



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 03:05 PM UTC

PDB ID : 2BPO / pdb_00002bpo
Title : Crystal structure of the yeast CPR triple mutant: D74G, Y75F, K78A.
Authors : Yermalitskaya, L.V.; Kim, Y.; Waterman, M.R.; Podust, L.M.
Deposited on : 2005-04-21
Resolution : 2.90 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

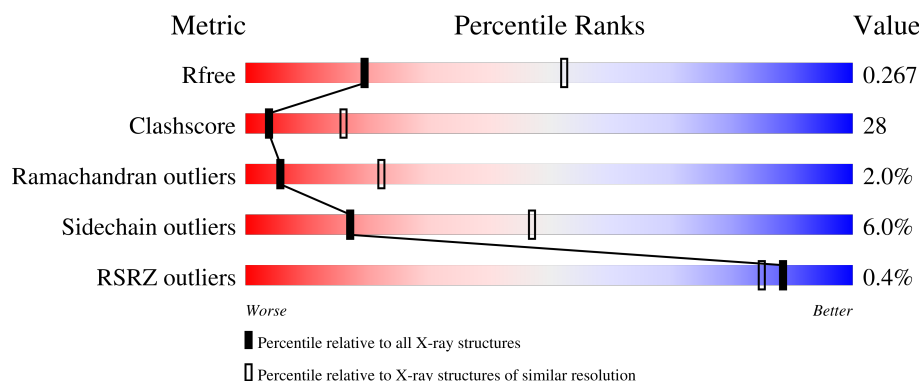
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

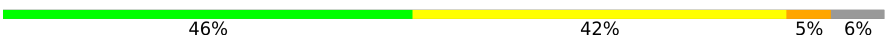
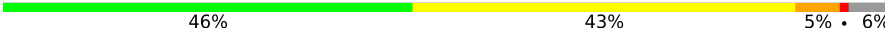
The reported resolution of this entry is 2.90 Å.

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	2481 (2.90-2.90)
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)
RSRZ outliers	180081	2481 (2.90-2.90)

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	682	 46% 42% 5% 6%
1	B	682	 46% 43% 5% 6%

2 Entry composition i

There are 6 unique types of molecules in this entry. The entry contains 10528 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.

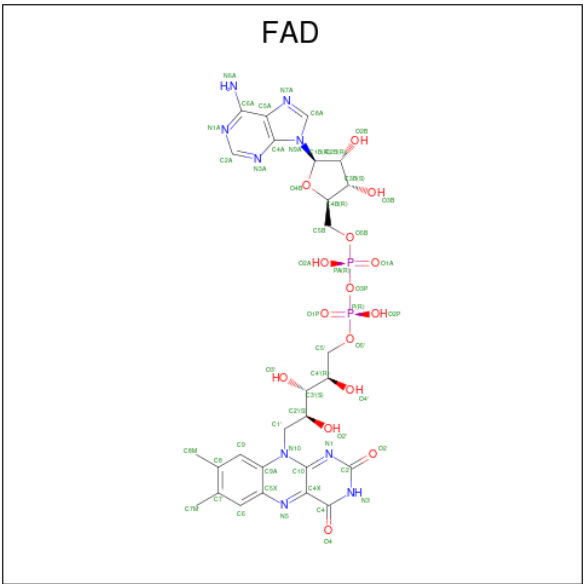
- Molecule 1 is a protein called NADPH-CYTOCHROM P450 REDUCTASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	641	Total	C	N	O	S	0	0	0
			5040	3213	833	979	15			
1	B	641	Total	C	N	O	S	0	0	0
			5040	3213	833	979	15			

There are 6 discrepancies between the modelled and reference sequences:

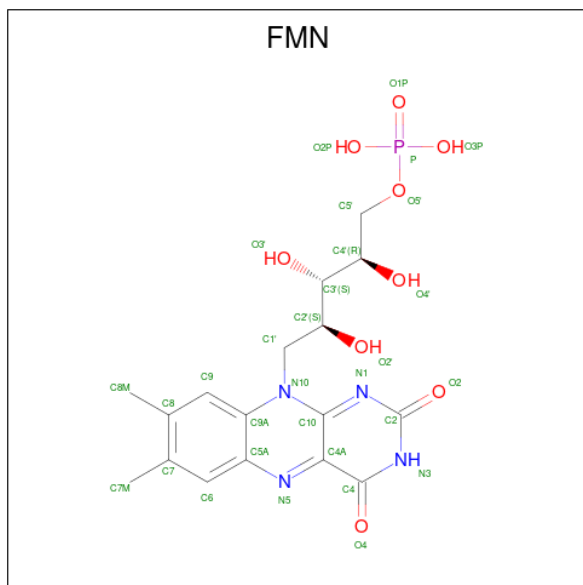
Chain	Residue	Modelled	Actual	Comment	Reference
A	74	GLY	ASP	engineered mutation	UNP P16603
A	75	PHE	TYR	engineered mutation	UNP P16603
A	78	ALA	LYS	engineered mutation	UNP P16603
B	74	GLY	ASP	engineered mutation	UNP P16603
B	75	PHE	TYR	engineered mutation	UNP P16603
B	78	ALA	LYS	engineered mutation	UNP P16603

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula: C₂₇H₃₃N₉O₁₅P₂).



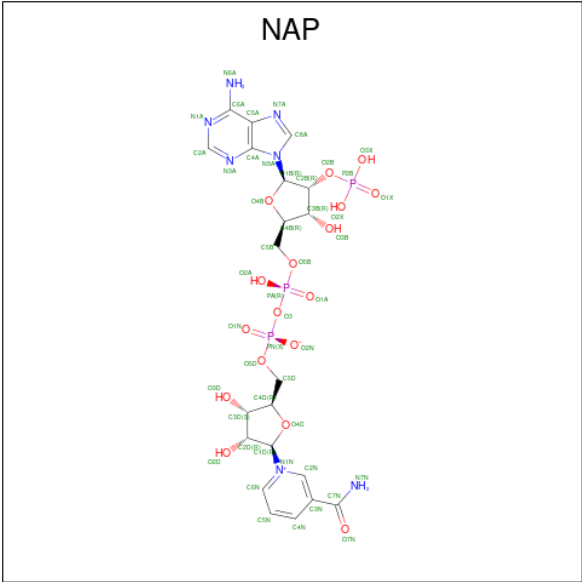
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	B	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 3 is FLAVIN MONONUCLEOTIDE (CCD ID: FMN) (formula: $C_{17}H_{21}N_4O_9P$).



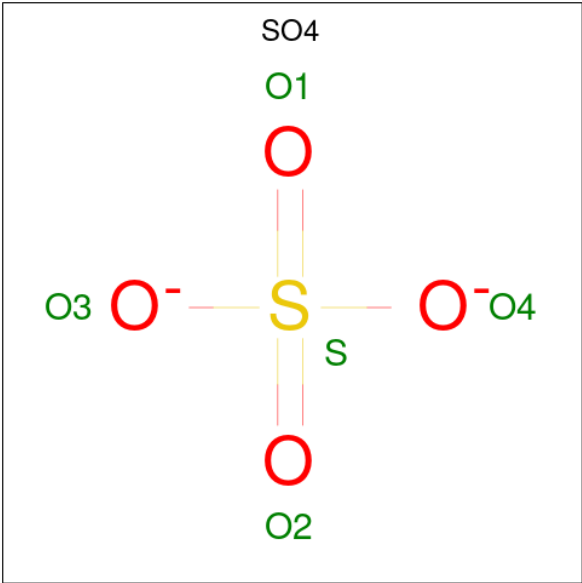
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
3	B	1	Total	C	N	O	P	0	0
			31	17	4	9	1		

- Molecule 4 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (CCD ID: NAP) (formula: $C_{21}H_{28}N_7O_{17}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	0
			40	15	6	16	3		
4	B	1	Total	C	N	O	P	0	0
			40	15	6	16	3		

- Molecule 5 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	O	S	0	0
			5	4	1		
5	A	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	O	S	0	0
			5	4	1		

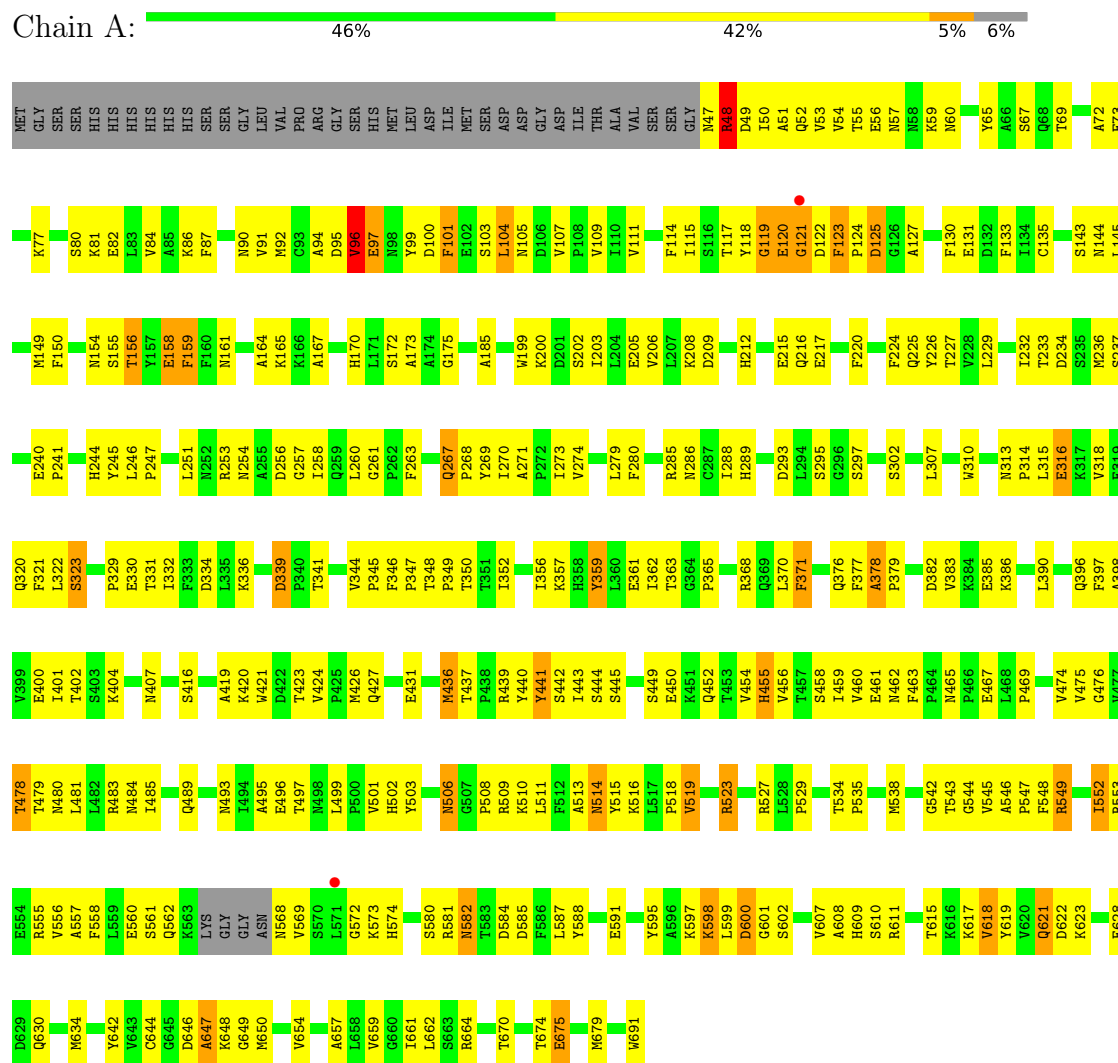
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	127	Total	O	0	0
			127	127		
6	B	58	Total	O	0	0
			58	58		

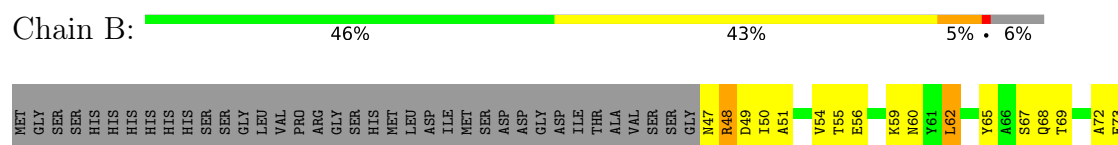
3 Residue-property plots

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: NADPH-CYTOCHROM P450 REDUCTASE



• Molecule 1: NADPH-CYTOCHROM P450 REDUCTASE





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	78.36Å 86.60Å 259.72Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.18 – 2.90 39.18 – 2.90	Depositor EDS
% Data completeness (in resolution range)	87.2 (39.18-2.90) 87.2 (39.18-2.90)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.77 (at 2.91Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.205 , 0.268 0.205 , 0.267	Depositor DCC
R_{free} test set	3727 reflections (10.02%)	wwPDB-VP
Wilson B-factor (Å ²)	51.0	Xtriage
Anisotropy	0.708	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 61.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10528	wwPDB-VP
Average B, all atoms (Å ²)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.76% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, FAD, NAP, FMN

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	0.48	0/5156	1.01	24/7000 (0.3%)
1	B	0.44	0/5156	1.01	26/7000 (0.4%)
All	All	0.46	0/10312	1.01	50/14000 (0.4%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (50) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	407	ASN	N-CA-C	-9.08	97.02	110.46
1	A	549	ARG	N-CA-C	-8.40	102.08	111.07
1	A	120	GLU	N-CA-C	-8.05	99.78	110.24
1	A	145	LEU	N-CA-C	7.81	120.39	109.15
1	B	328	ASP	CA-C-N	7.10	126.62	119.24
1	B	328	ASP	C-N-CA	7.10	126.62	119.24
1	A	607	VAL	N-CA-C	6.89	118.98	108.71
1	A	465	ASN	CA-C-N	6.70	126.83	119.87
1	A	465	ASN	C-N-CA	6.70	126.83	119.87
1	B	677	ILE	N-CA-C	-6.68	104.14	110.42
1	B	339	ASP	CA-C-N	6.50	127.01	119.47
1	B	339	ASP	C-N-CA	6.50	127.01	119.47
1	A	111	VAL	N-CA-C	6.49	117.20	108.11
1	A	323	SER	N-CA-C	6.37	117.89	111.07

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	545	VAL	N-CA-C	-6.30	106.57	113.43
1	B	549	ARG	N-CA-C	-6.17	104.64	111.36
1	B	463	PHE	CA-C-N	6.14	126.08	119.76
1	B	463	PHE	C-N-CA	6.14	126.08	119.76
1	B	95	ASP	N-CA-C	-6.11	100.80	109.96
1	A	359	TYR	N-CA-C	6.09	121.37	113.88
1	B	407	ASN	N-CA-C	-6.02	101.86	110.59
1	A	597	LYS	N-CA-C	-5.96	104.48	110.97
1	A	478	THR	N-CA-C	5.94	117.43	111.07
1	A	506	ASN	N-CA-C	-5.93	106.58	113.88
1	B	413	LYS	N-CA-C	-5.88	104.78	111.14
1	A	48	ARG	N-CA-C	-5.85	104.65	113.89
1	A	378	ALA	CA-C-N	5.80	127.09	119.84
1	A	378	ALA	C-N-CA	5.80	127.09	119.84
1	B	475	VAL	N-CA-C	5.80	117.70	108.89
1	A	618	VAL	N-CA-C	5.71	116.11	108.11
1	B	274	VAL	N-CA-C	5.66	116.12	110.23
1	B	98	ASN	N-CA-C	5.65	120.04	113.20
1	A	598	LYS	N-CA-C	5.50	118.04	111.71
1	B	79	PHE	N-CA-C	-5.38	105.06	111.03
1	B	615	THR	N-CA-C	5.37	116.43	108.86
1	B	458	SER	N-CA-C	5.36	118.19	107.62
1	A	344	VAL	CA-C-N	5.32	124.95	119.05
1	A	344	VAL	C-N-CA	5.32	124.95	119.05
1	B	125	ASP	N-CA-C	5.28	116.85	111.14
1	B	312	SER	N-CA-C	-5.24	101.11	109.23
1	A	158	GLU	N-CA-C	-5.16	101.86	110.17
1	A	458	SER	N-CA-C	5.15	118.05	107.69
1	B	629	ASP	N-CA-C	5.13	117.27	111.11
1	B	147	TYR	N-CA-C	5.10	117.04	109.69
1	B	364	GLY	CA-C-N	5.09	125.33	119.83
1	B	364	GLY	C-N-CA	5.09	125.33	119.83
1	B	503	TYR	N-CA-C	5.09	117.02	109.69
1	A	377	PHE	N-CA-C	5.09	118.36	112.97
1	B	335	LEU	N-CA-C	5.06	116.65	108.41
1	A	561	SER	N-CA-C	-5.01	107.19	113.15

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	441	TYR	Sidechain

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	5040	0	4933	273	0
1	B	5040	0	4933	306	0
2	A	53	0	31	2	0
2	B	53	0	31	4	0
3	A	31	0	19	2	0
3	B	31	0	19	1	0
4	A	40	0	19	2	0
4	B	40	0	19	2	0
5	A	10	0	0	0	0
5	B	5	0	0	0	0
6	A	127	0	0	9	0
6	B	58	0	0	7	0
All	All	10528	0	10004	579	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 28.

All (579) 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:B:619:TYR:HB3	1:B:621:GLN:HE22	1.03	1.12
1:B:621:GLN:H	1:B:621:GLN:NE2	1.54	1.06
1:B:539:ILE:HG23	1:B:620:VAL:HG11	1.39	1.03
1:B:621:GLN:HE21	1:B:621:GLN:N	1.57	1.01
1:B:625:LYS:O	1:B:628:GLU:HG3	1.60	1.00
1:B:582:ASN:HD21	1:B:584:ASP:HB2	1.27	0.99
1:B:582:ASN:ND2	1:B:584:ASP:H	1.60	0.99
1:A:621:GLN:HE21	1:A:621:GLN:N	1.62	0.98
1:B:445:SER:HB2	1:B:450:GLU:HG3	1.47	0.96
1:A:621:GLN:H	1:A:621:GLN:NE2	1.62	0.96
1:B:416:SER:HB2	1:B:419:ALA:HB3	1.49	0.94
1:B:225:GLN:HB3	1:B:336:LYS:HB2	1.50	0.93
1:A:67:SER:HB2	1:A:72:ALA:HB3	1.52	0.92
1:B:656:THR:O	1:B:659:VAL:HG12	1.68	0.91
1:B:60:ASN:HD22	1:B:90:ASN:H	1.01	0.91

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:621:GLN:H	1:B:621:GLN:HE21	0.91	0.90
1:A:60:ASN:ND2	1:A:90:ASN:H	1.68	0.90
1:B:427:GLN:H	1:B:427:GLN:HE21	1.14	0.89
1:B:619:TYR:HB3	1:B:621:GLN:NE2	1.87	0.88
1:B:427:GLN:H	1:B:427:GLN:NE2	1.70	0.88
1:B:352:ILE:HG23	1:B:426:MET:HE2	1.57	0.87
1:B:110:ILE:HD12	1:B:211:LEU:HD21	1.58	0.86
1:B:619:TYR:CB	1:B:621:GLN:HE22	1.87	0.86
1:A:60:ASN:HD22	1:A:90:ASN:N	1.72	0.86
1:B:674:THR:HA	1:B:677:ILE:HD12	1.58	0.85
1:A:390:LEU:HD23	1:A:396:GLN:HG2	1.58	0.85
1:A:60:ASN:HD22	1:A:90:ASN:H	0.88	0.84
1:A:416:SER:HB3	1:A:419:ALA:HB3	1.60	0.83
1:B:179:LEU:CD2	1:B:210:GLU:HG3	2.08	0.83
1:A:361:GLU:HG2	1:A:436:MET:HA	1.61	0.83
1:A:600:ASP:CG	1:A:601:GLY:N	2.35	0.83
1:A:105:ASN:HD21	1:A:144:ASN:H	1.23	0.83
1:B:234:ASP:HB3	1:B:247:PRO:HB2	1.59	0.82
1:A:227:THR:HB	6:A:2033:HOH:O	1.78	0.82
1:A:600:ASP:CG	1:A:601:GLY:H	1.85	0.82
1:A:234:ASP:HB3	1:A:247:PRO:HB2	1.61	0.81
1:A:87:PHE:HE2	1:A:215:GLU:HG2	1.45	0.81
1:B:220:PHE:H	1:B:376:GLN:HE22	1.27	0.81
1:B:168:GLU:HG3	1:B:182:LEU:HD12	1.64	0.80
1:A:233:THR:HG22	1:A:234:ASP:N	1.96	0.80
1:B:451:LYS:O	1:B:452:GLN:HB2	1.81	0.80
1:B:310:TRP:HB2	1:B:518:PRO:HB2	1.64	0.80
1:B:60:ASN:ND2	1:B:90:ASN:H	1.78	0.79
1:B:237:SER:HA	1:B:246:LEU:HD21	1.63	0.79
1:A:225:GLN:HB3	1:A:336:LYS:HB3	1.66	0.79
1:B:60:ASN:HD22	1:B:90:ASN:N	1.79	0.78
1:A:120:GLU:O	1:A:122:ASP:N	2.17	0.78
1:B:467:GLU:O	1:B:469:PRO:HD3	1.84	0.78
1:B:80:SER:O	1:B:84:VAL:HG23	1.83	0.78
1:B:179:LEU:HD21	1:B:210:GLU:HG3	1.66	0.77
1:B:316:GLU:HG3	1:B:501:VAL:HG12	1.65	0.77
1:A:237:SER:HA	1:A:246:LEU:HD21	1.67	0.76
1:A:295:SER:HA	1:A:452:GLN:OE1	1.85	0.76
1:B:352:ILE:O	1:B:356:ILE:HG12	1.83	0.76
1:B:542:GLY:O	1:B:545:VAL:HG23	1.86	0.76
1:B:73:GLU:O	1:B:77:LYS:HG3	1.85	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:65:TYR:CZ	1:A:73:GLU:HG3	2.21	0.75
1:B:125:ASP:O	1:B:128:VAL:HG23	1.87	0.75
1:B:407:ASN:ND2	2:B:750:FAD:H61A	1.84	0.75
1:B:416:SER:HB2	1:B:419:ALA:CB	2.17	0.75
1:B:272:PRO:HB2	6:B:2022:HOH:O	1.86	0.75
1:A:232:ILE:HD12	1:A:236:MET:HB2	1.68	0.74
1:A:621:GLN:HE22	4:A:753:NAP:H2A	1.51	0.74
1:B:446:SER:O	1:B:450:GLU:HG2	1.86	0.74
1:A:549:ARG:O	1:A:553:ARG:HG3	1.88	0.74
1:B:233:THR:HG22	1:B:235:SER:H	1.50	0.74
1:A:493:ASN:HD21	1:A:495:ALA:HB3	1.52	0.74
1:B:200:LYS:O	1:B:203:ILE:HG22	1.89	0.73
1:B:275:LYS:HB2	1:B:291:GLU:OE1	1.88	0.73
1:B:419:ALA:O	1:B:420:LYS:HB2	1.88	0.73
1:B:404:LYS:HG3	1:B:468:LEU:HD11	1.67	0.73
1:B:583:THR:HG23	6:B:2047:HOH:O	1.87	0.73
1:A:233:THR:HG22	1:A:234:ASP:H	1.54	0.73
1:A:87:PHE:CE2	1:A:215:GLU:HG2	2.22	0.73
1:A:310:TRP:HB2	1:A:518:PRO:HB2	1.71	0.72
1:A:269:TYR:CE1	1:A:297:SER:HB3	2.24	0.72
1:A:51:ALA:HB2	1:A:103:SER:O	1.89	0.72
1:B:142:LEU:HD13	1:B:145:LEU:HD12	1.72	0.72
1:B:647:ALA:O	1:B:650:MET:HB3	1.89	0.72
1:B:535:PRO:HB2	1:B:639:ALA:HB2	1.71	0.71
1:A:69:THR:HB	3:A:751:FMN:O2P	1.91	0.71
1:B:272:PRO:HG3	1:B:516:LYS:HE2	1.72	0.71
1:B:390:LEU:HD22	1:B:397:PHE:HA	1.72	0.70
1:A:523:ARG:HH11	1:A:523:ARG:HB2	1.55	0.70
1:B:274:VAL:HG12	1:B:275:LYS:HG3	1.71	0.69
1:A:82:GLU:OE1	1:A:200:LYS:HD2	1.91	0.69
1:A:48:ARG:HG2	1:A:100:ASP:OD2	1.93	0.68
1:A:493:ASN:HD22	1:A:496:GLU:HG3	1.57	0.68
1:A:439:ARG:HG3	1:A:478:THR:OG1	1.92	0.68
1:A:208:LYS:HE3	1:A:215:GLU:HG3	1.75	0.68
1:B:536:VAL:HB	1:B:574:HIS:ND1	2.09	0.68
1:A:445:SER:HB3	1:A:455:HIS:CG	2.29	0.67
1:B:56:GLU:HG2	6:B:2001:HOH:O	1.94	0.67
1:B:274:VAL:HG23	6:B:2022:HOH:O	1.94	0.67
1:B:513:ALA:O	1:B:514:ASN:HB2	1.94	0.67
1:A:322:LEU:HD13	1:A:329:PRO:HG3	1.77	0.67
1:A:621:GLN:HE21	1:A:621:GLN:H	0.80	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:556:VAL:O	1:B:560:GLU:HG3	1.94	0.67
1:B:97:GLU:HG3	1:B:126:GLY:O	1.95	0.66
1:A:123:PHE:CZ	1:A:167:ALA:HB2	2.30	0.66
1:B:123:PHE:N	1:B:123:PHE:HD2	1.93	0.66
1:A:582:ASN:ND2	1:A:584:ASP:H	1.94	0.66
1:B:531:ASN:HD22	1:B:532:PRO:HD2	1.60	0.66
1:A:670:THR:O	1:A:674:THR:HG23	1.96	0.66
1:A:558:PHE:CE2	1:A:569:VAL:HG21	2.31	0.65
1:A:475:VAL:HB	1:A:480:ASN:ND2	2.12	0.65
1:A:493:ASN:ND2	1:A:495:ALA:HB3	2.11	0.65
1:B:110:ILE:CD1	1:B:211:LEU:HD21	2.25	0.65
1:A:390:LEU:CD2	1:A:396:GLN:HG2	2.27	0.65
1:B:547:PRO:HG2	1:B:644:CYS:SG	2.37	0.65
1:B:552:ILE:HD12	1:B:592:TRP:HZ3	1.60	0.65
1:B:197:MET:HE2	1:B:197:MET:HA	1.78	0.64
1:B:562:GLN:HG2	1:B:569:VAL:HG22	1.79	0.64
1:B:617:LYS:HD3	1:B:619:TYR:CZ	2.32	0.64
1:B:558:PHE:HZ	1:B:569:VAL:HG11	1.62	0.64
1:A:513:ALA:O	1:A:514:ASN:HB2	1.97	0.64
1:B:484:ASN:ND2	1:B:503:TYR:H	1.95	0.64
1:A:461:GLU:OE2	4:A:753:NAP:H1D	1.98	0.64
1:B:448:LEU:HD23	1:B:448:LEU:O	1.98	0.64
1:A:445:SER:HB3	1:A:455:HIS:ND1	2.13	0.63
1:B:50:ILE:HG23	1:B:51:ALA:N	2.12	0.63
1:A:273:ILE:O	1:A:489:GLN:NE2	2.31	0.63
1:B:314:PRO:O	1:B:318:VAL:HG23	1.98	0.63
1:B:437:THR:HG22	1:B:438:PRO:O	1.98	0.63
1:B:123:PHE:N	1:B:123:PHE:CD2	2.66	0.63
1:B:582:ASN:HD21	1:B:584:ASP:CB	2.09	0.63
1:A:368:ARG:HB2	6:A:2026:HOH:O	1.97	0.63
1:B:460:VAL:HA	1:B:479:THR:HB	1.80	0.63
1:B:485:ILE:HG12	1:B:505:LEU:CD1	2.29	0.63
1:B:545:VAL:HG21	1:B:578:TYR:CE1	2.34	0.63
1:B:145:LEU:HD23	1:B:146:ARG:N	2.14	0.62
1:B:659:VAL:CB	1:B:677:ILE:HD11	2.29	0.62
1:A:382:ASP:OD1	1:A:386:LYS:HE3	1.99	0.62
1:B:220:PHE:H	1:B:376:GLN:NE2	1.97	0.62
1:B:236:MET:CE	1:B:332:ILE:HG21	2.29	0.62
1:B:451:LYS:O	1:B:452:GLN:CB	2.48	0.62
1:A:400:GLU:C	1:A:401:ILE:HD12	2.25	0.62
1:B:581:ARG:HB2	1:B:585:ASP:OD2	1.99	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:47:ASN:O	1:B:49:ASP:N	2.32	0.62
1:B:448:LEU:HD22	1:B:557:ALA:HB1	1.81	0.62
1:B:529:PRO:HD3	1:B:642:TYR:OH	2.00	0.62
1:A:307:LEU:HD21	1:A:519:VAL:HG21	1.80	0.61
1:B:448:LEU:HB2	1:B:554:GLU:CD	2.24	0.61
1:A:47:ASN:N	1:A:52:GLN:HE21	1.98	0.61
1:B:59:LYS:HD3	1:B:90:ASN:OD1	2.00	0.61
1:B:355:ALA:HA	1:B:359:TYR:CD1	2.36	0.61
1:B:135:CYS:SG	1:B:166:LYS:HE2	2.40	0.61
1:A:123:PHE:HD1	1:A:123:PHE:N	1.98	0.61
1:A:123:PHE:N	1:A:123:PHE:CD1	2.69	0.61
1:B:82:GLU:OE1	1:B:200:LYS:HD2	2.01	0.61
1:B:580:SER:HB2	1:B:585:ASP:OD1	2.01	0.61
1:B:355:ALA:HA	1:B:359:TYR:HD1	1.64	0.61
1:A:233:THR:CG2	1:A:234:ASP:N	2.64	0.60
1:A:274:VAL:HG11	1:A:293:ASP:HB2	1.82	0.60
1:A:314:PRO:O	1:A:318:VAL:HG23	2.00	0.60
1:B:497:THR:HG22	1:B:498:ASN:H	1.65	0.60
1:B:197:MET:HE1	1:B:369:GLN:CG	2.30	0.60
1:B:400:GLU:O	1:B:401:ILE:HD13	2.01	0.60
1:A:253:ARG:HD3	1:A:257:GLY:O	2.01	0.60
1:A:523:ARG:HH11	1:A:523:ARG:CB	2.14	0.60
1:A:50:ILE:HG23	1:A:51:ALA:N	2.15	0.60
1:A:288:ILE:HD12	1:A:288:ILE:N	2.17	0.60
1:A:315:LEU:HD12	1:A:502:HIS:CD2	2.36	0.60
1:A:135:CYS:HA	1:A:170:HIS:ND1	2.16	0.60
1:A:572:GLY:O	1:A:574:HIS:HD2	1.85	0.59
1:A:581:ARG:HD3	1:A:611:ARG:HD2	1.84	0.59
1:B:236:MET:HE1	1:B:332:ILE:HG21	1.85	0.59
1:B:447:SER:O	1:B:451:LYS:HG3	2.02	0.59
1:A:484:ASN:ND2	1:A:502:HIS:HA	2.18	0.59
1:A:158:GLU:O	1:A:159:PHE:HB2	2.02	0.59
1:A:546:ALA:HB3	1:A:547:PRO:HD3	1.84	0.59
1:A:123:PHE:HZ	1:A:167:ALA:HB2	1.67	0.59
1:B:113:ILE:O	1:B:149:MET:HB2	2.02	0.59
1:A:233:THR:CG2	1:A:234:ASP:H	2.16	0.59
1:A:623:LYS:HE2	1:A:623:LYS:HA	1.84	0.59
1:A:232:ILE:HA	1:A:236:MET:HE2	1.85	0.58
1:B:558:PHE:CZ	1:B:569:VAL:HG11	2.38	0.58
1:B:592:TRP:HB2	1:B:593:PRO:HD3	1.85	0.58
1:A:398:ALA:HA	1:A:402:THR:HB	1.85	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:285:ARG:HD3	1:B:581:ARG:NH1	2.19	0.58
1:B:437:THR:HG23	1:B:438:PRO:HD2	1.84	0.58
1:B:531:ASN:HD22	1:B:532:PRO:CD	2.17	0.58
1:B:145:LEU:HD23	1:B:146:ARG:H	1.66	0.58
1:A:334:ASP:HB3	6:A:2033:HOH:O	2.03	0.58
1:A:244:HIS:H	1:A:244:HIS:CD2	2.21	0.57
1:B:182:LEU:C	1:B:182:LEU:HD23	2.30	0.57
1:B:50:ILE:HG23	1:B:51:ALA:H	1.67	0.57
1:B:485:ILE:HG12	1:B:505:LEU:HD11	1.87	0.57
1:A:209:ASP:O	1:A:212:HIS:HD2	1.88	0.57
1:A:232:ILE:HD12	1:A:236:MET:HE2	1.86	0.57
1:B:364:GLY:H	1:B:407:ASN:ND2	2.03	0.57
1:A:443:ILE:HG23	1:A:454:VAL:HG13	1.86	0.57
1:B:370:LEU:HD23	1:B:370:LEU:O	2.04	0.57
1:A:547:PRO:HG2	1:A:644:CYS:SG	2.45	0.57
1:B:315:LEU:HG	1:B:502:HIS:O	2.05	0.56
1:B:179:LEU:HD23	1:B:210:GLU:HG3	1.85	0.56
1:A:232:ILE:HA	1:A:236:MET:CE	2.35	0.56
1:B:371:PHE:CE2	1:B:415:LEU:HD11	2.40	0.56
1:B:582:ASN:ND2	1:B:584:ASP:N	2.43	0.56
1:A:105:ASN:ND2	1:A:144:ASN:HB2	2.21	0.56
1:A:236:MET:HE1	1:A:332:ILE:HG21	1.87	0.56
1:B:375:ILE:HD11	1:B:388:THR:HA	1.87	0.56
1:B:309:VAL:O	1:B:311:PRO:HD3	2.05	0.56
1:A:552:ILE:O	1:A:556:VAL:HG23	2.05	0.56
1:B:498:ASN:O	1:B:499:LEU:C	2.49	0.56
1:A:314:PRO:HG3	1:A:503:TYR:CE2	2.41	0.56
1:A:630:GLN:O	1:A:634:MET:HG3	2.06	0.56
1:B:157:TYR:CE1	1:B:690:VAL:HG23	2.41	0.55
1:B:194:GLU:OE2	1:B:368:ARG:NH1	2.39	0.55
1:B:484:ASN:HD22	1:B:503:TYR:H	1.54	0.55
1:B:535:PRO:HB2	1:B:639:ALA:CB	2.37	0.55
1:B:580:SER:O	1:B:609:HIS:HA	2.07	0.55
1:A:245:TYR:HE1	1:A:267:GLN:NE2	2.05	0.55
1:B:51:ALA:HB2	1:B:103:SER:O	2.06	0.55
1:B:407:ASN:HD21	2:B:750:FAD:H61A	1.54	0.55
1:B:154:ASN:ND2	1:B:188:GLY:CA	2.69	0.55
1:A:254:ASN:HB3	1:A:260:LEU:HD11	1.87	0.55
1:B:263:PHE:CD2	1:B:269:TYR:HB2	2.42	0.54
1:B:291:GLU:OE2	1:B:455:HIS:NE2	2.40	0.54
1:A:313:ASN:ND2	6:A:2050:HOH:O	2.40	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:348:THR:HA	1:A:349:PRO:C	2.32	0.54
1:B:197:MET:HE1	1:B:369:GLN:HG2	1.89	0.54
1:B:234:ASP:CB	1:B:247:PRO:HB2	2.34	0.54
1:A:199:TRP:CZ2	1:A:203:ILE:HG13	2.43	0.54
1:B:369:GLN:NE2	1:B:369:GLN:C	2.66	0.54
1:A:379:PRO:HD3	1:A:421:TRP:CE3	2.42	0.54
1:B:348:THR:HA	1:B:349:PRO:C	2.32	0.54
1:B:161:ASN:OD1	1:B:164:ALA:HB3	2.08	0.54
1:B:263:PHE:CE2	1:B:269:TYR:HB2	2.43	0.54
1:A:379:PRO:HD2	1:A:383:VAL:HG11	1.90	0.54
1:B:220:PHE:N	1:B:376:GLN:HE22	2.03	0.54
1:B:443:ILE:HG23	1:B:454:VAL:HG13	1.89	0.54
1:A:582:ASN:HD22	1:A:584:ASP:H	1.55	0.53
1:A:657:ALA:O	1:A:661:ILE:HG13	2.09	0.53
1:A:542:GLY:C	1:A:544:GLY:H	2.16	0.53
1:B:404:LYS:CG	1:B:468:LEU:HD11	2.38	0.53
1:B:674:THR:HA	1:B:677:ILE:CD1	2.35	0.53
1:A:400:GLU:O	1:A:404:LYS:HD2	2.09	0.53
1:B:369:GLN:NE2	1:B:369:GLN:O	2.42	0.53
1:B:542:GLY:O	1:B:545:VAL:CG2	2.56	0.53
1:A:97:GLU:HA	6:A:2011:HOH:O	2.09	0.53
1:A:582:ASN:HD22	1:A:582:ASN:C	2.17	0.53
1:A:675:GLU:O	1:A:679:MET:HG3	2.09	0.53
1:B:659:VAL:HG23	1:B:677:ILE:HD11	1.89	0.53
1:A:159:PHE:N	1:A:159:PHE:CD1	2.76	0.53
1:A:562:GLN:HG3	1:A:569:VAL:HG22	1.91	0.53
1:A:591:GLU:HB3	1:A:595:TYR:CE1	2.45	0.52
1:A:608:ALA:HB2	1:A:623:LYS:HG3	1.91	0.52
1:B:476:GLY:HA3	2:B:750:FAD:O2P	2.08	0.52
1:B:659:VAL:HG21	1:B:674:THR:OG1	2.09	0.52
1:A:159:PHE:N	1:A:159:PHE:HD1	2.07	0.52
1:A:232:ILE:CD1	1:A:236:MET:HB2	2.39	0.52
1:A:476:GLY:HA3	2:A:750:FAD:O2P	2.09	0.52
1:B:352:ILE:CG2	1:B:426:MET:HE2	2.36	0.52
1:B:577:PHE:HB3	1:B:620:VAL:HG13	1.91	0.52
1:A:401:ILE:HD12	1:A:401:ILE:N	2.24	0.52
1:B:475:VAL:HB	1:B:480:ASN:ND2	2.24	0.52
1:A:321:PHE:HD2	1:A:356:ILE:HD13	1.74	0.52
1:A:331:THR:HB	1:A:352:ILE:HD12	1.92	0.52
1:A:94:ALA:HB1	1:A:99:TYR:CE1	2.45	0.52
1:A:573:LYS:HB3	1:A:634:MET:HE3	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:575:ILE:HG22	1:B:634:MET:HE1	1.90	0.52
1:B:445:SER:HB3	1:B:455:HIS:CG	2.44	0.52
1:A:154:ASN:OD1	1:A:156:THR:HB	2.09	0.51
1:A:268:PRO:HD3	1:A:310:TRP:CH2	2.44	0.51
1:A:587:LEU:HA	6:A:2042:HOH:O	2.09	0.51
1:A:423:THR:HG22	1:A:423:THR:O	2.10	0.51
1:B:225:GLN:HA	6:B:2019:HOH:O	2.09	0.51
1:B:548:PHE:HA	1:B:551:PHE:HB2	1.92	0.51
1:A:86:LYS:O	1:A:216:GLN:HG2	2.10	0.51
1:A:124:PRO:O	1:A:125:ASP:C	2.53	0.51
1:A:444:SER:HA	1:A:546:ALA:O	2.11	0.51
1:B:621:GLN:HA	1:B:624:LEU:HD12	1.92	0.51
1:A:467:GLU:O	1:A:469:PRO:HD3	2.10	0.51
1:B:285:ARG:HH21	1:B:585:ASP:CG	2.18	0.51
1:B:322:LEU:HD13	1:B:329:PRO:HG3	1.93	0.51
1:B:677:ILE:O	1:B:680:LEU:N	2.43	0.51
1:A:599:LEU:O	1:A:600:ASP:OD1	2.29	0.51
1:B:316:GLU:CG	1:B:501:VAL:HG12	2.36	0.51
1:B:419:ALA:O	1:B:420:LYS:CB	2.58	0.51
1:A:316:GLU:O	1:A:320:GLN:HG3	2.11	0.51
1:A:236:MET:HE1	1:A:332:ILE:HD13	1.92	0.51
1:A:513:ALA:O	1:A:516:LYS:HD2	2.10	0.51
1:B:673:ALA:O	1:B:677:ILE:HG13	2.10	0.51
1:A:346:PHE:HB2	1:A:347:PRO:CD	2.41	0.50
1:B:107:VAL:HG12	1:B:109:VAL:H	1.77	0.50
1:B:371:PHE:CZ	1:B:415:LEU:HD11	2.46	0.50
1:A:50:ILE:HG23	1:A:51:ALA:H	1.76	0.50
1:A:241:PRO:HB3	1:A:268:PRO:HG3	1.92	0.50
1:B:379:PRO:HD2	1:B:383:VAL:HG11	1.93	0.50
1:A:286:ASN:O	1:A:460:VAL:HG23	2.12	0.50
1:B:67:SER:HB2	1:B:72:ALA:HB3	1.94	0.50
1:A:288:ILE:HG12	1:A:483:ARG:HA	1.91	0.50
1:B:123:PHE:HD2	1:B:123:PHE:H	1.59	0.50
1:B:404:LYS:HB3	1:B:406:PHE:CE2	2.46	0.50
1:B:337:PRO:HB3	1:B:342:VAL:O	2.12	0.50
1:B:380:ASN:ND2	1:B:383:VAL:H	2.09	0.50
1:A:628:GLU:OE2	1:A:664:ARG:NH1	2.45	0.50
1:B:288:ILE:HD12	1:B:486:GLN:HG3	1.94	0.50
1:A:279:LEU:CD1	1:A:289:HIS:HB2	2.42	0.50
1:B:94:ALA:HB1	1:B:99:TYR:CE1	2.46	0.50
1:B:123:PHE:CD1	1:B:131:GLU:HB2	2.47	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:576:LEU:HD23	1:B:577:PHE:N	2.27	0.49
1:B:627:TYR:O	1:B:628:GLU:C	2.55	0.49
1:B:48:ARG:HG2	1:B:48:ARG:HH11	1.76	0.49
1:B:314:PRO:HG3	1:B:503:TYR:CZ	2.47	0.49
1:A:279:LEU:HD11	1:A:289:HIS:HB2	1.95	0.49
1:A:560:GLU:OE2	1:A:598:LYS:HD3	2.12	0.49
1:B:497:THR:HG22	1:B:498:ASN:N	2.26	0.49
1:B:607:VAL:O	1:B:623:LYS:HE3	2.12	0.49
1:A:356:ILE:HG23	1:A:362:ILE:HG21	1.95	0.49
1:A:499:LEU:HG	1:A:501:VAL:O	2.12	0.49
1:A:523:ARG:HB2	1:A:523:ARG:NH1	2.26	0.49
1:A:101:PHE:O	1:A:133:PHE:CZ	2.66	0.49
1:A:229:LEU:HD21	6:A:2033:HOH:O	2.13	0.49
1:A:310:TRP:CD1	1:A:310:TRP:N	2.80	0.49
1:B:607:VAL:HG12	1:B:608:ALA:N	2.26	0.49
1:A:610:SER:HB2	1:A:617:LYS:HG3	1.95	0.49
1:B:395:ASP:O	1:B:399:VAL:HG23	2.11	0.49
1:B:445:SER:HB3	1:B:455:HIS:ND1	2.27	0.49
1:A:316:GLU:HG3	1:A:501:VAL:HG12	1.94	0.49
1:A:443:ILE:HG22	1:A:445:SER:H	1.78	0.49
1:A:555:ARG:HE	1:A:574:HIS:HE1	1.59	0.49
1:A:421:TRP:O	1:A:424:VAL:HG23	2.12	0.49
1:B:51:ALA:HB3	1:B:103:SER:OG	2.13	0.49
1:A:460:VAL:HA	1:A:479:THR:HB	1.94	0.48
1:B:229:LEU:HD12	1:B:236:MET:HE3	1.95	0.48
1:B:627:TYR:O	1:B:631:VAL:HG23	2.13	0.48
1:A:237:SER:O	1:A:350:THR:HA	2.14	0.48
1:A:427:GLN:O	1:A:431:GLU:HG3	2.13	0.48
1:B:638:GLY:HA2	1:B:685:ARG:CZ	2.42	0.48
1:A:220:PHE:HB2	1:A:376:GLN:HE22	1.77	0.48
1:A:463:PHE:CE1	1:A:474:VAL:HB	2.49	0.48
1:A:628:GLU:CD	1:A:664:ARG:HH11	2.21	0.48
1:A:69:THR:O	1:A:69:THR:HG22	2.13	0.48
1:A:95:ASP:OD2	1:A:95:ASP:C	2.56	0.48
1:A:150:PHE:CZ	1:A:185:ALA:HB2	2.49	0.48
1:B:315:LEU:HG	1:B:503:TYR:HA	1.95	0.48
1:B:346:PHE:HB2	1:B:347:PRO:CD	2.44	0.48
1:A:120:GLU:O	1:A:121:GLY:C	2.55	0.48
1:A:365:PRO:HG3	2:A:750:FAD:C2A	2.43	0.48
1:B:269:TYR:CE2	1:B:297:SER:HB3	2.49	0.48
1:B:426:MET:N	1:B:427:GLN:HE21	2.12	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:347:PRO:HD2	1:A:359:TYR:CZ	2.48	0.48
1:A:450:GLU:HG2	1:A:455:HIS:CE1	2.49	0.48
1:B:96:VAL:HG21	1:B:130:PHE:CD2	2.48	0.48
1:B:618:VAL:HG11	1:B:623:LYS:HE2	1.95	0.48
1:A:322:LEU:CD1	1:A:329:PRO:HG3	2.44	0.48
1:A:508:PRO:O	1:A:509:ARG:C	2.57	0.48
1:B:65:TYR:CZ	1:B:73:GLU:HG3	2.49	0.48
1:B:161:ASN:OD1	1:B:161:ASN:O	2.32	0.48
1:B:321:PHE:O	1:B:324:ILE:HG22	2.14	0.48
1:B:446:SER:HB2	1:B:554:GLU:OE2	2.12	0.48
1:B:59:LYS:CD	1:B:90:ASN:OD1	2.62	0.48
1:A:295:SER:C	1:A:297:SER:H	2.22	0.47
1:B:444:SER:HA	1:B:546:ALA:O	2.14	0.47
1:A:441:TYR:HB3	1:A:456:VAL:HG13	1.96	0.47
1:B:104:LEU:HD23	1:B:142:LEU:HD13	1.96	0.47
1:B:154:ASN:HD21	1:B:188:GLY:CA	2.27	0.47
1:B:260:LEU:HA	1:B:298:ASN:OD1	2.13	0.47
1:B:541:PRO:HD2	1:B:650:MET:HE2	1.94	0.47
1:A:245:TYR:CE1	1:A:267:GLN:NE2	2.83	0.47
1:A:271:ALA:O	1:A:516:LYS:HA	2.12	0.47
1:A:323:SER:O	1:A:420:LYS:HD3	2.15	0.47
1:B:399:VAL:O	1:B:404:LYS:HE3	2.14	0.47
1:B:659:VAL:HB	1:B:677:ILE:HD11	1.95	0.47
1:A:95:ASP:C	1:A:97:GLU:H	2.23	0.47
1:A:599:LEU:O	1:A:602:SER:HB2	2.15	0.47
1:B:288:ILE:HD11	1:B:483:ARG:HG3	1.95	0.47
1:A:442:SER:HB3	1:A:547:PRO:HG3	1.96	0.47
1:A:647:ALA:O	1:A:648:LYS:C	2.56	0.47
1:B:448:LEU:HD22	1:B:557:ALA:CB	2.45	0.47
1:A:274:VAL:CG1	1:A:293:ASP:HB2	2.44	0.47
1:B:152:LEU:N	1:B:152:LEU:HD12	2.29	0.47
1:B:333:PHE:CE2	1:B:426:MET:HE3	2.50	0.47
1:B:280:PHE:CD2	1:B:585:ASP:HA	2.50	0.47
1:B:406:PHE:HB3	1:B:410:ASP:HB2	1.97	0.47
1:B:509:ARG:HH11	1:B:509:ARG:HG2	1.79	0.47
1:B:608:ALA:HB2	1:B:623:LYS:HG3	1.97	0.47
1:A:542:GLY:O	1:A:545:VAL:HG12	2.15	0.47
1:B:331:THR:HB	1:B:352:ILE:HD12	1.97	0.47
1:B:421:TRP:CD1	1:B:421:TRP:N	2.83	0.47
1:B:268:PRO:HB3	1:B:310:TRP:CE2	2.50	0.46
1:B:448:LEU:HB2	1:B:554:GLU:OE1	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:659:VAL:HA	1:B:677:ILE:HD11	1.96	0.46
1:A:59:LYS:HD3	1:A:90:ASN:ND2	2.31	0.46
1:A:493:ASN:ND2	1:A:496:GLU:HG3	2.28	0.46
1:B:285:ARG:HH21	1:B:585:ASP:CB	2.28	0.46
1:B:294:LEU:HD11	1:B:454:VAL:HG21	1.97	0.46
1:B:446:SER:C	1:B:450:GLU:HG2	2.39	0.46
1:B:659:VAL:CA	1:B:677:ILE:HD11	2.46	0.46
1:A:321:PHE:CD2	1:A:356:ILE:HD13	2.51	0.46
1:A:52:GLN:HG3	1:A:56:GLU:OE2	2.15	0.46
1:B:380:ASN:ND2	1:B:382:ASP:HB2	2.31	0.46
1:B:400:GLU:HA	1:B:404:LYS:HE3	1.96	0.46
1:A:131:GLU:CD	6:A:2012:HOH:O	2.59	0.46
1:B:91:VAL:HG12	1:B:92:MET:N	2.31	0.46
1:B:96:VAL:HG21	1:B:130:PHE:CG	2.51	0.46
1:B:192:THR:HB	6:B:2014:HOH:O	2.15	0.46
1:B:426:MET:O	1:B:430:VAL:HG23	2.15	0.46
1:A:202:SER:O	1:A:206:VAL:HG23	2.15	0.46
1:B:503:TYR:CD1	1:B:503:TYR:N	2.84	0.46
1:B:559:LEU:HD22	1:B:599:LEU:HD23	1.98	0.46
1:B:154:ASN:HB3	1:B:157:TYR:HD2	1.80	0.46
1:B:233:THR:CG2	1:B:234:ASP:N	2.79	0.46
1:B:503:TYR:O	1:B:505:LEU:HD23	2.15	0.46
1:B:659:VAL:CG2	1:B:677:ILE:HD11	2.45	0.46
1:A:619:TYR:O	1:A:622:ASP:HB2	2.16	0.46
1:B:529:PRO:HG3	1:B:640:PHE:CG	2.51	0.46
1:B:545:VAL:HG21	1:B:578:TYR:CD1	2.49	0.46
1:B:608:ALA:HB1	1:B:618:VAL:HG12	1.98	0.46
1:A:51:ALA:O	1:A:55:THR:HG23	2.16	0.45
1:A:154:ASN:C	1:A:156:THR:H	2.24	0.45
1:A:493:ASN:HB3	1:A:496:GLU:HG3	1.99	0.45
1:A:542:GLY:C	1:A:544:GLY:N	2.73	0.45
1:A:143:SER:HA	1:A:175:GLY:O	2.17	0.45
1:A:216:GLN:O	1:A:217:GLU:C	2.59	0.45
1:A:556:VAL:O	1:A:560:GLU:HG3	2.17	0.45
1:B:539:ILE:HD13	1:B:624:LEU:HD11	1.97	0.45
1:A:115:ILE:HG21	1:A:164:ALA:HA	1.99	0.45
1:A:580:SER:O	1:A:609:HIS:HA	2.16	0.45
1:A:646:ASP:O	1:A:647:ALA:C	2.59	0.45
1:A:650:MET:O	1:A:654:VAL:HG23	2.16	0.45
1:B:49:ASP:OD1	1:B:49:ASP:C	2.59	0.45
1:A:92:MET:HE3	1:A:94:ALA:HB2	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:279:LEU:HD21	1:A:588:TYR:CZ	2.51	0.45
1:A:357:LYS:O	1:A:357:LYS:HG2	2.15	0.45
1:A:647:ALA:O	1:A:650:MET:HB2	2.17	0.45
1:A:538:MET:HB3	1:A:548:PHE:CD2	2.52	0.45
1:B:48:ARG:HB3	1:B:100:ASP:OD2	2.15	0.45
1:B:448:LEU:HD23	1:B:448:LEU:C	2.41	0.45
1:A:77:LYS:O	1:A:81:LYS:HD3	2.17	0.45
1:B:62:LEU:HD13	1:B:111:VAL:HG13	1.99	0.45
1:B:81:LYS:HG3	6:B:2035:HOH:O	2.16	0.45
1:B:541:PRO:HG3	1:B:620:VAL:HG21	1.99	0.45
1:B:677:ILE:O	1:B:678:LYS:C	2.60	0.45
1:A:370:LEU:HD13	1:A:370:LEU:O	2.17	0.45
1:A:53:VAL:O	1:A:57:ASN:ND2	2.51	0.44
1:A:107:VAL:HG12	1:A:109:VAL:HG22	1.98	0.44
1:A:270:ILE:HD12	1:A:511:LEU:HD22	1.99	0.44
1:A:280:PHE:CD2	1:A:585:ASP:HA	2.52	0.44
1:B:54:VAL:HG13	1:B:59:LYS:HB2	1.99	0.44
1:A:95:ASP:O	1:A:97:GLU:N	2.51	0.44
1:A:260:LEU:HB3	1:A:261:GLY:H	1.61	0.44
1:B:246:LEU:HB2	1:B:249:HIS:HD2	1.82	0.44
1:B:611:ARG:NE	4:B:753:NAP:O2X	2.49	0.44
1:B:677:ILE:HA	1:B:680:LEU:HD12	1.98	0.44
1:A:172:SER:OG	1:A:173:ALA:N	2.49	0.44
1:A:288:ILE:HD13	1:A:460:VAL:HG22	2.00	0.44
1:A:385:GLU:HA	1:A:385:GLU:OE1	2.16	0.44
1:A:205:GLU:OE1	1:A:205:GLU:HA	2.17	0.44
1:A:628:GLU:CD	1:A:664:ARG:NH1	2.75	0.44
1:A:244:HIS:CD2	1:A:267:GLN:HG2	2.53	0.44
1:B:154:ASN:ND2	1:B:188:GLY:N	2.66	0.44
1:B:680:LEU:HB3	1:B:686:TYR:HB2	2.00	0.44
1:A:237:SER:CA	1:A:246:LEU:HD21	2.41	0.44
1:A:302:SER:HB2	1:A:527:ARG:NH2	2.32	0.44
1:B:236:MET:HG2	1:B:349:PRO:HB2	2.00	0.44
1:A:123:PHE:HD1	1:A:123:PHE:H	1.61	0.44
1:A:314:PRO:HG3	1:A:503:TYR:CZ	2.52	0.44
1:B:232:ILE:HG22	1:B:233:THR:N	2.33	0.44
1:A:80:SER:O	1:A:84:VAL:HG23	2.18	0.44
1:A:608:ALA:HB1	1:A:618:VAL:HG12	1.99	0.44
1:B:305:ASP:OD1	1:B:527:ARG:NH2	2.46	0.44
1:A:154:ASN:HB2	3:A:751:FMN:H1'1	1.99	0.44
1:A:423:THR:HB	6:A:2068:HOH:O	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:484:ASN:HD22	1:A:503:TYR:HD1	1.66	0.44
1:A:506:ASN:O	1:A:510:LYS:HA	2.18	0.44
1:B:314:PRO:HG3	1:B:503:TYR:CE2	2.53	0.44
1:A:114:PHE:CD2	1:A:150:PHE:HB3	2.53	0.43
1:B:159:PHE:N	1:B:159:PHE:CD1	2.86	0.43
1:B:513:ALA:O	1:B:514:ASN:CB	2.63	0.43
1:A:263:PHE:CD2	1:A:269:TYR:HB2	2.53	0.43
1:B:437:THR:CG2	1:B:438:PRO:N	2.81	0.43
1:B:492:VAL:O	1:B:494:ILE:N	2.51	0.43
1:A:449:SER:HB3	1:A:557:ALA:HB2	2.00	0.43
1:B:570:SER:O	1:B:571:LEU:C	2.61	0.43
1:A:485:ILE:HG23	1:A:515:TYR:HB3	1.99	0.43
1:B:483:ARG:HH12	1:B:498:ASN:HB2	1.83	0.43
1:A:49:ASP:O	1:A:52:GLN:HB3	2.18	0.43
1:A:54:VAL:HG13	1:A:59:LYS:HB2	2.00	0.43
1:A:253:ARG:HG2	1:A:253:ARG:HH11	1.83	0.43
1:B:628:GLU:O	1:B:631:VAL:HB	2.18	0.43
1:A:455:HIS:ND1	1:A:455:HIS:N	2.67	0.43
1:B:233:THR:HG22	1:B:234:ASP:N	2.33	0.43
1:B:273:ILE:O	1:B:489:GLN:NE2	2.46	0.43
1:A:50:ILE:CG2	1:A:51:ALA:N	2.80	0.43
1:A:65:TYR:CE1	1:A:73:GLU:HG3	2.53	0.43
1:B:543:THR:C	1:B:545:VAL:H	2.26	0.43
1:B:607:VAL:CG1	1:B:608:ALA:N	2.81	0.43
1:B:610:SER:HB2	1:B:617:LYS:HE2	2.00	0.43
1:B:619:TYR:CB	1:B:621:GLN:NE2	2.62	0.43
1:A:118:TYR:O	1:A:119:GLY:C	2.61	0.43
1:A:400:GLU:CB	1:A:401:ILE:HD12	2.49	0.43
1:B:83:LEU:HD12	1:B:83:LEU:HA	1.85	0.43
1:B:330:GLU:O	1:B:331:THR:C	2.61	0.43
1:A:104:LEU:O	1:A:107:VAL:HG23	2.19	0.42
1:B:69:THR:HB	3:B:751:FMN:O2P	2.19	0.42
1:B:437:THR:HG23	1:B:438:PRO:CD	2.46	0.42
1:A:161:ASN:O	1:A:165:LYS:HG3	2.18	0.42
1:A:558:PHE:CZ	1:A:569:VAL:HG21	2.54	0.42
1:B:507:GLY:HA3	1:B:512:PHE:CD1	2.54	0.42
1:A:378:ALA:HA	1:A:379:PRO:HD3	1.87	0.42
1:B:463:PHE:HA	1:B:464:PRO:HD3	1.85	0.42
1:B:443:ILE:HG22	1:B:445:SER:H	1.84	0.42
1:B:499:LEU:HD23	1:B:499:LEU:HA	1.77	0.42
1:A:117:THR:C	1:A:118:TYR:CD1	2.97	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:546:ALA:HB3	1:B:547:PRO:HD3	2.00	0.42
1:B:558:PHE:CZ	1:B:562:GLN:NE2	2.88	0.42
1:B:271:ALA:O	1:B:516:LYS:HA	2.19	0.42
1:B:276:SER:O	1:B:490:ASN:ND2	2.46	0.42
1:B:446:SER:HB3	1:B:550:GLY:O	2.18	0.42
1:A:199:TRP:CE2	1:A:203:ILE:HG13	2.55	0.42
1:B:65:TYR:CE1	1:B:95:ASP:HA	2.54	0.42
1:B:237:SER:CA	1:B:246:LEU:HD21	2.42	0.42
1:A:226:TYR:CD1	1:A:427:GLN:HG2	2.55	0.42
1:B:193:ASP:O	1:B:196:TYR:HB3	2.20	0.42
1:B:448:LEU:HB2	1:B:554:GLU:OE2	2.19	0.42
1:B:575:ILE:HA	1:B:604:GLU:O	2.20	0.42
1:B:659:VAL:CG1	1:B:660:GLY:N	2.83	0.42
1:A:401:ILE:O	1:A:402:THR:C	2.63	0.42
1:A:368:ARG:HG3	1:A:397:PHE:CG	2.55	0.41
1:B:373:SER:HB3	1:B:428:PHE:HZ	1.84	0.41
1:A:105:ASN:HD21	1:A:144:ASN:N	2.03	0.41
1:A:513:ALA:O	1:A:516:LYS:CD	2.67	0.41
1:B:334:ASP:HB2	1:B:349:PRO:HG3	2.02	0.41
1:B:380:ASN:HD21	1:B:382:ASP:HB2	1.84	0.41
1:B:511:LEU:HD23	1:B:511:LEU:HA	1.90	0.41
1:A:49:ASP:HB3	1:A:52:GLN:HB3	2.01	0.41
1:A:257:GLY:O	1:A:258:ILE:C	2.63	0.41
1:A:534:THR:HA	1:A:535:PRO:HD3	1.97	0.41
1:A:481:LEU:HA	1:A:503:TYR:CE1	2.55	0.41
1:B:302:SER:HB2	1:B:527:ARG:HH21	1.85	0.41
1:B:510:LYS:O	1:B:513:ALA:HB2	2.20	0.41
1:B:594:GLU:O	1:B:598:LYS:HG2	2.19	0.41
1:A:96:VAL:HG13	1:A:130:PHE:HB2	2.02	0.41
1:B:390:LEU:CD2	1:B:397:PHE:HA	2.44	0.41
1:A:60:ASN:ND2	1:A:90:ASN:HB3	2.36	0.41
1:A:224:PHE:CZ	1:A:345:PRO:HD3	2.56	0.41
1:A:659:VAL:HG11	1:A:674:THR:CG2	2.50	0.41
1:B:493:ASN:ND2	1:B:496:GLU:HG3	2.35	0.41
1:A:307:LEU:HG	1:A:519:VAL:HG22	2.02	0.41
1:A:96:VAL:HG22	1:A:130:PHE:CD1	2.55	0.41
1:A:370:LEU:HD13	1:A:370:LEU:C	2.46	0.41
1:B:478:THR:N	2:B:750:FAD:O1P	2.52	0.41
1:A:119:GLY:O	1:A:120:GLU:C	2.63	0.41
1:A:279:LEU:HD23	1:A:587:LEU:HD22	2.03	0.41
1:A:288:ILE:N	1:A:288:ILE:CD1	2.83	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:288:ILE:HD13	1:A:460:VAL:CG2	2.50	0.41
1:A:339:ASP:OD1	1:A:341:THR:N	2.53	0.41
1:A:368:ARG:O	1:A:371:PHE:HB2	2.19	0.41
1:A:484:ASN:ND2	1:A:503:TYR:H	2.19	0.41
1:B:50:ILE:CG2	1:B:51:ALA:N	2.80	0.41
1:B:62:LEU:HD23	1:B:92:MET:HB3	2.03	0.41
1:B:241:PRO:HB3	1:B:268:PRO:HG3	2.03	0.41
1:B:253:ARG:HG2	1:B:259:GLN:HA	2.02	0.41
1:B:467:GLU:C	1:B:469:PRO:HD3	2.46	0.41
1:B:558:PHE:CE1	1:B:569:VAL:HG21	2.56	0.41
1:A:268:PRO:HB3	1:A:310:TRP:CE2	2.56	0.41
1:B:104:LEU:HD23	1:B:142:LEU:CD1	2.51	0.41
1:B:370:LEU:HD23	1:B:370:LEU:C	2.46	0.41
1:B:531:ASN:ND2	1:B:532:PRO:HD2	2.29	0.41
1:A:240:GLU:HG2	1:A:245:TYR:O	2.21	0.40
1:A:529:PRO:HD3	1:A:642:TYR:OH	2.20	0.40
1:A:691:TRP:CD1	1:A:691:TRP:C	3.00	0.40
1:B:691:TRP:CZ3	4:B:753:NAP:H3D	2.56	0.40
1:A:556:VAL:HG21	1:A:595:TYR:HD2	1.85	0.40
1:A:330:GLU:O	1:A:331:THR:C	2.62	0.40
1:A:440:TYR:CD1	1:A:440:TYR:N	2.88	0.40
1:B:154:ASN:ND2	1:B:188:GLY:HA3	2.36	0.40
1:B:556:VAL:HA	1:B:599:LEU:HD21	2.02	0.40
1:A:91:VAL:HG12	1:A:92:MET:N	2.35	0.40
1:A:95:ASP:C	1:A:97:GLU:N	2.79	0.40
1:A:156:THR:HG23	1:A:649:GLY:H	1.86	0.40
1:B:534:THR:HG21	1:B:640:PHE:CE1	2.56	0.40
1:A:251:LEU:HD23	1:A:251:LEU:HA	1.95	0.40
1:A:254:ASN:C	1:A:254:ASN:OD1	2.64	0.40
1:B:48:ARG:HG2	1:B:48:ARG:NH1	2.37	0.40
1:B:157:TYR:HE1	1:B:690:VAL:HG23	1.83	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	637/682 (93%)	568 (89%)	59 (9%)	10 (2%)	7	27
1	B	637/682 (93%)	561 (88%)	60 (9%)	16 (2%)	4	17
All	All	1274/1364 (93%)	1129 (89%)	119 (9%)	26 (2%)	6	22

All (26) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	121	GLY
1	B	48	ARG
1	A	96	VAL
1	A	647	ALA
1	B	493	ASN
1	B	669	THR
1	A	155	SER
1	A	497	THR
1	A	514	ASN
1	B	120	GLU
1	B	420	LYS
1	B	452	GLN
1	B	514	ASN
1	B	526	PHE
1	A	127	ALA
1	A	543	THR
1	B	261	GLY
1	B	451	LYS
1	B	571	LEU
1	A	101	PHE
1	A	119	GLY
1	B	158	GLU
1	B	422	ASP
1	B	124	PRO
1	B	499	LEU
1	B	569	VAL

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	557/590 (94%)	525 (94%)	32 (6%)	18	49
1	B	557/590 (94%)	522 (94%)	35 (6%)	16	45
All	All	1114/1180 (94%)	1047 (94%)	67 (6%)	17	47

All (67) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	48	ARG
1	A	96	VAL
1	A	97	GLU
1	A	104	LEU
1	A	123	PHE
1	A	125	ASP
1	A	149	MET
1	A	156	THR
1	A	159	PHE
1	A	256	ASP
1	A	267	GLN
1	A	285	ARG
1	A	316	GLU
1	A	339	ASP
1	A	363	THR
1	A	371	PHE
1	A	426	MET
1	A	436	MET
1	A	437	THR
1	A	455	HIS
1	A	459	ILE
1	A	462	ASN
1	A	519	VAL
1	A	523	ARG
1	A	552	ILE
1	A	568	ASN
1	A	582	ASN
1	A	600	ASP
1	A	615	THR
1	A	621	GLN
1	A	662	LEU
1	A	675	GLU
1	B	55	THR

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Mol	Chain	Res	Type
1	B	62	LEU
1	B	68	GLN
1	B	96	VAL
1	B	123	PHE
1	B	134	ILE
1	B	145	LEU
1	B	159	PHE
1	B	191	THR
1	B	205	GLU
1	B	221	THR
1	B	240	GLU
1	B	252	ASN
1	B	264	ASP
1	B	316	GLU
1	B	339	ASP
1	B	369	GLN
1	B	371	PHE
1	B	389	LEU
1	B	404	LYS
1	B	426	MET
1	B	427	GLN
1	B	462	ASN
1	B	481	LEU
1	B	499	LEU
1	B	514	ASN
1	B	530	SER
1	B	545	VAL
1	B	555	ARG
1	B	562	GLN
1	B	569	VAL
1	B	590	ASP
1	B	615	THR
1	B	621	GLN
1	B	650	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (49) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	60	ASN
1	A	105	ASN
1	A	212	HIS
1	A	216	GLN

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Mol	Chain	Res	Type
1	A	223	GLN
1	A	225	GLN
1	A	230	ASN
1	A	244	HIS
1	A	250	GLN
1	A	252	ASN
1	A	286	ASN
1	A	313	ASN
1	A	358	HIS
1	A	376	GLN
1	A	380	ASN
1	A	396	GLN
1	A	435	GLN
1	A	480	ASN
1	A	484	ASN
1	A	493	ASN
1	A	502	HIS
1	A	574	HIS
1	A	582	ASN
1	A	621	GLN
1	A	630	GLN
1	B	60	ASN
1	B	144	ASN
1	B	148	ASN
1	B	154	ASN
1	B	225	GLN
1	B	249	HIS
1	B	286	ASN
1	B	306	HIS
1	B	369	GLN
1	B	376	GLN
1	B	380	ASN
1	B	407	ASN
1	B	427	GLN
1	B	435	GLN
1	B	452	GLN
1	B	484	ASN
1	B	486	GLN
1	B	493	ASN
1	B	498	ASN
1	B	531	ASN
1	B	562	GLN

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Mol	Chain	Res	Type
1	B	582	ASN
1	B	614	ASN
1	B	621	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

9 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAP	B	753	-	42,43,52	1.40	6 (14%)	62,67,80	1.82	12 (19%)
5	SO4	A	760	-	4,4,4	0.38	0	6,6,6	0.14	0
3	FMN	A	751	-	33,33,33	1.51	6 (18%)	48,50,50	1.36	8 (16%)
5	SO4	B	762	-	4,4,4	0.35	0	6,6,6	0.09	0
3	FMN	B	751	-	33,33,33	1.57	7 (21%)	48,50,50	1.37	5 (10%)
4	NAP	A	753	-	42,43,52	1.50	6 (14%)	62,67,80	1.83	12 (19%)
5	SO4	A	761	-	4,4,4	0.38	0	6,6,6	0.06	0
2	FAD	B	750	-	58,58,58	1.45	8 (13%)	85,89,89	0.85	3 (3%)
2	FAD	A	750	-	58,58,58	1.44	9 (15%)	85,89,89	0.91	3 (3%)

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	NAP	B	753	-	-	9/27/59/67	0/4/4/5
3	FMN	A	751	-	-	0/18/18/18	0/3/3/3
3	FMN	B	751	-	-	0/18/18/18	0/3/3/3
4	NAP	A	753	-	-	7/27/59/67	0/4/4/5
2	FAD	B	750	-	-	10/34/50/50	0/6/6/6
2	FAD	A	750	-	-	10/34/50/50	0/6/6/6

All (42) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	750	FAD	C4X-N5	5.49	1.42	1.30
2	B	750	FAD	C4X-N5	5.32	1.42	1.30
4	A	753	NAP	C5A-N7A	-4.38	1.31	1.39
3	B	751	FMN	C10-N10	4.15	1.46	1.37
3	A	751	FMN	C4A-N5	4.03	1.39	1.30
4	B	753	NAP	C5A-N7A	-3.71	1.32	1.39
3	B	751	FMN	C4A-N5	3.68	1.38	1.30
3	A	751	FMN	C9-C8	-3.64	1.34	1.39
3	A	751	FMN	C10-N10	3.63	1.45	1.37
2	B	750	FAD	C9-C8	3.58	1.44	1.39
4	A	753	NAP	C2B-C1B	-3.55	1.44	1.53
4	B	753	NAP	C4A-N3A	3.30	1.40	1.34
2	B	750	FAD	C4A-N3A	3.22	1.40	1.34
4	B	753	NAP	C2B-C1B	-3.19	1.45	1.53
2	A	750	FAD	PA-O3P	-3.14	1.56	1.59
4	A	753	NAP	C4A-N3A	3.11	1.40	1.34
2	A	750	FAD	C9A-C5X	3.11	1.46	1.41
2	B	750	FAD	C9A-N10	2.98	1.46	1.41
3	B	751	FMN	C9-C8	-2.93	1.35	1.39
2	B	750	FAD	C10-N1	2.86	1.39	1.33
2	A	750	FAD	C9A-N10	2.83	1.46	1.41
3	B	751	FMN	C6-C5A	2.72	1.44	1.40
2	A	750	FAD	C9-C8	2.67	1.43	1.39
2	B	750	FAD	C9A-C5X	2.66	1.45	1.41
4	A	753	NAP	PN-O3	-2.65	1.56	1.59
3	A	751	FMN	C6-C5A	2.58	1.43	1.40
2	B	750	FAD	C6-C5X	2.49	1.43	1.40
2	A	750	FAD	C6-C5X	2.47	1.43	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	753	NAP	P2B-O2X	-2.41	1.45	1.54
2	A	750	FAD	C4A-N3A	2.35	1.38	1.34
2	A	750	FAD	C10-N1	2.29	1.37	1.33
4	B	753	NAP	P2B-O2X	-2.23	1.46	1.54
2	B	750	FAD	PA-O3P	-2.19	1.57	1.59
3	B	751	FMN	C9A-C5A	2.19	1.44	1.41
3	B	751	FMN	P-O2P	-2.15	1.46	1.54
3	A	751	FMN	P-O2P	-2.15	1.46	1.54
4	B	753	NAP	C8A-N7A	2.14	1.35	1.31
4	B	753	NAP	C2A-N1A	2.13	1.37	1.33
3	B	751	FMN	C5'-C4'	2.12	1.54	1.51
4	A	753	NAP	O4D-C1D	2.06	1.47	1.42
2	A	750	FAD	C5A-C4A	-2.06	1.35	1.39
3	A	751	FMN	P-O3P	-2.04	1.47	1.54

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	753	NAP	O4D-C1D-N1N	-5.18	102.32	110.57
4	A	753	NAP	O4D-C1D-N1N	-5.16	102.34	110.57
4	B	753	NAP	C5A-C4A-N3A	-4.93	119.93	126.72
4	A	753	NAP	N3A-C2A-N1A	-4.92	121.13	128.58
4	A	753	NAP	C5A-C4A-N3A	-4.92	119.95	126.72
4	A	753	NAP	N3A-C4A-N9A	4.74	135.22	127.17
4	B	753	NAP	N3A-C4A-N9A	4.72	135.19	127.17
4	B	753	NAP	N3A-C2A-N1A	-4.64	121.56	128.58
3	B	751	FMN	C9A-C5A-N5	3.85	126.54	122.45
3	A	751	FMN	C9A-C5A-N5	3.71	126.39	122.45
4	B	753	NAP	C4A-N9A-C1B	-3.46	118.53	126.63
3	A	751	FMN	C5A-N5-C4A	-3.22	112.88	118.09
4	A	753	NAP	C4A-N9A-C1B	-3.22	119.11	126.63
3	B	751	FMN	C5A-N5-C4A	-3.13	113.02	118.09
4	A	753	NAP	C2A-N3A-C4A	3.03	119.23	111.83
4	B	753	NAP	C2A-N3A-C4A	2.96	119.06	111.83
3	A	751	FMN	O2-C2-N3	2.95	124.24	118.58
4	B	753	NAP	C1B-N9A-C8A	2.93	133.60	127.09
4	A	753	NAP	C1B-N9A-C8A	2.88	133.48	127.09
3	B	751	FMN	O2-C2-N3	2.69	123.74	118.58
3	A	751	FMN	C10-N1-C2	2.63	122.55	116.85
4	A	753	NAP	O4B-C1B-C2B	-2.63	102.06	106.59
3	B	751	FMN	C10-N1-C2	2.57	122.40	116.85
2	A	750	FAD	C4X-C10-N10	2.55	120.13	116.48

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	750	FAD	C4X-C10-N10	2.52	120.09	116.48
3	B	751	FMN	O3P-P-O2P	2.36	116.65	107.80
3	A	751	FMN	O3P-P-O2P	2.35	116.63	107.80
2	A	750	FAD	C5'-C4'-C3'	-2.23	108.02	112.22
4	A	753	NAP	C6A-C5A-N7A	-2.21	127.82	132.09
4	B	753	NAP	P2B-O2B-C2B	2.21	129.34	123.43
4	A	753	NAP	C2A-N1A-C6A	2.20	122.35	118.73
2	A	750	FAD	C4'-C3'-C2'	-2.18	109.94	113.57
2	B	750	FAD	O2B-C2B-C3B	2.15	118.71	111.82
4	A	753	NAP	O3B-C3B-C4B	-2.15	104.91	111.08
4	B	753	NAP	C6A-C5A-C4A	2.15	120.11	117.18
3	A	751	FMN	N3-C2-N1	-2.11	115.01	119.50
4	B	753	NAP	C6A-C5A-N7A	-2.11	128.02	132.09
4	B	753	NAP	O2A-PA-O3	2.11	112.98	107.27
2	B	750	FAD	C4'-C3'-C2'	-2.11	110.06	113.57
3	A	751	FMN	O3'-C3'-C4'	-2.04	104.29	108.93
4	A	753	NAP	C6A-C5A-C4A	2.04	119.96	117.18
4	B	753	NAP	C4A-N9A-C8A	2.03	107.87	105.74
3	A	751	FMN	O5'-P-O1P	-2.00	101.03	106.44

There are no chirality outliers.

All (36) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	750	FAD	C1'-C2'-C3'-C4'
2	B	750	FAD	C1'-C2'-C3'-C4'
2	B	750	FAD	C3'-C4'-C5'-O5'
2	B	750	FAD	O4'-C4'-C5'-O5'
4	A	753	NAP	C5B-O5B-PA-O1A
4	A	753	NAP	C5B-O5B-PA-O3
4	A	753	NAP	C2B-C1B-N9A-C8A
4	B	753	NAP	C5B-O5B-PA-O1A
4	B	753	NAP	C5B-O5B-PA-O3
4	B	753	NAP	C2B-C1B-N9A-C8A
4	B	753	NAP	C2B-C1B-N9A-C4A
4	B	753	NAP	C5D-O5D-PN-O3
4	B	753	NAP	C5D-O5D-PN-O2N
4	A	753	NAP	C2B-C1B-N9A-C4A
2	A	750	FAD	O2'-C2'-C3'-O3'
2	B	750	FAD	O2'-C2'-C3'-O3'
2	A	750	FAD	O2'-C2'-C3'-C4'
2	B	750	FAD	O2'-C2'-C3'-C4'

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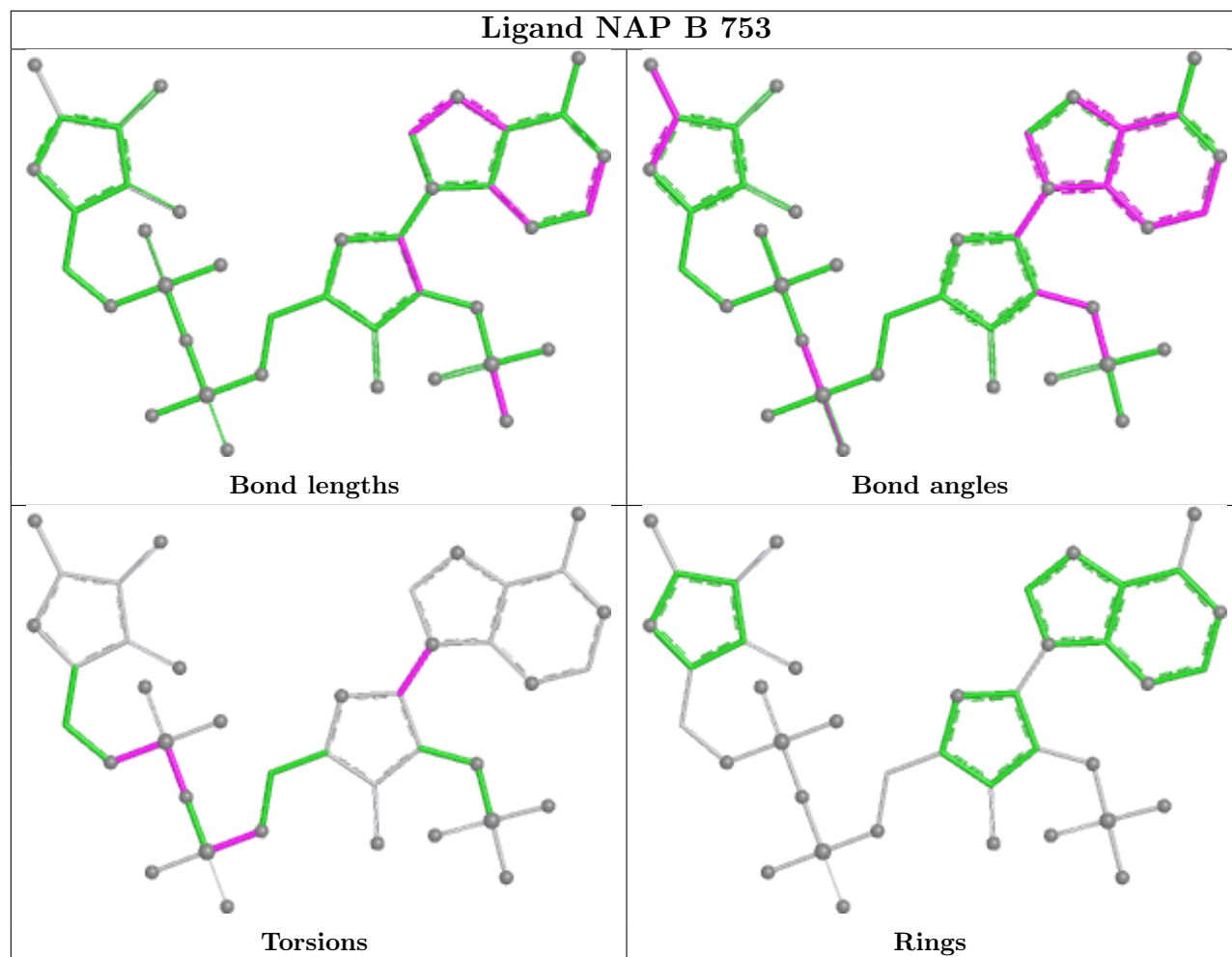
Mol	Chain	Res	Type	Atoms
2	A	750	FAD	C3'-C4'-C5'-O5'
2	A	750	FAD	C2B-C1B-N9A-C8A
2	B	750	FAD	C2B-C1B-N9A-C8A
2	A	750	FAD	O4'-C4'-C5'-O5'
2	A	750	FAD	P-O3P-PA-O1A
2	B	750	FAD	P-O3P-PA-O1A
4	A	753	NAP	C5B-O5B-PA-O2A
4	B	753	NAP	C5B-O5B-PA-O2A
4	B	753	NAP	C5D-O5D-PN-O1N
2	A	750	FAD	C2B-C1B-N9A-C4A
2	B	750	FAD	C2B-C1B-N9A-C4A
2	A	750	FAD	C1'-C2'-C3'-O3'
2	B	750	FAD	C1'-C2'-C3'-O3'
2	B	750	FAD	O4B-C1B-N9A-C8A
4	A	753	NAP	C4B-C5B-O5B-PA
2	A	750	FAD	O4B-C1B-N9A-C8A
4	B	753	NAP	PA-O3-PN-O2N
4	A	753	NAP	O4D-C4D-C5D-O5D

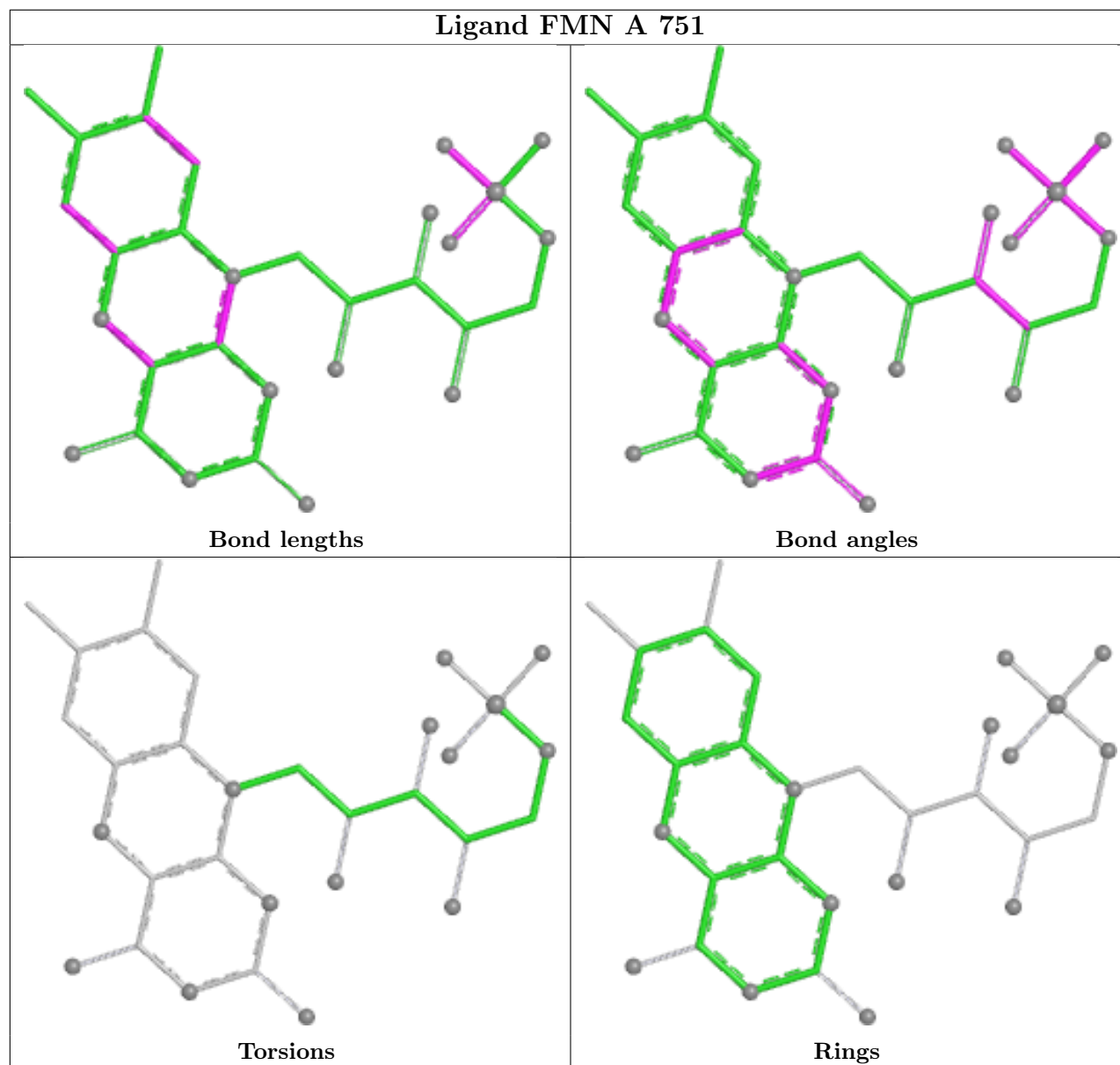
There are no ring outliers.

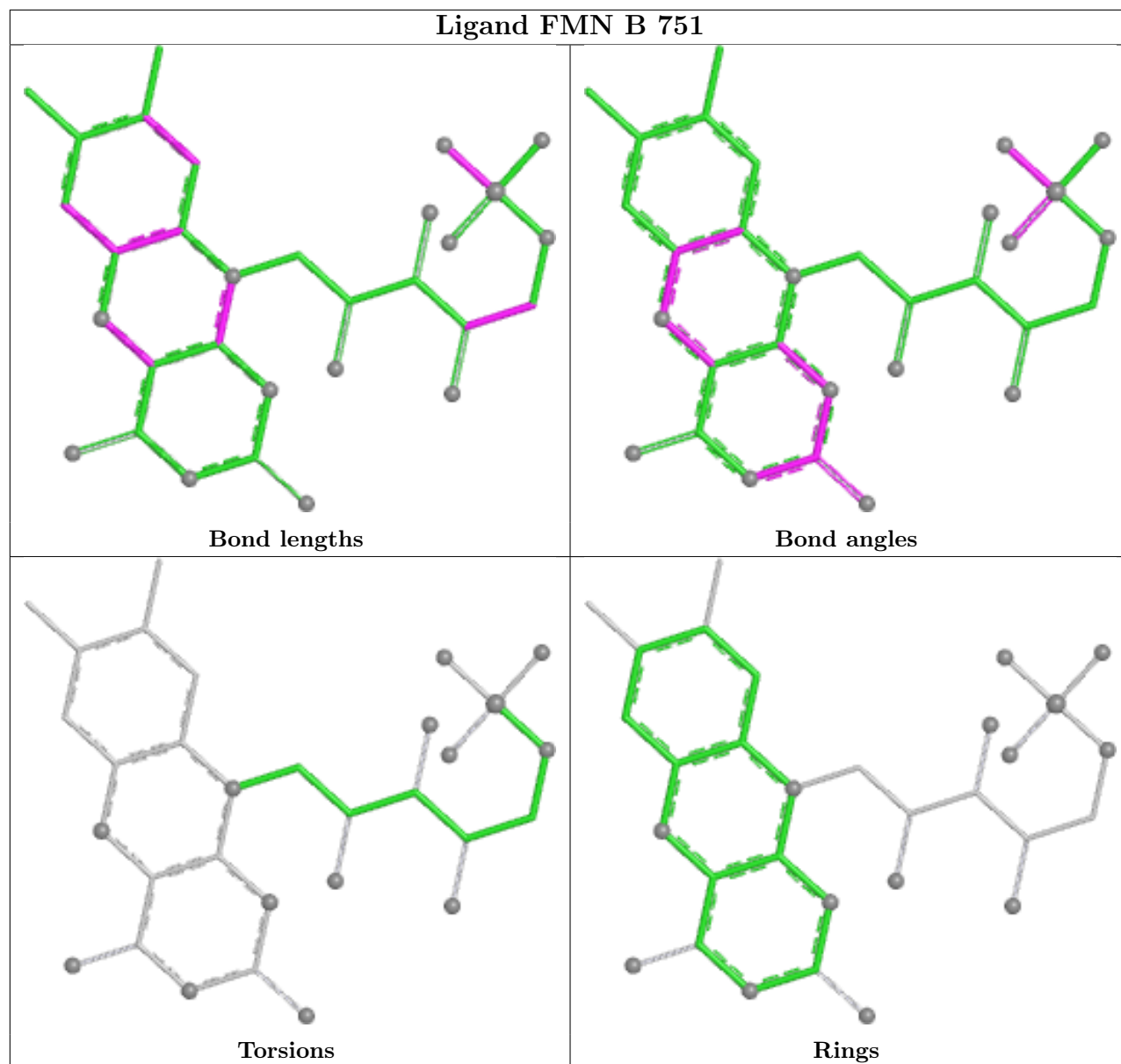
6 monomers are involved in 13 short contacts:

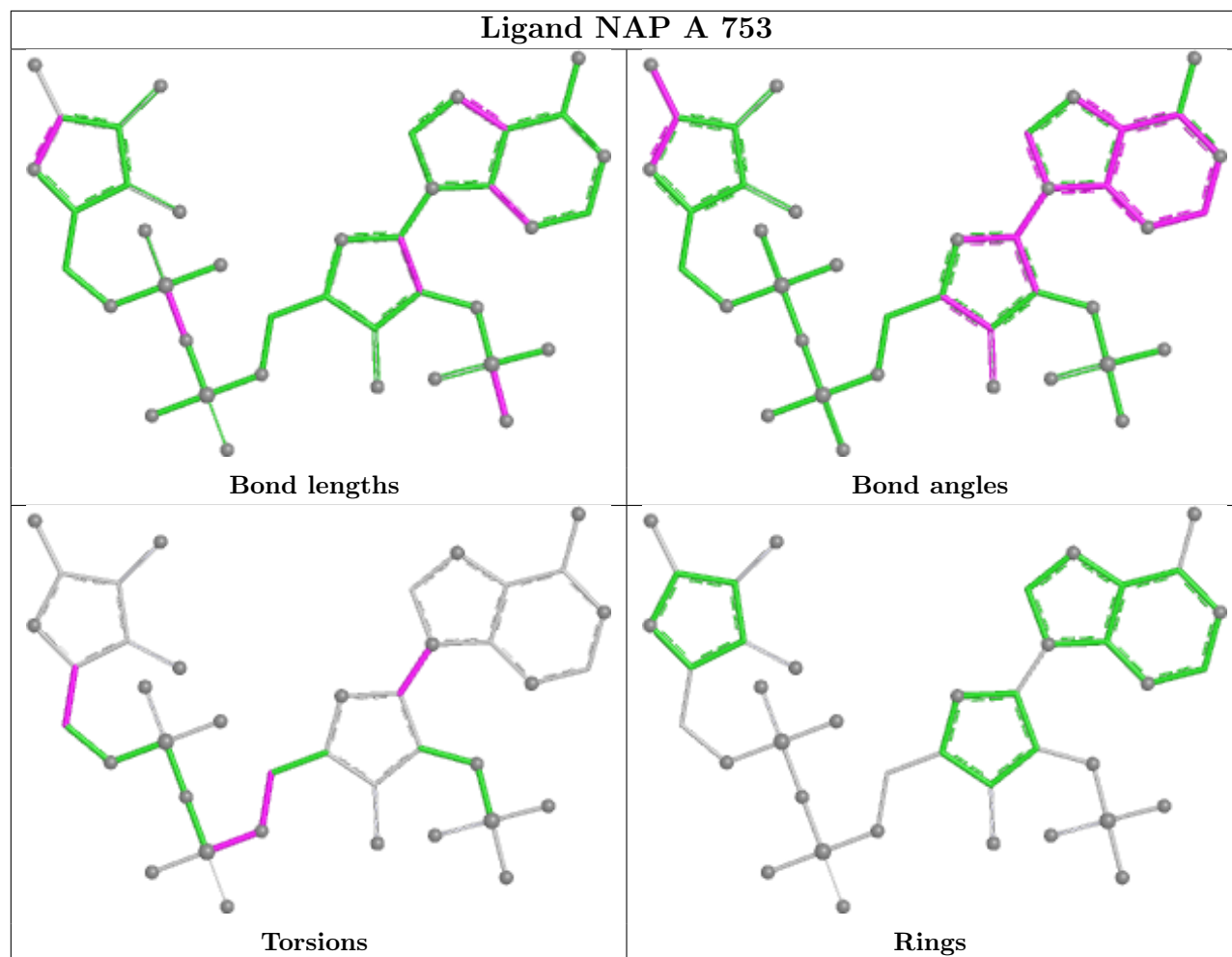
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	753	NAP	2	0
3	A	751	FMN	2	0
3	B	751	FMN	1	0
4	A	753	NAP	2	0
2	B	750	FAD	4	0
2	A	750	FAD	2	0

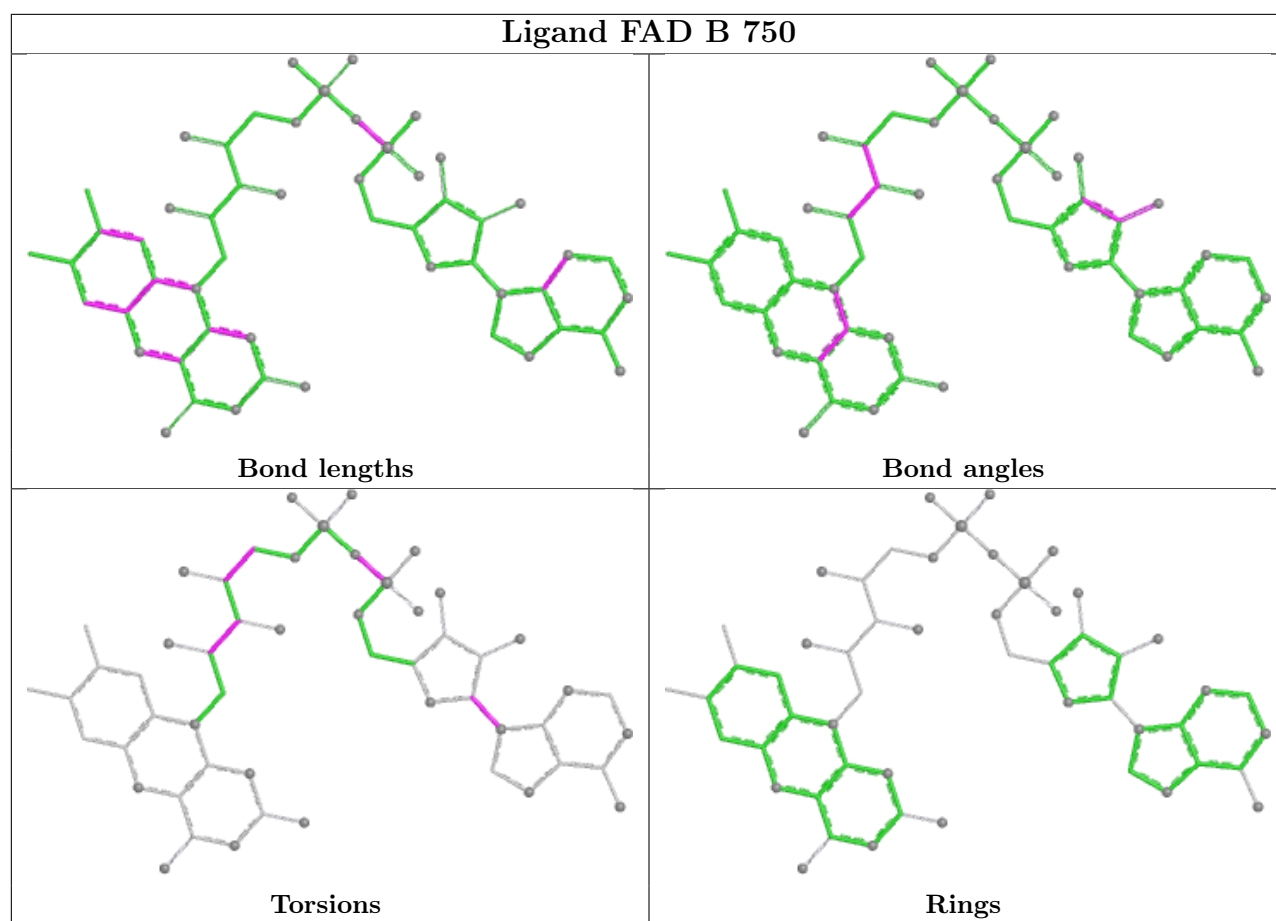
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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.

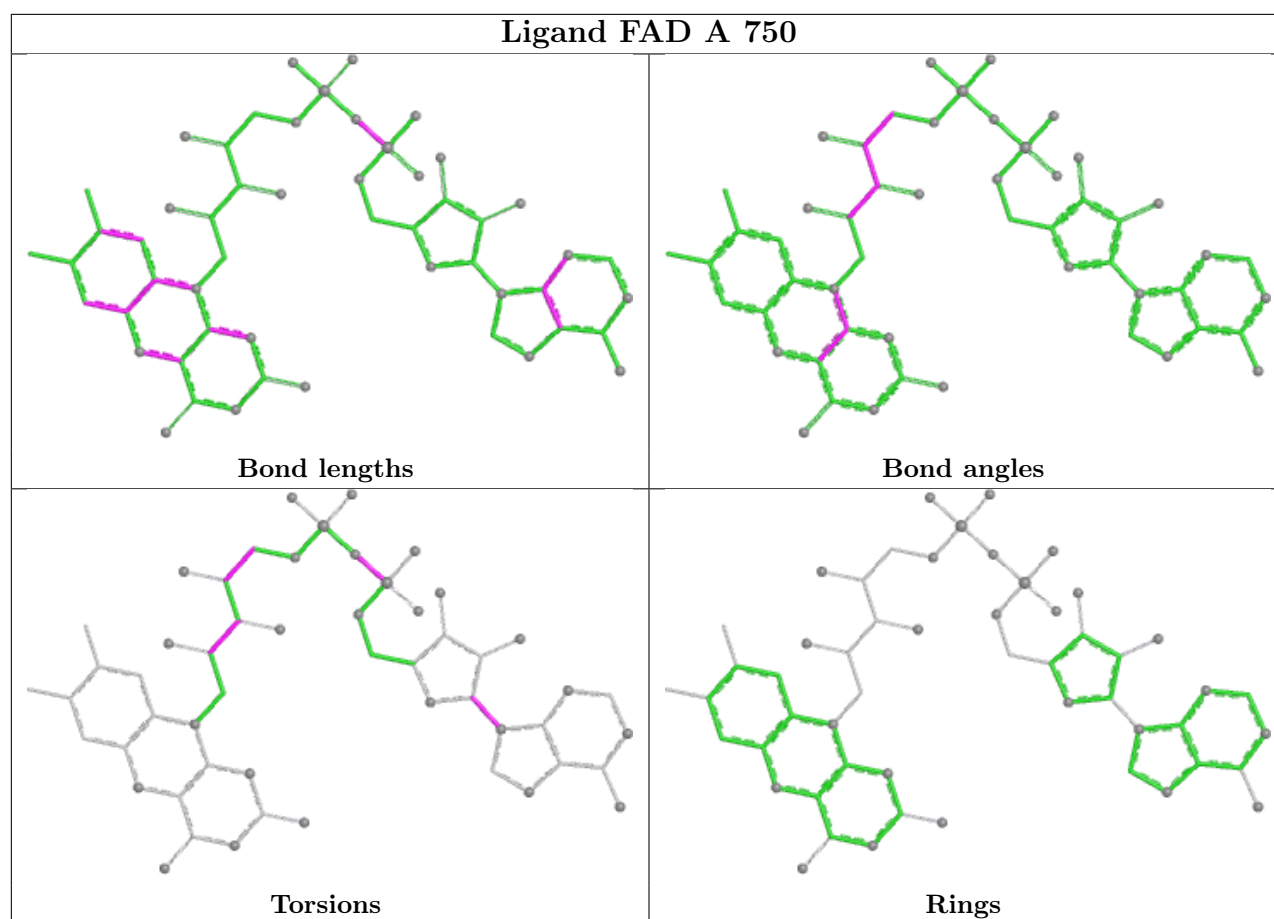












5.7 Other polymers [i](#)

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	641/682 (93%)	-0.09	2 (0%) 90 87	30, 50, 74, 99	0
1	B	641/682 (93%)	0.09	3 (0%) 87 83	33, 60, 81, 105	0
All	All	1282/1364 (93%)	-0.00	5 (0%) 88 85	30, 55, 78, 105	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	676	LEU	3.2
1	A	121	GLY	2.6
1	B	568	ASN	2.3
1	B	125	ASP	2.2
1	A	571	LEU	2.1

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](#)

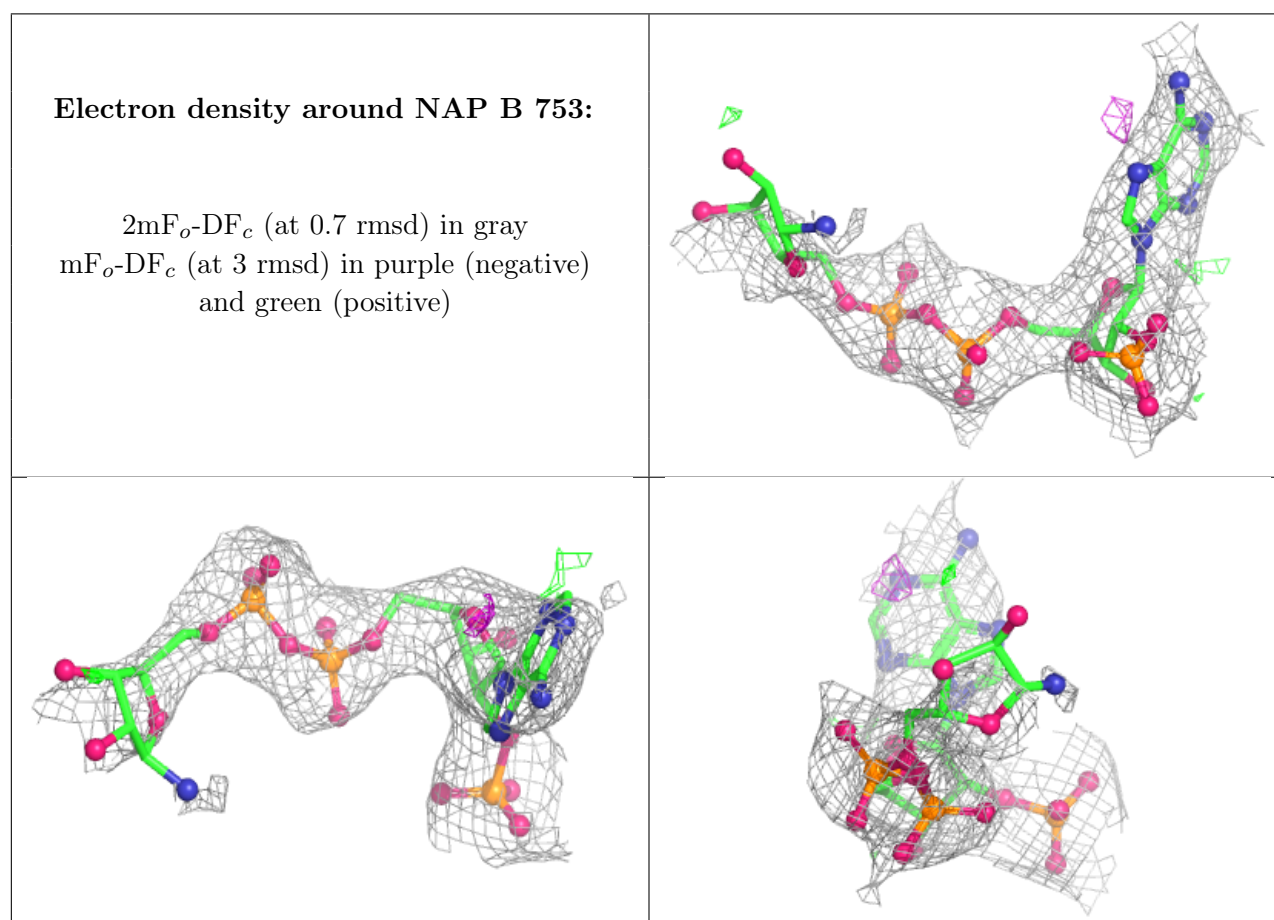
There are no oligosaccharides in this entry.

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.

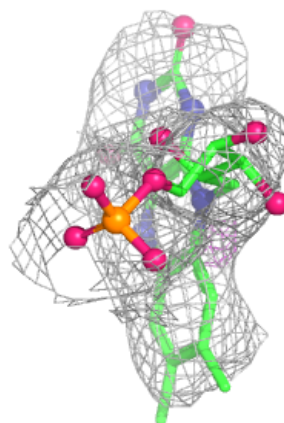
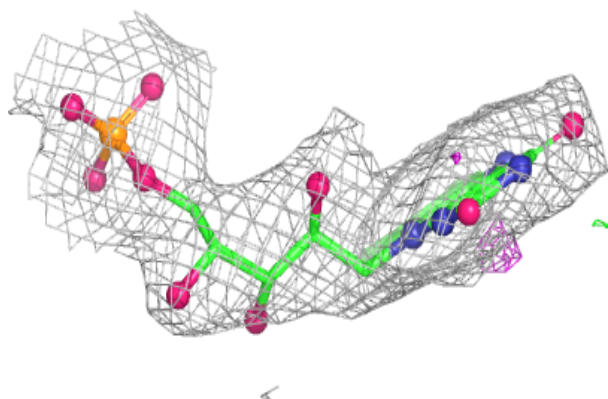
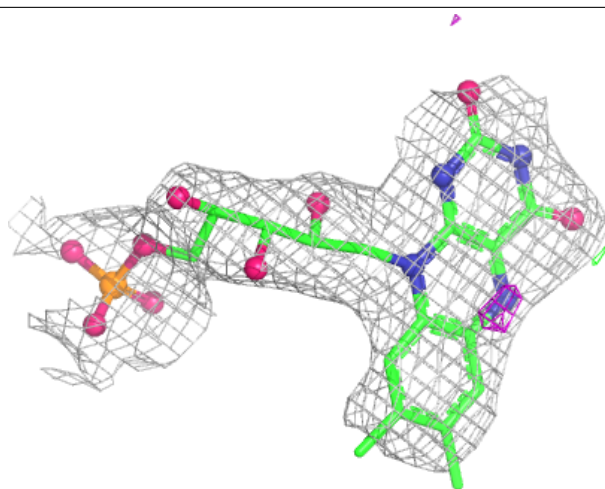
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
5	SO4	B	762	5/5	0.62	0.11	144,144,144,144	0
5	SO4	A	760	5/5	0.87	0.12	87,87,89,89	0
5	SO4	A	761	5/5	0.88	0.18	128,129,129,129	0
4	NAP	B	753	40/48	0.89	0.13	94,99,114,114	0
3	FMN	B	751	31/31	0.93	0.09	58,64,66,67	0
2	FAD	B	750	53/53	0.95	0.08	42,50,56,60	0
3	FMN	A	751	31/31	0.96	0.07	37,41,45,47	0
4	NAP	A	753	40/48	0.96	0.09	32,41,77,78	0
2	FAD	A	750	53/53	0.97	0.06	23,31,36,38	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.



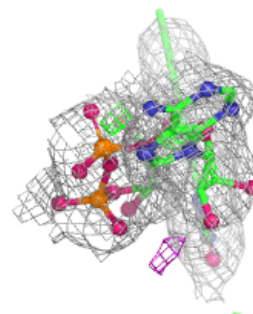
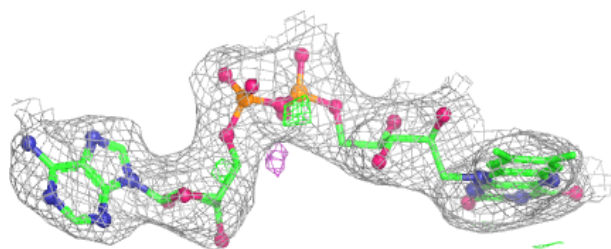
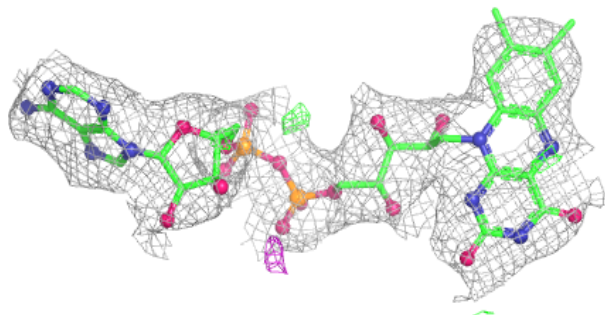
Electron density around FMN B 751:

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



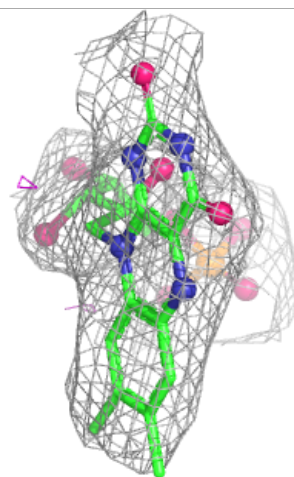
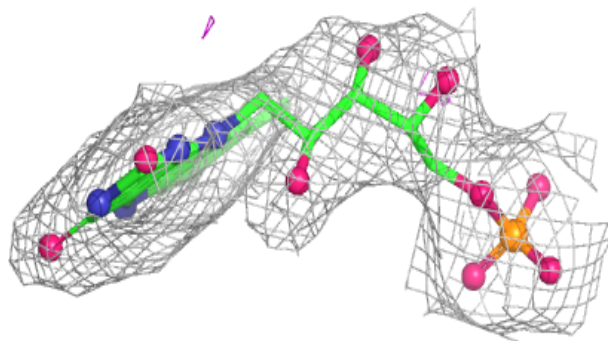
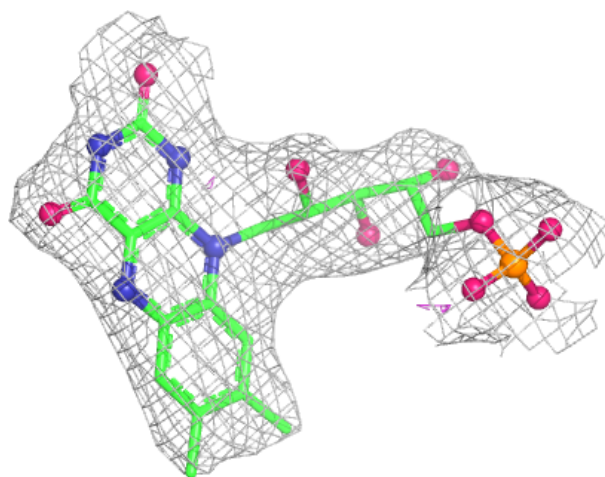
Electron density around FAD B 750:

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



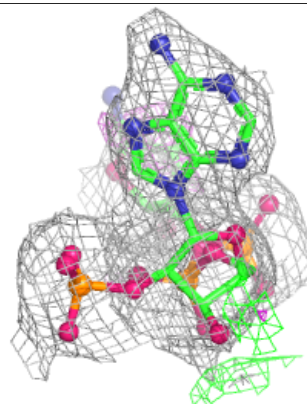
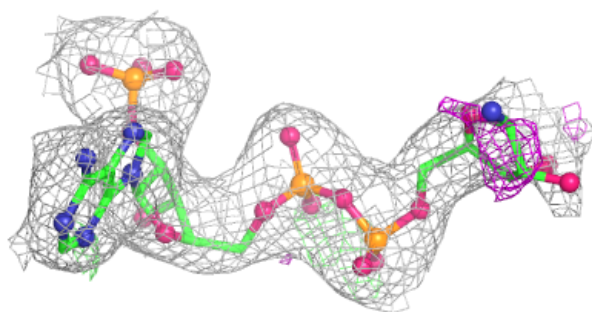
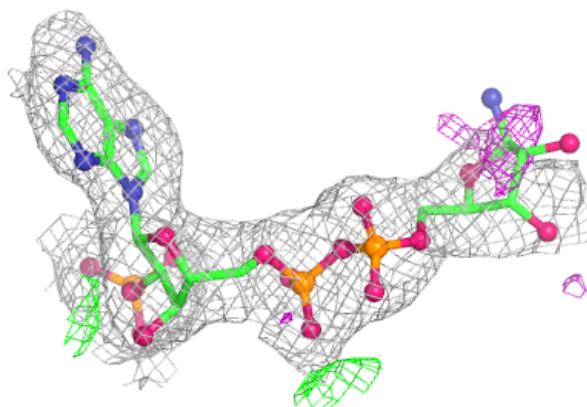
Electron density around FMN A 751:

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

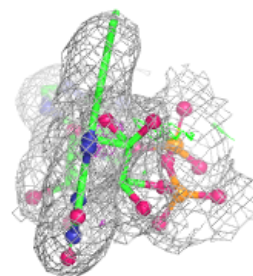
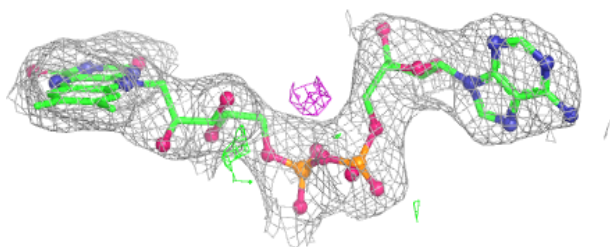
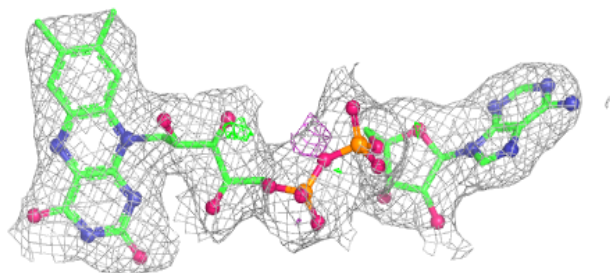


Electron density around NAP A 753:

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

**Electron density around FAD A 750:**

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



6.5 Other polymers [i](#)

There are no such residues in this entry.