



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 12:58 PM UTC

PDB ID : 7QPR / pdb_00007qpr
Title : Structure of full length SpoT
Authors : Garcia-Pino, A.; Tamman, H.
Deposited on : 2022-01-05
Resolution : 2.51 Å(reported)

This is a Full wwPDB X-ray Structure 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/XrayValidationReportHelp>

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:

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

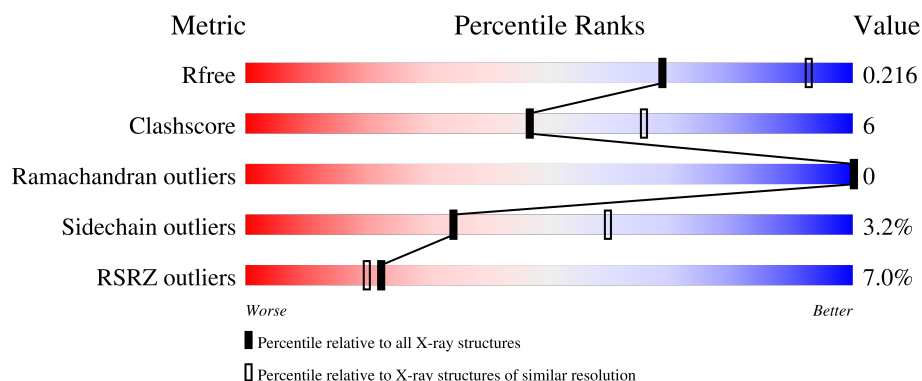
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.51 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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	7383 (2.54-2.50)
Clashscore	190562	8079 (2.54-2.50)
Ramachandran outliers	187476	7944 (2.54-2.50)
Sidechain outliers	187428	7946 (2.54-2.50)
RSRZ outliers	180081	7387 (2.54-2.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	701	<div> <div>6%</div> <div> <div></div> <div>82%</div> <div>15%</div> <div>..</div> </div> </div>
1	B	701	<div> <div>7%</div> <div> <div></div> <div>81%</div> <div>16%</div> <div>..</div> </div> </div>
1	C	701	<div> <div>5%</div> <div> <div></div> <div>83%</div> <div>13%</div> <div>..</div> </div> </div>
1	D	701	<div> <div>9%</div> <div> <div></div> <div>82%</div> <div>14%</div> <div>..</div> </div> </div>

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 22585 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 ACT domain protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	687	Total	C	N	O	S	0	1	0
			5418	3419	969	1002	28			
1	B	687	Total	C	N	O	S	0	0	0
			5379	3395	950	1007	27			
1	C	678	Total	C	N	O	S	0	0	0
			5335	3369	948	991	27			
1	D	689	Total	C	N	O	S	0	0	0
			5374	3396	951	999	28			

- Molecule 2 is MANGANESE (II) ION (CCD ID: MN) (formula: Mn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Mn	0	0
			1	1		
2	B	1	Total	Mn	0	0
			1	1		
2	C	1	Total	Mn	0	0
			1	1		
2	D	1	Total	Mn	0	0
			1	1		

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

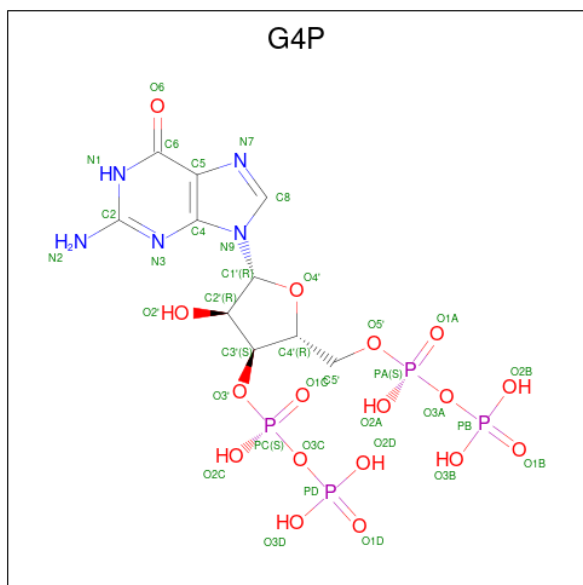
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn	0	0
			1	1		
3	B	1	Total	Zn	0	0
			1	1		
3	C	1	Total	Zn	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	D	1	Total	Zn	0	0
			1	1		

- Molecule 4 is GUANOSINE-5',3'-TETRAPHOSPHATE (CCD ID: G4P) (formula: $C_{10}H_{17}N_5O_{17}P_4$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	0
			36	10	5	17	4		
4	B	1	Total	C	N	O	P	0	0
			36	10	5	17	4		
4	C	1	Total	C	N	O	P	0	0
			36	10	5	17	4		
4	D	1	Total	C	N	O	P	0	0
			36	10	5	17	4		

- Molecule 5 is CITRATE ANION (CCD ID: FLC) (formula: $C_6H_5O_7$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			13	6	7		
5	C	1	Total	C	O	0	0
			13	6	7		

- Molecule 6 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			6	3	3		
6	B	1	Total	C	O	0	0
			6	3	3		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	C	1	Total	C	O	0	0
			6	3	3		
6	C	1	Total	C	O	0	0
			6	3	3		

- Molecule 7 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Cl	0	0
			1	1		
7	C	1	Total	Cl	0	0
			1	1		
7	D	1	Total	Cl	0	0
			1	1		

- Molecule 8 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	C	1	Total	Mg	0	0
			1	1		
8	D	1	Total	Mg	0	0
			1	1		

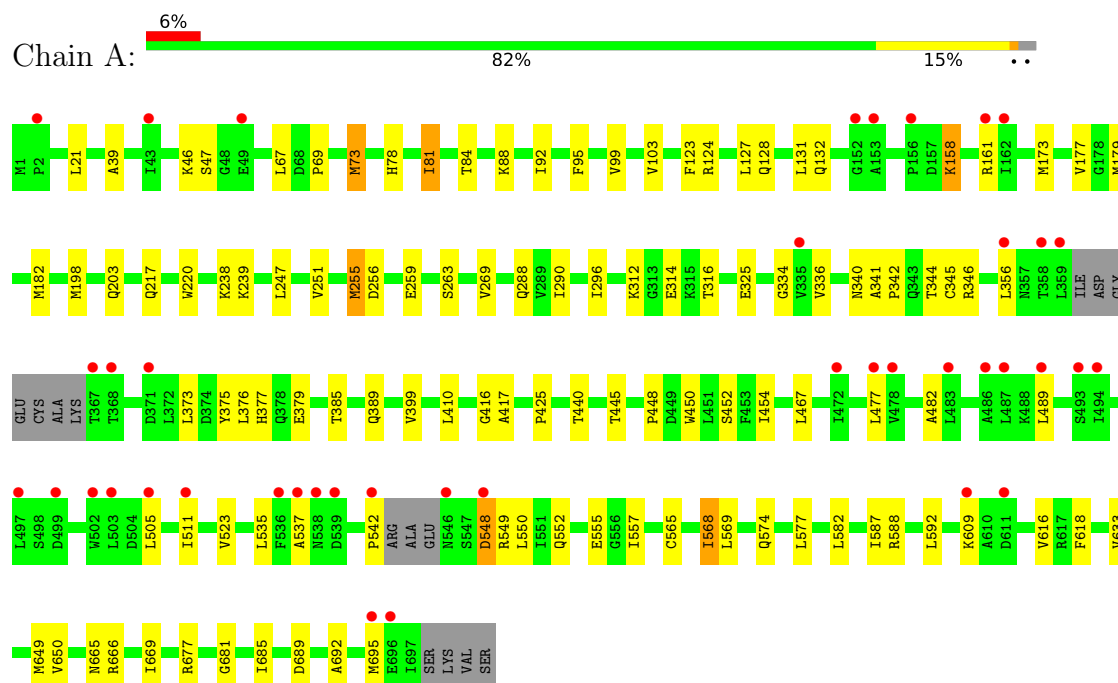
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	263	Total	O	0	0
			263	263		
9	B	206	Total	O	0	0
			206	206		
9	C	235	Total	O	0	0
			235	235		
9	D	168	Total	O	0	0
			168	168		

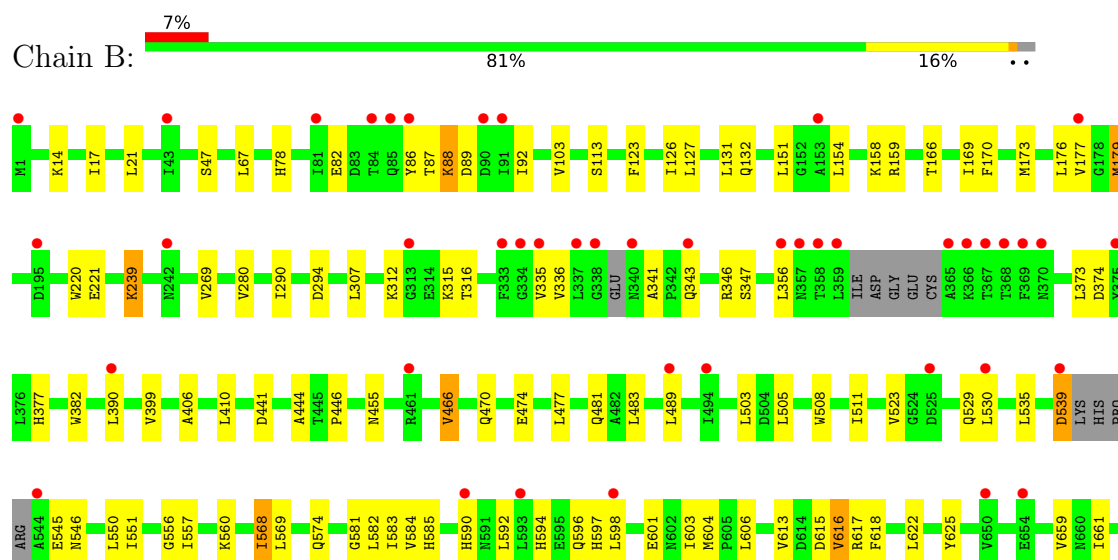
3 Residue-property plots [i](#)

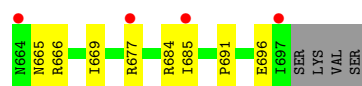
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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 dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). 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: ACT domain protein

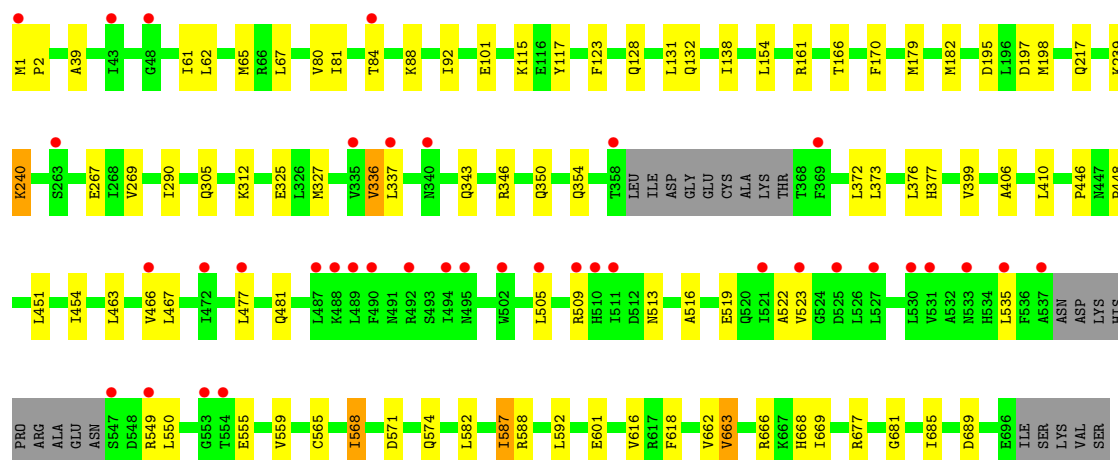
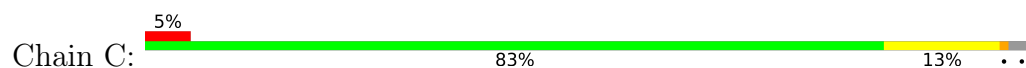


• Molecule 1: ACT domain protein

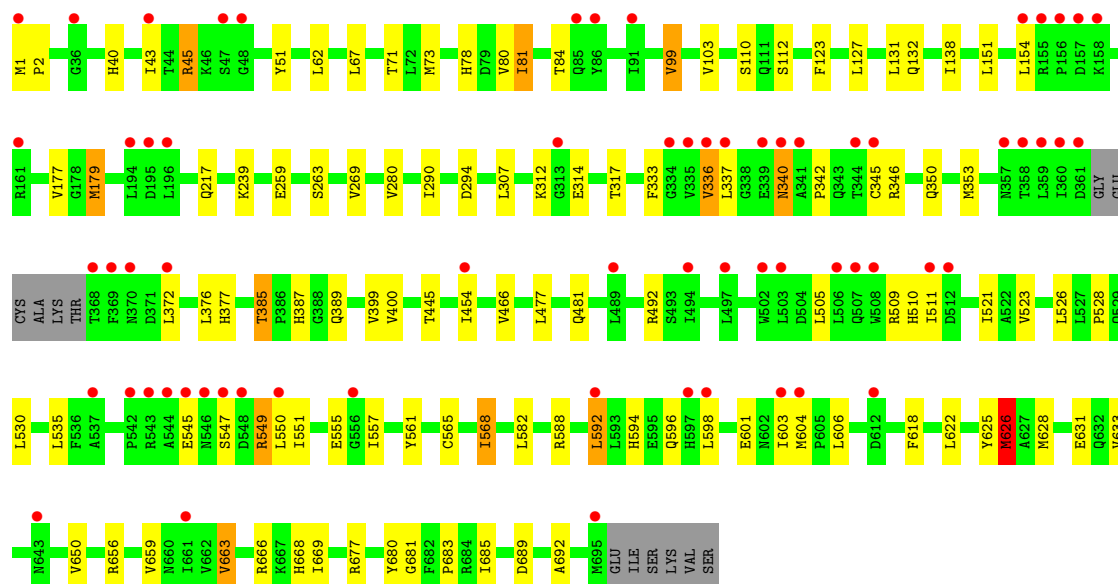
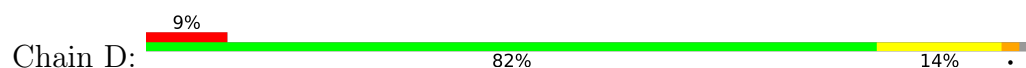




• Molecule 1: ACT domain protein



• Molecule 1: ACT domain protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	128.79Å 133.76Å 211.33Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.88 – 2.51 48.88 – 2.51	Depositor EDS
% Data completeness (in resolution range)	67.3 (48.88-2.51) 67.3 (48.88-2.51)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.61 (at 2.51Å)	Xtriage
Refinement program	BUSTER 2.10.4 (20-OCT-2021)	Depositor
R, R_{free}	0.221 , 0.258 0.219 , 0.216	Depositor DCC
R_{free} test set	4299 reflections (3.45%)	wwPDB-VP
Wilson B-factor (Å ²)	60.6	Xtriage
Anisotropy	0.061	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 46.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.000 for k,h,-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	22585	wwPDB-VP
Average B, all atoms (Å ²)	69.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 25.00 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.4426e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹ Intensities estimated from amplitudes.

² Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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: FLC, MG, MN, G4P, ZN, GOL, CL

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	0.71	2/5522 (0.0%)	1.10	7/7492 (0.1%)
1	B	0.72	2/5476 (0.0%)	1.13	8/7432 (0.1%)
1	C	0.70	0/5434	1.08	3/7374 (0.0%)
1	D	0.72	3/5476 (0.1%)	1.11	11/7439 (0.1%)
All	All	0.71	7/21908 (0.0%)	1.11	29/29737 (0.1%)

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	255	MET	SD-CE	-9.27	1.56	1.79
1	D	626	MET	SD-CE	-8.53	1.58	1.79
1	D	179	MET	SD-CE	-6.72	1.62	1.79
1	A	73	MET	SD-CE	-6.24	1.64	1.79
1	B	86	TYR	N-CA	5.86	1.53	1.45
1	B	179	MET	SD-CE	-5.20	1.66	1.79
1	D	692	ALA	CA-C	5.12	1.58	1.53

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	539	ASP	CA-CB-CG	8.01	120.61	112.60
1	B	374	ASP	CA-C-N	6.05	128.71	120.54
1	B	374	ASP	C-N-CA	6.05	128.71	120.54
1	D	592	LEU	CA-C-N	5.85	128.05	120.44
1	D	592	LEU	C-N-CA	5.85	128.05	120.44
1	B	616	VAL	N-CA-C	5.69	117.52	108.87
1	A	548	ASP	CA-C-N	5.65	130.25	121.26
1	A	548	ASP	C-N-CA	5.65	130.25	121.26
1	D	631	GLU	CB-CG-CD	5.54	122.02	112.60
1	C	571	ASP	CA-CB-CG	5.42	118.03	112.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	545	GLU	CA-C-N	5.42	129.87	122.34
1	D	545	GLU	C-N-CA	5.42	129.87	122.34
1	D	681	GLY	CA-C-N	5.40	128.66	122.83
1	D	681	GLY	C-N-CA	5.40	128.66	122.83
1	B	239	LYS	CG-CD-CE	5.39	123.69	111.30
1	C	681	GLY	CA-C-N	5.38	128.64	122.83
1	C	681	GLY	C-N-CA	5.38	128.64	122.83
1	D	663	VAL	N-CA-CB	-5.38	105.00	112.52
1	A	681	GLY	CA-C-N	5.37	128.62	122.83
1	A	681	GLY	C-N-CA	5.37	128.62	122.83
1	D	112	SER	N-CA-C	5.16	119.33	113.19
1	B	86	TYR	N-CA-C	-5.13	103.26	110.50
1	A	537	ALA	N-CA-C	5.09	117.06	108.96
1	B	546	ASN	CA-CB-CG	5.09	117.69	112.60
1	A	296	ILE	N-CA-C	-5.08	106.73	111.45
1	D	337	LEU	CA-C-N	5.03	126.03	122.16
1	D	337	LEU	C-N-CA	5.03	126.03	122.16
1	A	548	ASP	CA-CB-CG	5.03	117.63	112.60
1	B	581	GLY	N-CA-C	5.02	117.87	111.85

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	5418	0	5365	59	0
1	B	5379	0	5292	71	0
1	C	5335	0	5271	50	0
1	D	5374	0	5267	68	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	36	0	11	0	0
4	B	36	0	11	0	0
4	C	36	0	11	0	0
4	D	36	0	11	0	0
5	A	13	0	5	3	0
5	C	13	0	5	0	0
6	A	6	0	8	0	0
6	B	6	0	8	0	0
6	C	12	0	16	0	0
7	A	1	0	0	0	0
7	C	1	0	0	1	0
7	D	1	0	0	0	0
8	C	1	0	0	0	0
8	D	1	0	0	0	0
9	A	263	0	0	0	0
9	B	206	0	0	1	0
9	C	235	0	0	2	0
9	D	168	0	0	0	0
All	All	22585	0	21281	245	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 6.

All (245) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:626:MET:HE1	1:D:680:TYR:HB3	1.50	0.93
1:D:626:MET:HE2	1:D:683:PRO:HG3	1.59	0.84
1:B:594:HIS:CE1	1:B:598:LEU:HD22	2.12	0.84
1:A:334:GLY:H	1:A:340:ASN:HD21	1.26	0.83
1:A:416:GLY:HA3	1:B:503:LEU:HD13	1.61	0.82
1:B:17:ILE:HD11	1:B:21:LEU:HD12	1.62	0.81
1:B:455:ASN:HB2	1:B:556:GLY:HA2	1.60	0.81
1:A:238:LYS:NZ	5:A:804:FLC:HA2	1.97	0.79
1:A:548:ASP:OD1	1:A:549:ARG:HD2	1.87	0.75
1:A:448:PRO:HB3	1:A:467:LEU:HD11	1.69	0.74
1:D:596:GLN:HG2	1:D:603:ILE:HG13	1.69	0.73
1:C:115:LYS:O	1:C:161:ARG:NH2	2.21	0.73
1:B:446:PRO:HG2	1:B:466:VAL:HG11	1.70	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:550:LEU:HD11	1:B:616:VAL:HG11	1.69	0.73
1:D:626:MET:CE	1:D:683:PRO:HG3	2.19	0.73
1:A:550:LEU:HD11	1:A:616:VAL:HG11	1.71	0.72
1:B:455:ASN:HB2	1:B:556:GLY:CA	2.18	0.72
1:A:238:LYS:HZ2	5:A:804:FLC:HA2	1.52	0.71
1:B:343:GLN:HG3	9:B:963:HOH:O	1.90	0.71
1:D:290:ILE:HD11	1:D:312:LYS:HB2	1.74	0.69
1:B:470:GLN:HG2	1:B:474:GLU:HG2	1.73	0.68
1:D:557:ILE:HD12	1:D:582:LEU:HB2	1.76	0.66
1:C:373:LEU:HD22	1:C:377:HIS:CE1	2.30	0.66
1:B:87:THR:HG22	1:B:89:ASP:H	1.61	0.66
1:D:177:VAL:HG21	1:D:179:MET:HE3	1.78	0.66
1:B:568:ILE:HG13	1:B:618:PHE:HB3	1.77	0.65
1:B:691:PRO:HG2	1:B:696:GLU:HG2	1.78	0.65
1:C:138:ILE:HD11	1:C:336:VAL:CG1	2.27	0.65
1:C:446:PRO:HG2	1:C:466:VAL:HG21	1.77	0.65
1:D:663:VAL:HG22	1:D:668:HIS:CG	2.32	0.65
1:B:312:LYS:NZ	1:B:315:LYS:HA	2.14	0.62
1:C:555:GLU:HB2	7:C:808:CL:CL	2.37	0.62
1:A:373:LEU:HD22	1:A:377:HIS:CE1	2.34	0.61
1:D:131:LEU:O	1:D:346:ARG:HD3	2.01	0.61
1:D:530:LEU:HD13	1:D:604:MET:HE1	1.82	0.60
1:B:569:LEU:HD22	1:B:613:VAL:HG22	1.83	0.60
1:A:290:ILE:HD11	1:A:312:LYS:HB2	1.83	0.59
1:D:557:ILE:HD12	1:D:582:LEU:CB	2.33	0.59
1:A:452:SER:HB3	1:A:482:ALA:HA	1.85	0.59
1:C:354:GLN:HB2	9:C:907:HOH:O	2.01	0.59
1:A:549:ARG:HG3	1:A:555:GLU:HG3	1.84	0.59
1:D:663:VAL:HG22	1:D:668:HIS:ND1	2.17	0.59
1:B:530:LEU:HA	1:B:604:MET:HE3	1.85	0.58
1:C:62:LEU:HD23	1:C:65:MET:HE3	1.86	0.58
1:B:176:LEU:HD22	1:B:356:LEU:HD11	1.86	0.58
1:C:587:ILE:HG23	1:C:588:ARG:HG2	1.84	0.58
1:B:677:ARG:HG3	1:B:685:ILE:HD12	1.86	0.57
1:C:549:ARG:HG3	1:C:555:GLU:HA	1.86	0.57
1:C:550:LEU:HD11	1:C:616:VAL:HG11	1.87	0.57
1:D:625:TYR:HA	1:D:656:ARG:HG2	1.87	0.57
1:C:663:VAL:HG13	1:C:668:HIS:HB3	1.86	0.57
1:B:14:LYS:HA	1:B:17:ILE:HG22	1.87	0.56
1:C:290:ILE:HD11	1:C:312:LYS:HB2	1.86	0.56
1:A:247:LEU:O	1:A:251:VAL:HG23	2.05	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:505:LEU:HD11	1:A:535:LEU:HD11	1.87	0.56
1:C:448:PRO:HB3	1:C:467:LEU:HG	1.89	0.55
1:C:559:VAL:HG12	1:C:582:LEU:HB3	1.88	0.55
1:D:177:VAL:CG2	1:D:179:MET:HE3	2.36	0.55
1:D:312:LYS:HD3	1:D:317:THR:HG22	1.87	0.55
1:B:382:TRP:HD1	1:B:390:LEU:HD11	1.71	0.55
1:A:552:GLN:HG3	1:A:609:LYS:HA	1.88	0.55
1:A:342:PRO:O	1:A:345:CYS:HB2	2.07	0.55
1:A:73:MET:CE	1:A:95:PHE:HB3	2.37	0.54
1:A:128:GLN:OE1	1:A:379:GLU:HA	2.06	0.54
1:C:138:ILE:HD11	1:C:336:VAL:HG11	1.88	0.54
1:D:177:VAL:O	1:D:336:VAL:HB	2.07	0.54
1:B:596:GLN:HA	1:B:603:ILE:HG13	1.89	0.54
1:B:17:ILE:CD1	1:B:21:LEU:HD12	2.35	0.54
1:C:451:LEU:HA	1:C:454:ILE:HG12	1.90	0.54
1:D:400:VAL:HB	1:D:454:ILE:HD11	1.89	0.54
1:B:173:MET:O	1:B:177:VAL:HG12	2.08	0.54
1:D:40:HIS:ND1	1:D:43:ILE:HD12	2.23	0.54
1:D:73:MET:HE3	1:D:99:VAL:HG11	1.88	0.54
1:D:127:LEU:HD22	1:D:353:MET:HE2	1.90	0.54
1:D:626:MET:HE3	1:D:628:MET:HE2	1.90	0.54
1:A:577:LEU:HD23	1:A:582:LEU:HD13	1.88	0.53
1:D:565:CYS:HA	1:D:689:ASP:HB3	1.90	0.53
1:B:312:LYS:O	1:B:316:THR:O	2.27	0.53
1:B:568:ILE:HG13	1:B:618:PHE:CB	2.39	0.52
1:C:565:CYS:HA	1:C:689:ASP:HB3	1.92	0.52
1:A:568:ILE:HG13	1:A:618:PHE:CB	2.40	0.52
1:D:568:ILE:HG13	1:D:618:PHE:CB	2.40	0.52
1:B:177:VAL:HG22	1:B:177:VAL:O	2.11	0.51
1:D:626:MET:HE2	1:D:683:PRO:CG	2.36	0.51
1:C:505:LEU:HD11	1:C:535:LEU:HD11	1.92	0.51
1:D:151:LEU:CD1	1:D:154:LEU:HD22	2.41	0.51
1:A:217:GLN:HG2	1:A:239:LYS:HD2	1.91	0.51
1:A:565:CYS:HA	1:A:689:ASP:HB3	1.93	0.50
1:D:131:LEU:HD11	1:D:353:MET:HE1	1.92	0.50
1:C:568:ILE:HG13	1:C:618:PHE:CB	2.41	0.50
1:A:255:MET:HE3	1:A:256:ASP:H	1.77	0.50
1:C:343:GLN:HB3	1:C:346:ARG:HH21	1.77	0.50
1:C:509:ARG:HA	1:C:601:GLU:HB2	1.93	0.50
1:D:594:HIS:CE1	1:D:598:LEU:HD11	2.46	0.50
1:B:529:GLN:HB2	1:B:557:ILE:HD11	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:240:LYS:HE2	1:C:267:GLU:HG3	1.93	0.50
1:C:350:GLN:HB3	1:C:662:VAL:HG11	1.93	0.50
1:B:441:ASP:HB3	1:B:444:ALA:HB2	1.94	0.49
1:B:560:LYS:HD2	1:B:583:ILE:HD12	1.94	0.49
1:B:87:THR:HG22	1:B:89:ASP:N	2.27	0.49
1:C:132:GLN:O	1:C:346:ARG:NH1	2.46	0.49
1:C:61:ILE:HG22	1:C:65:MET:HE2	1.95	0.49
1:A:677:ARG:HG3	1:A:685:ILE:HD12	1.94	0.49
1:D:350:GLN:HA	1:D:353:MET:HE3	1.94	0.49
1:A:39:ALA:HB1	1:A:84:THR:HG21	1.95	0.49
1:C:677:ARG:HG3	1:C:685:ILE:HD12	1.94	0.49
1:B:88:LYS:O	1:B:92:ILE:HG13	2.13	0.49
1:C:574:GLN:HB3	1:C:592:LEU:HD21	1.94	0.49
1:D:509:ARG:HD2	1:D:526:LEU:HD13	1.94	0.49
1:C:663:VAL:HG11	1:C:669:ILE:HB	1.95	0.48
1:B:220:TRP:NE1	1:B:316:THR:HG21	2.27	0.48
1:D:385:THR:HB	1:D:389:GLN:HB3	1.95	0.48
1:B:505:LEU:HD11	1:B:535:LEU:HD11	1.96	0.48
1:B:131:LEU:O	1:B:346:ARG:HD3	2.14	0.48
1:D:45:ARG:HG2	1:D:51:TYR:HD1	1.77	0.48
1:B:290:ILE:HD11	1:B:312:LYS:HD3	1.95	0.48
1:D:582:LEU:HD21	1:D:606:LEU:HD11	1.95	0.48
1:D:663:VAL:CG2	1:D:668:HIS:CG	2.97	0.48
1:B:625:TYR:HB2	1:B:684:ARG:HB3	1.94	0.48
1:B:622:LEU:HD21	1:B:669:ILE:HD11	1.95	0.47
1:A:574:GLN:HB3	1:A:592:LEU:HD21	1.97	0.47
1:A:131:LEU:O	1:A:346:ARG:HD3	2.13	0.47
1:D:477:LEU:O	1:D:481:GLN:HG3	2.15	0.47
1:D:505:LEU:HD11	1:D:535:LEU:HD11	1.96	0.47
1:B:382:TRP:CD1	1:B:390:LEU:HD11	2.48	0.47
1:A:587:ILE:HG23	1:A:588:ARG:HG2	1.96	0.47
1:B:551:ILE:HG21	1:B:606:LEU:HD13	1.96	0.47
1:B:585:HIS:HB2	1:B:592:LEU:HD13	1.97	0.47
1:C:101:GLU:HG3	9:C:1052:HOH:O	2.15	0.47
1:D:677:ARG:HG3	1:D:685:ILE:HD12	1.96	0.47
1:B:508:TRP:NE1	1:B:601:GLU:HA	2.30	0.47
1:B:177:VAL:HG13	1:B:179:MET:HE3	1.96	0.47
1:A:81:ILE:HD12	1:A:103:VAL:HG12	1.97	0.46
1:B:17:ILE:CG1	1:B:21:LEU:HD12	2.46	0.46
1:A:425:PRO:HG3	1:B:511:ILE:O	2.14	0.46
1:D:333:PHE:HA	1:D:340:ASN:HD21	1.80	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:124:ARG:HB3	1:A:375:TYR:CE2	2.51	0.46
1:A:489:LEU:HG	1:A:542:PRO:HG2	1.98	0.46
1:D:626:MET:HE1	1:D:680:TYR:CB	2.34	0.46
1:B:294:ASP:HA	1:B:307:LEU:HD23	1.98	0.46
1:C:195:ASP:OD1	1:C:197:ASP:OD1	2.34	0.46
1:A:78:HIS:HA	1:A:103:VAL:HG13	1.97	0.46
1:C:217:GLN:HG2	1:C:239:LYS:HD2	1.97	0.45
1:C:568:ILE:HG13	1:C:618:PHE:HB2	1.98	0.45
1:D:132:GLN:O	1:D:346:ARG:NH1	2.50	0.45
1:D:217:GLN:HG2	1:D:239:LYS:HD2	1.98	0.45
1:D:280:VAL:HG21	1:D:307:LEU:HD13	1.98	0.45
1:D:568:ILE:HG13	1:D:618:PHE:HB2	1.99	0.45
1:D:633:VAL:HG13	1:D:650:VAL:HG11	1.98	0.45
1:A:385:THR:HB	1:A:389:GLN:HB3	1.97	0.45
1:A:410:LEU:HD23	1:A:440:THR:HG21	1.98	0.45
1:B:177:VAL:CG1	1:B:179:MET:HE3	2.47	0.45
1:B:280:VAL:HG21	1:B:307:LEU:HD13	1.99	0.45
1:B:582:LEU:HD21	1:B:606:LEU:HD11	1.98	0.45
1:C:65:MET:SD	1:C:337:LEU:HD11	2.56	0.45
1:A:341:ALA:HB3	1:A:344:THR:HG23	1.99	0.45
1:D:81:ILE:HD12	1:D:103:VAL:HG12	1.99	0.45
1:A:179:MET:HE2	1:A:182:MET:HG2	1.99	0.44
1:B:221:GLU:OE1	1:B:239:LYS:HE3	2.16	0.44
1:C:88:LYS:O	1:C:92:ILE:HG13	2.17	0.44
1:A:127:LEU:HD13	1:A:173:MET:HE1	1.98	0.44
1:D:294:ASP:HA	1:D:307:LEU:HD23	2.00	0.44
1:D:400:VAL:CG1	1:D:454:ILE:HD11	2.48	0.44
1:B:78:HIS:HA	1:B:103:VAL:HG13	2.00	0.44
1:C:166:THR:HA	1:C:170:PHE:HD2	1.83	0.44
1:A:128:GLN:NE2	1:A:375:TYR:CE2	2.86	0.44
1:A:158:LYS:O	1:A:161:ARG:HG2	2.18	0.44
1:A:177:VAL:O	1:A:336:VAL:HG22	2.17	0.44
1:A:568:ILE:HG13	1:A:618:PHE:HB2	1.99	0.44
1:C:516:ALA:HA	1:C:519:GLU:HG2	2.00	0.44
1:D:259:GLU:O	1:D:263:SER:HB2	2.17	0.44
1:B:551:ILE:HD13	1:B:584:VAL:HG21	1.99	0.44
1:D:1:MET:HG2	1:D:2:PRO:HD2	2.00	0.44
1:A:203:GLN:HE21	1:A:247:LEU:HD13	1.83	0.44
1:D:78:HIS:HA	1:D:103:VAL:HG13	2.00	0.44
1:A:132:GLN:O	1:A:346:ARG:NH1	2.51	0.43
1:A:238:LYS:HZ1	5:A:804:FLC:HA2	1.79	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:166:THR:HA	1:B:170:PHE:HD2	1.83	0.43
1:C:343:GLN:HB3	1:C:346:ARG:NH2	2.33	0.43
1:B:574:GLN:HB3	1:B:592:LEU:HD21	2.00	0.43
1:C:666:ARG:HA	1:C:669:ILE:HG22	2.00	0.43
1:D:62:LEU:HD13	1:D:71:THR:HG22	2.00	0.43
1:B:659:VAL:HG22	1:B:661:ILE:HG23	2.00	0.43
1:C:477:LEU:O	1:C:481:GLN:HG3	2.18	0.43
1:D:551:ILE:HG21	1:D:606:LEU:HD13	2.00	0.43
1:B:446:PRO:CG	1:B:466:VAL:HG11	2.46	0.43
1:B:569:LEU:HD23	1:B:665:ASN:HB3	2.00	0.43
1:A:692:ALA:O	1:A:695:MET:O	2.37	0.42
1:B:477:LEU:O	1:B:481:GLN:HG3	2.19	0.42
1:C:117:TYR:N	1:C:161:ARG:HH21	2.17	0.42
1:C:305:GLN:HB2	1:C:327:MET:HG2	2.01	0.42
1:D:666:ARG:HA	1:D:669:ILE:HG22	2.01	0.42
1:D:663:VAL:CG2	1:D:668:HIS:ND1	2.81	0.42
1:B:373:LEU:HD22	1:B:377:HIS:CE1	2.54	0.42
1:B:489:LEU:HA	1:B:545:GLU:HB2	2.01	0.42
1:C:128:GLN:HG3	1:C:376:LEU:HA	2.00	0.42
1:D:40:HIS:NE2	1:D:80:VAL:HG12	2.34	0.42
1:A:450:TRP:O	1:A:454:ILE:HG12	2.19	0.42
1:B:312:LYS:HZ1	1:B:315:LYS:HA	1.83	0.42
1:C:179:MET:HE2	1:C:182:MET:HG2	2.01	0.42
1:B:126:ILE:HD12	1:B:169:ILE:HG21	2.00	0.42
1:D:385:THR:HG22	1:D:387:HIS:H	1.84	0.42
1:D:510:HIS:HB2	1:D:601:GLU:HB3	2.01	0.42
1:B:594:HIS:CE1	1:B:598:LEU:CD2	2.96	0.42
1:D:622:LEU:HB2	1:D:659:VAL:HG13	2.02	0.42
1:D:342:PRO:O	1:D:345:CYS:HB2	2.18	0.42
1:C:454:ILE:HD13	1:C:463:LEU:HD12	2.00	0.42
1:D:511:ILE:HD12	1:D:511:ILE:HA	1.96	0.42
1:A:21:LEU:HD22	1:A:69:PRO:HG3	2.02	0.41
1:A:131:LEU:HD12	1:A:376:LEU:HD22	2.01	0.41
1:A:511:ILE:HD12	1:A:511:ILE:HA	1.97	0.41
1:D:81:ILE:HD12	1:D:103:VAL:CG1	2.50	0.41
1:D:138:ILE:HG12	1:D:179:MET:HE1	2.02	0.41
1:A:259:GLU:O	1:A:263:SER:HB2	2.20	0.41
1:D:336:VAL:HG22	1:D:342:PRO:HA	2.02	0.41
1:B:151:LEU:HG	1:B:159:ARG:HG2	2.02	0.41
1:B:406:ALA:HB3	1:B:410:LEU:HD12	2.03	0.41
1:D:549:ARG:HE	1:D:555:GLU:HA	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:477:LEU:HD12	1:B:597:HIS:HB2	2.02	0.41
1:D:131:LEU:HD12	1:D:376:LEU:HD22	2.01	0.41
1:D:521:ILE:HG23	1:D:528:PRO:HD3	2.02	0.41
1:A:399:VAL:HG11	1:A:417:ALA:HB2	2.02	0.41
1:A:569:LEU:HD23	1:A:665:ASN:HB3	2.02	0.41
1:B:132:GLN:O	1:B:346:ARG:NH1	2.54	0.41
1:B:347:SER:OG	1:B:617:ARG:HD2	2.21	0.41
1:A:633:VAL:HG13	1:A:650:VAL:HG11	2.03	0.41
1:A:666:ARG:HA	1:A:669:ILE:HG22	2.02	0.41
1:B:336:VAL:HG13	1:B:341:ALA:HB1	2.03	0.41
1:B:550:LEU:HD21	1:B:613:VAL:HG21	2.03	0.41
1:B:666:ARG:HA	1:B:669:ILE:HG22	2.03	0.41
1:C:406:ALA:HB3	1:C:410:LEU:HD12	2.03	0.41
1:C:1:MET:N	1:C:2:PRO:HD2	2.36	0.41
1:C:138:ILE:HD11	1:C:336:VAL:HG13	2.02	0.41
1:D:377:HIS:HD2	1:D:561:TYR:HE2	1.69	0.41
1:A:46:LYS:NZ	1:A:158:LYS:NZ	2.68	0.40
1:A:88:LYS:O	1:A:92:ILE:HG13	2.22	0.40
1:A:220:TRP:CE2	1:A:316:THR:HG21	2.55	0.40
1:A:399:VAL:HG11	1:A:417:ALA:CB	2.51	0.40
1:C:467:LEU:HD13	1:C:522:ALA:HB1	2.02	0.40
1:B:127:LEU:HD21	1:B:173:MET:HE1	2.02	0.40
1:D:45:ARG:HG2	1:D:51:TYR:CD1	2.56	0.40
1:D:588:ARG:HA	1:D:588:ARG:HD3	1.87	0.40
1:C:131:LEU:O	1:C:346:ARG:HD3	2.22	0.40
1:B:113:SER:HB3	1:B:158:LYS:HZ3	1.86	0.40
1:C:39:ALA:HB1	1:C:84:THR:HG21	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	682/701 (97%)	665 (98%)	17 (2%)	0	100	100
1	B	679/701 (97%)	656 (97%)	23 (3%)	0	100	100
1	C	672/701 (96%)	655 (98%)	17 (2%)	0	100	100
1	D	685/701 (98%)	662 (97%)	23 (3%)	0	100	100
All	All	2718/2804 (97%)	2638 (97%)	80 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	582/615 (95%)	565 (97%)	17 (3%)	37	63
1	B	574/615 (93%)	558 (97%)	16 (3%)	38	64
1	C	571/615 (93%)	554 (97%)	17 (3%)	36	62
1	D	568/615 (92%)	544 (96%)	24 (4%)	26	49
All	All	2295/2460 (93%)	2221 (97%)	74 (3%)	34	60

All (74) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	47	SER
1	A	67	LEU
1	A	81	ILE
1	A	99	VAL
1	A	123	PHE
1	A	158	LYS
1	A	198	MET
1	A	269	VAL
1	A	288	GLN
1	A	314	GLU
1	A	325	GLU
1	A	356	LEU
1	A	445	THR

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Mol	Chain	Res	Type
1	A	523	VAL
1	A	557	ILE
1	A	568	ILE
1	A	649	MET
1	B	47	SER
1	B	67	LEU
1	B	82	GLU
1	B	88	LYS
1	B	123	PHE
1	B	154	LEU
1	B	269	VAL
1	B	335	VAL
1	B	399	VAL
1	B	466	VAL
1	B	483	LEU
1	B	523	VAL
1	B	539	ASP
1	B	568	ILE
1	B	590	HIS
1	B	615	ASP
1	C	67	LEU
1	C	80	VAL
1	C	81	ILE
1	C	123	PHE
1	C	154	LEU
1	C	198	MET
1	C	240	LYS
1	C	269	VAL
1	C	325	GLU
1	C	336	VAL
1	C	372	LEU
1	C	399	VAL
1	C	513	ASN
1	C	523	VAL
1	C	568	ILE
1	C	587	ILE
1	C	663	VAL
1	D	45	ARG
1	D	67	LEU
1	D	81	ILE
1	D	84	THR
1	D	99	VAL

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Mol	Chain	Res	Type
1	D	110	SER
1	D	123	PHE
1	D	269	VAL
1	D	314	GLU
1	D	336	VAL
1	D	340	ASN
1	D	372	LEU
1	D	385	THR
1	D	399	VAL
1	D	445	THR
1	D	466	VAL
1	D	492	ARG
1	D	523	VAL
1	D	547	SER
1	D	549	ARG
1	D	550	LEU
1	D	568	ILE
1	D	592	LEU
1	D	626	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (44) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	11	GLN
1	A	180	ASN
1	A	192	GLN
1	A	203	GLN
1	A	204	ASN
1	A	295	HIS
1	A	340	ASN
1	A	354	GLN
1	A	455	ASN
1	A	495	ASN
1	A	576	HIS
1	A	585	HIS
1	B	11	GLN
1	B	128	GLN
1	B	164	GLN
1	B	192	GLN
1	B	193	ASN
1	B	234	GLN
1	B	343	GLN

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Mol	Chain	Res	Type
1	B	395	GLN
1	B	566	ASN
1	B	574	GLN
1	B	576	HIS
1	B	590	HIS
1	B	594	HIS
1	B	632	GLN
1	B	664	ASN
1	B	679	HIS
1	C	481	GLN
1	C	534	HIS
1	C	576	HIS
1	D	192	GLN
1	D	193	ASN
1	D	340	ASN
1	D	377	HIS
1	D	378	GLN
1	D	395	GLN
1	D	529	GLN
1	D	552	GLN
1	D	566	ASN
1	D	576	HIS
1	D	594	HIS
1	D	596	GLN
1	D	607	GLN

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 23 ligands modelled in this entry, 13 are monoatomic - leaving 10 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
4	G4P	A	803	2	36,38,38	1.14	3 (8%)	56,61,61	1.72	7 (12%)
6	GOL	B	804	-	5,5,5	0.05	0	5,5,5	0.14	0
6	GOL	C	806	-	5,5,5	0.34	0	5,5,5	0.26	0
5	FLC	A	804	-	12,12,12	1.08	0	17,17,17	1.43	3 (17%)
4	G4P	D	803	8	36,38,38	1.16	4 (11%)	56,61,61	1.79	5 (8%)
6	GOL	C	805	-	5,5,5	0.04	0	5,5,5	0.19	0
4	G4P	B	803	-	36,38,38	1.15	3 (8%)	56,61,61	1.69	6 (10%)
4	G4P	C	803	8	36,38,38	1.17	4 (11%)	56,61,61	1.66	7 (12%)
5	FLC	C	804	-	12,12,12	1.06	0	17,17,17	2.55	6 (35%)
6	GOL	A	805	-	5,5,5	0.05	0	5,5,5	0.10	0

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
4	G4P	A	803	2	-	6/27/43/43	0/3/3/3
6	GOL	B	804	-	-	0/4/4/4	-
6	GOL	C	806	-	-	2/4/4/4	-
5	FLC	A	804	-	-	5/16/16/16	-
4	G4P	D	803	8	-	9/27/43/43	0/3/3/3
6	GOL	C	805	-	-	0/4/4/4	-
4	G4P	B	803	-	-	8/27/43/43	0/3/3/3
4	G4P	C	803	8	-	5/27/43/43	0/3/3/3
5	FLC	C	804	-	-	10/16/16/16	-
6	GOL	A	805	-	-	4/4/4/4	-

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	803	G4P	C5-C4	3.15	1.47	1.38
4	B	803	G4P	C5-C4	3.13	1.47	1.38
4	C	803	G4P	C5-C4	3.11	1.47	1.38
4	A	803	G4P	C5-C4	3.07	1.47	1.38
4	D	803	G4P	C6-N1	-2.85	1.33	1.38
4	B	803	G4P	C6-N1	-2.79	1.33	1.38
4	A	803	G4P	C6-N1	-2.74	1.33	1.38
4	C	803	G4P	C6-N1	-2.63	1.33	1.38
4	B	803	G4P	C5-N7	-2.54	1.34	1.39
4	A	803	G4P	C5-N7	-2.54	1.34	1.39
4	D	803	G4P	C5-N7	-2.45	1.34	1.39
4	C	803	G4P	C5-N7	-2.31	1.34	1.39
4	C	803	G4P	PC-O3C	2.29	1.62	1.59
4	D	803	G4P	PA-O3A	2.10	1.61	1.59

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	803	G4P	C5-C4-N3	-7.18	116.96	128.39
4	A	803	G4P	C5-C4-N3	-6.79	117.58	128.39
4	B	803	G4P	C5-C4-N3	-6.67	117.78	128.39
4	C	803	G4P	C5-C4-N3	-6.42	118.17	128.39
4	D	803	G4P	C2-N3-C4	5.54	121.84	112.30
5	C	804	FLC	OHB-CB-CA	-5.52	96.79	109.38
4	D	803	G4P	N9-C4-N3	5.38	136.71	125.95
4	A	803	G4P	C2-N3-C4	5.28	121.40	112.30
4	A	803	G4P	N9-C4-N3	5.15	136.25	125.95
4	B	803	G4P	C2-N3-C4	5.08	121.05	112.30
4	C	803	G4P	C2-N3-C4	5.05	120.99	112.30
4	B	803	G4P	N9-C4-N3	5.04	136.04	125.95
4	C	803	G4P	N9-C4-N3	4.74	135.42	125.95
5	C	804	FLC	OHB-CB-CBC	4.68	115.60	108.96
5	C	804	FLC	OB2-CBC-CB	4.38	121.55	113.14
5	A	804	FLC	OB1-CBC-CB	-3.41	115.48	122.09
5	C	804	FLC	OB1-CBC-CB	-3.24	115.82	122.09
4	C	803	G4P	C6-C5-N7	2.96	135.68	130.29
5	C	804	FLC	OHB-CB-CG	2.80	115.77	109.38
4	A	803	G4P	C6-C5-N7	2.76	135.32	130.29
4	D	803	G4P	C6-C5-N7	2.71	135.23	130.29
4	B	803	G4P	C6-C5-N7	2.57	134.96	130.29
4	D	803	G4P	C4-C5-N7	-2.52	106.67	110.67
4	C	803	G4P	C4-C5-N7	-2.47	106.75	110.67

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	803	G4P	C4-C5-N7	-2.46	106.77	110.67
4	B	803	G4P	C4-C5-N7	-2.27	107.07	110.67
5	A	804	FLC	OB2-CBC-CB	2.24	117.43	113.14
4	A	803	G4P	O6-C6-C5	-2.22	120.68	126.53
5	C	804	FLC	OG1-CGC-CG	-2.20	116.72	122.95
4	C	803	G4P	O6-C6-C5	-2.17	120.80	126.53
4	A	803	G4P	C3'-C2'-C1'	2.16	104.65	99.89
5	A	804	FLC	OG1-CGC-CG	-2.11	116.97	122.95
4	C	803	G4P	C3'-C2'-C1'	2.06	104.42	99.89
4	B	803	G4P	O6-C6-C5	-2.06	121.10	126.53

There are no chirality outliers.

All (49) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	803	G4P	C5'-O5'-PA-O1A
4	B	803	G4P	C3'-O3'-PC-O3C
4	C	803	G4P	C4'-C5'-O5'-PA
4	D	803	G4P	C5'-O5'-PA-O3A
4	D	803	G4P	C5'-O5'-PA-O1A
4	D	803	G4P	C5'-O5'-PA-O2A
5	A	804	FLC	CAC-CA-CB-CBC
5	A	804	FLC	CAC-CA-CB-CG
5	C	804	FLC	CG-CB-CBC-OB1
5	C	804	FLC	CG-CB-CBC-OB2
5	C	804	FLC	OHB-CB-CBC-OB1
5	C	804	FLC	OHB-CB-CBC-OB2
5	C	804	FLC	CA-CB-CG-CGC
5	C	804	FLC	OHB-CB-CG-CGC
6	C	806	GOL	O1-C1-C2-O2
6	C	806	GOL	O1-C1-C2-C3
4	B	803	G4P	C3'-C4'-C5'-O5'
5	C	804	FLC	CBC-CB-CG-CGC
6	A	805	GOL	C1-C2-C3-O3
4	A	803	G4P	O4'-C4'-C5'-O5'
4	B	803	G4P	O4'-C4'-C5'-O5'
5	A	804	FLC	CAC-CA-CB-OHB
4	A	803	G4P	C3'-C4'-C5'-O5'
4	D	803	G4P	C2'-C1'-N9-C4
4	C	803	G4P	C3'-C4'-C5'-O5'
4	B	803	G4P	PB-O3A-PA-O5'
4	D	803	G4P	PB-O3A-PA-O5'

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Mol	Chain	Res	Type	Atoms
4	B	803	G4P	C3'-O3'-PC-O1C
4	B	803	G4P	PD-O3C-PC-O2C
4	C	803	G4P	PD-O3C-PC-O2C
4	D	803	G4P	PD-O3C-PC-O1C
6	A	805	GOL	O2-C2-C3-O3
5	C	804	FLC	CAC-CA-CB-OHB
4	A	803	G4P	C5'-O5'-PA-O3A
4	C	803	G4P	C5'-O5'-PA-O1A
4	D	803	G4P	C2'-C1'-N9-C8
6	A	805	GOL	O1-C1-C2-C3
4	A	803	G4P	PB-O3A-PA-O1A
5	A	804	FLC	CB-CG-CGC-OG2
5	C	804	FLC	CAC-CA-CB-CG
5	A	804	FLC	CB-CG-CGC-OG1
4	A	803	G4P	PB-O3A-PA-O2A
4	B	803	G4P	C2'-C1'-N9-C4
4	B	803	G4P	PD-O3C-PC-O1C
4	D	803	G4P	C3'-O3'-PC-O2C
4	D	803	G4P	PD-O3C-PC-O2C
6	A	805	GOL	O1-C1-C2-O2
5	C	804	FLC	CB-CG-CGC-OG1
4	C	803	G4P	PD-O3C-PC-O1C

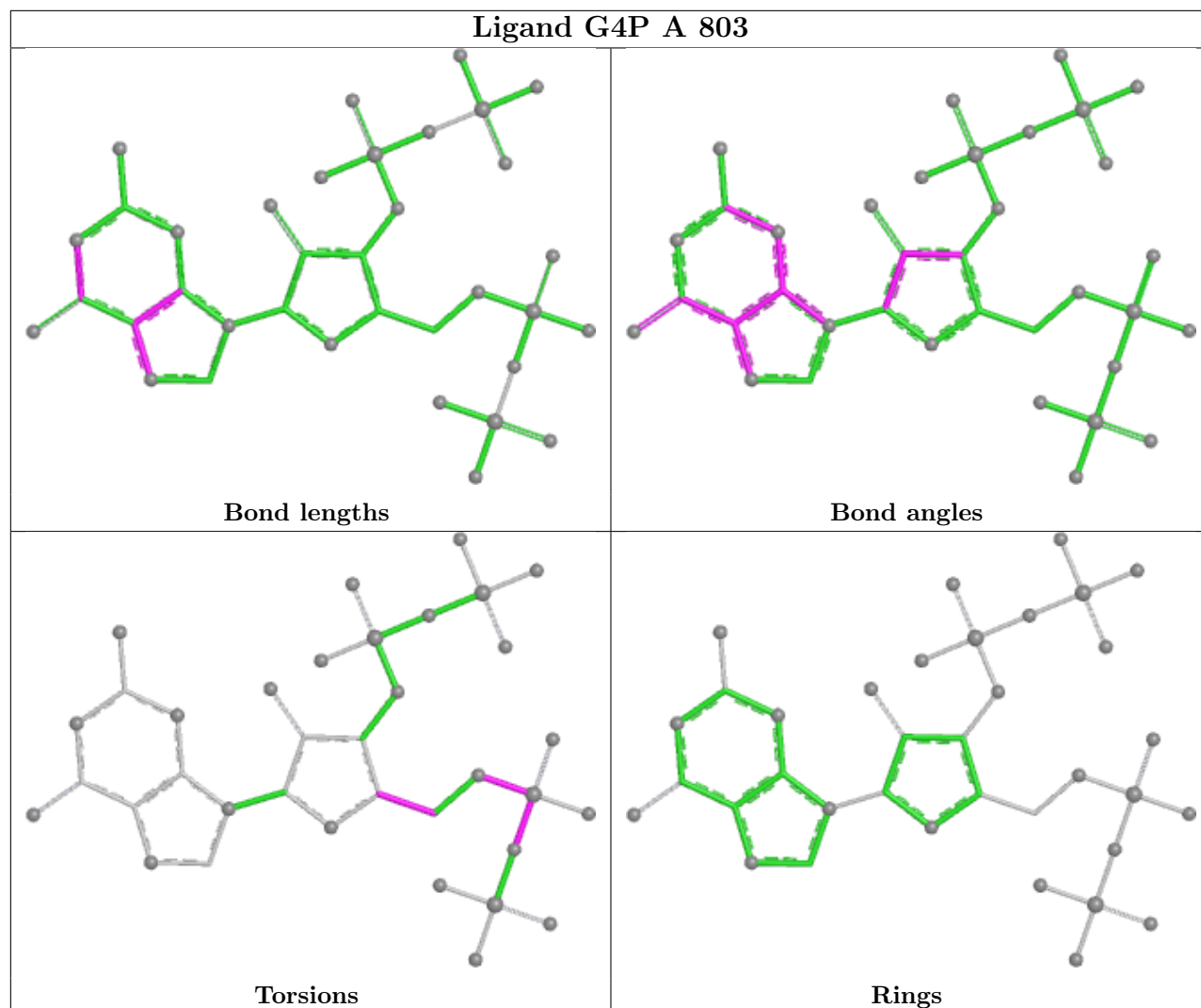
There are no ring outliers.

1 monomer is involved in 3 short contacts:

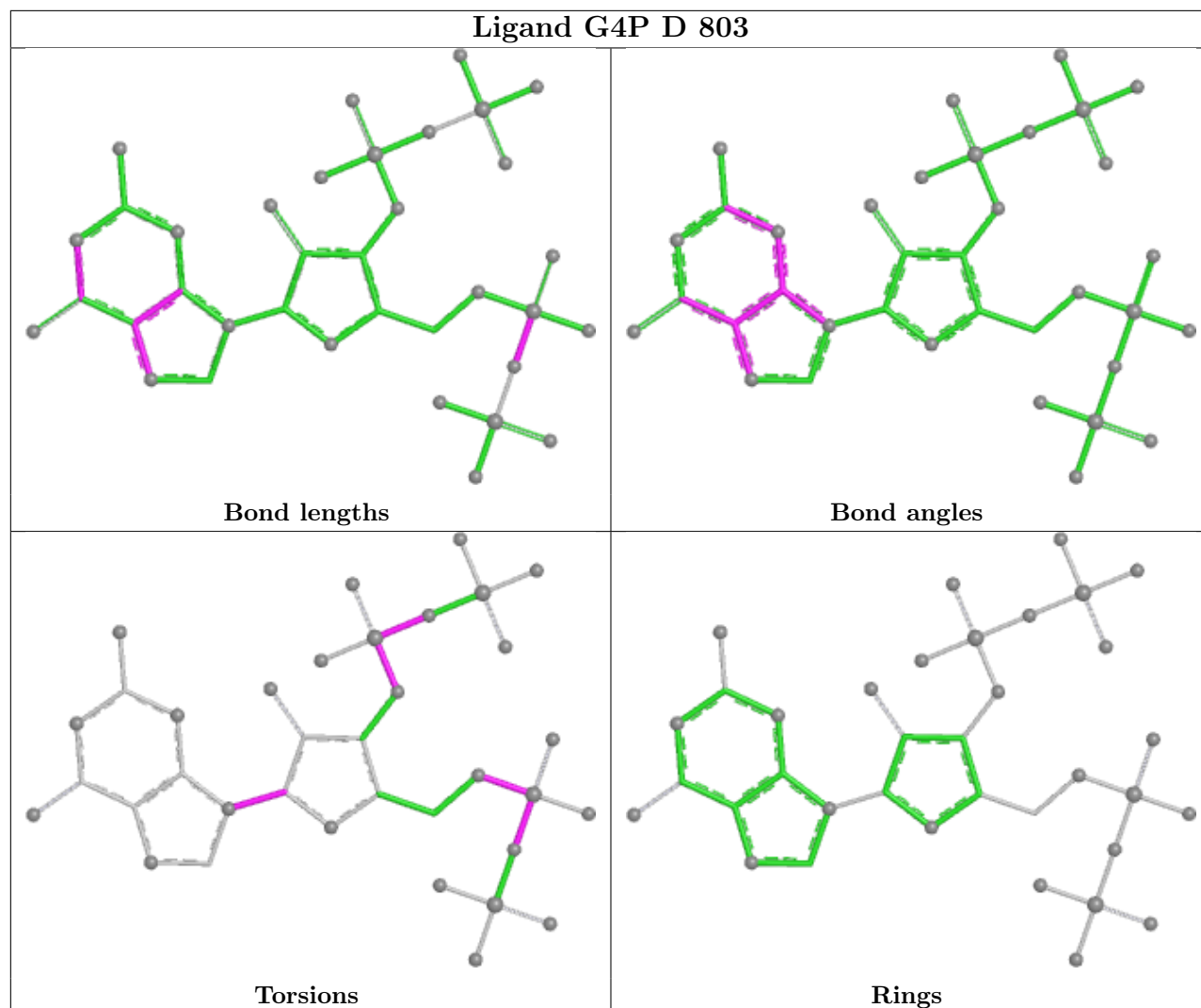
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	804	FLC	3	0

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 than 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.

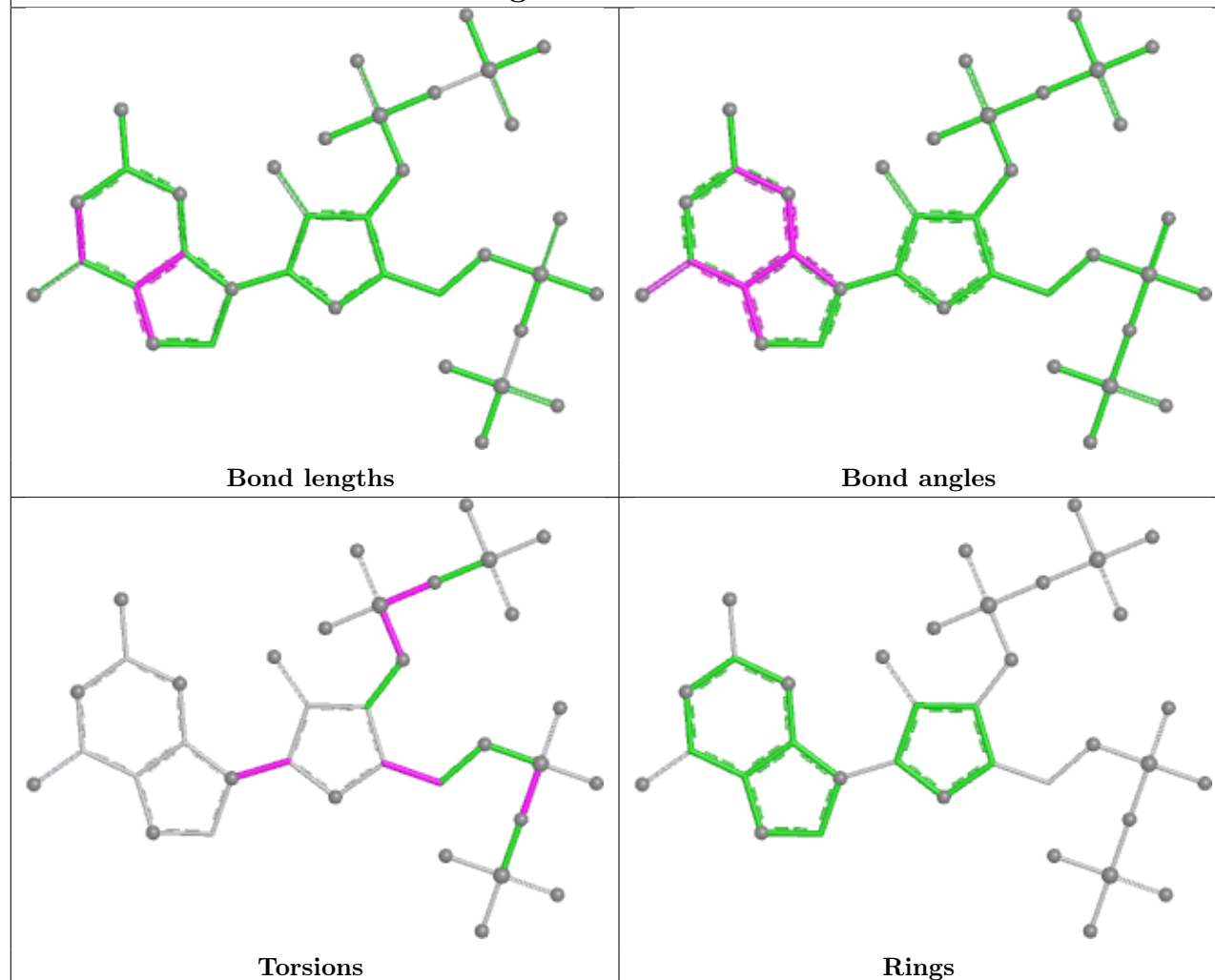
Ligand G4P A 803

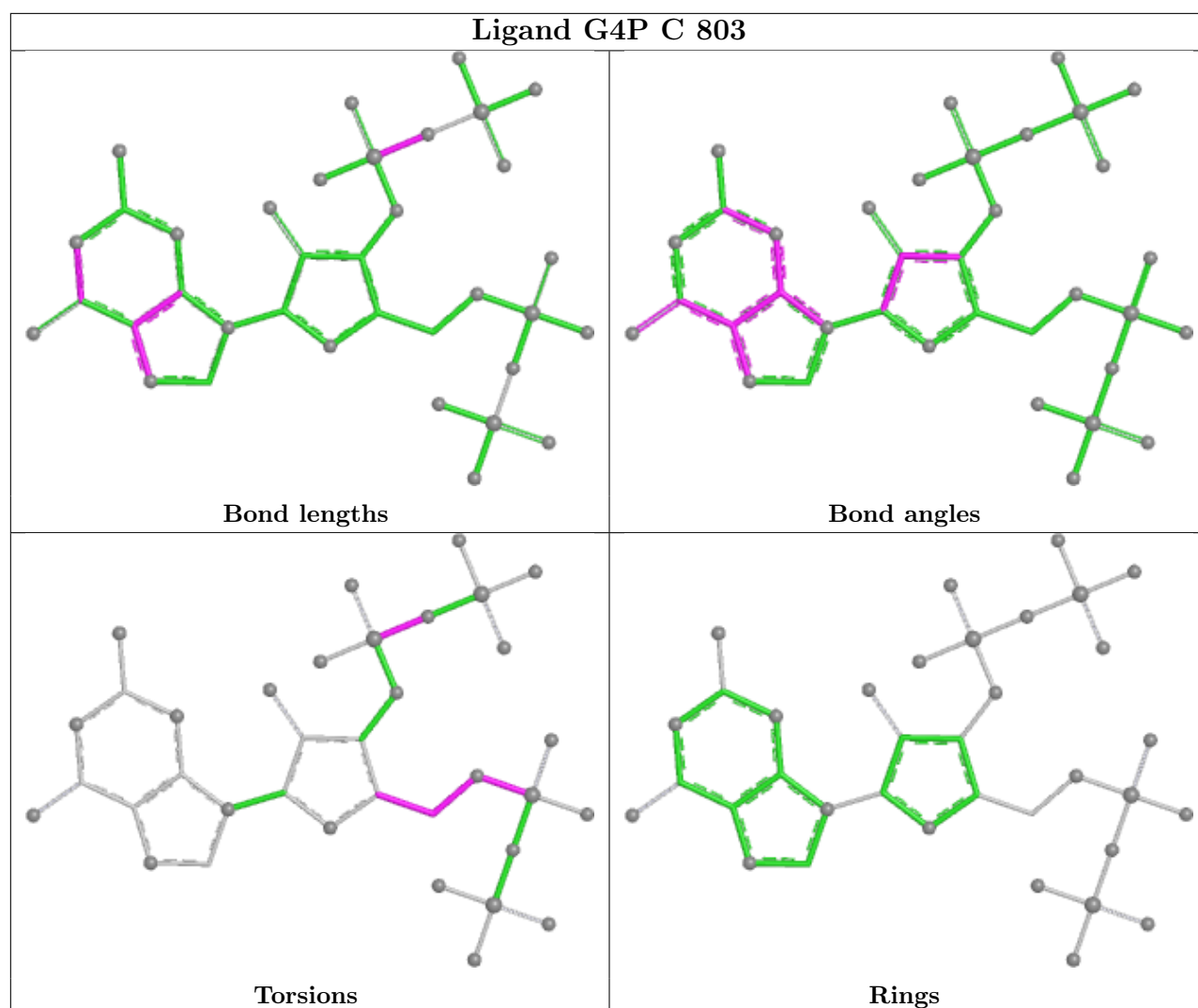


Ligand G4P D 803



Ligand G4P B 803





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 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å ²)	Q<0.9
1	A	687/701 (98%)	0.33	41 (5%)	27	24	35, 59, 110, 148	1 (0%)
1	B	687/701 (98%)	0.58	48 (6%)	22	20	39, 68, 103, 121	0
1	C	678/701 (96%)	0.45	38 (5%)	30	27	40, 63, 113, 143	0
1	D	689/701 (98%)	0.68	66 (9%)	13	12	42, 69, 113, 140	0
All	All	2741/2804 (97%)	0.51	193 (7%)	22	20	35, 65, 110, 148	1 (0%)

All (193) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	335	VAL	5.7
1	C	537	ALA	5.2
1	C	358	THR	5.1
1	B	334	GLY	5.1
1	D	157	ASP	5.0
1	B	369	PHE	4.8
1	D	512	ASP	4.8
1	D	335	VAL	4.6
1	A	539	ASP	4.4
1	A	358	THR	4.3
1	C	530	LEU	4.2
1	C	531	VAL	4.1
1	D	361	ASP	4.0
1	D	369	PHE	4.0
1	D	537	ALA	4.0
1	D	544	ALA	4.0
1	B	85	GLN	3.9
1	B	333	PHE	3.9
1	A	153	ALA	3.8
1	D	341	ALA	3.8
1	B	356	LEU	3.8

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Mol	Chain	Res	Type	RSRZ
1	B	365	ALA	3.7
1	A	538	ASN	3.7
1	A	493	SER	3.7
1	D	368	THR	3.7
1	A	695	MET	3.7
1	B	338	GLY	3.6
1	B	697	ILE	3.6
1	B	366	LYS	3.5
1	D	359	LEU	3.5
1	B	370	ASN	3.5
1	D	592	LEU	3.5
1	C	472	ILE	3.5
1	A	494	ILE	3.4
1	B	358	THR	3.4
1	D	358	THR	3.4
1	A	359	LEU	3.4
1	B	86	TYR	3.3
1	D	511	ILE	3.3
1	B	153	ALA	3.3
1	D	494	ILE	3.2
1	A	487	LEU	3.2
1	A	546	ASN	3.2
1	B	337	LEU	3.2
1	B	357	ASN	3.2
1	D	360	ILE	3.2
1	D	313	GLY	3.1
1	B	84	THR	3.1
1	B	544	ALA	3.1
1	B	359	LEU	3.1
1	D	43	ILE	3.1
1	D	339	GLU	3.0
1	A	505	LEU	3.0
1	B	43	ILE	3.0
1	C	502	TRP	3.0
1	C	340	ASN	3.0
1	C	553	GLY	3.0
1	A	542	PRO	3.0
1	C	505	LEU	3.0
1	B	539	ASP	3.0
1	B	340	ASN	3.0
1	C	495	ASN	3.0
1	D	194	LEU	2.9

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Mol	Chain	Res	Type	RSRZ
1	D	502	TRP	2.9
1	B	90	ASP	2.9
1	D	158	LYS	2.9
1	C	494	ILE	2.8
1	D	156	PRO	2.8
1	A	537	ALA	2.8
1	C	489	LEU	2.8
1	A	548	ASP	2.8
1	D	545	GLU	2.8
1	D	47	SER	2.8
1	D	91	ILE	2.8
1	C	535	LEU	2.8
1	D	695	MET	2.8
1	A	152	GLY	2.8
1	D	547	SER	2.8
1	A	472	ILE	2.8
1	D	543	ARG	2.8
1	D	661	ILE	2.7
1	D	336	VAL	2.7
1	A	371	ASP	2.7
1	D	597	HIS	2.7
1	D	36	GLY	2.7
1	C	1	MET	2.7
1	B	525	ASP	2.7
1	B	375	TYR	2.7
1	A	162	ILE	2.6
1	B	91	ILE	2.6
1	D	155	ARG	2.6
1	B	81	ILE	2.6
1	A	356	LEU	2.6
1	B	242	ASN	2.6
1	A	367	THR	2.6
1	A	511	ILE	2.6
1	D	550	LEU	2.6
1	D	598	LEU	2.6
1	A	368	THR	2.6
1	D	556	GLY	2.5
1	D	542	PRO	2.5
1	D	334	GLY	2.5
1	A	335	VAL	2.5
1	A	609	LYS	2.5
1	D	337	LEU	2.5

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Mol	Chain	Res	Type	RSRZ
1	D	507	GLN	2.5
1	D	508	TRP	2.5
1	B	461	ARG	2.5
1	C	547	SER	2.5
1	D	548	ASP	2.4
1	A	477	LEU	2.4
1	D	503	LEU	2.4
1	C	533	ASN	2.4
1	B	1	MET	2.4
1	A	696	GLU	2.4
1	B	494	ILE	2.4
1	B	489	LEU	2.4
1	A	611	ASP	2.4
1	A	483	LEU	2.4
1	B	530	LEU	2.4
1	C	554	THR	2.4
1	A	497	LEU	2.4
1	D	489	LEU	2.4
1	D	86	TYR	2.4
1	A	161	ARG	2.3
1	D	161	ARG	2.3
1	A	489	LEU	2.3
1	C	337	LEU	2.3
1	C	48	GLY	2.3
1	D	154	LEU	2.3
1	D	344	THR	2.3
1	D	48	GLY	2.3
1	A	43	ILE	2.2
1	D	372	LEU	2.2
1	D	506	LEU	2.2
1	D	604	MET	2.2
1	A	502	TRP	2.2
1	B	177	VAL	2.2
1	C	492	ARG	2.2
1	A	486	ALA	2.2
1	B	367	THR	2.2
1	C	511	ILE	2.2
1	B	650	VAL	2.2
1	D	340	ASN	2.2
1	C	488	LYS	2.2
1	D	603	ILE	2.2
1	A	49	GLU	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	156	PRO	2.2
1	C	369	PHE	2.2
1	D	643	ASN	2.2
1	C	521	ILE	2.2
1	C	509	ARG	2.2
1	C	523	VAL	2.1
1	B	590	HIS	2.1
1	B	368	THR	2.1
1	B	390	LEU	2.1
1	C	487	LEU	2.1
1	B	685	ILE	2.1
1	B	343	GLN	2.1
1	D	546	ASN	2.1
1	B	598	LEU	2.1
1	D	497	LEU	2.1
1	C	43	ILE	2.1
1	D	454	ILE	2.1
1	B	654	GLU	2.1
1	C	525	ASP	2.1
1	A	2	PRO	2.1
1	C	466	VAL	2.1
1	D	196	LEU	2.1
1	B	195	ASP	2.1
1	D	345	CYS	2.1
1	A	503	LEU	2.1
1	D	357	ASN	2.1
1	D	370	ASN	2.1
1	D	195	ASP	2.1
1	D	612	ASP	2.1
1	A	478	VAL	2.0
1	A	536	PHE	2.0
1	B	677	ARG	2.0
1	B	664	ASN	2.0
1	A	499	ASP	2.0
1	D	85	GLN	2.0
1	C	335	VAL	2.0
1	C	490	PHE	2.0
1	C	549	ARG	2.0
1	B	593	LEU	2.0
1	C	477	LEU	2.0
1	C	527	LEU	2.0
1	B	313	GLY	2.0

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Mol	Chain	Res	Type	RSRZ
1	C	84	THR	2.0
1	D	1	MET	2.0
1	C	263	SER	2.0
1	C	510	HIS	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
8	MG	C	807	1/1	0.14	0.20	109,109,109,109	0
5	FLC	C	804	13/13	0.54	0.19	105,106,107,107	0
6	GOL	C	805	6/6	0.67	0.18	126,126,126,126	0
4	G4P	C	803	36/36	0.67	0.17	189,190,192,192	0
5	FLC	A	804	13/13	0.70	0.17	114,114,115,115	0
4	G4P	A	803	36/36	0.72	0.14	152,155,156,156	0
4	G4P	D	803	36/36	0.73	0.17	125,127,130,130	36
4	G4P	B	803	36/36	0.77	0.13	191,191,192,192	0
6	GOL	C	806	6/6	0.78	0.11	74,75,75,75	0
2	MN	D	801	1/1	0.83	0.11	134,134,134,134	0
7	CL	A	806	1/1	0.85	0.27	129,129,129,129	0
6	GOL	A	805	6/6	0.86	0.30	104,104,104,104	0
7	CL	C	808	1/1	0.87	0.10	100,100,100,100	0
6	GOL	B	804	6/6	0.87	0.12	101,101,101,101	0
8	MG	D	804	1/1	0.90	0.10	74,74,74,74	0
2	MN	B	801	1/1	0.94	0.07	133,133,133,133	0
2	MN	A	801	1/1	0.94	0.12	121,121,121,121	0
7	CL	D	805	1/1	0.95	0.27	83,83,83,83	0
2	MN	C	801	1/1	0.96	0.07	124,124,124,124	0

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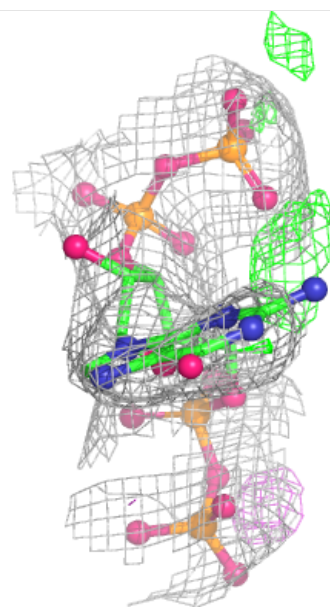
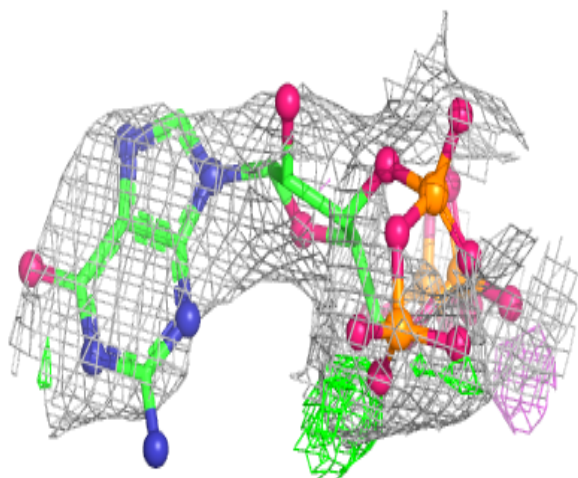
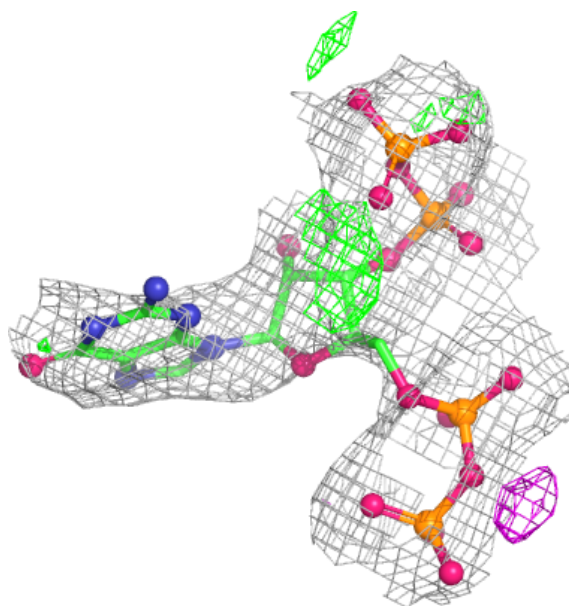
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	ZN	D	802	1/1	0.99	0.07	70,70,70,70	0
3	ZN	B	802	1/1	1.00	0.05	68,68,68,68	0
3	ZN	C	802	1/1	1.00	0.03	51,51,51,51	0
3	ZN	A	802	1/1	1.00	0.07	54,54,54,54	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

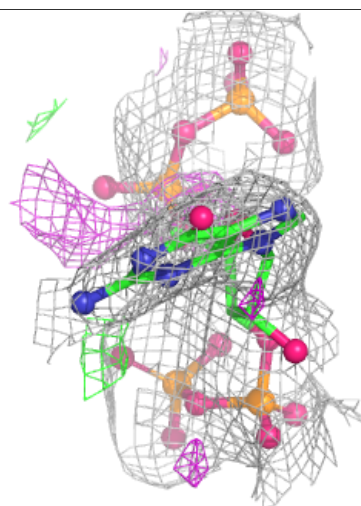
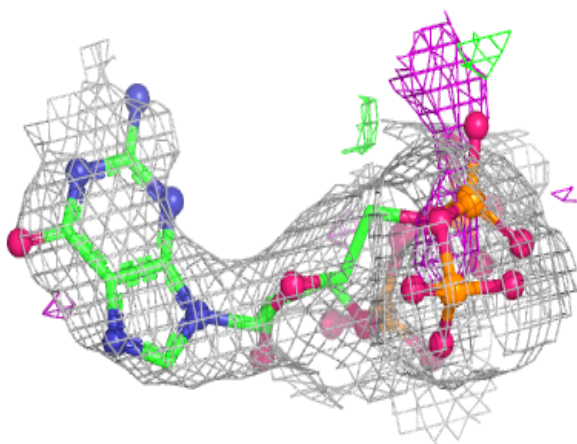
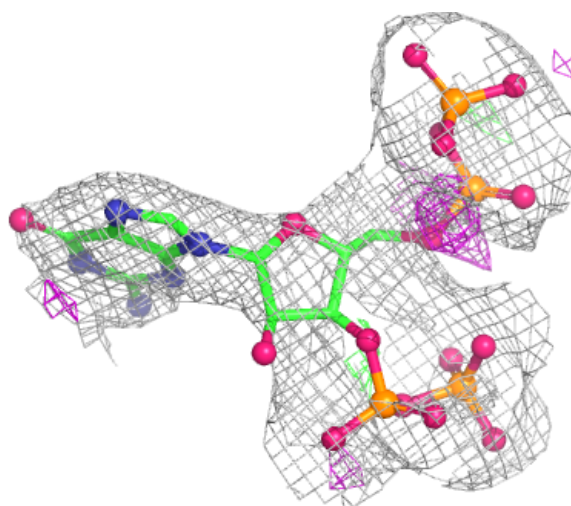
Electron density around G4P C 803:

2mF_o-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



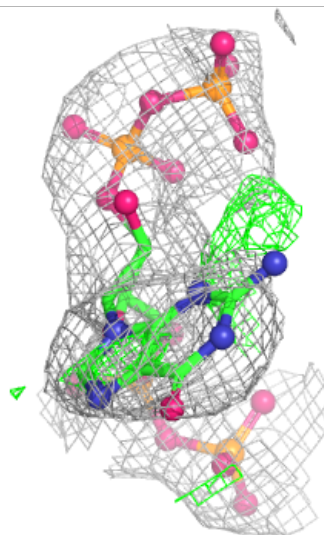
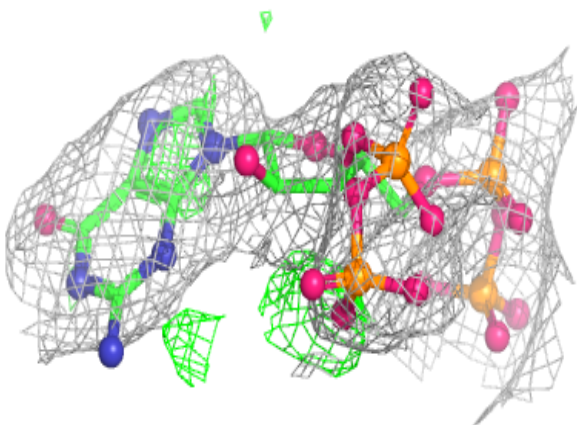
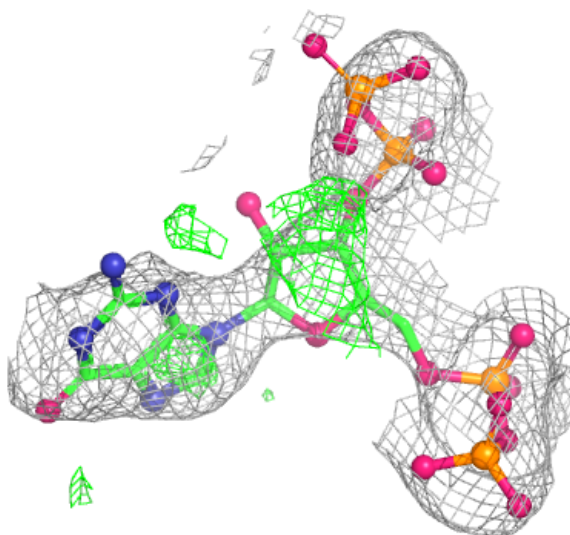
Electron density around G4P A 803:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



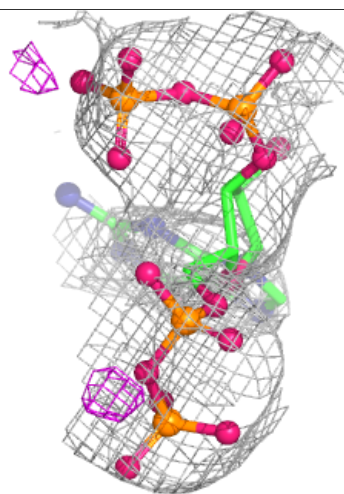
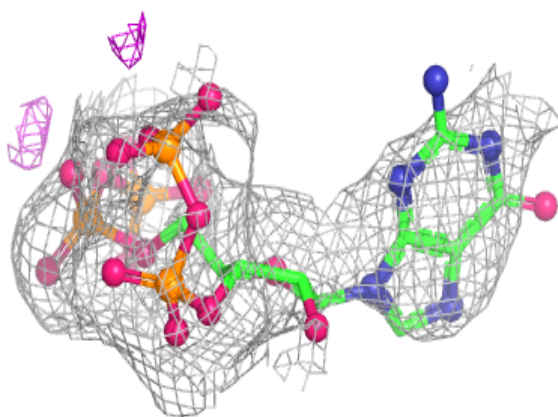
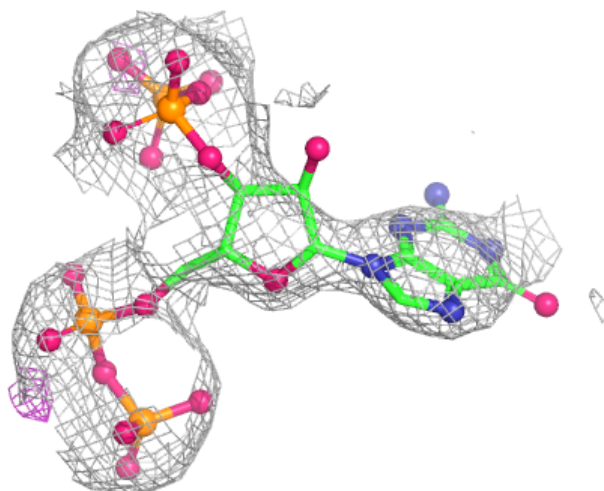
Electron density around G4P D 803:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



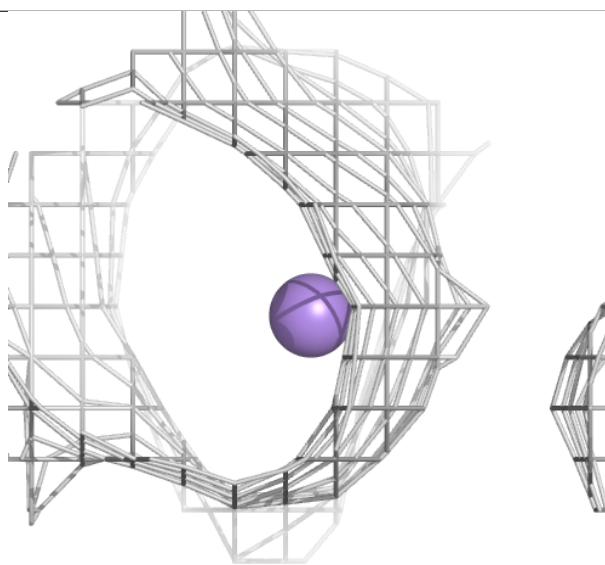
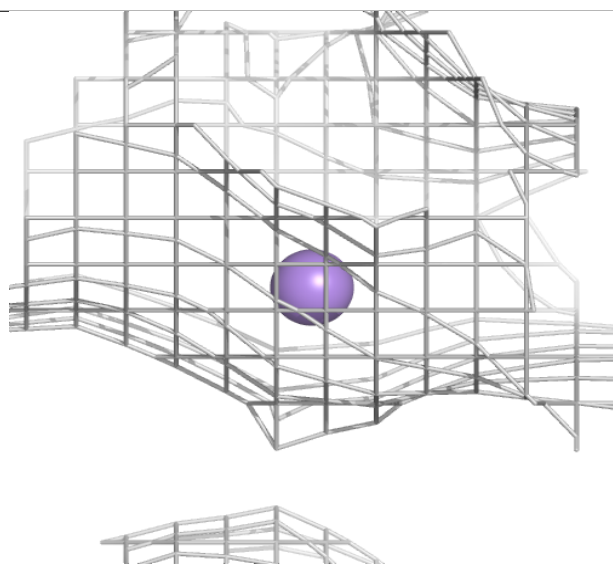
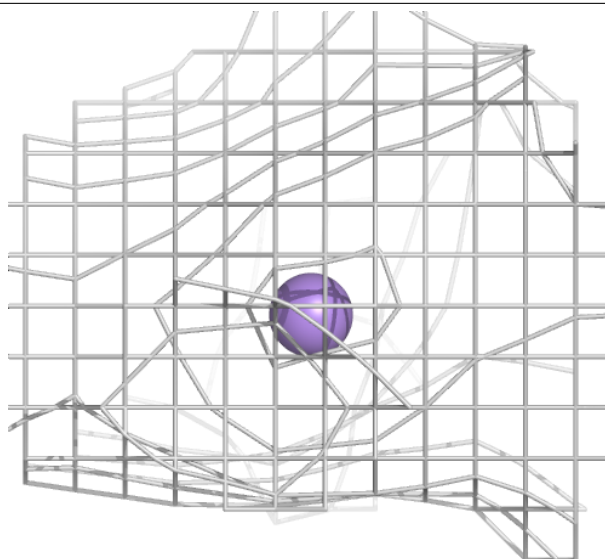
Electron density around G4P B 803:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



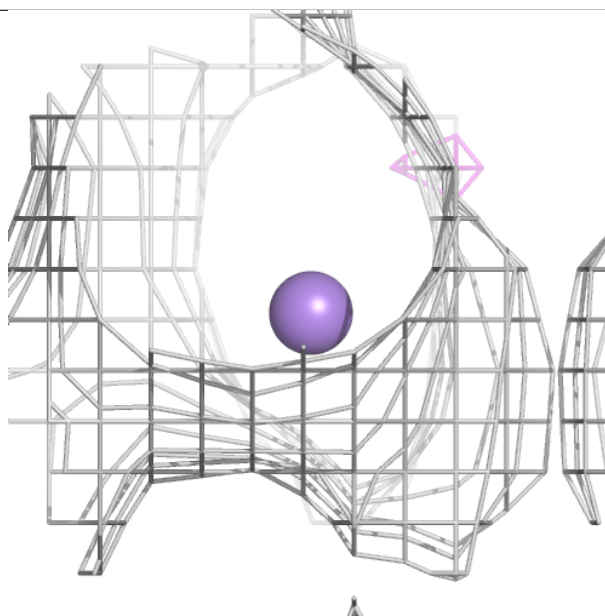
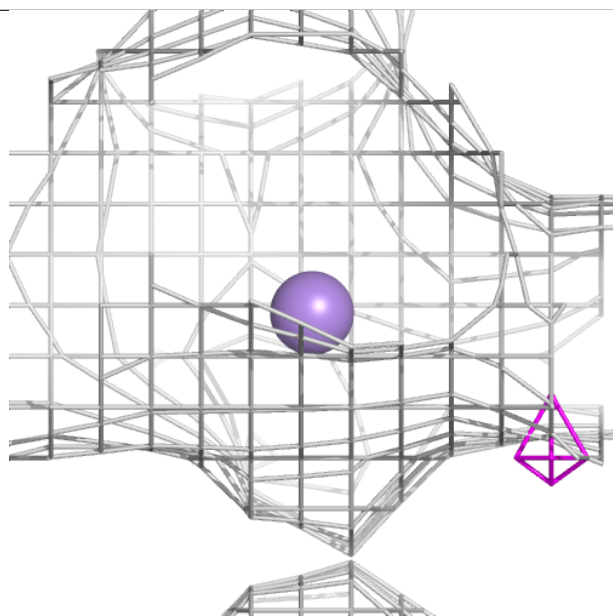
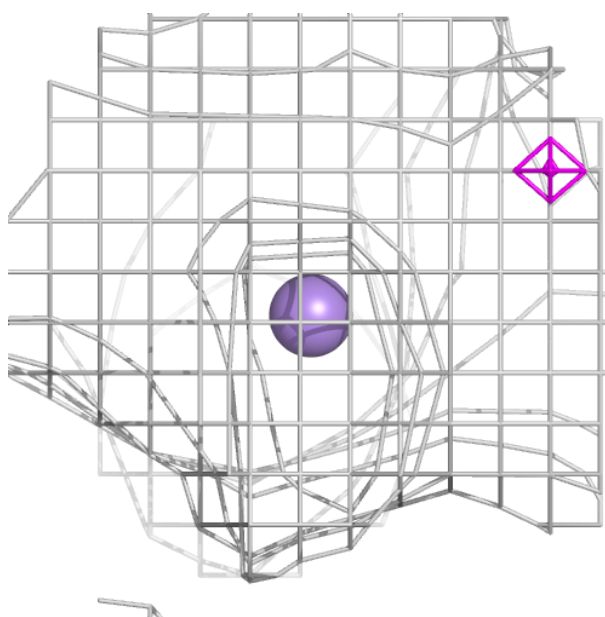
Electron density around MN D 801:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



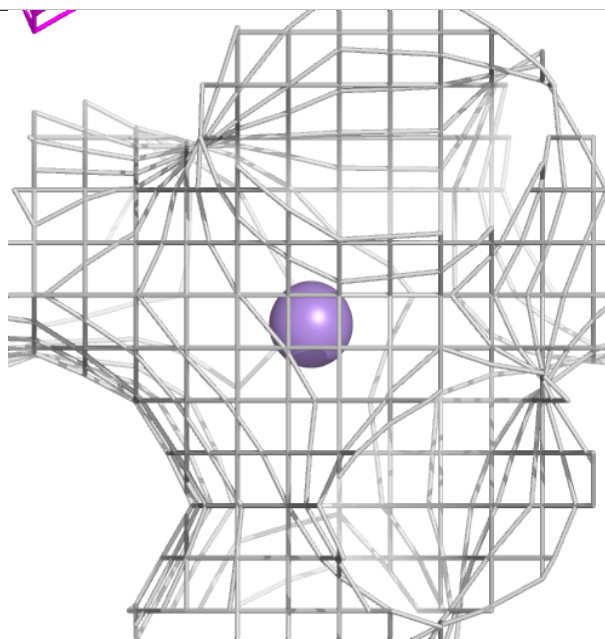
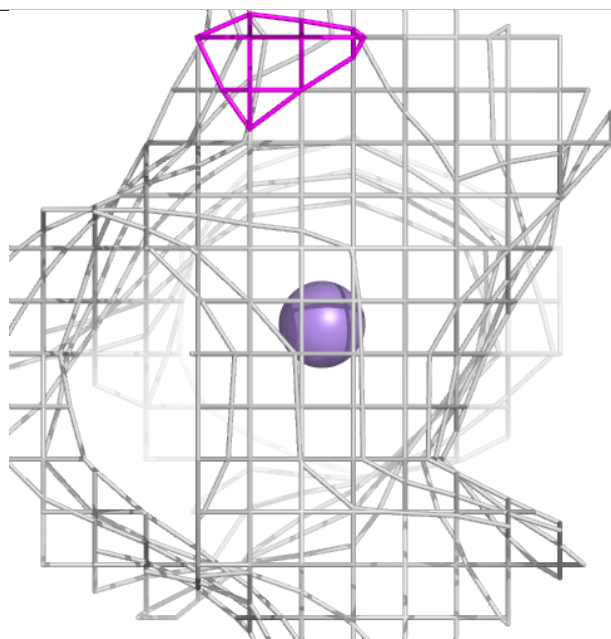
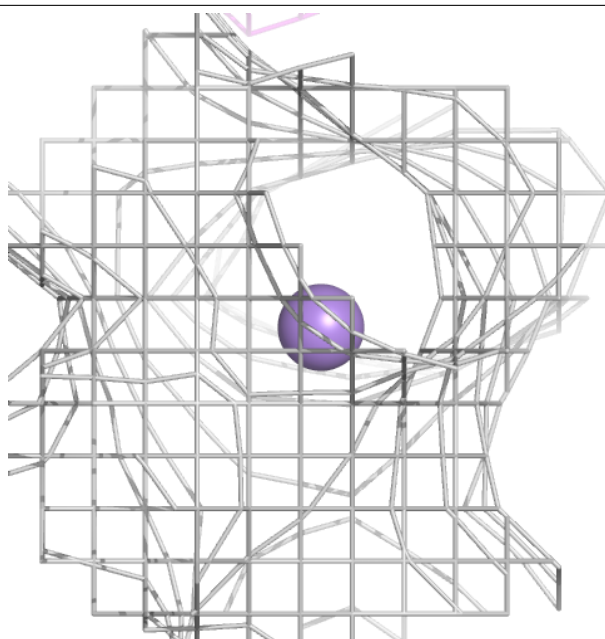
Electron density around MN B 801:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



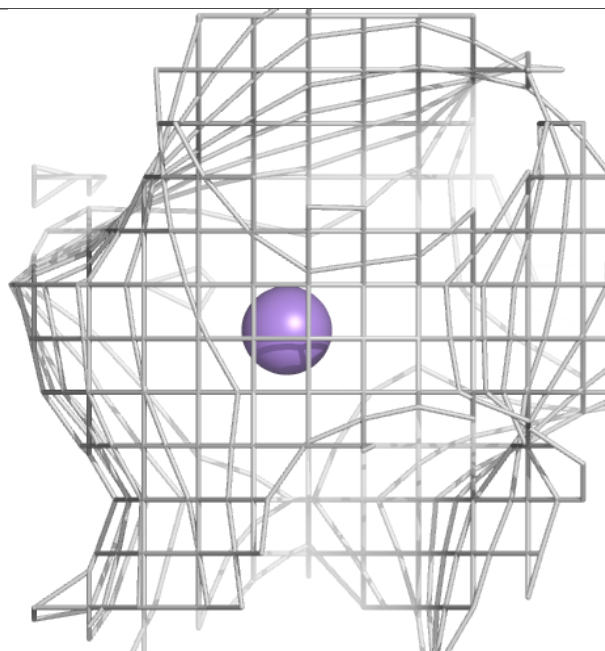
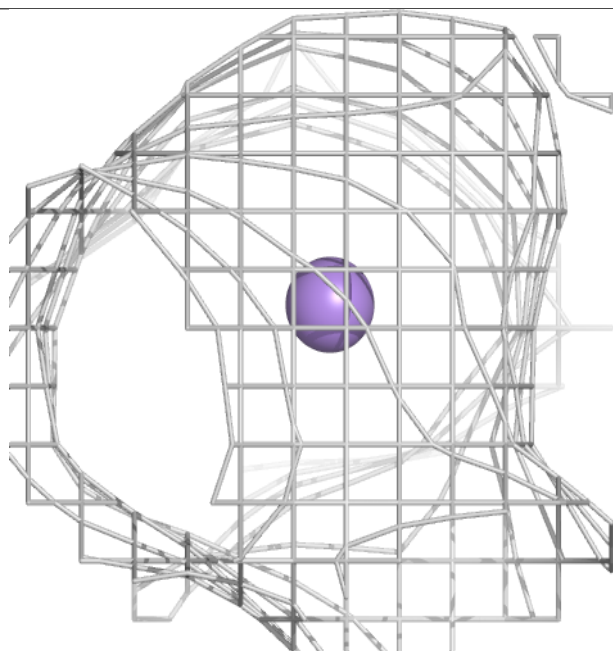
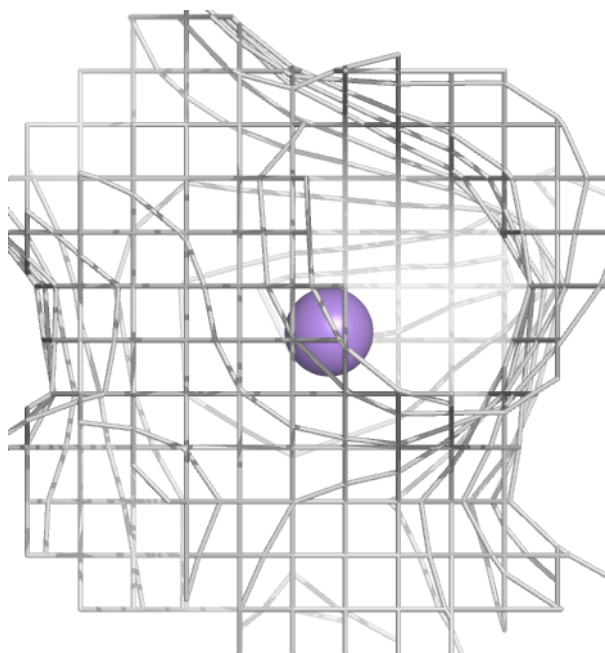
Electron density around MN A 801:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



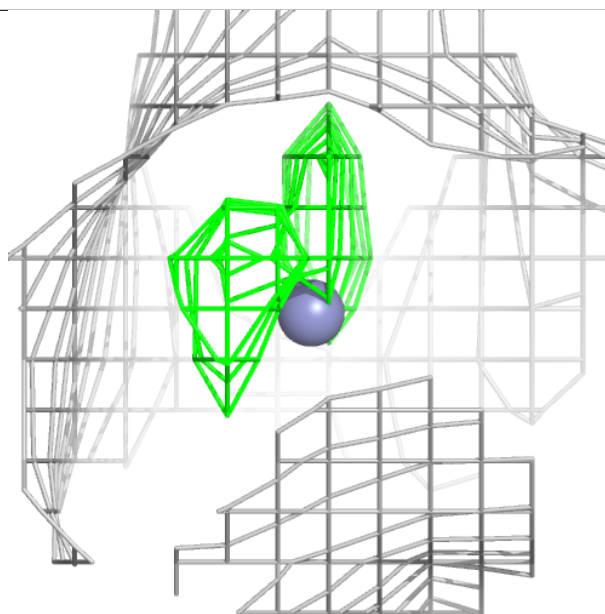
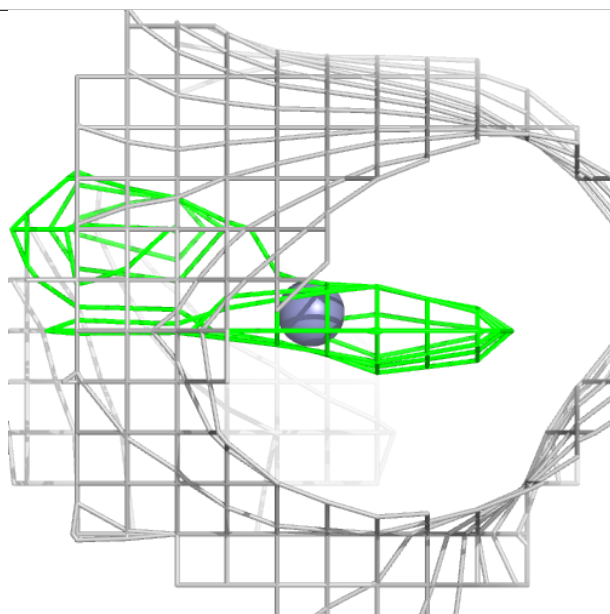
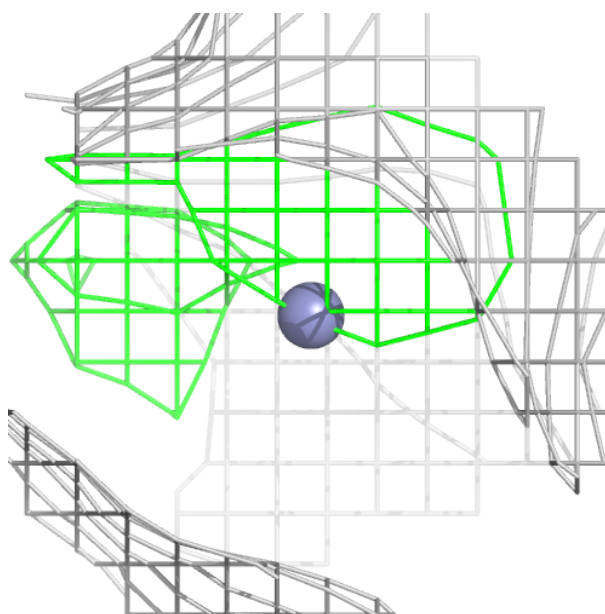
Electron density around MN C 801:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



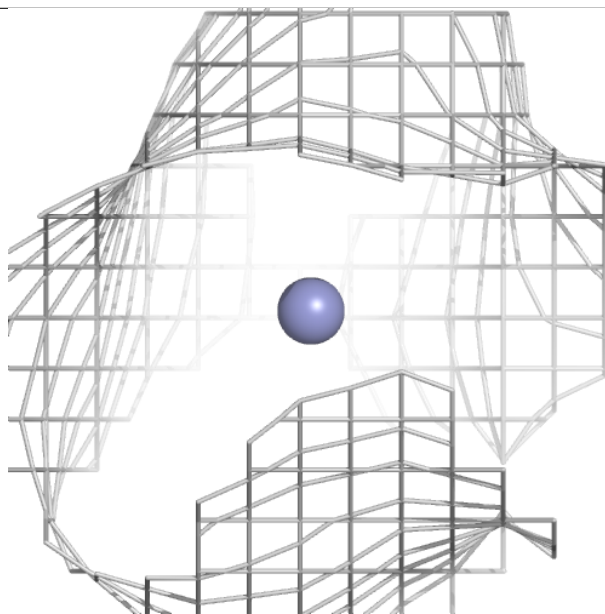
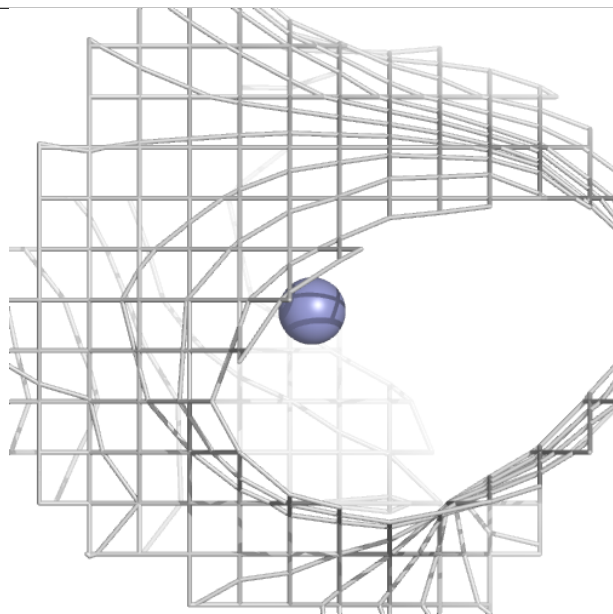
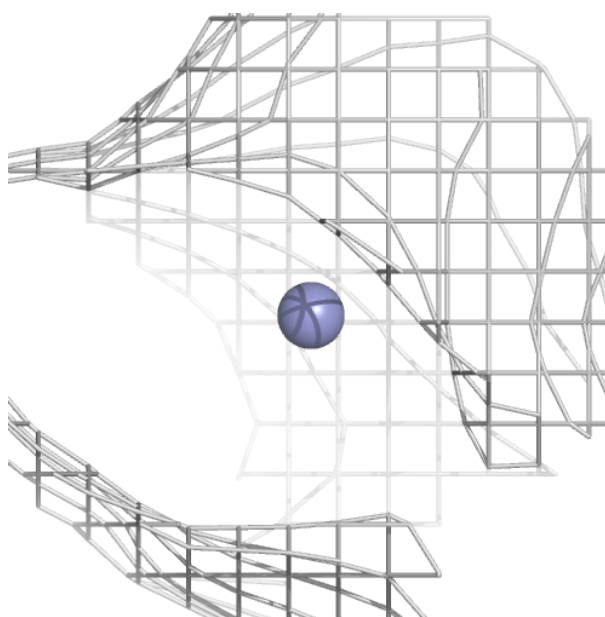
Electron density around ZN D 802:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



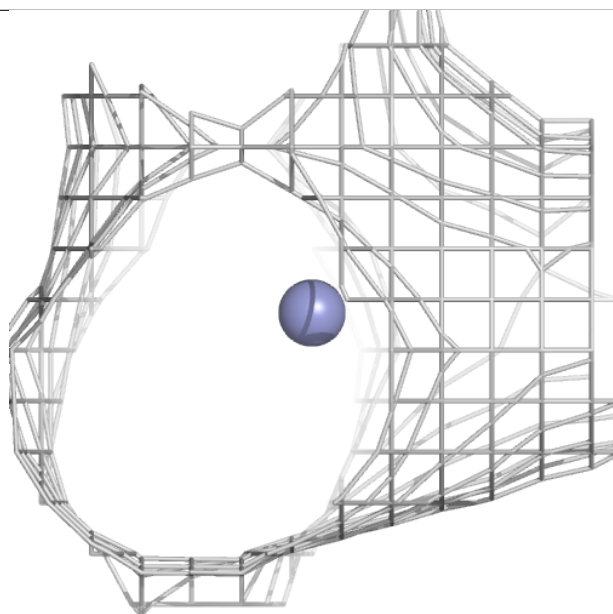
Electron density around ZN B 802:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



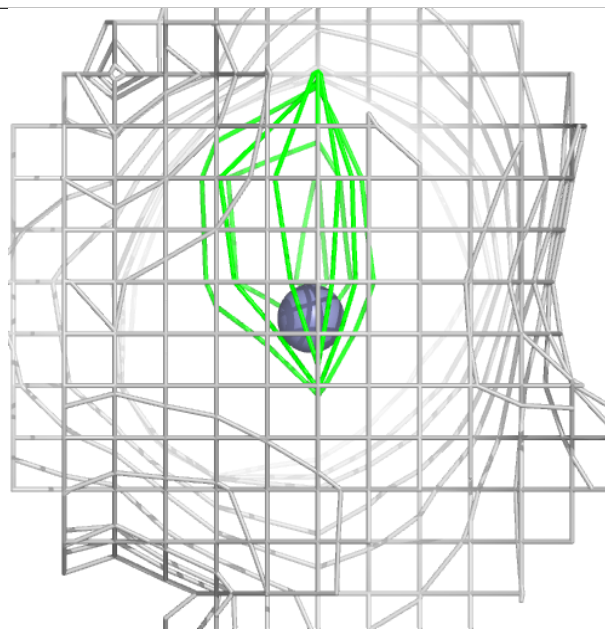
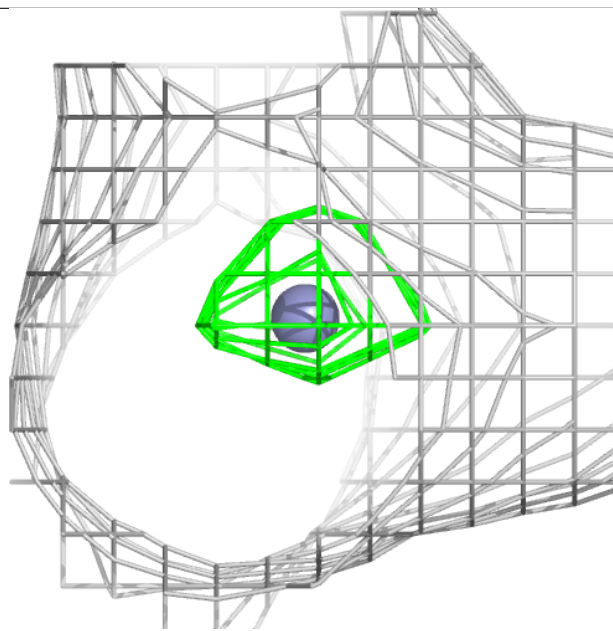
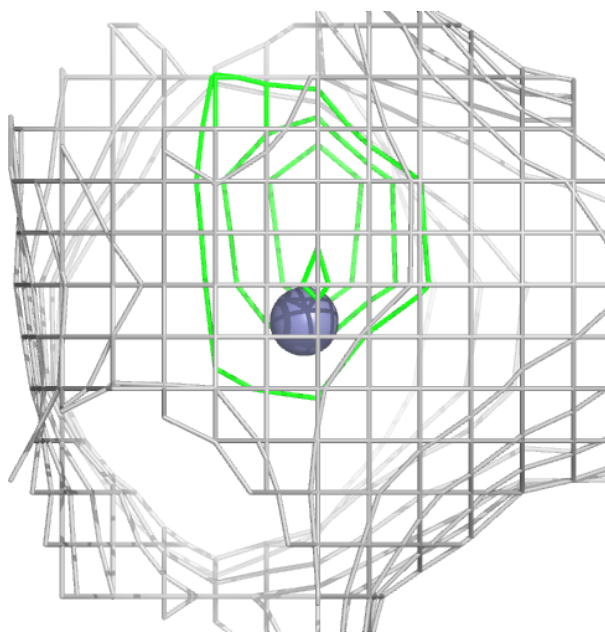
Electron density around ZN C 802:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around ZN A 802:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers ⓘ

There are no such residues in this entry.