



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 7, 2024 – 01:22 PM EDT

PDB ID : 4K03
Title : Crystal structure of Drosophila Cryprochrome
Authors : Berndt, A.; Wolf, E.
Deposited on : 2013-04-03
Resolution : 3.20 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	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

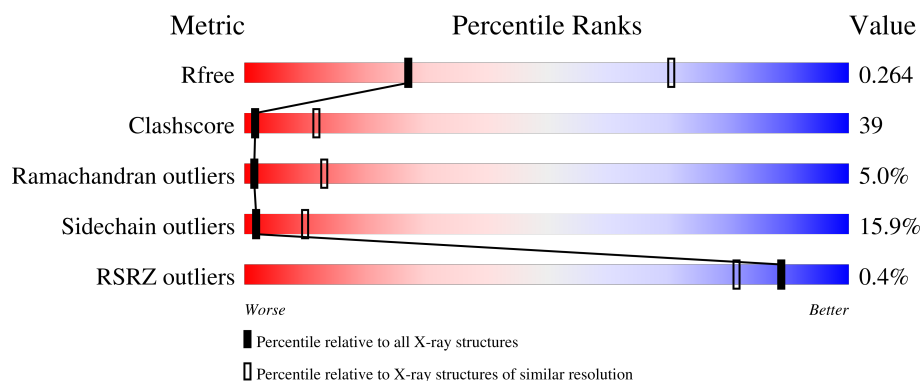
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.20 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}	164625	1370 (3.20-3.20)
Clashscore	180529	1497 (3.20-3.20)
Ramachandran outliers	177936	1479 (3.20-3.20)
Sidechain outliers	177891	1478 (3.20-3.20)
RSRZ outliers	164620	1371 (3.20-3.20)

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	561	
1	B	561	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 8746 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 Cryptochrome-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	529	Total	C	N	O	S	0	0	0
			4238	2707	749	758	24			
1	B	543	Total	C	N	O	S	0	0	0
			4350	2775	769	781	25			

There are 38 discrepancies between the modelled and reference sequences:

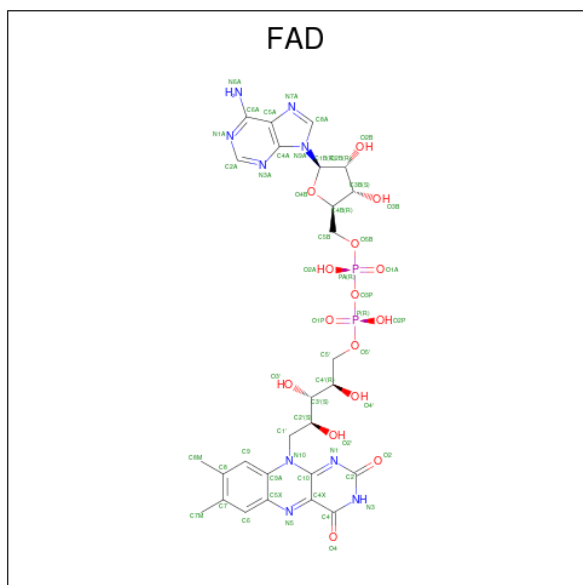
Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	GLY	-	expression tag	UNP O77059
A	-17	ALA	-	expression tag	UNP O77059
A	-16	MET	-	expression tag	UNP O77059
A	-15	GLY	-	expression tag	UNP O77059
A	-14	SER	-	expression tag	UNP O77059
A	-13	GLY	-	expression tag	UNP O77059
A	-12	ILE	-	expression tag	UNP O77059
A	-11	GLN	-	expression tag	UNP O77059
A	-10	ARG	-	expression tag	UNP O77059
A	-9	PRO	-	expression tag	UNP O77059
A	-8	THR	-	expression tag	UNP O77059
A	-7	SER	-	expression tag	UNP O77059
A	-6	THR	-	expression tag	UNP O77059
A	-5	SER	-	expression tag	UNP O77059
A	-4	SER	-	expression tag	UNP O77059
A	-3	LEU	-	expression tag	UNP O77059
A	-2	VAL	-	expression tag	UNP O77059
A	-1	ALA	-	expression tag	UNP O77059
A	0	ALA	-	expression tag	UNP O77059
B	-18	GLY	-	expression tag	UNP O77059
B	-17	ALA	-	expression tag	UNP O77059
B	-16	MET	-	expression tag	UNP O77059
B	-15	GLY	-	expression tag	UNP O77059
B	-14	SER	-	expression tag	UNP O77059
B	-13	GLY	-	expression tag	UNP O77059

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-12	ILE	-	expression tag	UNP O77059
B	-11	GLN	-	expression tag	UNP O77059
B	-10	ARG	-	expression tag	UNP O77059
B	-9	PRO	-	expression tag	UNP O77059
B	-8	THR	-	expression tag	UNP O77059
B	-7	SER	-	expression tag	UNP O77059
B	-6	THR	-	expression tag	UNP O77059
B	-5	SER	-	expression tag	UNP O77059
B	-4	SER	-	expression tag	UNP O77059
B	-3	LEU	-	expression tag	UNP O77059
B	-2	VAL	-	expression tag	UNP O77059
B	-1	ALA	-	expression tag	UNP O77059
B	0	ALA	-	expression tag	UNP O77059

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).



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		

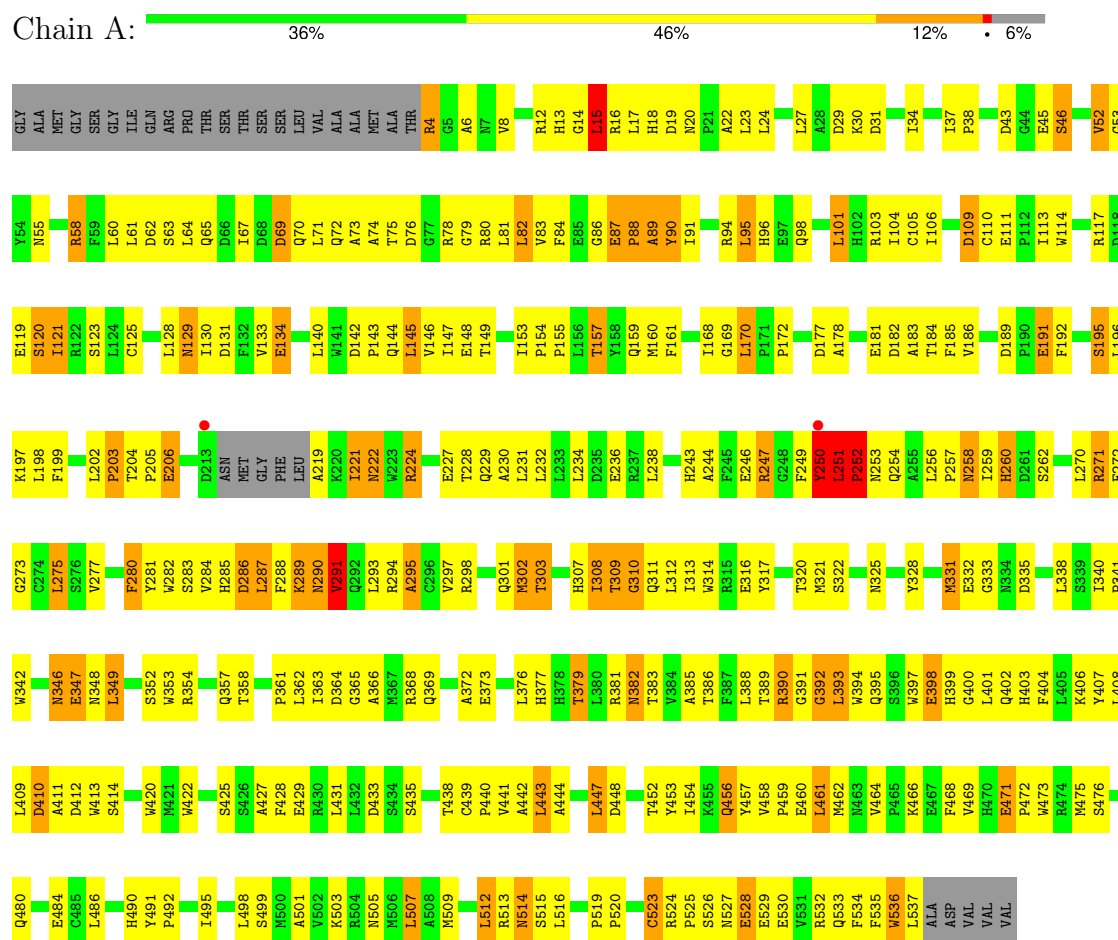
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	27	Total 27	O 27	0	0
3	B	25	Total 25	O 25	0	0

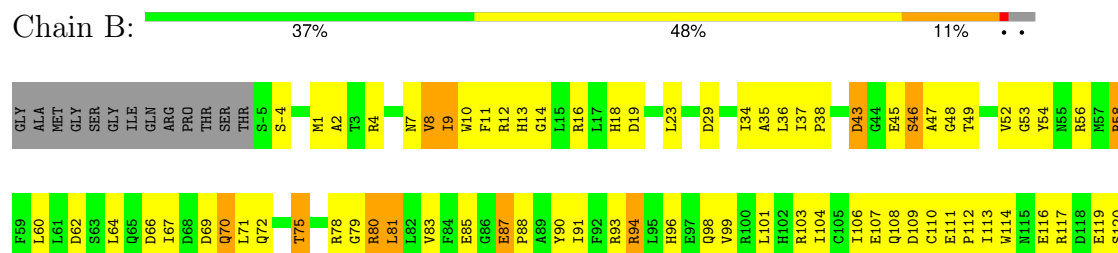
3 Residue-property plots

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: Cryptochrome-1



• Molecule 1: Cryptochrome-1



C485	C416	L349	V277	T204	I121
L486	A417	L350	R278	P205	R122
I487	G418	Q351	R279	E206	S123
G488	N419	Q352	F280		L124
V489	W420	W353	Y281	Y211	C125
H490	W421	R354	W282	G212	R126
Y491		L355	S283	D213	E127
P492	A427	G356		G216	L128
E493	F428	Q357	D286	F217	N129
R494	R429	T358	L287	L218	I130
I495	R430	G359	F288	A219	E134
I496	L431	F360	K289	K220	K135
D497	L432	P361	K280	I221	V136
L498	D433	L362	V291	N222	S137
S499	S434	I363	Q292	W223	H138
M500	S435	D364	L293	R224	
	L436	G365			
K503	V437	A366	C296	T228	T149
R504	T438	R367	V297	Q229	N150
N505	C439	R368	R298	A230	G151
M506	P440		G299	L231	G152
L507	W441	L371	V300	L232	I153
A508	A442		Q301	L233	P154
	L443	L376	K302	L234	P155
S511	A444	H377	T303	D235	L156
L512	K445	H378		E236	T157
R513	R446	T379	H307	R237	Y158
N514	L447	L380	T308	L238	Q159
S515	D448		T309	K239	
L516	P449	T383	G310	V240	L162
I517	D450	V384	G311	E241	H163
T518	G451	A385	L312	Q242	T164
P519	T452	T386	I313	R243	V165
P520	Y453	F387	Y319	A244	Q166
H521	I454	L388	T320	F245	L170
H522	K455	T389	M321	F246	P171
C523	D456		S322	R247	P172
R524	Y457	G391	Y323	G248	
P525	V458	G392	N324	F249	T175
S526	P459	L393	N325	Y250	A176
N527	E460	W394	P326	L251	D177
E528	L461	Q395	N327	P252	A178
E529		S396	Y328		R179
E530	V464	K397	D329	L256	L180
V531	P465	E398	R330	P257	E181
R532	K466		M331	N258	
Q533	E467	L401		T259	T184
F534	F468	Q402	N334	D261	F185
F535			D335	S262	V186
W536	E471	L405	I336	P263	
L537	P472	K406	C337	L270	E191
ALA	W473	Y407	L338	R271	F192
ASP	R474	L408	W342	F272	L196
VAL	W475	L409	A343	G273	F199
VAL	S476	D410	K344	C274	
VAL	A477	A411	P345	L275	L202
	E478	D412	W413	S276	P203
	Q479	W414	N346		
	Q480	V415			

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	71.12Å 121.81Å 79.72Å 90.00° 114.78° 90.00°	Depositor
Resolution (Å)	40.49 – 3.20 40.49 – 3.20	Depositor EDS
% Data completeness (in resolution range)	99.7 (40.49-3.20) 99.7 (40.49-3.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.45 (at 3.19Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.6.4_486)	Depositor
R, R_{free}	0.188 , 0.269 0.185 , 0.264	Depositor DCC
R_{free} test set	1041 reflections (5.11%)	wwPDB-VP
Wilson B-factor (Å ²)	58.7	Xtriage
Anisotropy	0.178	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 87.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	0.035 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	8746	wwPDB-VP
Average B, all atoms (Å ²)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 12.70% 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 [i](#)

5.1 Standard geometry [i](#)

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

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	0.52	0/4355	0.71	3/5929 (0.1%)
1	B	0.50	0/4469	0.72	1/6082 (0.0%)
All	All	0.51	0/8824	0.72	4/12011 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	251	LEU	CA-CB-CG	8.68	135.26	115.30
1	A	393	LEU	N-CA-C	6.16	127.62	111.00
1	A	291	VAL	N-CA-C	-5.91	95.03	111.00
1	B	232	LEU	CA-CB-CG	5.01	126.83	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4238	0	4076	343	0
1	B	4350	0	4190	342	0
2	A	53	0	31	3	0
2	B	53	0	31	1	0
3	A	27	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	25	0	0	1	0
All	All	8746	0	8328	670	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 39.

All (670) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:297:VAL:HG13	1:A:298:ARG:H	0.97	1.09
1:A:297:VAL:HG13	1:A:298:ARG:N	1.79	0.98
1:A:192:PHE:CZ	1:A:196:LEU:HD22	2.04	0.93
1:A:297:VAL:CG1	1:A:298:ARG:H	1.81	0.92
1:A:17:LEU:HD12	1:A:70:GLN:OE1	1.70	0.91
1:A:257:PRO:HD3	1:A:536:TRP:CD1	2.10	0.87
1:A:250:TYR:OH	1:B:528:GLU:HB3	1.75	0.87
1:B:298:ARG:CB	1:B:300:VAL:HG23	2.04	0.87
1:B:297:VAL:HB	1:B:298:ARG:CB	2.06	0.86
1:A:146:VAL:HG11	1:A:161:PHE:CE1	2.10	0.86
1:B:408:LEU:HB2	1:B:411:ALA:HB2	1.58	0.86
1:B:58:ARG:HH11	1:B:58:ARG:CG	1.87	0.85
1:A:461:LEU:HD22	1:A:469:VAL:HG23	1.59	0.84
1:A:58:ARG:HB3	1:A:58:ARG:NH1	1.91	0.84
1:B:46:SER:HA	1:B:114:TRP:CZ3	2.12	0.83
1:A:408:LEU:HB2	1:A:411:ALA:HB2	1.58	0.83
1:A:247:ARG:HG2	1:A:247:ARG:HH11	1.40	0.83
1:A:303:THR:HG21	1:B:301:GLN:HE22	1.44	0.82
1:A:392:GLY:HA2	1:A:394:TRP:N	1.94	0.81
1:A:29:ASP:O	1:A:34:ILE:HB	1.80	0.81
1:B:244:ALA:HA	1:B:247:ARG:NH1	1.96	0.81
1:A:287:LEU:HD23	1:A:288:PHE:CE1	2.15	0.81
1:B:224:ARG:HG3	1:B:229:GLN:HG2	1.64	0.80
1:B:290:ASN:O	1:B:291:VAL:HG23	1.80	0.80
1:A:247:ARG:HG2	1:A:247:ARG:NH1	1.95	0.80
1:A:369:GLN:HG3	1:A:457:TYR:CZ	2.17	0.80
1:A:303:THR:HG21	1:B:301:GLN:NE2	1.97	0.79
1:B:96:HIS:HD2	1:B:128:LEU:HD13	1.46	0.79
1:A:84:PHE:CE1	1:A:198:LEU:HB2	2.18	0.79
1:B:13:HIS:NE2	1:B:271:ARG:NH1	2.31	0.79
1:B:204:THR:HB	1:B:206:GLU:OE1	1.82	0.78
1:A:501:ALA:O	1:A:505:ASN:ND2	2.16	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:13:HIS:NE2	1:A:271:ARG:NH1	2.32	0.77
1:A:58:ARG:CG	1:A:58:ARG:HH11	1.96	0.77
1:A:157:THR:HG22	1:A:160:MET:HB2	1.65	0.77
1:B:497:ASP:OD1	1:B:500:MET:HG3	1.85	0.77
1:A:435:SER:HA	1:A:438:THR:HB	1.66	0.77
1:A:58:ARG:HH11	1:A:58:ARG:CB	1.98	0.76
1:B:448:ASP:OD2	1:B:453:TYR:HB3	1.85	0.76
1:B:58:ARG:HH11	1:B:58:ARG:HG3	1.49	0.76
1:A:277:VAL:HG23	1:A:312:LEU:HD13	1.68	0.76
1:B:162:LEU:O	1:B:166:GLN:HG3	1.87	0.75
1:A:427:ALA:O	1:A:513:ARG:NH1	2.20	0.75
1:A:394:TRP:O	1:A:394:TRP:CD1	2.39	0.74
1:B:229:GLN:OE1	1:B:229:GLN:HA	1.87	0.74
1:A:471:GLU:HB3	1:A:473:TRP:CZ2	2.22	0.74
1:A:103:ARG:HG2	1:A:131:ASP:HB3	1.67	0.74
1:B:125:CYS:HB3	1:B:130:ILE:O	1.87	0.73
1:A:362:LEU:HD22	1:A:444:ALA:HB2	1.68	0.73
1:A:125:CYS:HB3	1:A:130:ILE:O	1.88	0.73
1:A:247:ARG:HH21	1:A:252:PRO:HD2	1.53	0.73
1:A:389:THR:HG22	1:A:395:GLN:O	1.89	0.72
1:A:58:ARG:HB3	1:A:58:ARG:HH11	1.50	0.72
1:B:11:PHE:C	1:B:12:ARG:HG3	2.08	0.72
1:B:280:PHE:HE1	1:B:308:ILE:HD11	1.55	0.72
1:A:429:GLU:HG3	1:A:525:PRO:HG2	1.72	0.72
1:A:459:PRO:C	1:A:461:LEU:H	1.93	0.71
1:A:87:GLU:O	1:A:91:ILE:HG13	1.90	0.71
1:A:287:LEU:HD23	1:A:288:PHE:HE1	1.52	0.71
1:A:398:GLU:O	1:A:402:GLN:HG2	1.90	0.71
1:B:343:ALA:H	1:B:394:TRP:HD1	1.36	0.71
1:A:155:PRO:HB3	1:A:160:MET:HB3	1.72	0.71
1:A:96:HIS:HD2	1:A:128:LEU:HD13	1.55	0.70
1:A:290:ASN:C	1:A:290:ASN:HD22	1.95	0.70
1:B:467:GLU:HG2	1:B:468:PHE:CE2	2.26	0.70
1:B:380:LEU:O	1:B:384:VAL:HG22	1.92	0.70
1:B:393:LEU:H	1:B:496:ILE:CD1	2.05	0.70
1:B:321:MET:HE3	1:B:523:CYS:HB2	1.74	0.69
1:B:327:ASN:OD1	1:B:330:ARG:HD2	1.92	0.69
1:A:58:ARG:HH11	1:A:58:ARG:HG3	1.57	0.69
1:B:529:GLU:OE2	1:B:532:ARG:NH2	2.26	0.69
1:A:15:LEU:HA	1:A:67:ILE:HD11	1.74	0.69
1:B:159:GLN:HG2	1:B:526:SER:CB	2.22	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:179:ARG:NH1	1:B:181:GLU:HG3	2.07	0.69
1:B:358:THR:HG22	1:B:495:ILE:CD1	2.22	0.69
1:B:113:ILE:HD11	1:B:413:TRP:CD2	2.28	0.69
1:A:516:LEU:HD13	1:A:520:PRO:HD3	1.74	0.68
1:B:467:GLU:HG2	1:B:468:PHE:CD2	2.28	0.68
1:A:143:PRO:O	1:A:147:ILE:HG13	1.93	0.68
1:A:534:PHE:CD2	1:A:534:PHE:O	2.46	0.68
1:B:165:VAL:O	1:B:165:VAL:HG23	1.92	0.68
1:B:257:PRO:HD3	1:B:536:TRP:CE3	2.28	0.68
1:A:8:VAL:HG12	1:A:104:ILE:HA	1.76	0.68
1:A:290:ASN:HD22	1:A:291:VAL:N	1.91	0.67
1:A:224:ARG:HG2	1:A:229:GLN:HB2	1.75	0.67
1:B:149:THR:C	1:B:151:GLY:H	1.98	0.67
1:A:364:ASP:O	1:A:368:ARG:HG3	1.94	0.67
1:A:89:ALA:HB2	1:A:120:SER:OG	1.95	0.66
1:A:301:GLN:HG3	1:A:303:THR:HG23	1.75	0.66
1:A:346:ASN:HB3	1:A:349:LEU:HB2	1.76	0.66
1:B:516:LEU:HD21	1:B:520:PRO:HG3	1.77	0.66
1:B:412:ASP:HB2	1:B:415:VAL:HB	1.78	0.66
1:A:146:VAL:HG11	1:A:161:PHE:HE1	1.60	0.66
1:B:159:GLN:HG2	1:B:526:SER:HB3	1.77	0.66
1:B:248:GLY:O	1:B:250:TYR:CE2	2.49	0.66
1:B:72:GLN:HG2	1:B:80:ARG:HD3	1.77	0.66
1:A:238:LEU:HD11	1:A:283:SER:HB2	1.77	0.65
1:A:512:LEU:HG	1:A:513:ARG:N	2.10	0.65
1:B:79:GLY:HA3	1:B:185:PHE:CE1	2.30	0.65
1:B:346:ASN:HB3	1:B:349:LEU:HD13	1.78	0.65
1:B:389:THR:HG22	1:B:395:GLN:O	1.97	0.65
1:A:75:THR:O	1:A:78:ARG:HB2	1.96	0.65
1:A:491:TYR:CD1	1:A:492:PRO:HD2	2.31	0.65
1:A:221:ILE:O	1:A:222:ASN:HB3	1.97	0.64
1:B:247:ARG:NH1	1:B:252:PRO:HD3	2.13	0.64
1:A:4:ARG:NH1	1:A:4:ARG:HA	2.11	0.64
1:B:321:MET:HE2	1:B:328:TYR:HE1	1.62	0.64
1:B:46:SER:OG	1:B:117:ARG:NH1	2.31	0.64
1:B:192:PHE:CE1	1:B:196:LEU:HD13	2.33	0.64
1:B:464:VAL:CG1	1:B:465:PRO:HD2	2.27	0.64
1:B:8:VAL:HG12	1:B:104:ILE:HA	1.78	0.63
1:A:104:ILE:HD12	1:A:125:CYS:SG	2.38	0.63
1:B:162:LEU:HD12	1:B:162:LEU:H	1.62	0.63
1:B:260:HIS:H	1:B:260:HIS:CD2	2.17	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:461:LEU:HD22	1:B:464:VAL:CG2	2.29	0.63
1:B:486:LEU:O	1:B:489:VAL:O	2.17	0.63
1:A:191:GLU:O	1:A:195:SER:HB3	1.98	0.63
1:B:491:TYR:CD1	1:B:492:PRO:HD2	2.34	0.63
1:A:249:PHE:O	1:A:250:TYR:HB2	1.99	0.63
1:B:438:THR:HG22	1:B:439:CYS:N	2.13	0.63
1:B:113:ILE:O	3:B:704:HOH:O	2.16	0.63
1:B:388:LEU:HA	1:B:393:LEU:HD12	1.79	0.63
1:A:290:ASN:C	1:A:290:ASN:ND2	2.53	0.62
1:B:72:GLN:CG	1:B:80:ARG:HD3	2.29	0.62
1:B:427:ALA:O	1:B:513:ARG:HD3	1.99	0.62
1:A:363:ILE:CD1	1:A:383:THR:HG22	2.28	0.62
1:A:392:GLY:HA3	1:A:505:ASN:HD21	1.64	0.62
1:B:248:GLY:O	1:B:249:PHE:O	2.18	0.62
1:B:301:GLN:HG3	1:B:303:THR:HG23	1.81	0.62
1:B:230:ALA:HB1	1:B:275:LEU:HB2	1.82	0.62
1:B:297:VAL:CB	1:B:298:ARG:CB	2.78	0.62
1:A:125:CYS:O	1:A:129:ASN:N	2.33	0.61
1:B:358:THR:HG22	1:B:495:ILE:HD13	1.81	0.61
1:A:366:ALA:O	1:A:376:LEU:HD11	2.00	0.61
1:A:429:GLU:HG3	1:A:525:PRO:HB2	1.81	0.61
1:A:250:TYR:HE1	1:B:532:ARG:NH1	1.98	0.61
1:B:321:MET:HE3	1:B:336:ILE:HD13	1.81	0.61
1:B:515:SER:O	1:B:516:LEU:HB3	2.00	0.61
1:B:46:SER:O	1:B:47:ALA:HB3	2.01	0.61
1:A:23:LEU:HD12	1:A:23:LEU:O	2.01	0.61
1:B:71:LEU:O	1:B:75:THR:HG23	2.01	0.61
1:B:72:GLN:OE1	1:B:80:ARG:HD3	2.00	0.61
1:B:321:MET:HG2	1:B:321:MET:O	2.00	0.61
1:B:87:GLU:O	1:B:91:ILE:HG13	1.99	0.61
1:B:137:SER:O	1:B:138:HIS:HB3	2.00	0.61
1:B:213:ASP:OD1	1:B:216:GLY:HA2	2.01	0.61
1:A:234:LEU:HD22	1:A:275:LEU:HD11	1.83	0.60
1:A:22:ALA:HB1	1:A:105:CYS:HB3	1.83	0.60
1:A:394:TRP:HB2	1:A:505:ASN:OD1	2.01	0.60
1:B:247:ARG:HG2	1:B:248:GLY:O	2.01	0.60
1:B:464:VAL:HG13	1:B:465:PRO:HD2	1.82	0.60
1:B:43:ASP:HB3	1:B:45:GLU:H	1.66	0.60
1:A:358:THR:HG22	1:A:495:ILE:HD13	1.84	0.60
1:A:250:TYR:CD1	1:B:529:GLU:HB2	2.35	0.60
1:A:358:THR:O	1:A:495:ILE:HG23	2.01	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:535:PHE:O	1:A:536:TRP:HB2	2.01	0.60
1:A:428:PHE:CE2	1:A:519:PRO:HB3	2.37	0.60
1:B:351:GLN:O	1:B:355:LEU:HG	2.02	0.60
1:A:392:GLY:HA3	1:A:505:ASN:ND2	2.17	0.59
1:B:387:PHE:O	1:B:392:GLY:O	2.20	0.59
1:B:522:HIS:CD2	1:B:524:ARG:HB3	2.38	0.59
1:A:459:PRO:HD3	3:A:709:HOH:O	2.02	0.59
1:B:474:ARG:HG3	1:B:474:ARG:HH11	1.67	0.59
1:B:516:LEU:O	1:B:516:LEU:HD22	2.02	0.59
1:A:119:GLU:OE1	1:A:119:GLU:HA	2.02	0.59
1:B:159:GLN:O	1:B:162:LEU:HD12	2.02	0.59
1:B:249:PHE:O	1:B:250:TYR:O	2.19	0.59
1:A:472:PRO:HD2	1:A:473:TRP:CZ3	2.38	0.59
1:B:392:GLY:C	1:B:393:LEU:O	2.38	0.59
1:A:293:LEU:HD23	1:A:303:THR:HA	1.85	0.59
1:A:392:GLY:HA2	1:A:394:TRP:H	1.64	0.59
1:A:358:THR:HA	1:A:495:ILE:CG2	2.32	0.59
1:B:1:MET:HA	1:B:4:ARG:HB3	1.84	0.58
1:A:87:GLU:HG2	1:A:90:TYR:HB3	1.84	0.58
1:A:250:TYR:HE1	1:B:532:ARG:HH12	1.50	0.58
1:A:293:LEU:O	1:A:303:THR:HG22	2.03	0.58
1:B:258:ASN:OD1	1:B:258:ASN:C	2.41	0.58
1:A:346:ASN:O	1:A:348:ASN:N	2.37	0.58
1:B:280:PHE:CE1	1:B:308:ILE:HD11	2.38	0.58
1:A:346:ASN:O	1:A:349:LEU:N	2.36	0.58
1:B:514:ASN:CG	1:B:515:SER:H	2.06	0.58
1:A:106:ILE:HD11	1:A:134:GLU:OE2	2.03	0.58
1:A:294:ARG:O	1:A:295:ALA:HB2	2.03	0.58
1:B:293:LEU:N	1:B:293:LEU:HD22	2.19	0.58
1:A:386:THR:O	1:A:391:GLY:HA3	2.03	0.58
1:B:321:MET:HE2	1:B:328:TYR:CE1	2.38	0.58
1:B:354:ARG:O	1:B:371:LEU:HD11	2.05	0.57
1:A:96:HIS:CD2	1:A:128:LEU:HD13	2.38	0.57
1:A:206:GLU:H	1:A:206:GLU:CD	2.07	0.57
1:A:250:TYR:HE1	1:B:532:ARG:NH2	2.02	0.57
1:B:156:LEU:HD11	1:B:336:ILE:HG22	1.87	0.57
1:A:90:TYR:C	1:A:90:TYR:CD2	2.77	0.57
1:A:429:GLU:HG3	1:A:525:PRO:CG	2.34	0.57
1:A:75:THR:HB	1:A:78:ARG:NH1	2.19	0.57
1:A:229:GLN:HA	1:A:229:GLN:OE1	2.03	0.57
1:A:252:PRO:HB3	1:A:253:ASN:CB	2.34	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:27:LEU:O	1:A:30:LYS:HG3	2.05	0.57
1:A:486:LEU:HD13	1:A:490:HIS:HE1	1.69	0.57
1:B:237:ARG:HG3	1:B:238:LEU:N	2.20	0.57
1:B:377:HIS:O	1:B:380:LEU:HB2	2.05	0.57
1:B:37:ILE:HG12	1:B:186:VAL:HG11	1.85	0.57
1:B:127:GLU:HG2	1:B:128:LEU:HD23	1.87	0.57
1:A:20:ASN:HB3	1:A:23:LEU:HB3	1.86	0.57
1:A:429:GLU:HG3	1:A:525:PRO:CB	2.35	0.57
1:B:435:SER:HA	1:B:438:THR:HB	1.86	0.57
1:A:52:VAL:HG22	1:A:53:GLY:O	2.04	0.56
1:A:87:GLU:CG	1:A:90:TYR:HB3	2.35	0.56
1:A:46:SER:OG	1:A:117:ARG:NH1	2.38	0.56
1:B:104:ILE:HD12	1:B:130:ILE:HG21	1.87	0.56
1:A:286:ASP:O	1:A:288:PHE:N	2.38	0.56
1:B:11:PHE:O	1:B:12:ARG:HG3	2.04	0.56
1:B:96:HIS:HD2	1:B:128:LEU:CD1	2.17	0.56
1:A:43:ASP:HA	1:A:86:GLY:O	2.05	0.56
1:A:259:ILE:HD11	1:A:448:ASP:HB2	1.87	0.56
1:A:516:LEU:CD1	1:A:520:PRO:HD3	2.35	0.56
1:B:343:ALA:N	1:B:394:TRP:HD1	2.01	0.56
1:A:111:GLU:OE2	1:A:413:TRP:HB3	2.05	0.56
1:A:472:PRO:HD2	1:A:473:TRP:CE3	2.40	0.56
1:A:250:TYR:HH	1:B:528:GLU:HB3	1.71	0.56
1:A:391:GLY:O	1:A:392:GLY:O	2.24	0.56
1:A:390:ARG:HH21	1:A:433:ASP:CG	2.09	0.55
1:A:257:PRO:HD3	1:A:536:TRP:NE1	2.20	0.55
1:B:242:GLN:HA	1:B:245:PHE:HB3	1.88	0.55
1:A:219:ALA:N	1:A:372:ALA:HB1	2.21	0.55
1:B:329:ASP:OD2	1:B:413:TRP:HZ2	1.89	0.55
1:B:527:ASN:O	1:B:531:VAL:HG23	2.05	0.55
1:B:293:LEU:N	1:B:293:LEU:CD2	2.68	0.55
1:A:530:GLU:HA	1:A:533:GLN:NE2	2.21	0.55
1:B:358:THR:O	1:B:494:ARG:HA	2.07	0.55
1:A:111:GLU:HB2	1:A:114:TRP:CD1	2.42	0.55
1:A:297:VAL:CG1	1:A:307:HIS:HB2	2.37	0.55
1:A:280:PHE:HE1	1:A:308:ILE:HD11	1.71	0.55
1:A:381:ARG:HD3	2:A:601:FAD:C9A	2.37	0.55
1:B:96:HIS:CD2	1:B:128:LEU:HD13	2.36	0.55
1:B:98:GLN:HG2	1:B:192:PHE:CE1	2.41	0.55
1:B:361:PRO:O	1:B:365:GLY:N	2.34	0.55
1:B:461:LEU:HD22	1:B:464:VAL:HG21	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:147:ILE:HG23	1:A:154:PRO:N	2.22	0.55
1:A:295:ALA:HA	1:B:299:GLY:O	2.07	0.55
1:A:369:GLN:HG3	1:A:457:TYR:CE1	2.42	0.55
1:A:388:LEU:O	1:A:388:LEU:HG	2.07	0.55
1:A:95:LEU:HD12	1:A:192:PHE:HE2	1.71	0.55
1:A:388:LEU:HD23	1:A:389:THR:HG23	1.88	0.55
1:A:459:PRO:C	1:A:461:LEU:N	2.55	0.55
1:B:58:ARG:CG	1:B:58:ARG:NH1	2.59	0.55
1:B:401:LEU:HG	1:B:405:LEU:CD1	2.37	0.55
1:B:418:GLY:HA2	1:B:421:MET:CE	2.37	0.55
1:A:498:LEU:O	1:A:499:SER:C	2.46	0.54
1:B:360:PHE:CE2	1:B:494:ARG:HB3	2.41	0.54
1:A:258:ASN:C	1:A:258:ASN:OD1	2.45	0.54
1:A:63:SER:O	1:A:67:ILE:HG13	2.07	0.54
1:B:58:ARG:HG3	1:B:58:ARG:NH1	2.21	0.54
1:A:20:ASN:O	1:A:24:LEU:HG	2.08	0.54
1:A:196:LEU:O	1:A:197:LYS:HB2	2.07	0.54
1:A:363:ILE:HD11	1:A:440:PRO:CG	2.37	0.54
1:B:159:GLN:HA	1:B:162:LEU:HD11	1.90	0.54
1:A:24:LEU:HD21	1:A:178:ALA:HB2	1.89	0.54
1:A:168:ILE:HG22	1:A:169:GLY:N	2.23	0.54
1:A:247:ARG:O	1:A:247:ARG:HG3	2.06	0.54
1:A:8:VAL:CG1	1:A:104:ILE:HG23	2.38	0.54
1:A:95:LEU:HD12	1:A:192:PHE:CE2	2.43	0.54
1:A:459:PRO:O	1:A:461:LEU:N	2.41	0.54
1:A:476:SER:O	1:A:480:GLN:HG3	2.08	0.54
1:A:509:MET:HA	1:A:512:LEU:HD23	1.90	0.54
1:B:52:VAL:HG22	1:B:53:GLY:N	2.23	0.53
1:B:324:ASN:O	1:B:326:PRO:HD3	2.08	0.53
1:B:394:TRP:CZ3	1:B:505:ASN:HB3	2.43	0.53
1:A:38:PRO:HB2	1:A:81:LEU:HA	1.90	0.53
1:B:345:PRO:HA	1:B:395:GLN:OE1	2.08	0.53
1:A:441:VAL:C	1:A:443:LEU:H	2.10	0.53
1:B:7:ASN:ND2	1:B:34:ILE:HG21	2.24	0.53
1:A:72:GLN:HG3	1:A:80:ARG:HG2	1.89	0.53
1:A:503:LYS:O	1:A:507:LEU:HD22	2.08	0.53
1:B:288:PHE:O	1:B:289:LYS:C	2.46	0.53
1:A:410:ASP:O	1:A:411:ALA:C	2.46	0.53
1:B:361:PRO:O	1:B:364:ASP:N	2.41	0.53
1:A:109:ASP:OD2	1:A:117:ARG:NH2	2.37	0.53
1:A:368:ARG:NH1	1:A:458:VAL:HG13	2.24	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:16:ARG:HD2	1:B:18:HIS:CE1	2.43	0.53
1:B:248:GLY:O	1:B:250:TYR:CD2	2.62	0.53
1:A:205:PRO:HB2	1:A:206:GLU:OE2	2.09	0.53
1:A:302:MET:O	1:A:302:MET:HG3	2.07	0.53
1:B:159:GLN:HA	1:B:162:LEU:CD1	2.39	0.53
1:A:60:LEU:O	1:A:64:LEU:HG	2.09	0.53
1:A:428:PHE:CZ	1:A:519:PRO:HB3	2.43	0.53
1:A:461:LEU:HD23	1:A:464:VAL:CG2	2.39	0.53
1:B:412:ASP:O	1:B:416:CYS:HB2	2.09	0.53
1:A:340:ILE:CD1	1:A:425:SER:HA	2.39	0.53
1:A:363:ILE:HD11	1:A:440:PRO:CB	2.39	0.53
1:B:46:SER:CA	1:B:114:TRP:CZ3	2.88	0.53
1:B:46:SER:CA	1:B:114:TRP:HZ3	2.22	0.53
1:B:79:GLY:HA3	1:B:185:PHE:CZ	2.44	0.53
1:B:353:TRP:O	1:B:367:MET:HG3	2.09	0.53
1:A:62:ASP:O	1:A:65:GLN:HB3	2.10	0.52
1:B:149:THR:O	1:B:151:GLY:N	2.41	0.52
1:B:489:VAL:O	1:B:490:HIS:HB2	2.07	0.52
1:B:10:TRP:CE2	1:B:12:ARG:HD3	2.44	0.52
1:B:217:PHE:O	1:B:218:LEU:HB2	2.09	0.52
1:A:394:TRP:CE3	1:A:505:ASN:HB3	2.44	0.52
1:A:422:TRP:CZ2	1:A:525:PRO:HA	2.44	0.52
1:A:535:PHE:O	1:A:536:TRP:CB	2.56	0.52
1:B:137:SER:O	1:B:138:HIS:CB	2.58	0.52
1:B:216:GLY:O	1:B:217:PHE:CG	2.63	0.52
1:B:433:ASP:HB3	1:B:506:MET:HG2	1.92	0.52
1:A:87:GLU:HG2	1:A:90:TYR:CB	2.39	0.52
1:A:358:THR:HA	1:A:495:ILE:HG21	1.91	0.52
1:A:406:LYS:HD3	1:A:407:TYR:CE2	2.45	0.52
1:B:112:PRO:HD2	1:B:413:TRP:HZ3	1.74	0.52
1:B:46:SER:HA	1:B:114:TRP:HZ3	1.67	0.52
1:B:454:ILE:O	1:B:458:VAL:HB	2.10	0.52
1:A:16:ARG:O	1:A:20:ASN:ND2	2.41	0.51
1:B:321:MET:O	1:B:321:MET:CG	2.57	0.51
1:A:362:LEU:HB2	1:A:444:ALA:HB2	1.91	0.51
1:B:16:ARG:HD3	1:B:273:GLY:O	2.10	0.51
1:B:58:ARG:HH11	1:B:58:ARG:HG2	1.69	0.51
1:A:96:HIS:HD2	1:A:128:LEU:CD1	2.20	0.51
1:A:250:TYR:CE1	1:B:532:ARG:NH1	2.76	0.51
1:A:331:MET:HE1	1:A:342:TRP:HD1	1.76	0.51
1:B:358:THR:HG22	1:B:495:ILE:HD11	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:514:ASN:C	1:A:516:LEU:N	2.64	0.51
1:B:418:GLY:HA2	1:B:421:MET:HE2	1.91	0.51
1:A:6:ALA:HB1	1:A:37:ILE:HD11	1.92	0.51
1:A:8:VAL:HG23	1:A:37:ILE:O	2.10	0.51
1:A:250:TYR:HE1	1:B:532:ARG:CZ	2.23	0.51
1:A:516:LEU:O	1:A:516:LEU:HD12	2.11	0.51
1:B:112:PRO:HD2	1:B:413:TRP:CZ3	2.46	0.51
1:A:369:GLN:OE1	1:A:376:LEU:HD23	2.10	0.51
1:A:260:HIS:ND1	1:A:260:HIS:N	2.47	0.51
1:B:36:LEU:HD23	1:B:38:PRO:HD3	1.92	0.51
1:B:52:VAL:CG2	1:B:53:GLY:N	2.73	0.51
1:B:12:ARG:HH22	1:B:106:ILE:HD12	1.76	0.51
1:B:149:THR:C	1:B:151:GLY:N	2.64	0.51
1:A:14:GLY:O	1:A:16:ARG:N	2.44	0.50
1:B:111:GLU:OE2	1:B:413:TRP:HB3	2.10	0.50
1:B:158:TYR:CE2	1:B:162:LEU:HD21	2.45	0.50
1:B:515:SER:O	1:B:516:LEU:CB	2.57	0.50
1:B:535:PHE:N	1:B:535:PHE:CD2	2.79	0.50
1:A:247:ARG:HH11	1:A:247:ARG:CG	2.14	0.50
1:A:94:ARG:O	1:A:98:GLN:HG2	2.11	0.50
1:B:71:LEU:HD23	1:B:180:LEU:HD13	1.92	0.50
1:B:111:GLU:HB2	1:B:114:TRP:CD1	2.47	0.50
1:B:383:THR:OG1	1:B:443:LEU:HD23	2.10	0.50
1:A:349:LEU:O	1:A:352:SER:HB2	2.11	0.50
1:A:17:LEU:HD23	1:A:23:LEU:HD22	1.92	0.50
1:B:79:GLY:O	1:B:80:ARG:HG2	2.10	0.50
1:B:392:GLY:O	1:B:393:LEU:HB2	2.10	0.50
1:A:325:ASN:O	1:A:328:TYR:HB2	2.11	0.50
1:A:346:ASN:OD1	1:A:349:LEU:HD22	2.11	0.50
1:A:524:ARG:HG2	1:A:525:PRO:HD2	1.93	0.50
1:B:46:SER:N	1:B:114:TRP:HZ3	2.09	0.50
1:B:301:GLN:O	1:B:307:HIS:HB3	2.11	0.50
1:B:386:THR:O	1:B:391:GLY:HA3	2.12	0.50
1:A:431:LEU:HB2	1:A:528:GLU:OE2	2.12	0.49
1:B:19:ASP:OD1	1:B:175:THR:HG23	2.11	0.49
1:B:136:VAL:HG12	1:B:136:VAL:O	2.10	0.49
1:B:508:ALA:HA	1:B:511:SER:HB2	1.94	0.49
1:B:516:LEU:O	1:B:517:ILE:C	2.50	0.49
1:A:86:GLY:HA3	1:A:91:ILE:HD11	1.93	0.49
1:A:514:ASN:O	1:A:516:LEU:N	2.45	0.49
1:B:13:HIS:CD2	1:B:271:ARG:NH1	2.79	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:244:ALA:CA	1:B:247:ARG:NH1	2.73	0.49
1:A:101:LEU:HB3	1:A:130:ILE:HD13	1.95	0.49
1:B:107:GLU:OE2	1:B:138:HIS:HB2	2.12	0.49
1:B:486:LEU:O	1:B:487:ILE:C	2.51	0.49
1:A:58:ARG:NH1	1:A:58:ARG:CB	2.62	0.49
1:A:182:ASP:CG	1:A:182:ASP:O	2.51	0.49
1:A:441:VAL:O	1:A:443:LEU:N	2.46	0.49
1:B:342:TRP:CG	1:B:396:SER:HA	2.48	0.49
1:B:389:THR:O	1:B:390:ARG:CB	2.60	0.49
1:A:394:TRP:O	1:A:394:TRP:CG	2.66	0.49
1:B:282:TRP:O	1:B:286:ASP:HB2	2.13	0.49
1:A:106:ILE:HD11	1:A:134:GLU:HB2	1.94	0.49
1:A:290:ASN:O	1:A:291:VAL:HG23	2.12	0.49
1:B:67:ILE:HA	1:B:70:GLN:HB2	1.95	0.49
1:B:113:ILE:HD11	1:B:413:TRP:CG	2.48	0.49
1:A:145:LEU:O	1:A:149:THR:N	2.40	0.49
1:B:293:LEU:HD21	1:B:303:THR:HA	1.94	0.49
1:A:536:TRP:O	1:A:537:LEU:HD23	2.12	0.49
1:B:247:ARG:O	1:B:248:GLY:C	2.51	0.49
1:A:78:ARG:NH2	1:A:183:ALA:O	2.46	0.49
1:A:79:GLY:HA3	1:A:185:PHE:CG	2.48	0.49
1:B:364:ASP:O	1:B:368:ARG:HG3	2.13	0.49
1:B:401:LEU:HG	1:B:405:LEU:HD11	1.93	0.49
1:B:458:VAL:HG12	1:B:458:VAL:O	2.11	0.49
1:B:238:LEU:HD11	1:B:283:SER:HB2	1.94	0.48
1:A:90:TYR:C	1:A:90:TYR:HD2	2.17	0.48
1:A:260:HIS:HD2	1:A:452:THR:HG22	1.77	0.48
1:B:511:SER:O	1:B:514:ASN:OD1	2.31	0.48
1:A:103:ARG:HG2	1:A:131:ASP:CB	2.41	0.48
1:B:75:THR:O	1:B:78:ARG:HB2	2.14	0.48
1:A:55:ASN:HB3	1:A:409:LEU:HD21	1.95	0.48
1:B:90:TYR:C	1:B:90:TYR:CD2	2.86	0.48
1:A:15:LEU:HB2	1:A:272:PHE:O	2.14	0.48
1:A:159:GLN:HG2	1:A:526:SER:HB3	1.95	0.48
1:B:376:LEU:HD22	1:B:380:LEU:HD12	1.94	0.48
1:A:69:ASP:O	1:A:70:GLN:C	2.51	0.48
1:A:250:TYR:HE1	1:B:532:ARG:HH22	1.55	0.48
1:B:393:LEU:H	1:B:496:ILE:HD13	1.76	0.48
1:A:282:TRP:HZ3	1:A:285:HIS:CE1	2.32	0.48
1:A:293:LEU:H	1:A:303:THR:HB	1.78	0.48
1:A:309:THR:HG23	1:A:313:ILE:HD11	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:468:PHE:CD2	1:A:475:MET:HG2	2.49	0.48
1:B:229:GLN:OE1	1:B:229:GLN:CA	2.61	0.48
1:B:346:ASN:CB	1:B:349:LEU:HD22	2.44	0.48
1:A:16:ARG:HD3	1:A:273:GLY:O	2.13	0.48
1:B:113:ILE:O	1:B:113:ILE:HG22	2.13	0.48
1:B:279:ARG:O	1:B:283:SER:OG	2.27	0.48
1:B:379:THR:HG23	1:B:536:TRP:CD1	2.49	0.48
1:B:271:ARG:CG	1:B:412:ASP:OD2	2.62	0.48
1:B:321:MET:CE	1:B:336:ILE:HD13	2.44	0.48
1:B:459:PRO:C	1:B:461:LEU:H	2.17	0.48
1:B:465:PRO:O	1:B:466:LYS:HB2	2.14	0.48
1:A:466:LYS:HA	1:A:469:VAL:HG12	1.96	0.47
1:B:401:LEU:HD13	1:B:417:ALA:HA	1.95	0.47
1:B:234:LEU:O	1:B:238:LEU:HB2	2.14	0.47
1:A:310:GLY:HA2	1:A:313:ILE:HG12	1.95	0.47
1:A:428:PHE:CE1	1:A:519:PRO:HD3	2.49	0.47
1:A:448:ASP:CG	1:A:448:ASP:O	2.52	0.47
1:B:297:VAL:CA	1:B:298:ARG:CB	2.92	0.47
1:B:325:ASN:O	1:B:328:TYR:HB2	2.15	0.47
1:A:314:TRP:O	1:A:317:TYR:HB3	2.15	0.47
1:A:528:GLU:HG2	1:A:532:ARG:NH1	2.29	0.47
1:A:244:ALA:HA	1:A:247:ARG:NH1	2.30	0.47
1:A:256:LEU:HB2	1:A:257:PRO:HD2	1.96	0.47
1:A:498:LEU:HD23	1:A:498:LEU:HA	1.76	0.47
1:A:529:GLU:HB2	1:B:250:TYR:CD2	2.49	0.47
1:B:309:THR:O	1:B:313:ILE:HG12	2.14	0.47
1:A:37:ILE:HG23	1:A:186:VAL:HG21	1.96	0.47
1:A:471:GLU:HA	1:A:473:TRP:CZ3	2.49	0.47
1:B:93:ARG:HH12	1:B:128:LEU:HD21	1.80	0.47
1:A:144:GLN:O	1:A:148:GLU:HB2	2.15	0.47
1:A:159:GLN:HG2	1:A:526:SER:CB	2.45	0.47
1:A:484:GLU:HG3	1:A:484:GLU:O	2.15	0.47
1:B:172:PRO:O	1:B:278:ARG:HG2	2.15	0.47
1:B:328:TYR:HA	1:B:334:ASN:HD21	1.80	0.47
1:B:450:ASP:OD2	1:B:466:LYS:HE3	2.14	0.47
1:B:527:ASN:OD1	1:B:530:GLU:N	2.38	0.47
1:A:288:PHE:O	1:A:289:LYS:C	2.53	0.47
1:A:297:VAL:HG12	1:A:307:HIS:HB2	1.96	0.47
1:B:69:ASP:O	1:B:71:LEU:N	2.48	0.47
1:B:443:LEU:HD13	1:B:446:ARG:NH2	2.30	0.47
1:A:250:TYR:CE1	1:B:529:GLU:HB2	2.50	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:251:LEU:O	1:A:252:PRO:C	2.54	0.46
1:B:280:PHE:CG	1:B:312:LEU:HD11	2.50	0.46
1:B:514:ASN:CG	1:B:515:SER:N	2.67	0.46
1:A:43:ASP:OD1	1:A:46:SER:HB2	2.16	0.46
1:A:459:PRO:O	1:A:462:MET:HG3	2.15	0.46
1:A:8:VAL:CG1	1:A:104:ILE:HA	2.43	0.46
1:A:14:GLY:O	1:A:16:ARG:HG2	2.16	0.46
1:B:262:SER:HB3	1:B:263:PRO:CD	2.46	0.46
1:A:8:VAL:HG13	1:A:8:VAL:O	2.16	0.46
1:A:397:TRP:C	1:A:399:HIS:H	2.19	0.46
1:B:23:LEU:O	1:B:23:LEU:HD12	2.15	0.46
1:B:224:ARG:CG	1:B:229:GLN:HE21	2.29	0.46
1:A:79:GLY:HA3	1:A:185:PHE:CD2	2.51	0.46
1:B:52:VAL:HG22	1:B:53:GLY:O	2.15	0.46
1:B:474:ARG:HG3	1:B:474:ARG:NH1	2.30	0.46
1:A:110:CYS:O	1:A:111:GLU:C	2.53	0.46
1:A:461:LEU:HD23	1:A:464:VAL:HG21	1.98	0.46
1:B:158:TYR:HE2	1:B:162:LEU:HD21	1.81	0.46
2:B:601:FAD:H3B	2:B:601:FAD:H5'2	1.98	0.46
1:B:34:ILE:HD13	1:B:34:ILE:N	2.31	0.46
1:A:71:LEU:HD23	1:A:71:LEU:HA	1.72	0.46
1:A:340:ILE:HA	1:A:341:PRO:HD3	1.83	0.46
1:B:388:LEU:HG	1:B:389:THR:HG23	1.98	0.46
1:A:358:THR:HA	1:A:495:ILE:HG23	1.97	0.45
1:B:18:HIS:O	1:B:19:ASP:C	2.54	0.45
1:B:72:GLN:CD	1:B:80:ARG:HD3	2.35	0.45
1:B:239:LYS:O	1:B:240:VAL:C	2.53	0.45
1:B:346:ASN:HB3	1:B:349:LEU:HD22	1.97	0.45
1:A:15:LEU:HD23	1:A:15:LEU:H	1.81	0.45
1:A:280:PHE:O	1:A:284:VAL:HG23	2.16	0.45
1:A:309:THR:HG22	1:A:310:GLY:N	2.30	0.45
1:B:217:PHE:CZ	1:B:368:ARG:HD3	2.52	0.45
1:B:287:LEU:HD23	1:B:288:PHE:CE1	2.51	0.45
1:A:311:GLN:HB3	2:A:601:FAD:O4B	2.16	0.45
1:B:10:TRP:CZ3	1:B:121:ILE:HD12	2.51	0.45
1:B:211:TYR:O	1:B:213:ASP:N	2.49	0.45
1:B:519:PRO:HA	1:B:520:PRO:HD3	1.83	0.45
1:A:362:LEU:HD22	1:A:444:ALA:CB	2.40	0.45
1:A:385:ALA:HB1	1:A:420:TRP:CZ3	2.52	0.45
1:B:119:GLU:OE2	1:B:126:ARG:NH2	2.50	0.45
1:B:409:LEU:HA	1:B:409:LEU:HD23	1.69	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:527:ASN:HB2	1:B:250:TYR:OH	2.17	0.45
1:B:107:GLU:OE1	1:B:137:SER:HB3	2.16	0.45
1:B:378:HIS:NE2	1:B:534:PHE:O	2.47	0.45
1:B:488:GLY:O	1:B:489:VAL:C	2.55	0.45
1:A:83:VAL:O	1:A:199:PHE:HD2	2.00	0.45
1:A:94:ARG:HB3	1:A:192:PHE:HE1	1.82	0.45
1:A:288:PHE:O	1:A:290:ASN:O	2.35	0.45
1:B:431:LEU:O	1:B:431:LEU:HD12	2.15	0.45
1:B:93:ARG:HH22	1:B:127:GLU:CD	2.20	0.45
1:B:202:LEU:HD12	1:B:203:PRO:HD2	1.98	0.45
1:A:106:ILE:O	1:A:106:ILE:HG13	2.17	0.45
1:B:377:HIS:ND1	1:B:379:THR:OG1	2.50	0.45
1:A:247:ARG:O	1:A:247:ARG:CG	2.62	0.44
1:B:38:PRO:HG2	1:B:81:LEU:HA	1.99	0.44
1:B:7:ASN:OD1	1:B:103:ARG:HB2	2.17	0.44
1:B:290:ASN:O	1:B:291:VAL:CG2	2.60	0.44
1:B:441:VAL:O	1:B:445:LYS:HG3	2.18	0.44
1:B:480:GLN:HB3	1:B:485:CYS:O	2.18	0.44
1:A:161:PHE:HE1	1:A:320:THR:HG21	1.83	0.44
1:A:353:TRP:CH2	1:A:400:GLY:HA2	2.53	0.44
1:B:238:LEU:HA	1:B:238:LEU:HD23	1.47	0.44
1:B:256:LEU:HB2	1:B:257:PRO:HD2	1.99	0.44
1:B:346:ASN:O	1:B:349:LEU:HB2	2.17	0.44
1:A:69:ASP:O	1:A:72:GLN:N	2.49	0.44
1:A:192:PHE:CE1	1:A:196:LEU:HD22	2.49	0.44
1:A:270:LEU:CD2	1:A:275:LEU:HD23	2.47	0.44
1:B:297:VAL:HG21	1:B:307:HIS:CD2	2.52	0.44
1:A:297:VAL:HG11	1:A:307:HIS:HB2	2.00	0.44
1:B:271:ARG:HG3	1:B:412:ASP:OD2	2.16	0.44
1:A:294:ARG:O	1:A:295:ALA:CB	2.65	0.44
1:A:361:PRO:O	1:A:365:GLY:N	2.39	0.44
1:A:142:ASP:O	1:A:144:GLN:N	2.50	0.44
1:A:202:LEU:HG	1:A:203:PRO:HD2	1.99	0.44
1:A:38:PRO:HG2	1:A:71:LEU:HD13	1.99	0.43
1:A:466:LYS:O	1:A:466:LYS:HG2	2.18	0.43
1:A:534:PHE:O	1:A:534:PHE:CG	2.71	0.43
1:B:35:ALA:HB2	1:B:184:THR:HB	2.00	0.43
1:B:154:PRO:O	1:B:156:LEU:HD23	2.18	0.43
1:B:248:GLY:O	1:B:249:PHE:C	2.56	0.43
1:B:385:ALA:HB1	1:B:420:TRP:CZ3	2.53	0.43
1:A:88:PRO:C	1:A:90:TYR:N	2.71	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:54:TYR:CG	1:B:212:GLY:HA2	2.53	0.43
1:B:69:ASP:O	1:B:70:GLN:C	2.56	0.43
1:A:154:PRO:HB2	1:A:321:MET:HA	1.99	0.43
1:B:270:LEU:HD21	1:B:280:PHE:HD2	1.83	0.43
1:A:29:ASP:OD2	1:A:103:ARG:NH1	2.52	0.43
1:A:17:LEU:HD23	1:A:23:LEU:CD2	2.49	0.43
1:A:192:PHE:O	1:A:196:LEU:HB2	2.18	0.43
1:A:280:PHE:CG	1:A:312:LEU:HD11	2.54	0.43
1:A:281:TYR:CD2	1:A:281:TYR:C	2.91	0.43
1:A:354:ARG:HB3	1:A:403:HIS:CE1	2.54	0.43
1:B:242:GLN:HB2	1:B:287:LEU:HD11	2.00	0.43
1:B:528:GLU:O	1:B:532:ARG:HG3	2.19	0.43
1:A:381:ARG:HB3	2:A:601:FAD:C8	2.49	0.43
1:A:401:LEU:HD13	1:A:420:TRP:CD1	2.53	0.43
1:A:441:VAL:C	1:A:443:LEU:N	2.72	0.43
1:A:453:TYR:O	1:A:454:ILE:C	2.57	0.43
1:B:29:ASP:HB3	1:B:34:ILE:HG12	1.99	0.43
1:B:478:GLU:H	1:B:478:GLU:HG2	1.50	0.43
1:A:74:ALA:O	1:A:181:GLU:HA	2.19	0.43
1:A:221:ILE:CB	1:A:373:GLU:OE2	2.66	0.43
1:A:353:TRP:CZ3	1:A:400:GLY:HA2	2.54	0.43
1:B:242:GLN:O	1:B:245:PHE:HB3	2.19	0.43
1:B:46:SER:H	1:B:114:TRP:HZ3	1.66	0.42
1:B:293:LEU:HD23	1:B:303:THR:HB	2.00	0.42
1:A:104:ILE:HG13	1:A:130:ILE:HG21	2.01	0.42
1:A:361:PRO:HB2	1:A:454:ILE:HD13	2.01	0.42
1:A:486:LEU:HD13	1:A:490:HIS:CE1	2.52	0.42
1:A:297:VAL:CG1	1:A:298:ARG:N	2.52	0.42
1:A:338:LEU:HD12	1:A:425:SER:O	2.19	0.42
1:A:379:THR:O	1:A:382:ASN:HB2	2.18	0.42
1:B:452:THR:HG22	1:B:453:TYR:N	2.33	0.42
1:B:471:GLU:CB	1:B:473:TRP:CZ2	3.02	0.42
1:B:361:PRO:O	1:B:364:ASP:HB2	2.19	0.42
1:B:410:ASP:OD1	1:B:411:ALA:N	2.47	0.42
1:B:514:ASN:O	1:B:515:SER:C	2.57	0.42
1:A:38:PRO:O	1:A:82:LEU:HG	2.20	0.42
1:A:140:LEU:H	1:A:316:GLU:CD	2.23	0.42
1:A:438:THR:HG22	1:A:439:CYS:N	2.34	0.42
1:B:60:LEU:O	1:B:64:LEU:HG	2.20	0.42
1:B:85:GLU:HB2	1:B:199:PHE:CE2	2.55	0.42
1:B:108:GLN:HG3	1:B:109:ASP:N	2.35	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:219:ALA:O	1:B:220:LYS:CB	2.65	0.42
1:B:319:TYR:HA	1:B:414:SER:CB	2.49	0.42
1:B:56:ARG:HD3	1:B:408:LEU:O	2.19	0.42
1:B:309:THR:HG22	1:B:310:GLY:N	2.34	0.42
1:B:443:LEU:CD1	1:B:446:ARG:NH2	2.83	0.42
1:A:282:TRP:CZ3	1:A:285:HIS:ND1	2.88	0.42
1:A:286:ASP:O	1:A:289:LYS:N	2.52	0.42
1:A:309:THR:O	1:A:311:GLN:N	2.53	0.42
1:B:8:VAL:CG1	1:B:104:ILE:HG23	2.49	0.42
1:B:9:ILE:CG1	1:B:23:LEU:HA	2.49	0.42
1:B:342:TRP:HA	1:B:394:TRP:CD1	2.55	0.42
1:B:365:GLY:HA2	1:B:458:VAL:HG23	2.01	0.42
1:A:160:MET:O	1:A:161:PHE:C	2.58	0.42
1:A:170:LEU:HA	1:A:170:LEU:HD12	1.70	0.42
1:A:244:ALA:HA	1:A:247:ARG:HG2	2.02	0.42
1:A:286:ASP:O	1:A:287:LEU:C	2.57	0.42
1:A:439:CYS:HA	1:A:440:PRO:HD3	1.66	0.42
1:A:88:PRO:C	1:A:90:TYR:H	2.23	0.42
1:A:206:GLU:CD	1:A:206:GLU:N	2.73	0.42
1:B:9:ILE:C	1:B:9:ILE:HD13	2.39	0.42
1:B:16:ARG:NH2	1:B:137:SER:OG	2.53	0.42
1:B:331:MET:HE1	1:B:342:TRP:HD1	1.84	0.42
1:B:356:GLY:C	1:B:364:ASP:OD1	2.58	0.42
1:B:368:ARG:HH22	1:B:460:GLU:CD	2.23	0.42
1:B:497:ASP:OD1	1:B:500:MET:CG	2.61	0.42
1:A:18:HIS:O	1:A:19:ASP:C	2.58	0.41
1:A:383:THR:HG23	1:A:440:PRO:HG3	2.01	0.41
1:B:244:ALA:HB1	1:B:251:LEU:HD12	2.02	0.41
1:A:105:CYS:HA	1:A:133:VAL:HB	2.01	0.41
1:A:228:THR:C	1:A:230:ALA:N	2.73	0.41
1:A:357:GLN:HB3	1:A:492:PRO:HG3	2.01	0.41
1:B:101:LEU:HB2	1:B:130:ILE:CD1	2.51	0.41
1:B:498:LEU:O	1:B:499:SER:C	2.58	0.41
1:A:88:PRO:O	1:A:90:TYR:N	2.52	0.41
1:A:400:GLY:HA3	1:A:420:TRP:CZ2	2.56	0.41
1:A:447:LEU:HD12	1:A:447:LEU:HA	1.68	0.41
1:B:93:ARG:NH1	1:B:128:LEU:HD21	2.35	0.41
1:B:327:ASN:O	1:B:330:ARG:HG3	2.21	0.41
1:B:522:HIS:O	1:B:524:ARG:NH1	2.53	0.41
1:A:321:MET:SD	1:A:523:CYS:HB2	2.60	0.41
1:A:363:ILE:CD1	1:A:383:THR:CG2	2.98	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:9:ILE:C	1:B:9:ILE:CD1	2.89	0.41
1:B:94:ARG:HD3	1:B:94:ARG:HA	1.76	0.41
1:B:108:GLN:HG3	1:B:109:ASP:H	1.85	0.41
1:B:410:ASP:O	1:B:411:ALA:C	2.57	0.41
1:A:244:ALA:HB1	1:A:251:LEU:HD22	2.02	0.41
1:B:394:TRP:HZ3	1:B:505:ASN:HB3	1.86	0.41
1:B:398:GLU:O	1:B:402:GLN:HG2	2.20	0.41
1:A:103:ARG:HG2	1:A:131:ASP:OD2	2.21	0.41
1:A:288:PHE:O	1:A:290:ASN:N	2.54	0.41
1:B:43:ASP:HB2	1:B:45:GLU:O	2.21	0.41
1:B:121:ILE:O	1:B:122:ARG:C	2.59	0.41
1:B:162:LEU:O	1:B:163:HIS:C	2.56	0.41
1:B:363:ILE:CD1	1:B:440:PRO:HB3	2.51	0.41
1:A:13:HIS:O	1:A:272:PHE:O	2.38	0.41
1:A:18:HIS:CE1	1:A:231:LEU:HD21	2.55	0.41
1:A:303:THR:CG2	1:B:301:GLN:NE2	2.78	0.41
1:A:332:GLU:HG2	1:A:333:GLY:H	1.86	0.41
1:B:37:ILE:CG1	1:B:186:VAL:HG11	2.51	0.41
1:B:72:GLN:OE1	1:B:80:ARG:CD	2.69	0.41
1:B:85:GLU:HB2	1:B:199:PHE:CZ	2.55	0.41
1:B:156:LEU:HD11	1:B:336:ILE:CG2	2.49	0.41
1:B:192:PHE:CZ	1:B:196:LEU:HD13	2.55	0.41
1:B:389:THR:O	1:B:390:ARG:HG2	2.20	0.41
1:B:337:CYS:O	1:B:338:LEU:C	2.58	0.41
1:B:342:TRP:CD1	1:B:396:SER:HA	2.55	0.41
1:B:343:ALA:N	1:B:394:TRP:CD1	2.84	0.41
1:B:439:CYS:HA	1:B:440:PRO:HD3	1.54	0.41
1:B:461:LEU:HD23	1:B:461:LEU:HA	1.86	0.41
1:B:491:TYR:HA	1:B:492:PRO:HD3	1.92	0.41
1:A:404:PHE:CD2	1:A:420:TRP:NE1	2.89	0.41
1:B:2:ALA:O	1:B:99:VAL:HG23	2.20	0.41
1:B:376:LEU:HD23	1:B:376:LEU:HA	1.92	0.41
1:A:20:ASN:O	1:A:23:LEU:HB3	2.21	0.40
1:A:121:ILE:H	1:A:121:ILE:HG12	1.36	0.40
1:A:202:LEU:HA	1:A:203:PRO:HD2	1.91	0.40
1:A:311:GLN:O	1:A:314:TRP:HB2	2.21	0.40
1:B:12:ARG:NH2	1:B:106:ILE:HD12	2.36	0.40
1:B:349:LEU:HD23	1:B:393:LEU:HD22	2.03	0.40
1:B:429:GLU:HB3	1:B:432:LEU:HD12	2.03	0.40
1:A:377:HIS:HE1	1:A:536:TRP:CZ3	2.39	0.40
1:A:17:LEU:CD1	1:A:70:GLN:OE1	2.57	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:168:ILE:CG2	1:A:169:GLY:N	2.83	0.40
1:A:310:GLY:CA	1:A:313:ILE:HG12	2.51	0.40
1:A:453:TYR:O	1:A:456:GLN:N	2.54	0.40
1:B:387:PHE:O	1:B:393:LEU:HB2	2.21	0.40
1:A:12:ARG:HD3	1:A:12:ARG:N	2.36	0.40
1:A:61:LEU:HB3	1:A:202:LEU:HD21	2.04	0.40
1:A:147:ILE:HG23	1:A:153:ILE:C	2.42	0.40
1:A:243:HIS:O	1:A:247:ARG:HG2	2.21	0.40
1:B:179:ARG:NH1	1:B:181:GLU:CG	2.81	0.40
1:B:181:GLU:H	1:B:181:GLU:HG2	1.67	0.40
1:B:383:THR:OG1	1:B:443:LEU:CD2	2.70	0.40
1:B:476:SER:O	1:B:480:GLN:HG3	2.21	0.40
1:A:15:LEU:HD23	1:A:15:LEU:N	2.37	0.40
1:A:79:GLY:HA3	1:A:185:PHE:CD1	2.56	0.40
1:A:189:ASP:O	1:A:192:PHE:N	2.49	0.40
1:A:232:LEU:C	1:A:232:LEU:HD23	2.42	0.40
1:A:427:ALA:CB	1:A:512:LEU:HD21	2.51	0.40
1:B:158:TYR:O	1:B:162:LEU:HD12	2.20	0.40
1:B:223:TRP:CD1	1:B:223:TRP:N	2.90	0.40
1:B:235:ASP:HA	1:B:238:LEU:HB2	2.03	0.40
1:B:273:GLY:C	1:B:275:LEU:N	2.75	0.40
1:B:406:LYS:HB3	1:B:407:TYR:CD2	2.57	0.40
1:B:461:LEU:HD22	1:B:464:VAL:HG23	2.01	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	525/561 (94%)	409 (78%)	90 (17%)	26 (5%)	1	13
1	B	541/561 (96%)	444 (82%)	70 (13%)	27 (5%)	1	13

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	1066/1122 (95%)	853 (80%)	160 (15%)	53 (5%)	1	13

All (53) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	15	LEU
1	A	221	ILE
1	A	252	PRO
1	A	254	GLN
1	A	291	VAL
1	A	347	GLU
1	A	392	GLY
1	A	393	LEU
1	B	221	ILE
1	B	249	PHE
1	B	250	TYR
1	B	517	ILE
1	A	76	ASP
1	A	227	GLU
1	A	250	TYR
1	A	287	LEU
1	A	289	LYS
1	A	295	ALA
1	B	70	GLN
1	B	150	ASN
1	B	216	GLY
1	B	290	ASN
1	B	466	LYS
1	B	489	VAL
1	A	88	PRO
1	A	310	GLY
1	A	382	ASN
1	A	442	ALA
1	A	460	GLU
1	A	515	SER
1	B	110	CYS
1	B	218	LEU
1	B	239	LYS
1	B	293	LEU
1	B	390	ARG
1	B	393	LEU
1	A	69	ASP

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Mol	Chain	Res	Type
1	A	73	ALA
1	A	172	PRO
1	A	203	PRO
1	A	286	ASP
1	B	-4	SER
1	B	14	GLY
1	B	66	ASP
1	B	88	PRO
1	B	262	SER
1	B	274	CYS
1	A	89	ALA
1	B	252	PRO
1	B	487	ILE
1	B	48	GLY
1	B	240	VAL
1	B	212	GLY

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	447/488 (92%)	377 (84%)	70 (16%)	2	10
1	B	458/488 (94%)	384 (84%)	74 (16%)	2	9
All	All	905/976 (93%)	761 (84%)	144 (16%)	2	10

All (144) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	ARG
1	A	15	LEU
1	A	31	ASP
1	A	45	GLU
1	A	46	SER
1	A	52	VAL
1	A	58	ARG

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Mol	Chain	Res	Type
1	A	82	LEU
1	A	87	GLU
1	A	90	TYR
1	A	95	LEU
1	A	101	LEU
1	A	109	ASP
1	A	113	ILE
1	A	120	SER
1	A	121	ILE
1	A	123	SER
1	A	129	ASN
1	A	134	GLU
1	A	145	LEU
1	A	157	THR
1	A	170	LEU
1	A	177	ASP
1	A	184	THR
1	A	191	GLU
1	A	195	SER
1	A	204	THR
1	A	206	GLU
1	A	222	ASN
1	A	224	ARG
1	A	236	GLU
1	A	246	GLU
1	A	247	ARG
1	A	250	TYR
1	A	251	LEU
1	A	252	PRO
1	A	258	ASN
1	A	260	HIS
1	A	262	SER
1	A	271	ARG
1	A	275	LEU
1	A	280	PHE
1	A	290	ASN
1	A	302	MET
1	A	303	THR
1	A	308	ILE
1	A	309	THR
1	A	322	SER
1	A	331	MET

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Mol	Chain	Res	Type
1	A	335	ASP
1	A	346	ASN
1	A	347	GLU
1	A	349	LEU
1	A	379	THR
1	A	390	ARG
1	A	398	GLU
1	A	410	ASP
1	A	412	ASP
1	A	414	SER
1	A	443	LEU
1	A	447	LEU
1	A	456	GLN
1	A	461	LEU
1	A	471	GLU
1	A	507	LEU
1	A	512	LEU
1	A	514	ASN
1	A	523	CYS
1	A	528	GLU
1	A	536	TRP
1	B	8	VAL
1	B	9	ILE
1	B	43	ASP
1	B	46	SER
1	B	49	THR
1	B	58	ARG
1	B	62	ASP
1	B	75	THR
1	B	80	ARG
1	B	81	LEU
1	B	83	VAL
1	B	87	GLU
1	B	94	ARG
1	B	116	GLU
1	B	120	SER
1	B	121	ILE
1	B	123	SER
1	B	134	GLU
1	B	153	ILE
1	B	162	LEU
1	B	164	THR

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Mol	Chain	Res	Type
1	B	165	VAL
1	B	170	LEU
1	B	175	THR
1	B	177	ASP
1	B	184	THR
1	B	191	GLU
1	B	196	LEU
1	B	204	THR
1	B	228	THR
1	B	237	ARG
1	B	242	GLN
1	B	258	ASN
1	B	260	HIS
1	B	261	ASP
1	B	271	ARG
1	B	274	CYS
1	B	276	SER
1	B	280	PHE
1	B	283	SER
1	B	290	ASN
1	B	293	LEU
1	B	296	CYS
1	B	300	VAL
1	B	301	GLN
1	B	303	THR
1	B	308	ILE
1	B	309	THR
1	B	322	SER
1	B	330	ARG
1	B	335	ASP
1	B	346	ASN
1	B	352	SER
1	B	379	THR
1	B	383	THR
1	B	386	THR
1	B	390	ARG
1	B	412	ASP
1	B	414	SER
1	B	437	VAL
1	B	438	THR
1	B	447	LEU
1	B	456	GLN

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Mol	Chain	Res	Type
1	B	460	GLU
1	B	467	GLU
1	B	478	GLU
1	B	498	LEU
1	B	500	MET
1	B	503	LYS
1	B	507	LEU
1	B	511	SER
1	B	516	LEU
1	B	524	ARG
1	B	535	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	96	HIS
1	A	222	ASN
1	A	290	ASN
1	A	402	GLN
1	A	403	HIS
1	A	505	ASN
1	A	533	GLN
1	B	55	ASN
1	B	96	HIS
1	B	301	GLN
1	B	307	HIS
1	B	369	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

2 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	$\# Z > 2$
2	FAD	A	601	-	54,58,58	0.70	0	71,89,89	1.29	6 (8%)
2	FAD	B	601	-	54,58,58	0.86	1 (1%)	71,89,89	1.24	6 (8%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	FAD	A	601	-	-	3/30/50/50	0/6/6/6
2	FAD	B	601	-	-	3/30/50/50	0/6/6/6

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	601	FAD	PA-O3P	4.40	1.64	1.59

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	601	FAD	O3P-PA-O1A	-6.87	90.04	110.70
2	A	601	FAD	O3P-PA-O1A	-5.62	93.78	110.70
2	A	601	FAD	O3P-P-O1P	-3.50	100.18	110.70
2	B	601	FAD	O3P-P-O1P	-3.41	100.43	110.70
2	A	601	FAD	C2'-C1'-N10	3.35	126.03	110.20
2	A	601	FAD	O2P-P-O3P	3.03	115.46	107.27
2	A	601	FAD	C1'-C2'-C3'	2.85	117.39	109.66
2	A	601	FAD	O2A-PA-O3P	-2.54	100.41	107.27
2	B	601	FAD	C5A-C6A-N6A	2.30	123.81	120.31
2	B	601	FAD	C2'-C1'-N10	2.29	121.02	110.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	601	FAD	O2P-P-O1P	2.04	121.91	112.44
2	B	601	FAD	C1'-C2'-C3'	2.03	115.17	109.66

There are no chirality outliers.

All (6) torsion outliers are listed below:

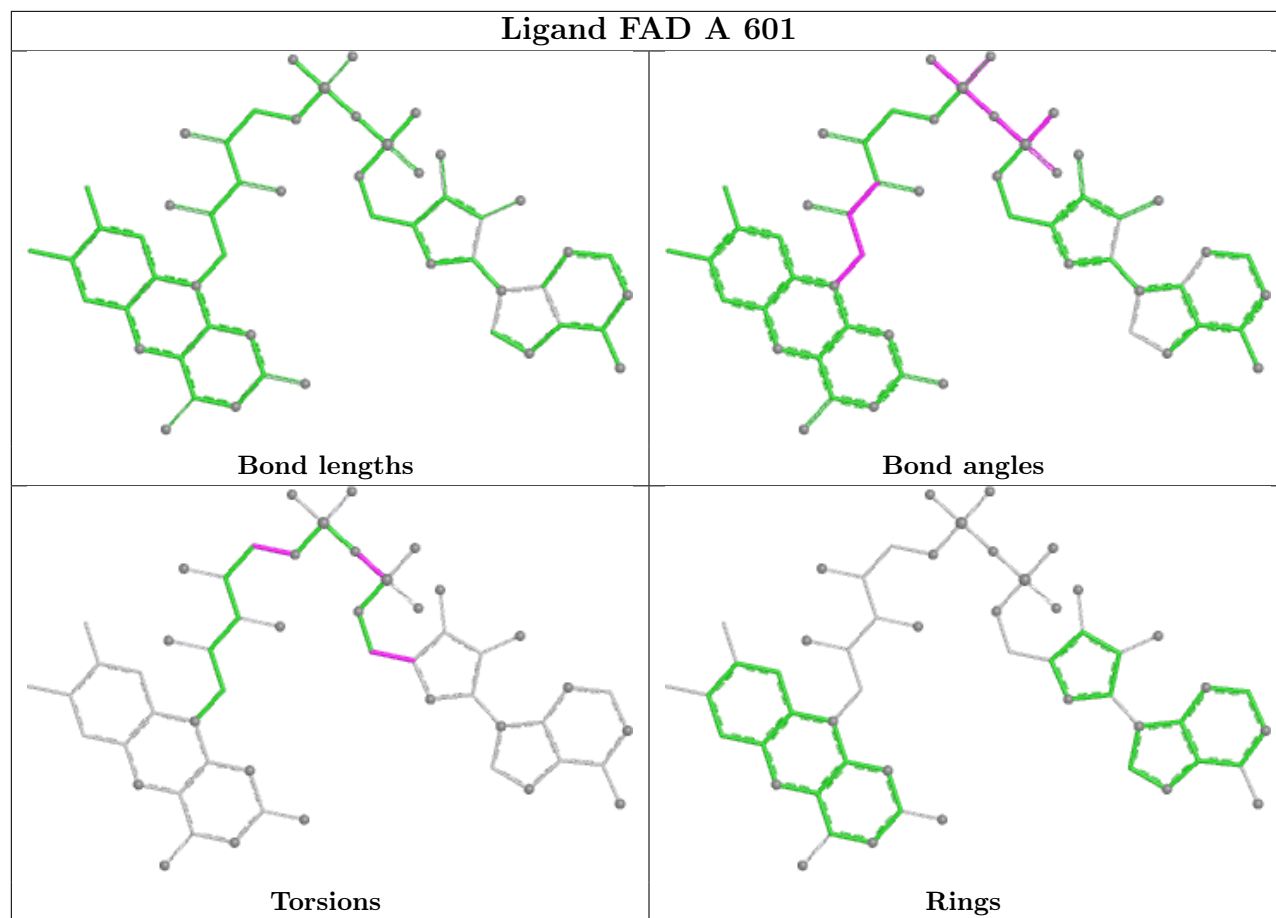
Mol	Chain	Res	Type	Atoms
2	A	601	FAD	C4'-C5'-O5'-P
2	B	601	FAD	C4'-C5'-O5'-P
2	A	601	FAD	P-O3P-PA-O1A
2	A	601	FAD	O4B-C4B-C5B-O5B
2	B	601	FAD	O4B-C4B-C5B-O5B
2	B	601	FAD	P-O3P-PA-O1A

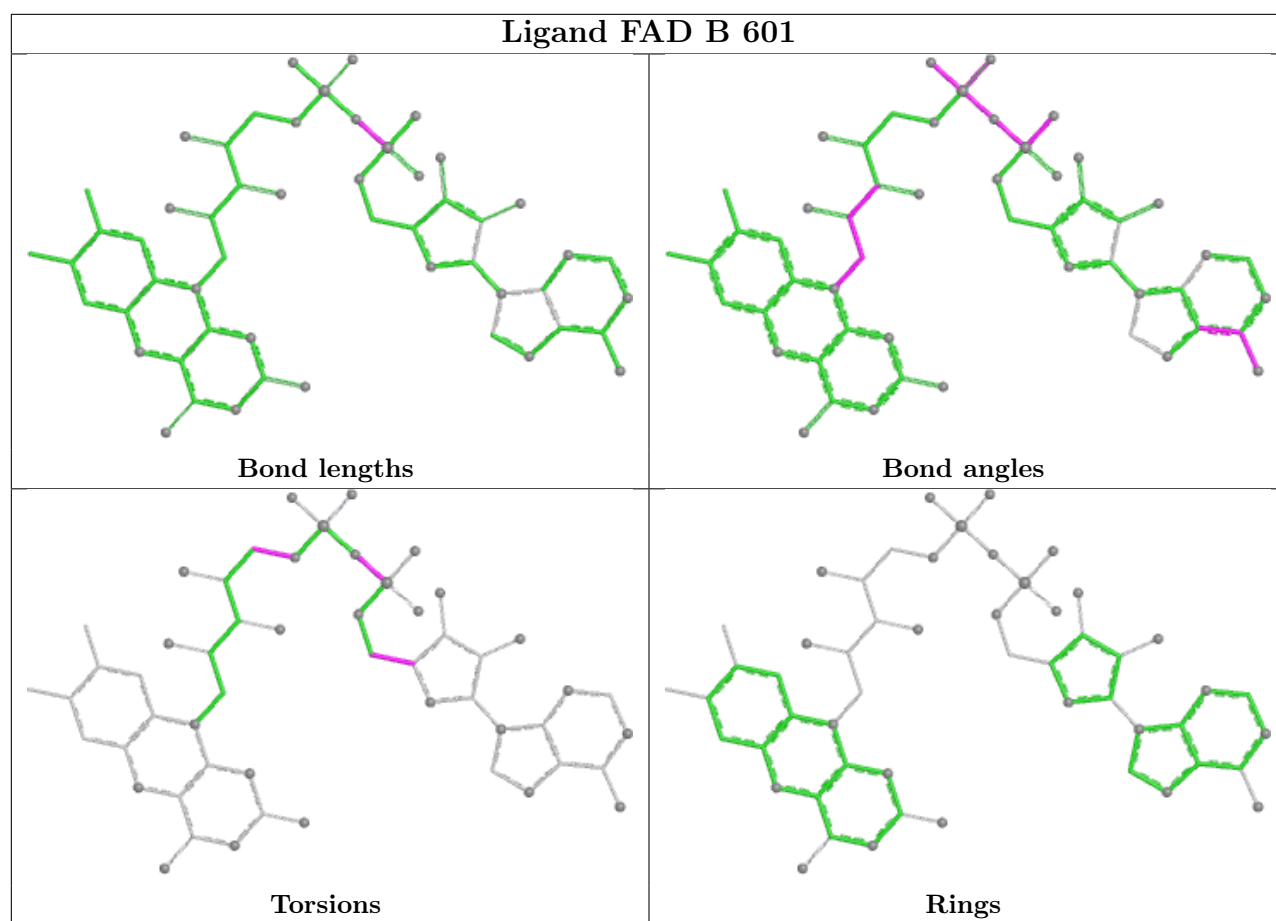
There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	601	FAD	3	0
2	B	601	FAD	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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	529/561 (94%)	-0.59	2 (0%) 89 81	23, 52, 87, 135	0
1	B	543/561 (96%)	-0.54	2 (0%) 89 81	17, 54, 92, 161	0
All	All	1072/1122 (95%)	-0.57	4 (0%) 89 81	17, 54, 90, 161	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	250	TYR	3.2
1	A	213	ASP	2.5
1	B	218	LEU	2.3
1	B	219	ALA	2.2

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 monosaccharides 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.

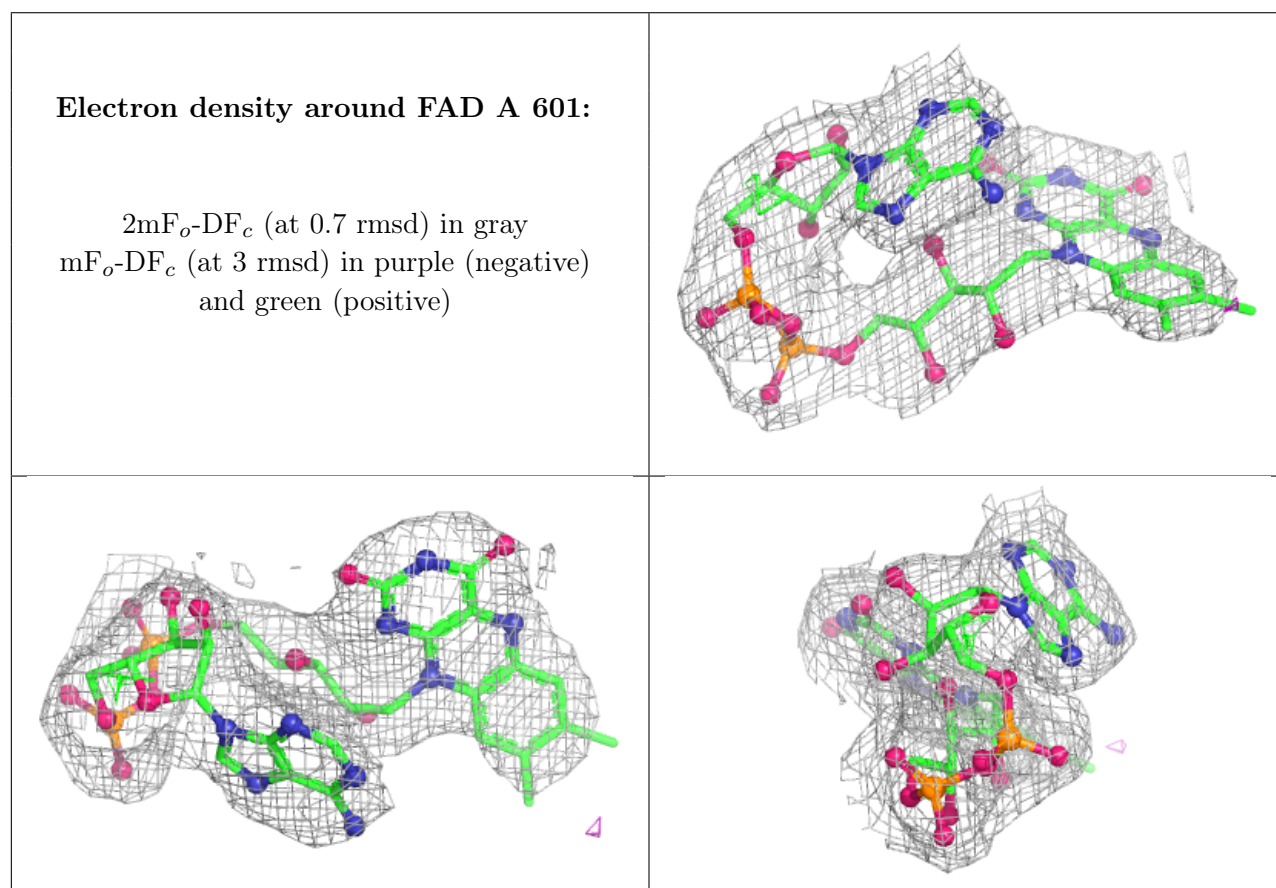
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	FAD	A	601	53/53	0.97	0.08	37,37,60,60	0

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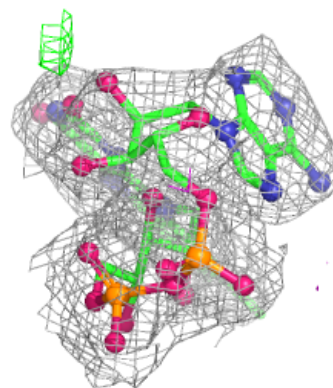
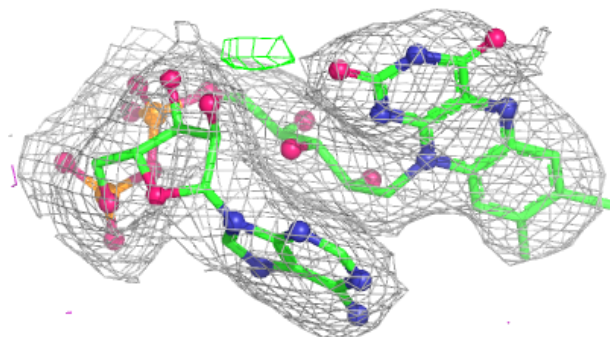
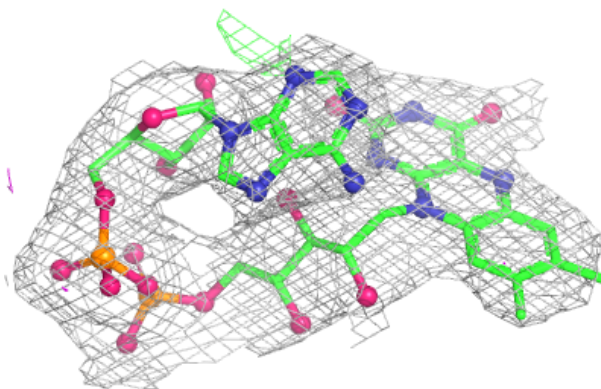
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	FAD	B	601	53/53	0.97	0.08	39,39,63,63	0

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 FAD B 601:

$2mF_o-DF_c$ (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.