:3:725:ASP:OD1	2.26	0.66
9:3:570:ARG:NE	11:5:614:LEU:HD11	2.11	0.66
8:2:344:CYS:SG	8:2:367:CYS:CB	2.85	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
12:6:607:GLY:O	12:6:627:ALA:N	2.29	0.65
13:7:428:VAL:O	13:7:432:LEU:HD22	1.97	0.65
8:2:781:MET:SD	8:2:782:ASP:N	2.70	0.65
9:3:456:ARG:HH21	13:7:327:ILE:CB	1.94	0.65
9:3:318:LYS:HE2	9:3:320:LEU:HD11	1.78	0.65
8:2:360:ARG:NH2	12:6:345:THR:OG1	2.30	0.65
9:3:410:ASP:O	9:3:415:LYS:NZ	2.30	0.65
9:3:476:ASP:OD1	11:5:757:LYS:NZ	2.29	0.65
12:6:366:ASN:OD1	12:6:367:GLU:N	2.29	0.64
4:D:255:CYS:SG	4:D:269:LEU:N	2.70	0.64
8:2:367:CYS:SG	18:2:1003:ZN:ZN	1.86	0.64
9:3:623:GLU:OE1	9:3:624:LYS:N	2.31	0.64
13:7:89:GLN:OE1	13:7:102:LEU:N	2.28	0.64
13:7:455:ASN:N	13:7:595:ASP:OD2	2.31	0.64
2:B:187:GLU:OE2	3:C:179:LYS:NZ	2.24	0.64
12:6:364:ASN:CG	12:6:394:ARG:HE	2.00	0.64
8:2:344:CYS:SG	8:2:367:CYS:HB3	2.36	0.64
13:7:596:ILE:HD11	13:7:695:LEU:HD11	1.79	0.63
14:X:302:LEU:HD12	14:X:438:LYS:HG2	1.81	0.63
8:2:578:ALA:O	8:2:633:LYS:NZ	2.31	0.63
8:2:761:GLU:OE1	8:2:761:GLU:N	2.32	0.63
11:5:374:ILE:HD12	11:5:428:PHE:CE1	2.32	0.63
11:5:667:GLU:OE2	11:5:675:ARG:NH2	2.32	0.63
14:X:351:LYS:O	14:X:351:LYS:NZ	2.24	0.63
15:Y:71:ASN:ND2	15:Y:71:ASN:O	2.31	0.63
8:2:591:LEU:HD23	11:5:270:MET:HE2	1.81	0.63
8:2:786:VAL:CG2	11:5:573:ILE:HD11	2.29	0.63
8:2:856:GLN:OE1	8:2:856:GLN:N	2.31	0.63
13:7:246:THR:O	13:7:247:ARG:CG	2.45	0.63
4:D:190:TRP:CZ3	4:D:209:ILE:HD11	2.34	0.63
4:D:190:TRP:HZ3	4:D:209:ILE:HD11	1.64	0.62
8:2:626:GLN:OE1	8:2:626:GLN:N	2.30	0.62
14:X:656:GLU:O	14:X:661:LYS:NZ	2.32	0.62
5:E:345:ASN:O	5:E:349:SER:N	2.32	0.62
11:5:448:GLY:O	11:5:468:ALA:N	2.32	0.62
13:7:420:PRO:C	13:7:625:GLN:NE2	2.52	0.62
4:D:147:ARG:NE	4:D:179:GLU:OE2	2.29	0.62
11:5:658:ARG:NH1	11:5:661:GLU:OE2	2.32	0.62
1:A:40:ILE:O	1:A:44:VAL:HG23	2.00	0.62
9:3:703:GLU:OE1	16:7:1001:ATP:O3'	2.17	0.62
1:A:154:SER:OG	1:A:197:GLU:OE2	2.17	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:5:353:GLU:OE1	11:5:353:GLU:N	2.33	0.62
2:B:180:GLU:OE1	3:C:187:THR:HG21	1.99	0.61
10:4:378:GLU:OE1	12:6:95:ARG:NH2	2.33	0.61
5:E:105:ILE:HD11	5:E:117:ARG:HB3	1.82	0.61
4:D:98:ILE:HD11	4:D:129:MET:HB3	1.82	0.61
1:A:36:ILE:HD12	1:A:36:ILE:H	1.66	0.61
8:2:552:ILE:O	8:2:556:VAL:HG13	2.00	0.61
9:3:671:LEU:HD21	9:3:706:ILE:HG23	1.82	0.61
8:2:591:LEU:HD22	11:5:270:MET:HE1	1.83	0.60
13:7:634:GLU:OE1	13:7:634:GLU:N	2.32	0.60
8:2:511:ILE:O	8:2:515:VAL:HG12	2.02	0.60
10:4:632:ASP:O	10:4:674:SER:OG	2.19	0.60
14:X:465:ASP:OD1	14:X:466:ARG:N	2.34	0.60
8:2:631:ILE:HD11	8:2:640:LEU:HD13	1.84	0.59
9:3:456:ARG:NH2	13:7:327:ILE:HD12	2.16	0.59
3:C:105:PHE:CE2	3:C:170:GLU:OE1	2.54	0.59
8:2:358:GLU:OE1	8:2:358:GLU:N	2.35	0.59
9:3:688:ASN:HD22	13:7:606:ARG:HH21	1.49	0.59
10:4:206:ARG:NH1	10:4:247:ASN:OD1	2.36	0.59
12:6:585:LEU:CD1	12:6:679:LEU:HD21	2.33	0.59
9:3:318:LYS:HE2	9:3:320:LEU:HD21	1.85	0.59
10:4:820:GLU:N	10:4:820:GLU:OE1	2.35	0.59
13:7:336:ASN:ND2	13:7:377:GLU:OE2	2.35	0.59
13:7:615:HIS:CE1	13:7:625:GLN:OE1	2.55	0.59
8:2:824:ARG:NH1	8:2:833:ASP:OD2	2.36	0.59
5:E:71:TYR:CD2	5:E:96:LEU:HD22	2.38	0.58
9:3:449:ASP:OD1	9:3:450:ARG:N	2.37	0.58
12:6:570:ASN:O	12:6:710:ASP:HB3	2.02	0.58
10:4:274:GLN:NE2	10:4:274:GLN:O	2.36	0.58
13:7:508:LEU:HD21	13:7:557:LEU:HD11	1.84	0.58
4:D:261:PRO:O	4:D:264:LYS:NZ	2.32	0.58
8:2:854:ARG:NE	8:2:858:ARG:NH2	2.51	0.58
10:4:374:ILE:N	10:4:374:ILE:HD12	2.18	0.58
11:5:350:THR:N	11:5:353:GLU:OE2	2.37	0.58
3:C:108:ALA:O	3:C:112:ILE:HG13	2.03	0.58
9:3:358:ASP:OD1	9:3:358:ASP:N	2.35	0.58
9:3:234:GLU:N	9:3:234:GLU:OE1	2.36	0.58
10:4:709:LEU:HD13	10:4:711:LYS:HG2	1.79	0.58
12:6:574:VAL:HG21	12:6:699:LEU:HD21	1.85	0.58
4:D:204:GLU:OE2	4:D:207:GLN:NE2	2.37	0.57
8:2:778:LEU:HD11	8:2:814:LEU:HD12	1.85	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:4:199:MET:HE3	10:4:227:ILE:HD11	1.87	0.57
11:5:552:MET:CE	11:5:687:SER:OG	2.52	0.57
12:6:523:GLU:N	12:6:523:GLU:OE1	2.37	0.57
8:2:591:LEU:CD2	11:5:270:MET:HE2	2.34	0.57
9:3:98:ILE:HD11	9:3:157:PHE:CE1	2.40	0.57
11:5:552:MET:HE3	11:5:687:SER:OG	2.04	0.57
3:C:23:ASP:N	3:C:23:ASP:OD1	2.36	0.57
8:2:399:PRO:O	8:2:401:ARG:NH1	2.38	0.57
12:6:742:ILE:HG22	12:6:744:PRO:HD3	1.87	0.57
10:4:562:ILE:HA	10:4:703:ASP:OD2	2.05	0.56
14:X:84:LEU:HA	14:X:88:LEU:HD23	1.87	0.56
6:F:24:DG:O3'	14:X:401:ARG:NH2	2.39	0.56
8:2:591:LEU:HD22	11:5:270:MET:CE	2.35	0.56
9:3:688:ASN:ND2	13:7:606:ARG:HH21	2.03	0.56
12:6:609:THR:HG22	12:6:610:ALA:H	1.70	0.56
9:3:716:ARG:NH2	9:3:718:SER:OG	2.39	0.56
2:B:53:ILE:N	4:D:132:GLU:OE2	2.36	0.56
10:4:262:LEU:HD21	10:4:308:VAL:HG22	1.86	0.56
11:5:773:SER:O	11:5:773:SER:OG	2.21	0.56
13:7:607:ASP:OD1	13:7:607:ASP:N	2.39	0.56
14:X:291:PHE:HB2	14:X:474:GLU:OE2	2.06	0.56
10:4:709:LEU:CD1	10:4:711:LYS:CG	2.70	0.56
12:6:525:ILE:O	12:6:529:LEU:HD12	2.05	0.56
10:4:308:VAL:HG21	10:4:325:LEU:HD23	1.88	0.56
11:5:396:SER:OG	11:5:398:LYS:NZ	2.38	0.56
11:5:729:SER:OG	11:5:732:THR:OG1	1.96	0.56
13:7:709:ASP:OD1	13:7:710:ILE:N	2.39	0.56
12:6:262:VAL:HG13	12:6:262:VAL:O	2.06	0.55
11:5:602:TYR:OH	11:5:666:LEU:O	2.24	0.55
13:7:203:TYR:OH	13:7:336:ASN:O	2.22	0.55
10:4:583:LYS:NZ	13:7:447:GLY:O	2.39	0.55
12:6:576:ASP:OD1	12:6:689:TYR:N	2.40	0.55
14:X:517:LEU:HD23	14:X:572:LEU:HD21	1.88	0.55
10:4:705:VAL:O	10:4:705:VAL:HG13	2.06	0.55
13:7:599:LEU:O	13:7:727:LEU:HD22	2.06	0.55
2:B:146:GLN:CB	11:5:47:ARG:NH1	2.70	0.55
3:C:112:ILE:O	3:C:116:SER:N	2.40	0.55
10:4:516:GLU:OE1	10:4:516:GLU:N	2.37	0.55
10:4:547:GLY:N	10:4:560:GLY:O	2.37	0.55
9:3:235:ASP:OD1	9:3:236:THR:N	2.37	0.55
10:4:234:ARG:NE	10:4:284:ILE:HD11	2.22	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:151:ILE:HD11	4:D:175:LEU:HD22	1.88	0.55
8:2:636:ILE:O	8:2:638:THR:HG22	2.07	0.54
9:3:456:ARG:HH22	13:7:327:ILE:HD13	1.70	0.54
12:6:144:LYS:HA	12:6:196:LEU:HD13	1.90	0.54
11:5:393:MET:HE1	11:5:602:TYR:CE2	2.43	0.54
14:X:119:ALA:O	14:X:123:LYS:HE3	2.08	0.54
14:X:497:ASP:OD1	14:X:498:ILE:N	2.39	0.54
9:3:570:ARG:CZ	11:5:614:LEU:HD11	2.38	0.54
10:4:183:THR:OG1	10:4:185:VAL:HG22	2.07	0.54
8:2:789:VAL:HG22	8:2:864:TYR:CE1	2.42	0.54
10:4:713:ASP:OD1	10:4:714:GLU:N	2.40	0.54
11:5:162:LEU:HD21	11:5:328:ILE:CD1	2.38	0.54
5:E:411:ARG:NH2	5:E:486:ASP:OD1	2.40	0.54
9:3:416:SER:O	9:3:420:ARG:HG2	2.08	0.54
12:6:147:ASP:OD1	12:6:147:ASP:O	2.25	0.54
13:7:595:ASP:C	13:7:596:ILE:HD12	2.28	0.53
8:2:808:ARG:HG2	8:2:808:ARG:HH11	1.72	0.53
9:3:212:ARG:HH11	9:3:232:PRO:HG3	1.73	0.53
13:7:247:ARG:HD3	13:7:314:LYS:HD2	1.90	0.53
15:Y:62:ASP:OD1	15:Y:63:LYS:N	2.42	0.53
12:6:150:THR:OG1	12:6:384:ASP:OD2	2.26	0.53
14:X:96:GLU:O	14:X:96:GLU:OE1	2.27	0.53
9:3:676:ILE:HD11	13:7:617:THR:HG23	1.91	0.53
10:4:508:LYS:NZ	10:4:512:VAL:HG23	2.24	0.53
8:2:670:THR:HG22	8:2:671:GLU:N	2.24	0.53
13:7:453:ASP:OD2	13:7:562:SER:N	2.42	0.53
9:3:582:VAL:HG11	11:5:399:ILE:HG13	1.91	0.53
2:B:79:LEU:CB	2:B:85:CYS:SG	2.95	0.53
8:2:311:GLU:OE1	8:2:312:SER:N	2.42	0.53
10:4:375:ASP:OD1	14:X:681:ARG:NH1	2.41	0.53
14:X:187:ILE:HD13	14:X:277:PHE:CE2	2.44	0.53
9:3:216:ASP:OD1	9:3:217:ALA:N	2.42	0.53
11:5:633:LEU:HD13	11:5:647:PRO:CA	2.39	0.53
11:5:708:LEU:HA	11:5:711:ILE:HD12	1.91	0.52
10:4:532:GLU:O	10:4:533:LEU:HD12	2.10	0.52
5:E:294:LEU:O	5:E:298:GLU:HG3	2.09	0.52
5:E:609:PHE:CD2	5:E:630:ILE:HD13	2.44	0.52
9:3:412:SER:N	16:3:1001:ATP:O2B	2.42	0.52
11:5:719:LYS:HE3	11:5:755:LEU:HD21	1.90	0.52
13:7:615:HIS:HE1	13:7:625:GLN:OE1	1.92	0.52
5:E:259:LEU:HD22	5:E:264:GLU:O	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
12:6:765:LEU:HD11	12:6:804:ILE:CD1	2.40	0.52
14:X:47:LEU:HD12	14:X:47:LEU:N	2.25	0.52
4:D:188:LEU:HD23	4:D:188:LEU:C	2.29	0.52
14:X:206:LEU:HD13	14:X:285:PRO:HB2	1.90	0.52
4:D:281:VAL:HG23	4:D:282:ILE:HG23	1.90	0.52
8:2:319:ARG:NH2	8:2:425:GLU:OE1	2.43	0.52
10:4:199:MET:HE3	10:4:199:MET:HA	1.92	0.52
13:7:464:VAL:HG23	13:7:466:LYS:HG3	1.92	0.52
3:C:104:PHE:CB	3:C:170:GLU:OE2	2.50	0.52
13:7:459:MET:CE	13:7:597:LEU:HD21	2.40	0.52
8:2:591:LEU:HD13	8:2:631:ILE:HD12	1.92	0.52
11:5:463:TYR:HA	11:5:509:ILE:HD13	1.92	0.52
10:4:758:ILE:O	10:4:759:HIS:ND1	2.43	0.51
13:7:598:PHE:HA	13:7:727:LEU:CD1	2.39	0.51
1:A:84:ARG:NH1	4:D:216:VAL:HG21	2.25	0.51
11:5:690:ASP:OD1	11:5:691:ALA:N	2.43	0.51
13:7:214:ARG:HG2	13:7:215:TYR:CD1	2.45	0.51
12:6:447:ASP:OD1	12:6:447:ASP:O	2.28	0.51
13:7:726:SER:O	13:7:727:LEU:HD23	2.10	0.51
9:3:225:ILE:HD12	9:3:225:ILE:H	1.75	0.51
5:E:92:LEU:HD13	5:E:140:ILE:HD11	1.92	0.51
9:3:450:ARG:NH1	9:3:450:ARG:O	2.43	0.51
9:3:648:PRO:HG2	9:3:650:LEU:HD13	1.93	0.51
9:3:688:ASN:ND2	13:7:606:ARG:HE	2.06	0.51
10:4:234:ARG:CD	10:4:284:ILE:HD11	2.41	0.51
1:A:7:ASN:O	1:A:11:LEU:HD23	2.11	0.51
12:6:668:ILE:O	12:6:668:ILE:HG23	2.10	0.51
10:4:709:LEU:HD12	10:4:709:LEU:O	2.10	0.51
11:5:371:THR:O	11:5:374:ILE:HG22	2.10	0.51
14:X:486:GLN:NE2	14:X:497:ASP:O	2.44	0.51
14:X:422:GLN:N	14:X:422:GLN:OE1	2.44	0.51
5:E:16:LEU:O	5:E:20:SER:OG	2.18	0.50
9:3:39:ARG:NH1	9:3:136:MET:CE	2.74	0.50
10:4:534:GLU:OE1	10:4:534:GLU:N	2.40	0.50
12:6:613:VAL:HG21	12:6:624:GLU:OE1	2.11	0.50
3:C:104:PHE:HB3	3:C:170:GLU:CD	2.30	0.50
9:3:688:ASN:HD22	13:7:606:ARG:NE	2.08	0.50
14:X:180:ILE:O	14:X:184:LEU:HG	2.10	0.50
14:X:768:LEU:HD23	15:Y:130:VAL:HG22	1.92	0.50
8:2:328:THR:O	8:2:386:GLN:NE2	2.43	0.50
10:4:718:ARG:HB2	13:7:665:ILE:HD11	1.92	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:282:ILE:C	4:D:282:ILE:HD12	2.31	0.50
8:2:184:GLU:O	8:2:187:SER:OG	2.29	0.50
14:X:132:LEU:HD11	14:X:167:ILE:HD11	1.93	0.50
14:X:301:LEU:HD21	14:X:426:ALA:HB1	1.93	0.50
8:2:755:ILE:HD11	12:6:560:VAL:CG2	2.42	0.50
10:4:769:GLU:OE2	10:4:822:VAL:HG21	2.12	0.50
12:6:516:LEU:HD21	12:6:757:TYR:CG	2.46	0.50
13:7:26:VAL:HG12	13:7:26:VAL:O	2.12	0.50
9:3:449:ASP:OD2	9:3:452:THR:OG1	2.30	0.50
11:5:393:MET:CE	11:5:602:TYR:CE2	2.95	0.50
9:3:676:ILE:CG1	13:7:617:THR:HG21	2.42	0.50
12:6:577:PRO:O	12:6:578:SER:OG	2.21	0.50
9:3:308:GLN:OE1	11:5:209:ARG:NE	2.40	0.50
10:4:241:LEU:HD23	10:4:276:ILE:HD11	1.94	0.50
9:3:406:LEU:HD12	9:3:407:MET:N	2.27	0.49
10:4:608:ASP:O	10:4:612:LYS:N	2.44	0.49
8:2:488:SER:OG	8:2:824:ARG:O	2.24	0.49
9:3:451:GLU:CD	11:5:460:ARG:HH12	2.13	0.49
13:7:612:LEU:C	13:7:612:LEU:HD23	2.33	0.49
7:G:4:DG:OP2	10:4:451:ARG:NH1	2.45	0.49
8:2:707:HIS:NE2	12:6:763:PRO:O	2.44	0.49
11:5:350:THR:OG1	11:5:353:GLU:OE1	2.23	0.49
11:5:719:LYS:CE	11:5:755:LEU:HD21	2.43	0.49
14:X:540:LEU:HA	14:X:543:VAL:HG12	1.93	0.49
2:B:132:ASP:OD1	2:B:132:ASP:C	2.50	0.49
5:E:624:ASN:OD1	5:E:625:PHE:N	2.45	0.49
9:3:39:ARG:NH1	9:3:136:MET:HE2	2.28	0.49
9:3:441:GLY:O	9:3:461:ALA:N	2.42	0.49
9:3:570:ARG:HE	11:5:614:LEU:HD11	1.77	0.49
10:4:656:ILE:HD11	10:4:665:LEU:HD11	1.94	0.49
1:A:130:TYR:HB2	4:D:193:LEU:HD12	1.93	0.49
11:5:420:THR:O	11:5:420:THR:HG22	2.13	0.49
13:7:312:GLU:OE1	13:7:334:HIS:NE2	2.46	0.49
10:4:629:CYS:N	10:4:670:SER:O	2.43	0.49
10:4:652:GLN:HA	10:4:652:GLN:OE1	2.13	0.49
10:4:683:ASN:HD22	10:4:686:LEU:HD13	1.78	0.49
13:7:544:GLN:O	13:7:545:THR:OG1	2.26	0.49
10:4:678:ILE:HD11	10:4:693:ASP:HB2	1.94	0.49
13:7:510:GLY:HA3	13:7:514:VAL:HG21	1.93	0.49
9:3:456:ARG:CZ	13:7:327:ILE:HD12	2.42	0.49
14:X:400:LYS:HG3	14:X:401:ARG:N	2.28	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:X:517:LEU:CD2	14:X:572:LEU:HD21	2.43	0.49
14:X:28:ALA:HB2	14:X:83:ILE:HD11	1.95	0.48
9:3:456:ARG:HH22	13:7:327:ILE:CG1	2.26	0.48
14:X:592:ILE:HD12	14:X:675:TYR:CE1	2.48	0.48
14:X:768:LEU:CD2	15:Y:130:VAL:HG22	2.43	0.48
10:4:606:THR:OG1	10:4:607:ARG:N	2.46	0.48
12:6:781:ARG:NH1	12:6:792:SER:OG	2.46	0.48
9:3:580:GLU:HB2	9:3:581:PRO:HD2	1.96	0.48
10:4:744:VAL:O	10:4:748:THR:HG23	2.14	0.48
13:7:685:THR:O	13:7:688:THR:N	2.45	0.48
10:4:696:PRO:N	10:4:697:PRO:HD2	2.28	0.48
12:6:652:ILE:HG13	12:6:652:ILE:O	2.14	0.48
14:X:291:PHE:CB	14:X:474:GLU:OE2	2.62	0.48
4:D:209:ILE:O	4:D:218:MET:CE	2.61	0.48
10:4:234:ARG:HD3	10:4:284:ILE:HD11	1.95	0.48
13:7:517:ASP:OD1	13:7:518:ASN:N	2.47	0.48
2:B:105:GLU:OE2	2:B:155:LYS:NZ	2.46	0.48
2:B:164:ASN:OD1	2:B:164:ASN:N	2.46	0.48
10:4:331:LEU:HD23	10:4:332:VAL:O	2.13	0.48
8:2:562:ARG:NH1	8:2:600:ASP:O	2.47	0.48
10:4:740:ASP:OD1	10:4:740:ASP:C	2.52	0.48
12:6:393:ASP:OD1	12:6:393:ASP:C	2.52	0.48
14:X:89:LEU:HD22	14:X:175:VAL:HG21	1.95	0.48
9:3:673:GLN:OE1	9:3:677:ASN:ND2	2.39	0.48
2:B:10:THR:OG1	2:B:11:PHE:N	2.47	0.48
10:4:565:LEU:HD23	10:4:566:LEU:N	2.29	0.48
11:5:708:LEU:H	11:5:708:LEU:HD22	1.76	0.48
13:7:605:SER:OG	13:7:608:ASP:OD1	2.32	0.48
4:D:255:CYS:SG	4:D:270:THR:N	2.85	0.47
9:3:485:ALA:O	9:3:489:VAL:HG23	2.14	0.47
12:6:807:SER:CB	12:6:824:ILE:HD13	2.44	0.47
13:7:482:TYR:HA	13:7:522:CYS:HB2	1.94	0.47
14:X:291:PHE:CB	14:X:474:GLU:HG2	2.43	0.47
5:E:71:TYR:OH	5:E:98:ILE:HD11	2.14	0.47
14:X:493:ASP:OD1	14:X:494:ASN:N	2.46	0.47
2:B:150:GLU:OE2	11:5:47:ARG:HD3	2.13	0.47
3:C:131:ARG:NH2	3:C:168:LYS:O	2.47	0.47
5:E:466:LEU:HD11	5:E:470:ARG:NE	2.29	0.47
9:3:192:VAL:HG21	9:3:284:ASP:OD1	2.15	0.47
10:4:683:ASN:ND2	10:4:686:LEU:CD1	2.77	0.47
10:4:692:ILE:HG22	10:4:692:ILE:O	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:5:648:ILE:HG21	11:5:653:LEU:HD23	1.96	0.47
14:X:476:LEU:HD12	14:X:535:ALA:CB	2.44	0.47
15:Y:94:PHE:CD1	15:Y:94:PHE:C	2.88	0.47
1:A:38:ARG:HA	1:A:41:LEU:HD12	1.96	0.47
2:B:146:GLN:HB3	11:5:47:ARG:NH1	2.29	0.47
5:E:292:TYR:OH	5:E:296:GLN:NE2	2.28	0.47
8:2:515:VAL:HG21	8:2:556:VAL:HG11	1.94	0.47
9:3:470:VAL:CG1	9:3:512:VAL:HG22	2.44	0.47
1:A:40:ILE:HG21	1:A:86:LEU:HD21	1.97	0.47
4:D:98:ILE:HD12	4:D:133:LEU:CD1	2.43	0.47
5:E:345:ASN:OD1	5:E:345:ASN:C	2.52	0.47
8:2:790:TYR:OH	8:2:794:ARG:NH1	2.48	0.47
9:3:34:THR:HG1	9:3:106:PHE:HE1	1.61	0.47
9:3:318:LYS:CE	9:3:320:LEU:HD21	2.45	0.47
13:7:517:ASP:OD1	13:7:517:ASP:C	2.53	0.47
13:7:726:SER:C	13:7:727:LEU:HD23	2.35	0.47
5:E:426:GLU:OE2	5:E:547:ARG:NH1	2.47	0.47
9:3:442:LEU:CD1	9:3:486:ILE:HD11	2.45	0.47
11:5:162:LEU:C	11:5:162:LEU:HD12	2.35	0.47
11:5:648:ILE:HG21	11:5:653:LEU:CD2	2.45	0.47
3:C:96:ASP:OD2	3:C:99:SER:OG	2.31	0.47
5:E:622:ILE:O	5:E:622:ILE:HG22	2.13	0.47
8:2:234:LEU:HD23	8:2:235:GLY:N	2.29	0.47
8:2:695:LEU:O	8:2:699:VAL:HG23	2.14	0.47
11:5:490:ARG:NH2	11:5:541:ASP:O	2.48	0.47
11:5:755:LEU:HB3	11:5:761:ILE:HD12	1.97	0.47
2:B:97:GLU:OE2	2:B:97:GLU:HA	2.15	0.47
5:E:572:ILE:HD12	5:E:579:TYR:OH	2.15	0.47
11:5:657:ILE:HG22	11:5:658:ARG:N	2.30	0.47
14:X:463:GLU:CD	14:X:463:GLU:O	2.54	0.47
7:G:11:DC:H2"	7:G:12:DT:H72	1.97	0.47
8:2:472:ASP:O	8:2:475:SER:OG	2.32	0.47
12:6:574:VAL:CG2	12:6:699:LEU:HD21	2.45	0.47
13:7:246:THR:C	13:7:247:ARG:HG3	2.34	0.47
13:7:414:LEU:HD12	13:7:638:MET:HG3	1.97	0.47
13:7:546:ILE:O	13:7:557:LEU:N	2.44	0.47
14:X:418:LEU:HD12	14:X:418:LEU:O	2.14	0.47
6:F:25:DT:C4'	14:X:401:ARG:HH12	2.27	0.46
11:5:361:SER:HA	11:5:366:LEU:HD22	1.96	0.46
13:7:67:LEU:HD22	13:7:121:ILE:HG23	1.97	0.46
1:A:77:LEU:HD11	3:C:53:ILE:HG21	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:E:635:GLU:OE2	5:E:635:GLU:N	2.45	0.46
12:6:743:GLU:N	12:6:743:GLU:OE1	2.49	0.46
14:X:463:GLU:OE2	14:X:466:ARG:HB3	2.16	0.46
5:E:71:TYR:HH	5:E:103:TYR:HH	1.60	0.46
11:5:266:PRO:HG2	11:5:269:GLU:HG3	1.98	0.46
16:5:1001:ATP:N3	16:5:1001:ATP:C2'	2.79	0.46
14:X:58:LEU:HD23	14:X:131:LEU:HD21	1.97	0.46
11:5:392:LEU:HD11	11:5:432:VAL:HG11	1.97	0.46
11:5:568:ILE:O	11:5:572:VAL:HG23	2.15	0.46
13:7:263:ASP:OD1	13:7:263:ASP:N	2.41	0.46
1:A:165:VAL:HG11	1:A:200:ILE:HD11	1.97	0.46
4:D:125:PRO:O	4:D:129:MET:HG2	2.15	0.46
8:2:591:LEU:CD2	11:5:270:MET:CE	2.92	0.46
12:6:523:GLU:CD	12:6:524:HIS:CD2	2.86	0.46
14:X:507:GLU:O	14:X:511:ILE:HG12	2.15	0.46
8:2:364:CYS:SG	8:2:368:LYS:C	2.93	0.46
9:3:698:THR:HG22	9:3:699:ALA:N	2.31	0.46
10:4:422:GLU:HG2	10:4:423:LEU:N	2.29	0.46
10:4:502:THR:OG1	10:4:505:ASP:OD2	2.28	0.46
14:X:92:LEU:HD22	14:X:175:VAL:HG13	1.97	0.46
5:E:18:ASN:ND2	5:E:79:ASN:OD1	2.46	0.46
8:2:615:GLN:O	8:2:618:THR:OG1	2.29	0.46
9:3:283:VAL:HG13	9:3:284:ASP:N	2.30	0.46
9:3:576:TYR:O	9:3:577:LEU:C	2.52	0.46
13:7:440:VAL:HG11	13:7:452:GLY:O	2.15	0.46
14:X:97:ASN:O	14:X:101:LEU:HD22	2.15	0.46
14:X:520:ALA:HB1	14:X:528:VAL:HG13	1.97	0.46
8:2:797:SER:O	8:2:802:SER:OG	2.34	0.46
10:4:709:LEU:HD12	10:4:709:LEU:C	2.35	0.46
11:5:648:ILE:HG22	11:5:649:THR:N	2.31	0.46
12:6:323:GLN:OE1	12:6:323:GLN:N	2.48	0.46
5:E:45:LEU:HD21	5:E:255:ILE:HD12	1.97	0.46
11:5:374:ILE:HG23	11:5:385:LYS:HD3	1.98	0.46
13:7:455:ASN:ND2	13:7:541:MET:SD	2.89	0.46
14:X:251:ASN:OD1	14:X:433:ASN:ND2	2.45	0.46
8:2:597:VAL:HG21	8:2:640:LEU:HD23	1.98	0.46
1:A:41:LEU:HD22	4:D:201:TYR:CD2	2.50	0.45
8:2:255:ILE:HD11	8:2:259:PHE:CE1	2.51	0.45
9:3:386:MET:O	9:3:714:LYS:NZ	2.36	0.45
9:3:456:ARG:NH1	13:7:327:ILE:HD12	2.31	0.45
12:6:96:ALA:HB2	14:X:221:THR:HG22	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
12:6:629:MET:HE1	12:6:672:LEU:HD13	1.98	0.45
12:6:679:LEU:C	12:6:679:LEU:HD23	2.37	0.45
14:X:743:ASP:OD1	14:X:743:ASP:C	2.55	0.45
8:2:783:MET:HG2	11:5:573:ILE:HG21	1.97	0.45
12:6:710:ASP:O	12:6:711:LEU:HD23	2.16	0.45
14:X:184:LEU:HA	14:X:187:ILE:HG22	1.99	0.45
14:X:753:LEU:HD21	14:X:760:PHE:CE1	2.51	0.45
8:2:778:LEU:CD1	8:2:814:LEU:HD12	2.46	0.45
10:4:635:ASP:OD1	10:4:636:LYS:N	2.49	0.45
13:7:492:GLY:O	13:7:494:THR:N	2.49	0.45
8:2:367:CYS:HG	18:2:1003:ZN:ZN	1.28	0.45
3:C:135:LEU:HD21	3:C:177:TYR:HB2	1.98	0.45
9:3:638:ASN:ND2	9:3:644:GLY:O	2.50	0.45
11:5:377:SER:OG	11:5:575:ILE:HD11	2.17	0.45
5:E:145:ASP:OD1	5:E:146:GLY:N	2.49	0.45
9:3:688:ASN:HD22	13:7:606:ARG:NH2	2.13	0.45
5:E:229:GLN:O	5:E:232:GLU:HG2	2.17	0.45
6:F:21:DT:H2"	6:F:22:DG:C8	2.51	0.45
8:2:234:LEU:HD23	8:2:234:LEU:C	2.37	0.45
11:5:450:THR:OG1	11:5:451:ALA:N	2.49	0.45
11:5:749:ASP:N	11:5:749:ASP:OD1	2.49	0.45
9:3:705:LEU:HD21	9:3:733:LEU:HD23	1.98	0.45
13:7:347:ASP:OD1	13:7:348:ILE:N	2.49	0.45
1:A:93:ARG:NH1	1:A:127:GLU:OE2	2.50	0.45
8:2:536:ASP:OD2	8:2:627:GLN:NE2	2.44	0.45
13:7:508:LEU:C	13:7:508:LEU:HD23	2.37	0.45
2:B:118:ASN:OD1	2:B:118:ASN:O	2.34	0.45
4:D:248:GLU:OE2	4:D:252:GLY:HA2	2.17	0.45
8:2:814:LEU:O	8:2:818:GLU:HG3	2.17	0.45
5:E:124:ASP:OD1	5:E:126:HIS:N	2.44	0.44
5:E:393:ASP:OD1	5:E:393:ASP:C	2.55	0.44
10:4:421:ASP:O	10:4:424:VAL:HG12	2.18	0.44
11:5:541:ASP:OD1	11:5:541:ASP:N	2.50	0.44
12:6:373:MET:SD	12:6:373:MET:N	2.90	0.44
8:2:578:ALA:CB	8:2:591:LEU:HD21	2.47	0.44
11:5:403:GLY:O	11:5:405:ARG:NH1	2.50	0.44
5:E:27:LEU:HD11	5:E:82:LEU:HD23	2.00	0.44
5:E:319:ASN:N	5:E:319:ASN:OD1	2.50	0.44
9:3:347:ILE:O	9:3:350:ILE:HG22	2.18	0.44
14:X:554:SER:HA	14:X:557:ILE:HD12	1.99	0.44
10:4:401:GLU:OE2	10:4:413:HIS:N	2.45	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:5:761:ILE:HG22	11:5:762:GLN:N	2.33	0.44
14:X:450:ASN:OD1	14:X:451:ILE:N	2.50	0.44
8:2:397:VAL:HG12	8:2:398:PRO:O	2.18	0.44
8:2:547:THR:HG21	8:2:683:VAL:CG1	2.46	0.44
14:X:92:LEU:HD21	14:X:178:ALA:HB3	1.99	0.44
3:C:33:ASN:OD1	3:C:33:ASN:O	2.36	0.44
3:C:175:GLU:OE2	3:C:178:LYS:NZ	2.43	0.44
5:E:579:TYR:CE2	5:E:637:LEU:HD22	2.51	0.44
9:3:570:ARG:HG3	11:5:614:LEU:HD21	1.98	0.44
10:4:686:LEU:HD12	10:4:686:LEU:H	1.83	0.44
11:5:455:ARG:HD3	11:5:460:ARG:HG3	1.98	0.44
12:6:402:ILE:HG21	12:6:455:LEU:HD12	1.99	0.44
5:E:570:ALA:HB2	5:E:581:VAL:HG22	1.99	0.44
9:3:702:LEU:O	9:3:702:LEU:HD23	2.17	0.44
12:6:585:LEU:HD11	12:6:679:LEU:HD21	1.99	0.44
15:Y:119:GLY:HA2	15:Y:125:LEU:HD23	1.98	0.44
2:B:146:GLN:HB3	11:5:47:ARG:HH12	1.82	0.44
9:3:436:GLY:O	9:3:438:SER:N	2.51	0.44
11:5:472:ALA:O	11:5:517:THR:HG22	2.18	0.44
1:A:52:GLU:OE1	1:A:52:GLU:HA	2.18	0.44
5:E:151:THR:O	5:E:151:THR:OG1	2.27	0.44
9:3:572:LEU:CD1	9:3:578:GLU:HB3	2.48	0.44
10:4:686:LEU:HD12	10:4:686:LEU:N	2.33	0.44
11:5:760:THR:HG22	11:5:761:ILE:HG13	1.99	0.44
1:A:141:LEU:HD11	4:D:182:TYR:CD1	2.53	0.43
5:E:71:TYR:CZ	5:E:98:ILE:HD11	2.53	0.43
9:3:672:THR:OG1	9:3:720:THR:OG1	2.34	0.43
12:6:124:VAL:HG12	12:6:135:VAL:CG2	2.48	0.43
14:X:282:ILE:CG2	14:X:286:LEU:HD11	2.48	0.43
5:E:357:LYS:NZ	8:2:236:GLU:OE2	2.40	0.43
9:3:312:ASN:O	9:3:313:THR:OG1	2.31	0.43
10:4:374:ILE:HD12	10:4:374:ILE:H	1.80	0.43
15:Y:126:ARG:O	15:Y:130:VAL:HG23	2.18	0.43
8:2:247:ARG:HB3	8:2:247:ARG:NH1	2.34	0.43
8:2:786:VAL:HG21	11:5:573:ILE:HD11	1.98	0.43
13:7:596:ILE:HD12	13:7:596:ILE:N	2.33	0.43
14:X:344:GLN:OE1	14:X:344:GLN:HA	2.17	0.43
14:X:734:SER:O	14:X:738:VAL:HG23	2.19	0.43
10:4:199:MET:CE	10:4:227:ILE:HD11	2.48	0.43
11:5:374:ILE:O	11:5:374:ILE:CG2	2.65	0.43
15:Y:78:ILE:HD11	15:Y:91:ILE:HD11	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:31:DC:H2'	6:F:32:DT:H72	2.00	0.43
14:X:540:LEU:HD11	14:X:598:VAL:HG22	1.99	0.43
14:X:742:SER:O	14:X:743:ASP:C	2.57	0.43
2:B:22:ASN:OD1	4:D:135:ARG:NH1	2.47	0.43
9:3:451:GLU:HB2	11:5:460:ARG:NH2	2.21	0.43
11:5:626:PHE:CD1	11:5:653:LEU:HD21	2.54	0.43
12:6:511:ASP:OD1	12:6:512:GLU:N	2.51	0.43
14:X:180:ILE:HD11	14:X:262:VAL:HA	2.00	0.43
11:5:740:THR:HG22	11:5:742:ARG:NE	2.34	0.43
10:4:263:ASN:ND2	13:7:136:ASP:OD2	2.52	0.43
10:4:774:TYR:HD2	12:6:728:ALA:HB2	1.84	0.43
11:5:400:LEU:HD12	11:5:404:MET:O	2.19	0.43
11:5:402:ASP:OD1	11:5:403:GLY:N	2.52	0.43
13:7:513:LEU:HD13	13:7:540:VAL:HG21	2.01	0.43
3:C:39:THR:OG1	3:C:40:LYS:N	2.52	0.43
5:E:609:PHE:CE2	5:E:630:ILE:HD13	2.54	0.43
10:4:592:SER:OG	10:4:593:GLY:N	2.51	0.43
11:5:162:LEU:HD11	11:5:258:LEU:CD2	2.49	0.43
11:5:383:ASP:OD1	11:5:383:ASP:N	2.50	0.43
4:D:248:GLU:OE1	4:D:249:ASN:O	2.36	0.42
6:F:26:DG:H2"	6:F:27:DA:C8	2.54	0.42
9:3:562:SER:O	9:3:566:LEU:HG	2.19	0.42
12:6:143:MET:O	12:6:147:ASP:N	2.52	0.42
13:7:146:ARG:NH1	13:7:268:GLU:O	2.51	0.42
13:7:293:GLN:HB2	15:Y:105:LYS:HZ2	1.84	0.42
13:7:409:ASP:O	13:7:410:VAL:C	2.57	0.42
13:7:629:ASP:OD1	13:7:630:PHE:N	2.52	0.42
14:X:546:THR:HG23	14:X:557:ILE:HD13	2.01	0.42
2:B:15:GLU:OE1	4:D:71:ARG:NH1	2.51	0.42
9:3:185:ILE:HD11	9:3:291:ARG:NH1	2.34	0.42
10:4:432:ARG:HH11	10:4:432:ARG:HG3	1.84	0.42
13:7:711:ASP:O	13:7:715:GLU:HG3	2.18	0.42
8:2:653:ASN:N	8:2:666:ASN:O	2.49	0.42
10:4:541:LEU:HD23	10:4:541:LEU:C	2.39	0.42
14:X:540:LEU:O	14:X:543:VAL:HG12	2.19	0.42
14:X:542:LEU:O	14:X:542:LEU:HD12	2.19	0.42
6:F:31:DC:H2'	6:F:32:DT:C7	2.49	0.42
8:2:264:PRO:HB3	8:2:317:LEU:HD13	2.01	0.42
9:3:479:THR:HG22	9:3:480:ASP:N	2.34	0.42
11:5:483:ASP:OD1	11:5:484:LYS:N	2.51	0.42
13:7:440:VAL:HG22	13:7:441:ASP:N	2.34	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
15:Y:70:LYS:HD2	15:Y:70:LYS:C	2.39	0.42
1:A:5:LEU:N	1:A:5:LEU:HD22	2.35	0.42
5:E:312:THR:O	5:E:315:THR:HG22	2.20	0.42
13:7:481:VAL:O	13:7:522:CYS:HB2	2.20	0.42
5:E:256:TYR:HE2	5:E:298:GLU:OE1	2.02	0.42
6:F:29:DA:C8	6:F:30:DT:H72	2.55	0.42
9:3:572:LEU:HD11	9:3:578:GLU:HB3	2.01	0.42
10:4:616:LEU:O	10:4:616:LEU:HD23	2.20	0.42
11:5:711:ILE:HG23	11:5:751:ALA:HB2	2.01	0.42
13:7:414:LEU:HD13	13:7:414:LEU:HA	1.94	0.42
14:X:484:LYS:HD2	14:X:538:GLU:OE2	2.20	0.42
1:A:67:VAL:HG12	1:A:71:GLN:OE1	2.19	0.42
13:7:599:LEU:N	13:7:727:LEU:HD13	2.31	0.42
1:A:92:LEU:O	1:A:96:ILE:HG12	2.19	0.42
9:3:456:ARG:NH2	13:7:327:ILE:CG1	2.80	0.42
9:3:673:GLN:O	9:3:676:ILE:HG22	2.20	0.42
10:4:833:ILE:O	10:4:834:LYS:CB	2.68	0.42
8:2:311:GLU:OE1	8:2:311:GLU:N	2.53	0.42
9:3:170:THR:O	9:3:170:THR:HG22	2.20	0.42
12:6:101:LYS:HA	14:X:422:GLN:HE22	1.85	0.42
1:A:94:THR:HG23	1:A:130:TYR:CE2	2.55	0.42
2:B:146:GLN:HG3	11:5:47:ARG:NH1	2.13	0.42
3:C:135:LEU:HD23	3:C:135:LEU:O	2.20	0.42
9:3:687:ARG:NH2	13:7:602:ASP:OD1	2.53	0.42
10:4:320:ASN:OD1	10:4:320:ASN:C	2.58	0.42
10:4:549:ASN:OD1	10:4:559:ARG:NH2	2.53	0.42
10:4:577:ILE:O	10:4:581:VAL:HG13	2.19	0.42
13:7:441:ASP:O	13:7:442:LYS:C	2.58	0.42
3:C:21:GLN:OE1	3:C:69:VAL:HG13	2.20	0.41
8:2:578:ALA:HB1	8:2:591:LEU:HD21	2.02	0.41
9:3:281:ASP:OD1	9:3:281:ASP:N	2.52	0.41
11:5:450:THR:O	11:5:467:GLY:N	2.43	0.41
11:5:486:ARG:NE	11:5:488:GLU:OE2	2.47	0.41
9:3:107:ASP:OD1	9:3:109:SER:OG	2.37	0.41
2:B:50:TRP:HD1	2:B:52:LEU:HD21	1.86	0.41
4:D:209:ILE:HA	4:D:218:MET:HE1	2.02	0.41
5:E:624:ASN:OD1	5:E:624:ASN:C	2.58	0.41
8:2:812:SER:O	8:2:816:ILE:HG12	2.19	0.41
10:4:508:LYS:HZ2	10:4:512:VAL:HG23	1.83	0.41
11:5:755:LEU:HD23	11:5:755:LEU:HA	1.95	0.41
3:C:163:SER:O	3:C:167:LEU:HD23	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:E:259:LEU:O	5:E:263:GLY:N	2.53	0.41
8:2:612:MET:O	8:2:617:ARG:NH2	2.53	0.41
9:3:48:TYR:CD1	9:3:92:LEU:HD23	2.56	0.41
11:5:485:MET:SD	11:5:493:ILE:HD12	2.61	0.41
14:X:139:LEU:O	14:X:140:ILE:HD13	2.20	0.41
6:F:27:DA:C8	6:F:28:DT:H72	2.56	0.41
9:3:676:ILE:CG1	13:7:617:THR:CG2	2.98	0.41
11:5:162:LEU:CD1	11:5:258:LEU:HD21	2.50	0.41
11:5:690:ASP:O	11:5:694:GLN:N	2.52	0.41
14:X:348:ASN:ND2	14:X:725:PRO:O	2.53	0.41
15:Y:93:GLN:O	15:Y:97:LEU:HD23	2.21	0.41
3:C:105:PHE:HD2	3:C:170:GLU:OE1	1.89	0.41
9:3:712:HIS:CD2	9:3:728:VAL:HG11	2.56	0.41
10:4:709:LEU:HD13	10:4:711:LYS:CD	2.50	0.41
14:X:554:SER:O	14:X:558:GLU:N	2.48	0.41
5:E:572:ILE:HD12	5:E:579:TYR:CZ	2.55	0.41
9:3:568:THR:CG2	11:5:400:LEU:HD11	2.50	0.41
10:4:444:ILE:HD11	10:4:458:LYS:HB2	2.01	0.41
10:4:579:GLN:O	10:4:583:LYS:HG3	2.20	0.41
10:4:756:GLU:OE1	10:4:756:GLU:HA	2.20	0.41
10:4:835:ASP:O	10:4:836:TYR:C	2.59	0.41
4:D:194:VAL:HG21	4:D:209:ILE:HD12	2.03	0.41
8:2:502:ALA:N	8:2:503:PRO:CD	2.84	0.41
8:2:580:VAL:HG23	8:2:590:THR:O	2.21	0.41
8:2:670:THR:CG2	8:2:671:GLU:N	2.83	0.41
13:7:710:ILE:HD12	13:7:713:VAL:CG2	2.51	0.41
1:A:37:ILE:HG22	1:A:41:LEU:HD11	2.02	0.41
1:A:92:LEU:HD22	3:C:6:ILE:HD11	2.02	0.41
1:A:204:TYR:C	1:A:205:LEU:HD12	2.42	0.41
3:C:33:ASN:OD1	3:C:33:ASN:C	2.59	0.41
6:F:27:DA:H2"	6:F:28:DT:C7	2.51	0.41
8:2:684:ARG:HG2	8:2:686:LEU:CD2	2.51	0.41
9:3:389:VAL:H	9:3:710:THR:HG21	1.86	0.41
9:3:470:VAL:HG13	9:3:470:VAL:O	2.20	0.41
9:3:676:ILE:HG12	13:7:617:THR:CG2	2.51	0.41
10:4:742:LEU:HD13	10:4:746:PHE:HE1	1.86	0.41
11:5:646:ILE:O	11:5:646:ILE:HG13	2.20	0.41
12:6:527:ASP:OD1	12:6:527:ASP:N	2.54	0.41
14:X:282:ILE:O	14:X:286:LEU:HG	2.21	0.41
14:X:453:LEU:HD21	14:X:479:PHE:HE2	1.86	0.41
14:X:765:PHE:CE1	15:Y:125:LEU:HD21	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
15:Y:129:ARG:HA	15:Y:132:LEU:HD12	2.01	0.41
10:4:632:ASP:OD2	10:4:633:GLU:HG2	2.21	0.41
10:4:709:LEU:HD13	10:4:711:LYS:CG	2.47	0.41
13:7:728:TYR:CG	13:7:729:GLN:N	2.86	0.41
8:2:431:LYS:NZ	8:2:452:GLU:OE1	2.43	0.40
10:4:239:SER:O	10:4:239:SER:OG	2.33	0.40
2:B:74:TRP:CD1	2:B:74:TRP:C	2.94	0.40
10:4:772:ARG:HD2	10:4:772:ARG:C	2.42	0.40
12:6:646:ILE:HD13	12:6:646:ILE:HA	2.00	0.40
13:7:77:SER:OG	13:7:338:THR:HG21	2.21	0.40
14:X:510:PHE:CD2	14:X:511:ILE:HD13	2.55	0.40
5:E:539:TYR:CE1	5:E:548:LEU:HD22	2.56	0.40
8:2:651:ASN:O	8:2:651:ASN:OD1	2.39	0.40
14:X:370:ASP:OD1	14:X:370:ASP:O	2.38	0.40
1:A:104:ASN:OD1	1:A:104:ASN:C	2.59	0.40
5:E:30:PHE:CD2	5:E:81:LEU:HD21	2.57	0.40
5:E:84:VAL:O	5:E:84:VAL:HG23	2.21	0.40
12:6:629:MET:CE	12:6:672:LEU:HD13	2.52	0.40
13:7:139:LEU:HD22	13:7:196:LEU:HD21	2.04	0.40
9:3:467:ARG:N	9:3:509:ARG:O	2.45	0.40
10:4:273:ASP:OD1	10:4:303:VAL:HG12	2.22	0.40
11:5:564:ARG:O	11:5:568:ILE:HG13	2.20	0.40
13:7:214:ARG:HG2	13:7:215:TYR:CE1	2.57	0.40
13:7:293:GLN:HB2	15:Y:105:LYS:NZ	2.37	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	190/208 (91%)	186 (98%)	4 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	B	185/213 (87%)	176 (95%)	8 (4%)	1 (0%)	25 59
3	C	168/217 (77%)	163 (97%)	5 (3%)	0	100 100
4	D	216/294 (74%)	211 (98%)	5 (2%)	0	100 100
5	E	560/650 (86%)	548 (98%)	12 (2%)	0	100 100
8	2	649/868 (75%)	625 (96%)	24 (4%)	0	100 100
9	3	632/971 (65%)	613 (97%)	19 (3%)	0	100 100
10	4	603/933 (65%)	582 (96%)	19 (3%)	2 (0%)	37 68
11	5	623/775 (80%)	597 (96%)	26 (4%)	0	100 100
12	6	630/1017 (62%)	610 (97%)	20 (3%)	0	100 100
13	7	633/845 (75%)	603 (95%)	29 (5%)	1 (0%)	44 75
14	X	699/1238 (56%)	683 (98%)	16 (2%)	0	100 100
15	Y	90/92 (98%)	86 (96%)	4 (4%)	0	100 100
All	All	5878/8321 (71%)	5683 (97%)	191 (3%)	4 (0%)	50 79

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
10	4	834	LYS
2	B	94	THR
13	7	493	LEU
10	4	694	LEU

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	179/193 (93%)	179 (100%)	0	100 100
2	B	178/198 (90%)	176 (99%)	2 (1%)	70 83
3	C	156/192 (81%)	155 (99%)	1 (1%)	84 91
4	D	213/279 (76%)	211 (99%)	2 (1%)	75 86

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
5	E	504/586 (86%)	500 (99%)	4 (1%)	79 88
8	2	576/770 (75%)	571 (99%)	5 (1%)	75 86
9	3	551/835 (66%)	546 (99%)	5 (1%)	75 86
10	4	551/848 (65%)	545 (99%)	6 (1%)	70 83
11	5	577/688 (84%)	575 (100%)	2 (0%)	91 96
12	6	559/886 (63%)	553 (99%)	6 (1%)	70 83
13	7	560/753 (74%)	556 (99%)	4 (1%)	81 89
14	X	639/1125 (57%)	625 (98%)	14 (2%)	47 70
15	Y	85/85 (100%)	84 (99%)	1 (1%)	67 82
All	All	5328/7438 (72%)	5276 (99%)	52 (1%)	71 84

All (52) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	74	TRP
2	B	132	ASP
3	C	23	ASP
4	D	126	LEU
4	D	190	TRP
5	E	151	THR
5	E	397	ASP
5	E	578	THR
5	E	607	MET
8	2	234	LEU
8	2	271	PHE
8	2	489	ARG
8	2	621	HIS
8	2	777	LYS
9	3	156	SER
9	3	358	ASP
9	3	404	ASN
9	3	421	PHE
9	3	738	LEU
10	4	361	ASP
10	4	404	ASP
10	4	519	TYR
10	4	531	TYR
10	4	616	LEU
10	4	746	PHE

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Mol	Chain	Res	Type
11	5	90	PHE
11	5	644	SER
12	6	118	PHE
12	6	319	ASP
12	6	614	ARG
12	6	641	PHE
12	6	669	HIS
12	6	679	LEU
13	7	574	TYR
13	7	630	PHE
13	7	677	SER
13	7	728	TYR
14	X	92	LEU
14	X	94	ASP
14	X	101	LEU
14	X	115	PHE
14	X	134	LEU
14	X	237	ASP
14	X	238	THR
14	X	247	ASP
14	X	256	SER
14	X	293	PHE
14	X	439	GLU
14	X	536	PHE
14	X	559	PHE
14	X	713	PHE
15	Y	137	MET

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

Mol	Chain	Res	Type
5	E	296	GLN
9	3	522	GLN
9	3	688	ASN
10	4	274	GLN
10	4	683	ASN
13	7	332	ASN
13	7	585	ASN
13	7	615	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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 16 ligands modelled in this entry, 10 are monoatomic - leaving 6 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	$\#\|Z\| > 2$
19	ADP	4	1004	-	24,29,29	0.91	0	29,45,45	1.19	2 (6%)
16	ATP	7	1001	17	28,33,33	0.64	0	34,52,52	0.97	1 (2%)
16	ATP	5	1001	17	28,33,33	0.73	0	34,52,52	1.25	3 (8%)
19	ADP	4	1001	17	24,29,29	0.90	0	29,45,45	1.30	2 (6%)
16	ATP	2	1001	17	28,33,33	0.65	0	34,52,52	0.94	2 (5%)
16	ATP	3	1001	17	28,33,33	0.64	0	34,52,52	1.19	3 (8%)

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
19	ADP	4	1004	-	-	5/12/32/32	0/3/3/3
16	ATP	7	1001	17	-	6/18/38/38	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
16	ATP	5	1001	17	-	5/18/38/38	0/3/3/3
19	ADP	4	1001	17	-	1/12/32/32	0/3/3/3
16	ATP	2	1001	17	-	7/18/38/38	0/3/3/3
16	ATP	3	1001	17	-	0/18/38/38	0/3/3/3

There are no bond length outliers.

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	3	1001	ATP	C4'-O4'-C1'	-4.47	105.83	109.92
16	5	1001	ATP	C4'-O4'-C1'	-4.28	106.00	109.92
19	4	1004	ADP	N3-C2-N1	-4.24	122.92	128.67
19	4	1001	ADP	N3-C2-N1	-4.15	123.04	128.67
16	5	1001	ATP	O2'-C2'-C3'	3.76	123.88	111.82
19	4	1001	ADP	C4-C5-N7	-2.53	106.67	109.34
16	7	1001	ATP	C5-C6-N6	2.33	123.85	120.31
16	3	1001	ATP	C5-C6-N6	2.28	123.78	120.31
16	2	1001	ATP	C5-C6-N6	2.27	123.76	120.31
16	5	1001	ATP	C5-C6-N6	2.22	123.69	120.31
19	4	1004	ADP	C4-C5-N7	-2.07	107.15	109.34
16	3	1001	ATP	O3'-C3'-C4'	-2.02	105.28	111.08
16	2	1001	ATP	O4'-C1'-N9	-2.00	106.09	108.75

There are no chirality outliers.

All (24) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
16	2	1001	ATP	PB-O3B-PG-O2G
16	5	1001	ATP	PB-O3B-PG-O3G
16	5	1001	ATP	C4'-C5'-O5'-PA
16	7	1001	ATP	PB-O3B-PG-O2G
16	7	1001	ATP	PB-O3B-PG-O3G
19	4	1001	ADP	PA-O3A-PB-O3B
19	4	1004	ADP	C5'-O5'-PA-O3A
16	2	1001	ATP	O4'-C4'-C5'-O5'
16	7	1001	ATP	O4'-C4'-C5'-O5'
19	4	1004	ADP	O4'-C4'-C5'-O5'
16	2	1001	ATP	PB-O3A-PA-O1A
16	5	1001	ATP	PB-O3B-PG-O1G
16	7	1001	ATP	PA-O3A-PB-O2B
16	7	1001	ATP	PB-O3A-PA-O2A

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Mol	Chain	Res	Type	Atoms
19	4	1004	ADP	C3'-C4'-C5'-O5'
16	5	1001	ATP	C5'-O5'-PA-O1A
19	4	1004	ADP	C5'-O5'-PA-O1A
16	5	1001	ATP	PA-O3A-PB-O1B
16	2	1001	ATP	PB-O3A-PA-O5'
16	2	1001	ATP	C4'-C5'-O5'-PA
16	2	1001	ATP	C3'-C4'-C5'-O5'
16	7	1001	ATP	PA-O3A-PB-O1B
19	4	1004	ADP	C4'-C5'-O5'-PA
16	2	1001	ATP	PB-O3B-PG-O1G

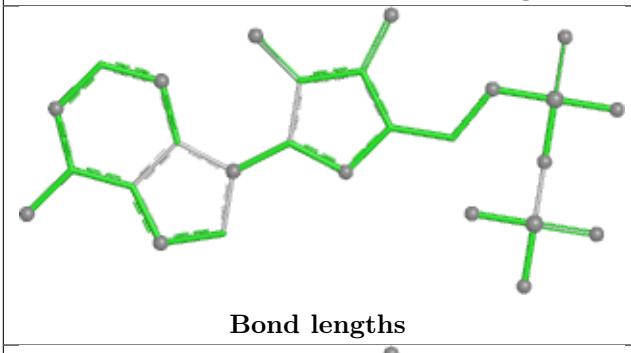
There are no ring outliers.

6 monomers are involved in 7 short contacts:

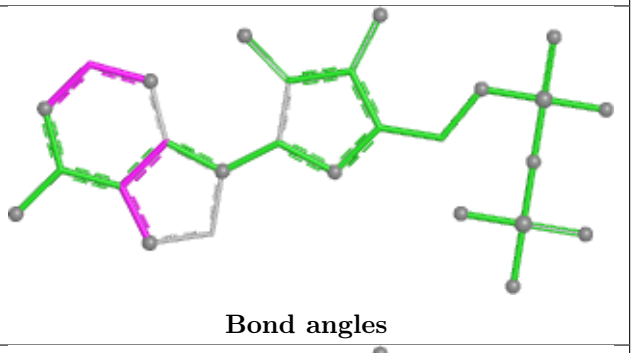
Mol	Chain	Res	Type	Clashes	Symm-Clashes
19	4	1004	ADP	1	0
16	7	1001	ATP	1	0
16	5	1001	ATP	1	0
19	4	1001	ADP	1	0
16	2	1001	ATP	2	0
16	3	1001	ATP	1	0

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

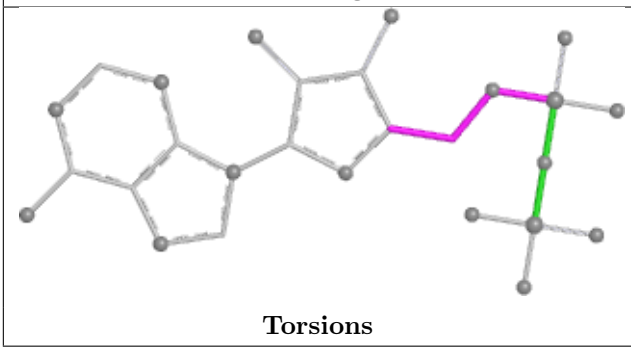
Ligand ADP 4 1004



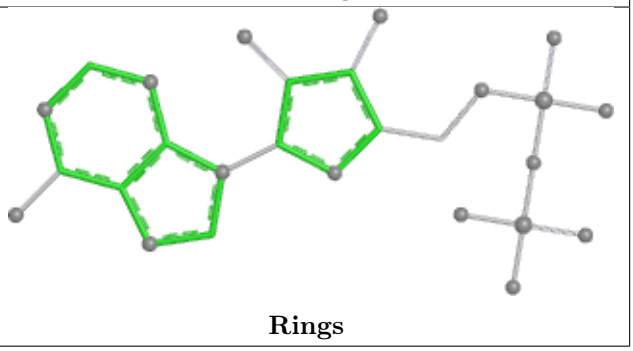
Bond lengths



Bond angles

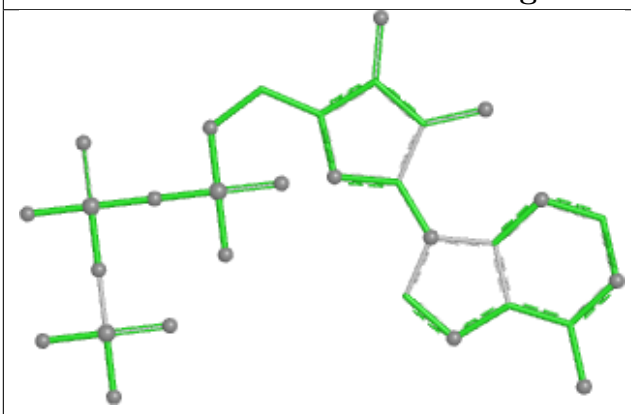


Torsions



Rings

Ligand ATP 7 1001



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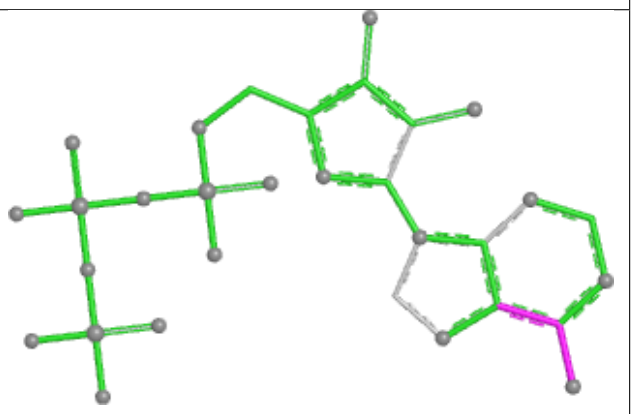
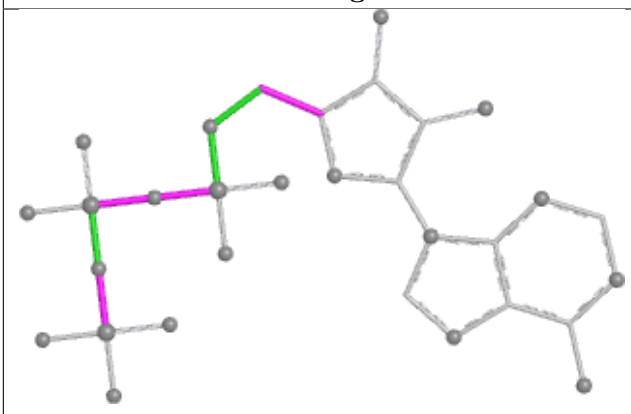


Bond angles



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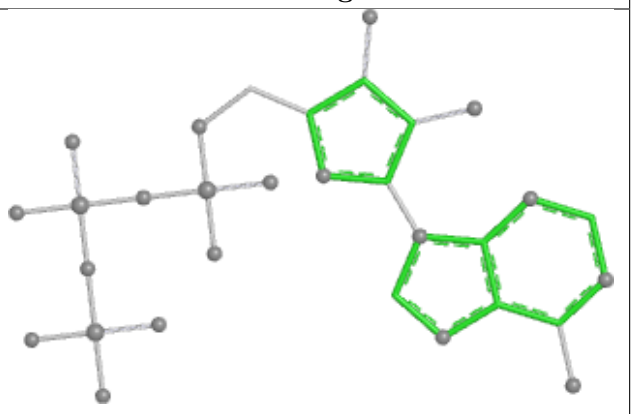
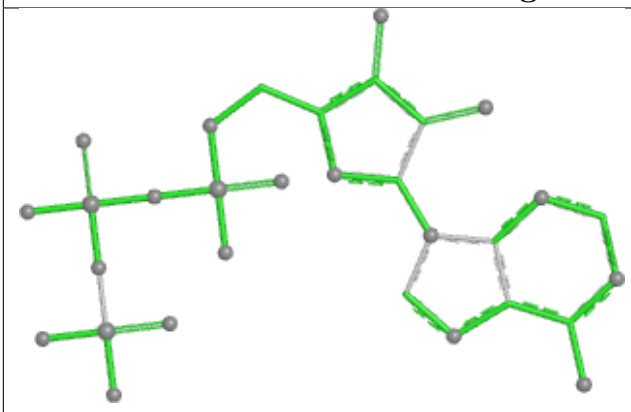
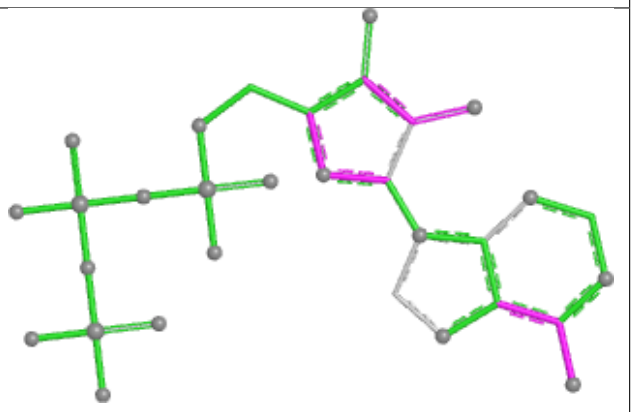


Rings

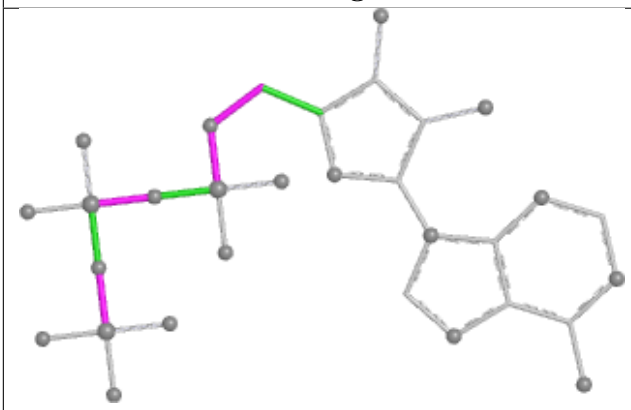
Ligand ATP 5 1001



Bond lengths



Bond angles



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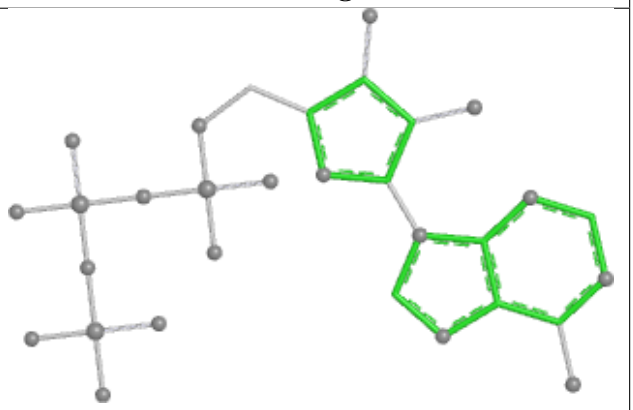
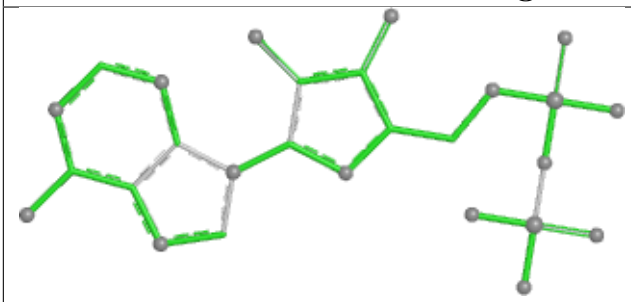
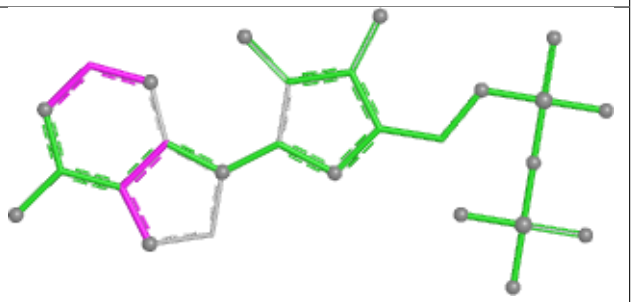


Rings

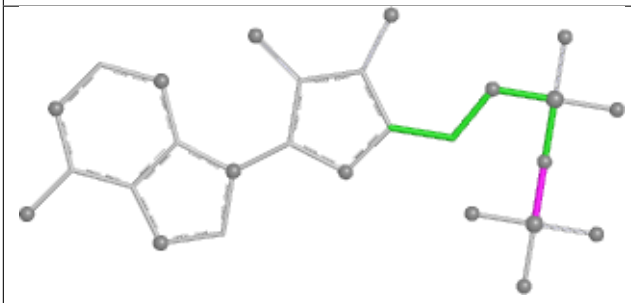
Ligand ADP 4 1001



Bond lengths



Bond angles



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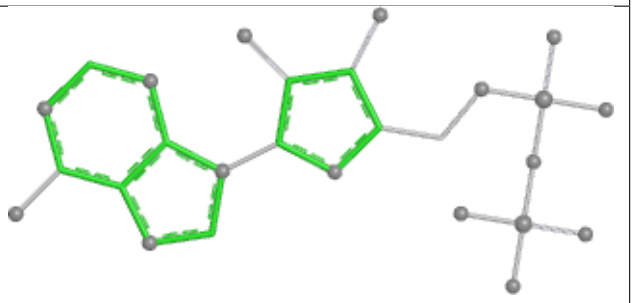
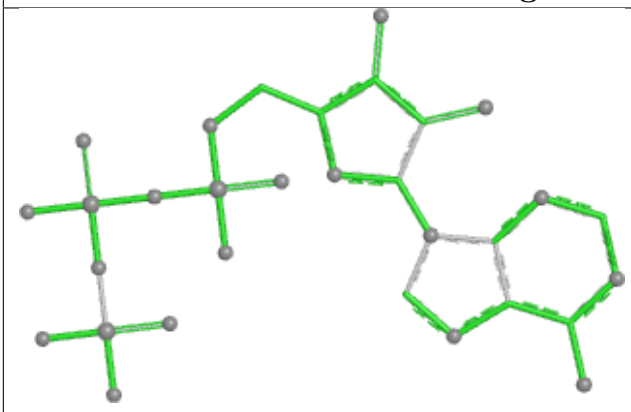
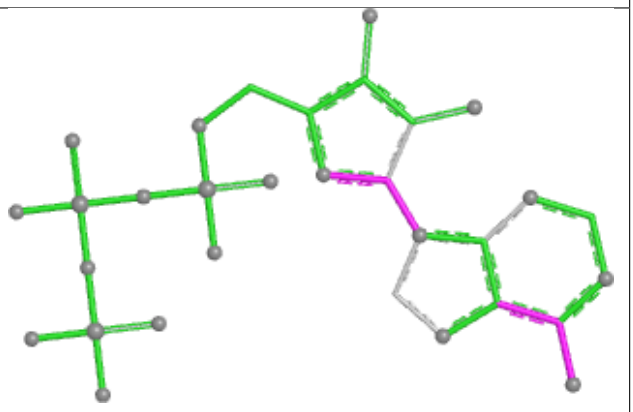


Rings

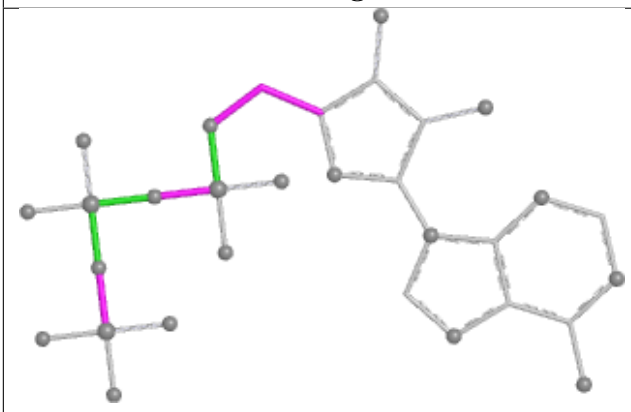
Ligand ATP 2 1001



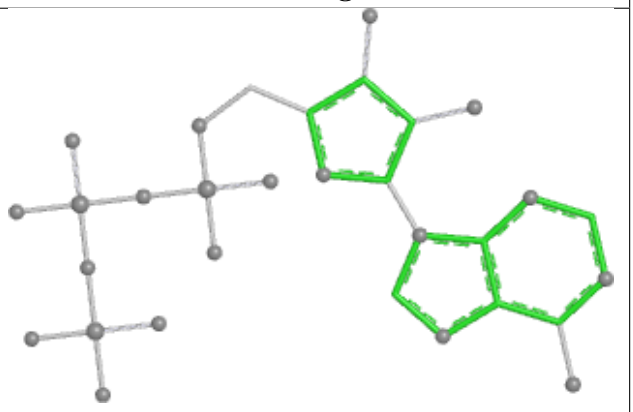
Bond lengths



Bond angles

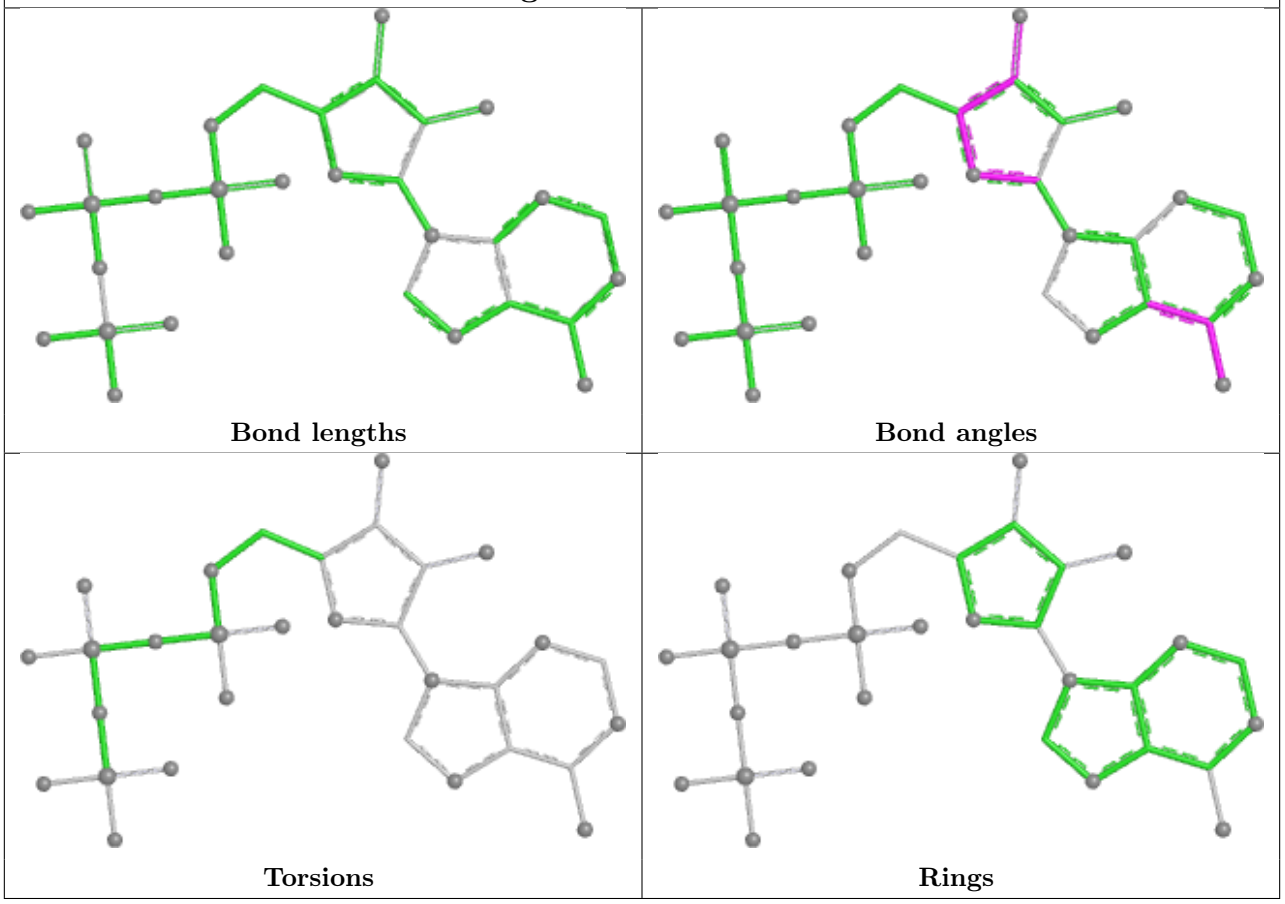


Torsions



Rings

Ligand ATP 3 1001



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Map visualisation

This section contains visualisations of the EMDB entry EMD-47471. 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

This section was not generated.

6.2 Central slices

This section was not generated.

6.3 Largest variance slices

This section was not generated.

6.4 Orthogonal standard-deviation projections (False-color)

This section was not generated.

6.5 Orthogonal surface views

This section was not generated.

6.6 Mask visualisation

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

7 Map analysis

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

7.1 Map-value distribution

This section was not generated.

7.2 Volume estimate versus contour level

This section was not generated.

7.3 Rotationally averaged power spectrum

This section was not generated. The rotationally averaged power spectrum had issues being displayed.

8 Fourier-Shell correlation

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

9 Map-model fit

This section was not generated.