



Full wwPDB EM Validation Report ⓘ

May 6, 2025 – 04:48 AM EDT

PDB ID : 7KY5 / pdb_00007ky5
EMDB ID : EMD-23068
Title : Structure of the *S. cerevisiae* phosphatidylcholine flippase Dnf2-Lem3 complex in the E2P transition state
Authors : Bai, L.; You, Q.; Jain, B.K.; Duan, H.D.; Kovach, A.; Graham, T.R.; Li, H.
Deposited on : 2020-12-07
Resolution : 3.98 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev118
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0rc1
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.43.1

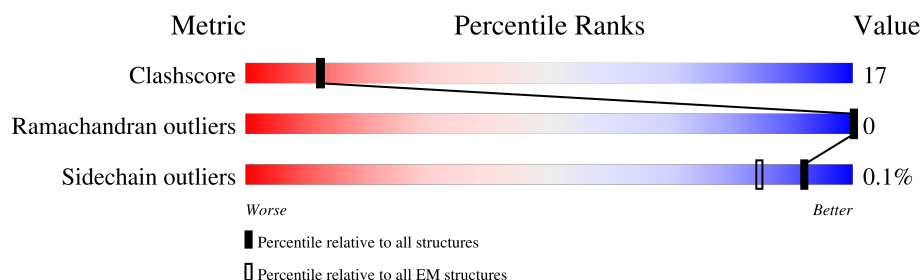
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.98 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1612	31% 47% 25% 28%
2	B	414	18% 59% 30% 11%
3	C	3	100%
3	D	3	100%

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 12483 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

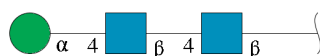
- Molecule 1 is a protein called Phospholipid-transporting ATPase DNF2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1165	9297	5976	1543	1730	48	0	0

- Molecule 2 is a protein called Alkylphosphocholine resistance protein LEM3.

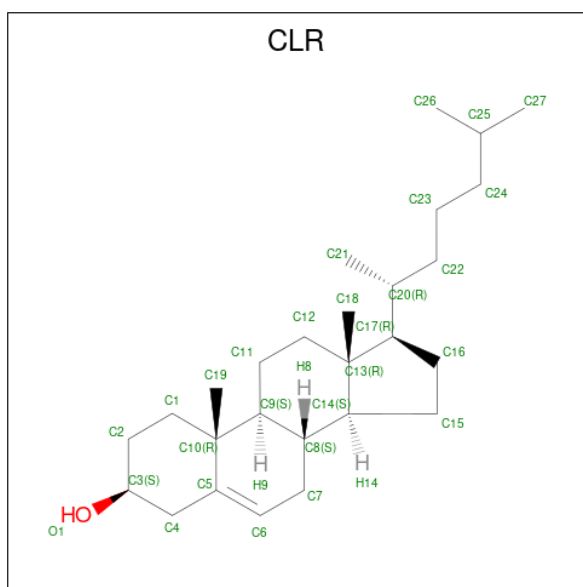
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	369	2974	1908	501	551	14	0	0

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



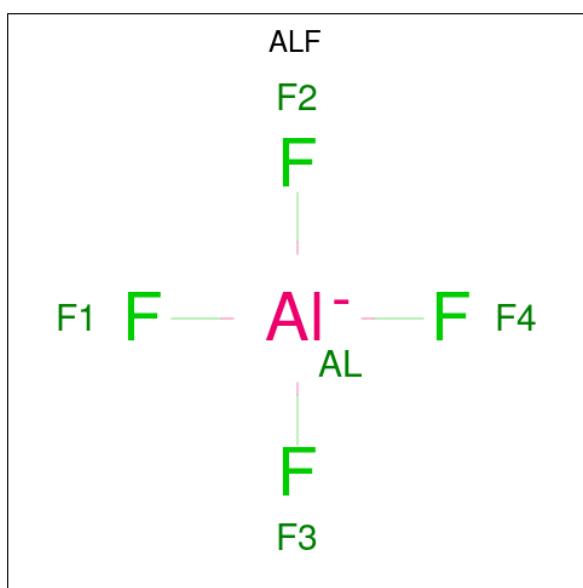
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	C	3	39	22	2	15	0	0
3	D	3	39	22	2	15	0	0

- Molecule 4 is CHOLESTEROL (CCD ID: CLR) (formula: C₂₇H₄₆O).



Mol	Chain	Residues	Atoms			AltConf
4	A	1	Total	C	O	0
			28	27	1	
4	A	1	Total	C	O	0
			28	27	1	

- Molecule 5 is TETRAFLUOROALUMINATE ION (CCD ID: ALF) (formula: AlF_4).

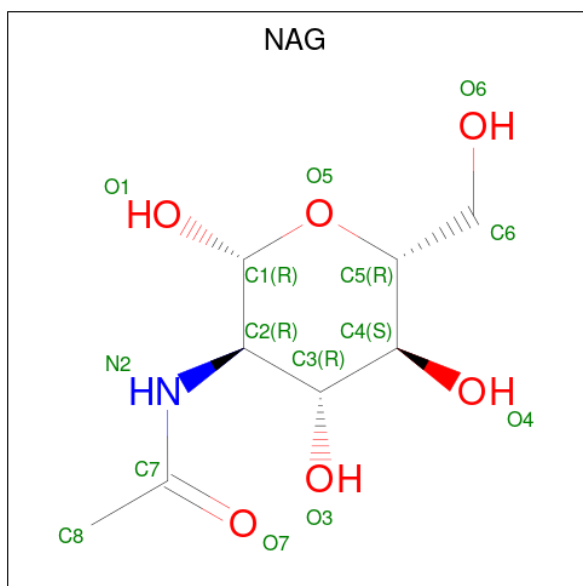


Mol	Chain	Residues	Atoms			AltConf
5	A	1	Total	Al	F	0
			5	1	4	

- Molecule 6 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
6	A	1	Total	Mg	0
			1	1	

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



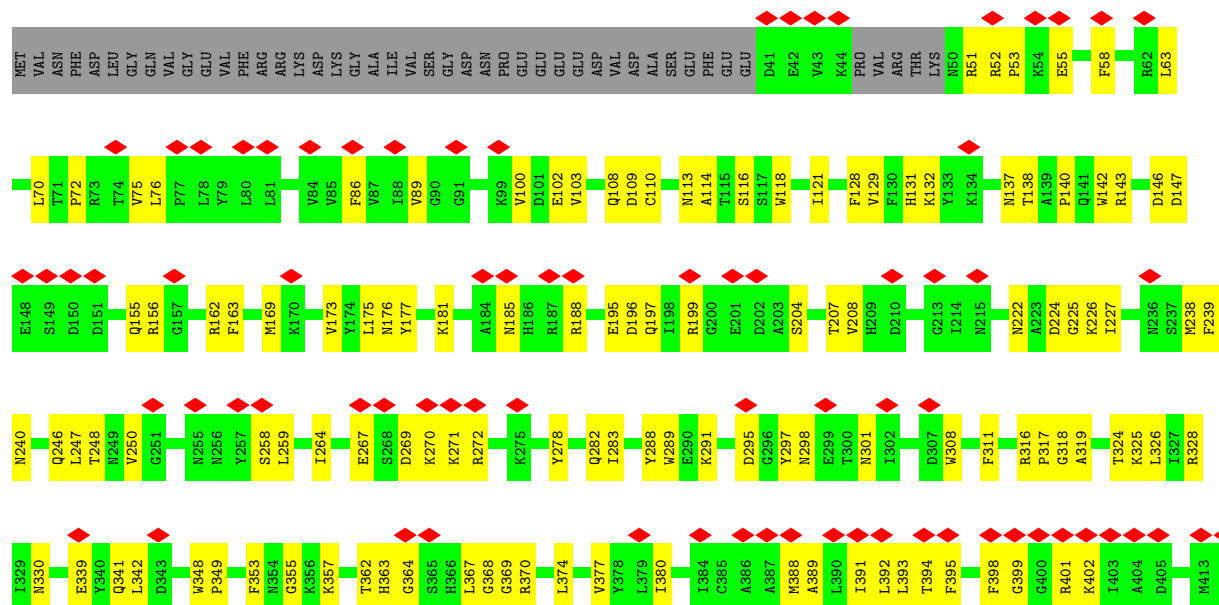
Mol	Chain	Residues	Atoms				AltConf
7	B	1	Total	C	N	O	0
			14	8	1	5	
7	B	1	Total	C	N	O	0
			14	8	1	5	
7	B	1	Total	C	N	O	0
			15	8	1	6	
7	B	1	Total	C	N	O	0
			14	8	1	5	
7	B	1	Total	C	N	O	0
			15	8	1	6	

ASN	ASN	ASP	A1417	V1340	F1260	G1187	A1119	G1046	N952	D919	G857	D788	E723	F644
PRO	LEU	PHE	Q1418	V1341	E1261	V1188	A1123	N1047	R983	S920	Y858	D789	F724	F644
LEU	PRO	GLY	P1419	T1342	Y1262	G1192	L1124	V1048	E984	V921	S959	L789	K725	W648
ARG	ARG	ILE	W1422	L1346	Y1263	G1193	N1126	L1049	E985	I922	F960	V790	K726	V649
SER	SER	SER	A1423	L1347	T1265	E1194	G1126	N1051	E986	R925	G862	V791	K727	I652
MET	LEU	ASP	V1424	G1347	F1267	G1195	E1127	D1052	E987	L926	S863	V792	I728	L653
ALA	ASP	ASP	V1427	L1348	F1268	G1196	E1128	L1056	D988	D927	S864	K794	N730	L657
THR	THR	THR	G1428	D1349	N1269	M1200	M1129	V1057	K989	R928	K865	V795	Y734	L658
SER	SER	THR	V1429	H1350	L1270	C1201	R1130	V990	T991	T929	K866	V796	G735	V658
GLY	GLY	PHE	L1430	R1351	A1271	S1202	R1131	V1058	T992	Q930	S867	V797	R736	P659
ASN	ASN	ASP	F1431	Y1352	A1272	D1203	K1132	K1069	D993	N931	S868	V798	I660	I660
LYS	LYS	VAL	C1432	F1354	T1273	Y1204	F1133	A1060	V993	A932	L868	V799	L742	S861
LEU	LEU	SER	G1433	G1355	S1274	A1205	L1136	S1061	E995	T934	V870	L800	A743	Y663
ARG	ARG	HIS	L1434	V1356	G1207	I1206	C1137	G1062	R996	R935	E871	K801	G744	Y664
THR	THR	SER	P1435	F1357	G1208	G1207	L1144	E1063	R997	L936	Q873	G802	E740	E667
SER	SER	GLN	R1436	V1358	F1209	F1209	K1141	D1064	E997	L937	G874	S903	A741	I668
GLU	GLU	THR	A1360	T1359	Y1211	Y1211	A1142	V1065	L998	E937	V875	S904	L742	I669
ILE	ILE	VAL	V1363	A1360	V1212	V1212	V1143	E1066	L1000	K938	Q876	G905	A743	I669
ARG	ARG	THR	F1368	V1369	V1216	V1216	L1144	E1067	L1001	T939	K877	D806	G744	Q673
GLY	GLY	GLY	Y1369	V1370	L1217	L1217	L1079	F1068	G1002	A940	E878	H814	L745	A674
ILE	ILE	ILE	F1371	F1371	L1218	L1218	K1082	G1069	I1006	L941	F879	F815	R746	I675
PRO	PRO	MET	Y1445	V1370	Y1219	Y1219	K1153	G1070	I1007	H942	Q880	F816	ARG	Y678
ALA	ALA	ASN	F1446	M1372	K1221	K1221	A1151	E1085	D1008	L943	V881	L832	LYS	V681
SER	SER	ILE	Y1447	E1373	W1222	W1222	Q1152	E1086	R1009	E945	N884	V884	GLY	V681
LEU	LEU	LEU	P1448	G1374	Y1224	Y1224	A1154	E1087	I1010	E947	N885	L816	V751	V681
ASN	ASN	ASN	D1450	Y1375	K1225	K1225	K1155	E1088	D1011	T948	E886	A818	D752	K687
LEU	LEU	THR	I1453	R1376	R1226	R1226	V1156	F1088	D1012	R952	N888	L819	V753	L688
ASP	ASP	GLY	Y1454	W1377	E1227	E1227	V1157	F1089	G1013	R955	F887	A820	E754	D689
THR	THR	GLN	R1455	F1380	A1228	A1228	K1158	G1089	V1014	C955	S890	L821	S755	Y690
VAL	VAL	SER	W1458	G1381	E1229	E1229	V1159	E1090	D1015	L957	R891	V825	E756	P691
ALA	ALA	ARG	F1463	L1383	Q1233	Q1233	M1090	E1091	S1017	A957	K892	V825	G757	C892
ARG	ARG	TYR	L1464	F1384	F1234	F1234	S1091	E1092	I1018	Q958	R893	K331	G758	P694
VAL	VAL	VAL	L1465	L1387	F1235	F1235	K1161	E1093	A1019	R959	M894	D832	R759	I699
SER	SER	SER	G1469	A1390	Y1236	Y1236	D1165	E1094	L1020	E960	I897	D833	E760	S700
LEU	LEU	THR	Y1470	V1391	K1237	K1237	V1166	E1095	A1022	L961	I898	P834	K761	D701
ASP	ASP	THR	P1471	G1394	N1238	N1238	T1168	E1096	E1023	T962	K999	P834	E762	D702
LEU	LEU	LEU	D1472	V1394	V1239	V1239	L1169	E1097	A1024	W963	I900	K335	I764	L703
GLY	GLY	GLY	P1473	G1394	I1240	I1240	A1170	E1098	G1025	S964	P901	K336	A765	G704
ILE	ILE	ARG	T1473	G1394	L1243	L1243	D1173	E1099	L1028	E965	G902	L837	I706	I706
ARG	ARG	ASP	D1474	L1398	F1246	F1246	G1174	E1100	W1029	Y966	THR	D838	D767	I709
ASN	ASN	GLN	P1475	W1399	W1247	W1247	S1175	K1101	V1030	E967	THR	I839	R768	F710
ALA	ALA	LEU	S1476	T1400	Y1248	Y1248	N1176	L1104	L1031	R968	LYS	K340	E769	S711
THR	THR	PRO	R1477	E1407	Q1323	Q1323	V1177	G1105	D1034	W969	ASP	Q842	T770	D712
VAL	VAL	VAL	P1478	F1408	M1252	M1252	D1177	L1106	K1035	S970	E908	S943	M771	K713
LEU	LEU	THR	R1479	Y1409	F1254	F1254	V1178	P1107	V1036	K971	P909	P944	I772	I772
THR	THR	THR	K1410	G1411	D1255	D1255	M1180	Q1108	E1037	T972	K910	D845	E774	D773
SER	SER	THR	P1331	P1331	G1256	G1256	Q1181	T1038	I1037	Y973	A911	E946	L775	L775
GLN	GLN	THR	A1412	A1412	S1257	S1257	Q1182	I1039	I1040	D974	L912	E946	R776	Q719
			V1415	V1415	Y1258	Y1258	F1111	I1110	N1041	V975	L913	S851	S777	N720
			F1416	F1416	L1259	L1259	A1112	V1113	F1044	A976	L914	T852	S779	N721
							I1114	I1114	S1045	A977	C915	A853	D780	W722
										S979	K916	R854	N781	M722
												Q855	T782	N722
												L856	Q783	F784

ARG
SER
ARG
ASP
ARG

• Molecule 2: Alkylphosphocholine resistance protein LEM3

Chain B: 

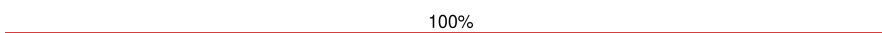


• Molecule 3: alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C: 

MAG1
MAG2
MAN3

• Molecule 3: alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D: 

MAG1
MAG2
MAN3

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	127442	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	64	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.037	Depositor
Minimum map value	-0.018	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.012	Depositor
Map size ($\text{\AA}$)	231.28, 231.28, 231.28	wwPDB
Map dimensions	280, 280, 280	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.826, 0.826, 0.826	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ALF, NAG, MAN, MG, CLR

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	0.15	0/9490	0.41	1/12865 (0.0%)
2	B	0.14	0/3055	0.36	0/4153
All	All	0.14	0/12545	0.40	1/17018 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	699	ILE	N-CA-C	5.49	115.15	106.32

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	9297	0	9301	332	0
2	B	2974	0	2868	115	0
3	C	39	0	34	3	0
3	D	39	0	32	3	0
4	A	56	0	92	2	0
5	A	5	0	0	0	0
6	A	1	0	0	0	0
7	B	72	0	69	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	12483	0	12396	419	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 17.

All (419) 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:1409:TYR:HD1	2:B:272:ARG:NH2	1.45	1.12
1:A:1127:GLU:HG2	1:A:1130:ARG:HH11	1.02	1.09
1:A:941:LEU:HA	1:A:944:GLU:OE1	1.54	1.08
1:A:941:LEU:HA	1:A:944:GLU:CD	1.78	1.08
1:A:1409:TYR:CD1	2:B:272:ARG:NH2	2.20	1.06
1:A:1127:GLU:HG2	1:A:1130:ARG:NH1	1.70	1.06
1:A:861:VAL:O	1:A:869:ILE:HB	1.56	1.06
1:A:1308:TRP:HD1	1:A:1312:LYS:HZ1	1.15	0.94
1:A:1127:GLU:CG	1:A:1130:ARG:NH1	2.32	0.92
1:A:941:LEU:O	1:A:944:GLU:HG2	1.77	0.84
1:A:1096:GLU:HA	1:A:1099:GLU:CD	2.04	0.82
1:A:1409:TYR:HD1	2:B:272:ARG:HH21	0.85	0.81
2:B:175:LEU:HB3	2:B:328:ARG:HB2	1.62	0.81
1:A:1410:LYS:CG	2:B:269:ASP:OD1	2.32	0.78
2:B:222:ASN:HD21	2:B:226:LYS:HB2	1.49	0.77
1:A:781:ASN:HB3	1:A:784:PHE:HB2	1.67	0.76
1:A:1237:LYS:HE3	1:A:1273:THR:HG23	1.70	0.73
1:A:468:SER:OG	1:A:507:ILE:CD1	2.38	0.72
1:A:557:LEU:HD21	1:A:560:THR:HB	1.70	0.72
1:A:888:ASN:HB2	1:A:891:ARG:HB2	1.70	0.71
1:A:1400:THR:HG21	1:A:1412:ALA:H	1.55	0.71
2:B:173:VAL:HB	2:B:330:ASN:HB3	1.72	0.71
1:A:1308:TRP:CD1	1:A:1312:LYS:HZ1	2.05	0.71
1:A:894:MET:HB3	1:A:916:LYS:HE3	1.73	0.70
1:A:735:GLY:H	1:A:793:SER:HB3	1.57	0.69
1:A:532:TRP:NE1	1:A:541:ARG:HE	1.89	0.69
1:A:690:TYR:HA	2:B:51:ARG:HH22	1.58	0.69
1:A:318:LEU:HD11	1:A:436:CYS:HB2	1.75	0.69
1:A:681:VAL:HG12	2:B:53:PRO:HB2	1.75	0.69
1:A:941:LEU:CA	1:A:944:GLU:OE1	2.38	0.69
2:B:102:GLU:HG3	2:B:129:VAL:HG22	1.75	0.69
1:A:681:VAL:HG11	2:B:55:GLU:HG2	1.73	0.69
1:A:627:ARG:HH12	2:B:188:ARG:HB3	1.58	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:694:PRO:HB3	1:A:1204:TYR:CE1	2.28	0.68
1:A:468:SER:OG	1:A:507:ILE:HD13	1.94	0.68
2:B:246:GLN:HA	2:B:258:SER:HA	1.76	0.68
1:A:602:PHE:HE1	1:A:658:VAL:HG21	1.59	0.68
1:A:285:LEU:HD22	1:A:660:ILE:HD12	1.77	0.67
1:A:501:ILE:HD12	1:A:507:ILE:HG12	1.75	0.67
1:A:322:LYS:H	1:A:322:LYS:HD2	1.60	0.66
1:A:1430:LEU:HD11	2:B:86:PHE:HD2	1.59	0.66
2:B:297:TYR:HA	2:B:301:ASN:HD21	1.60	0.66
2:B:238:MET:HB3	2:B:289:TRP:HE1	1.61	0.66
2:B:86:PHE:HA	2:B:89:VAL:HG12	1.78	0.66
1:A:1234:PHE:HD2	1:A:1237:LYS:HD3	1.60	0.65
1:A:211:ASN:HB2	1:A:511:LYS:HA	1.78	0.65
1:A:463:ASP:HB2	1:A:569:PHE:HB2	1.79	0.65
1:A:260:TYR:HA	1:A:263:ILE:HG12	1.78	0.65
2:B:108:GLN:HB3	2:B:357:LYS:H	1.61	0.65
1:A:1127:GLU:HG3	1:A:1130:ARG:NH1	2.12	0.65
1:A:1096:GLU:HA	1:A:1099:GLU:OE1	1.97	0.64
1:A:724:PHE:HB3	1:A:852:THR:HG21	1.78	0.64
1:A:481:LYS:NZ	1:A:486:GLU:O	2.29	0.64
1:A:520:HIS:HD2	1:A:522:ASN:HD22	1.44	0.64
1:A:927:ASP:O	1:A:931:ASN:ND2	2.31	0.64
1:A:1350:HIS:HB3	1:A:1353:PHE:HD2	1.63	0.64
1:A:532:TRP:HE1	1:A:541:ARG:HE	1.43	0.64
2:B:100:VAL:O	2:B:370:ARG:NH1	2.30	0.64
2:B:114:ALA:HB2	2:B:142:TRP:CZ3	2.33	0.64
1:A:770:THR:HG23	1:A:794:LYS:HD3	1.80	0.64
1:A:1369:TYR:HE1	1:A:1436:ARG:HG2	1.63	0.63
2:B:121:ILE:HG12	2:B:142:TRP:CD1	2.33	0.63
1:A:1410:LYS:HG3	2:B:269:ASP:OD1	1.97	0.63
2:B:226:LYS:HD2	2:B:282:GLN:HA	1.80	0.63
1:A:232:ASN:ND2	1:A:443:TRP:O	2.29	0.62
2:B:52:ARG:NH1	2:B:55:GLU:OE2	2.32	0.62
1:A:922:ILE:HG13	1:A:955:CYS:HB2	1.81	0.62
1:A:900:ILE:O	1:A:909:PRO:HA	2.00	0.62
2:B:246:GLN:HE22	2:B:248:THR:HG23	1.65	0.61
1:A:1375:TYR:O	1:A:1455:ARG:NH1	2.33	0.61
1:A:1018:ILE:HG23	1:A:1028:LEU:HD21	1.82	0.61
1:A:1130:ARG:HD2	1:A:1159:LEU:HD13	1.83	0.61
1:A:1338:ASN:HB2	1:A:1340:VAL:HG12	1.82	0.61
1:A:1419:PRO:HA	1:A:1422:TRP:HD1	1.66	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1154:ALA:HB2	1:A:1179:ALA:HB1	1.83	0.61
1:A:726:LYS:HE2	1:A:736:ARG:HA	1.84	0.60
2:B:240:ASN:H	2:B:348:TRP:HB2	1.66	0.60
1:A:207:THR:HA	1:A:514:VAL:O	2.01	0.60
1:A:1226:ARG:HG2	1:A:1284:ASP:HB3	1.82	0.60
1:A:821:LEU:HD23	1:A:914:ILE:HD11	1.82	0.60
1:A:295:LYS:NZ	1:A:296:ASP:OD1	2.34	0.60
1:A:699:ILE:O	1:A:699:ILE:HG22	2.00	0.60
1:A:1343:GLU:H	2:B:368:GLY:HA2	1.66	0.60
2:B:185:ASN:ND2	2:B:319:ALA:O	2.35	0.60
1:A:582:VAL:HG22	1:A:582:VAL:O	2.01	0.59
2:B:238:MET:HE2	2:B:311:PHE:HD1	1.68	0.59
1:A:1252:ASN:ND2	2:B:185:ASN:O	2.34	0.59
1:A:772:ILE:HG12	1:A:789:LEU:HD23	1.85	0.59
1:A:1187:GLY:HA3	1:A:1203:ASP:H	1.68	0.59
1:A:1260:PHE:HB3	1:A:1264:TYR:HD2	1.68	0.59
1:A:1375:TYR:HB3	1:A:1455:ARG:HH12	1.67	0.59
1:A:1261:GLU:OE2	1:A:1399:TRP:NE1	2.35	0.59
1:A:468:SER:CB	1:A:507:ILE:CD1	2.80	0.59
1:A:806:ASP:OD1	1:A:807:HIS:N	2.35	0.59
1:A:1125:ASN:OD1	1:A:1126:GLY:N	2.35	0.58
1:A:929:THR:HG23	1:A:930:GLN:OE1	2.03	0.58
2:B:146:ASP:OD1	2:B:156:ARG:NH2	2.36	0.58
1:A:980:VAL:HG12	1:A:981:THR:H	1.68	0.58
1:A:1018:ILE:HG21	1:A:1048:VAL:HG22	1.85	0.58
2:B:155:GLN:HG3	2:B:349:PRO:HA	1.85	0.58
1:A:796:ILE:HD11	1:A:816:LEU:HD11	1.85	0.58
2:B:208:VAL:HG21	2:B:227:ILE:HD11	1.85	0.57
1:A:1331:PRO:HG2	1:A:1358:VAL:HG12	1.85	0.57
1:A:479:GLU:OE2	1:A:489:LEU:HD13	2.03	0.57
1:A:825:VAL:HG11	1:A:850:VAL:HG21	1.85	0.57
1:A:1153:LYS:HA	1:A:1156:VAL:HG12	1.86	0.57
1:A:1348:LEU:O	1:A:1349:ASP:CB	2.52	0.57
1:A:821:LEU:HD21	1:A:898:ILE:HG21	1.87	0.56
2:B:267:GLU:HA	2:B:270:LYS:HE2	1.87	0.56
1:A:1056:LEU:HB2	1:A:1113:VAL:HG12	1.86	0.56
2:B:301:ASN:HD22	3:D:1:NAG:C7	2.18	0.56
1:A:468:SER:OG	1:A:507:ILE:HD11	2.05	0.56
1:A:860:PHE:HE1	1:A:868:LEU:HB3	1.69	0.56
1:A:605:LEU:HD12	1:A:657:LEU:HD12	1.87	0.56
1:A:678:TYR:HE1	1:A:693:THR:HG22	1.70	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1187:GLY:O	1:A:1204:TYR:N	2.29	0.56
1:A:772:ILE:O	1:A:776:ARG:HG2	2.06	0.56
1:A:1096:GLU:O	1:A:1099:GLU:HG2	2.06	0.56
2:B:271:LYS:HA	2:B:271:LYS:HE3	1.88	0.56
2:B:394:THR:OG1	2:B:398:PHE:CD2	2.59	0.56
1:A:468:SER:CB	1:A:507:ILE:HD11	2.36	0.56
1:A:754:GLU:HB2	1:A:1475:PRO:HB2	1.87	0.55
1:A:1323:GLN:HE22	1:A:1432:CYS:HA	1.70	0.55
1:A:694:PRO:HB3	1:A:1204:TYR:HE1	1.70	0.55
1:A:936:LEU:HG	1:A:1000:LEU:HD21	1.89	0.55
1:A:1038:THR:HA	1:A:1041:ASN:HD21	1.71	0.55
1:A:935:LEU:HA	1:A:938:LYS:HE2	1.89	0.54
1:A:1374:GLN:OE1	1:A:1376:ARG:N	2.39	0.54
2:B:401:ARG:NH2	2:B:402:LYS:O	2.40	0.54
1:A:965:GLU:O	1:A:968:ARG:HD3	2.07	0.54
1:A:1127:GLU:CG	1:A:1130:ARG:HH11	1.87	0.54
1:A:474:GLY:O	1:A:494:SER:N	2.40	0.54
1:A:1300:ARG:HA	1:A:1303:ILE:HD12	1.88	0.54
1:A:1234:PHE:CD2	1:A:1237:LYS:HD3	2.41	0.54
1:A:1278:ILE:O	1:A:1282:VAL:HG12	2.08	0.54
1:A:1238:ASN:OD1	1:A:1239:VAL:N	2.41	0.54
1:A:972:THR:HA	1:A:975:VAL:HG12	1.88	0.53
2:B:196:ASP:OD1	2:B:197:GLN:N	2.42	0.53
1:A:477:TYR:HB3	1:A:489:LEU:HD12	1.91	0.53
2:B:248:THR:OG1	2:B:341:GLN:O	2.24	0.53
1:A:457:ASN:HA	1:A:558:ARG:HH21	1.72	0.53
1:A:1350:HIS:CD2	2:B:317:PRO:HD2	2.43	0.53
1:A:249:ILE:O	1:A:253:PHE:N	2.37	0.53
1:A:1400:THR:OG1	1:A:1411:GLY:N	2.32	0.53
1:A:1352:TYR:HB3	1:A:1408:PHE:CZ	2.44	0.53
2:B:278:TYR:HD1	2:B:282:GLN:HE21	1.57	0.53
1:A:211:ASN:ND2	1:A:510:THR:O	2.42	0.52
1:A:1118:ASP:OD1	1:A:1119:ALA:N	2.42	0.52
1:A:1212:VAL:O	1:A:1216:VAL:HG12	2.09	0.52
1:A:549:ASN:O	1:A:549:ASN:ND2	2.43	0.52
1:A:1304:LEU:HB2	1:A:1306:LYS:HZ2	1.75	0.52
1:A:1371:PHE:O	1:A:1377:TRP:NE1	2.42	0.52
1:A:1350:HIS:HB3	1:A:1353:PHE:CD2	2.42	0.52
1:A:653:LEU:HD22	1:A:1256:GLY:HA2	1.92	0.52
1:A:1430:LEU:HD11	2:B:86:PHE:CD2	2.42	0.52
2:B:140:PRO:HB3	2:B:163:PHE:HA	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:176:ASN:OD1	2:B:326:LEU:HA	2.09	0.51
1:A:1448:PRO:HB2	1:A:1453:ILE:HD11	1.92	0.51
1:A:437:ARG:HE	1:A:438:PHE:H	1.58	0.51
1:A:594:LEU:HD21	1:A:662:LEU:HD21	1.92	0.51
1:A:1140:CYS:SG	1:A:1141:LYS:N	2.82	0.51
1:A:1200:MET:HA	1:A:1200:MET:HE3	1.93	0.51
1:A:447:LYS:HD3	1:A:448:VAL:N	2.26	0.51
2:B:110:CYS:HA	2:B:142:TRP:HZ3	1.76	0.51
2:B:291:LYS:HE2	3:C:2:NAG:C6	2.40	0.51
1:A:1124:LEU:O	1:A:1130:ARG:NH2	2.38	0.51
1:A:718:THR:OG1	1:A:1009:ARG:O	2.26	0.51
1:A:925:ARG:HH21	1:A:992:ASP:HA	1.76	0.50
1:A:704:GLY:HA3	1:A:1224:TYR:HB2	1.92	0.50
1:A:783:GLN:H	1:A:854:ARG:NH1	2.09	0.50
1:A:1235:PHE:HD2	1:A:1313:PHE:CZ	2.28	0.50
1:A:477:TYR:HE2	1:A:491:VAL:HG12	1.75	0.50
1:A:1110:ASN:H	1:A:1141:LYS:HE2	1.76	0.50
1:A:1298:LEU:O	1:A:1301:VAL:HG22	2.10	0.50
1:A:1341:VAL:HA	2:B:368:GLY:HA3	1.93	0.50
1:A:464:MET:HE2	1:A:464:MET:HA	1.94	0.50
2:B:316:ARG:O	2:B:325:LYS:NZ	2.35	0.50
1:A:1410:LYS:HG2	2:B:269:ASP:OD1	2.12	0.50
2:B:116:SER:O	2:B:143:ARG:NH2	2.45	0.50
2:B:297:TYR:HA	2:B:301:ASN:ND2	2.26	0.50
1:A:710:PHE:HD1	1:A:1029:TRP:HB2	1.76	0.50
2:B:308:TRP:CD1	2:B:311:PHE:H	2.30	0.50
1:A:462:ALA:HA	1:A:553:ARG:HD3	1.94	0.50
1:A:814:HIS:CD2	1:A:1001:LEU:HD22	2.47	0.50
1:A:484:ASP:OD1	1:A:485:GLY:N	2.44	0.49
1:A:507:ILE:HG22	1:A:507:ILE:O	2.12	0.49
1:A:745:LEU:HD12	1:A:746:ARG:HG2	1.94	0.49
1:A:703:LEU:O	1:A:1299:TYR:OH	2.29	0.49
1:A:939:THR:O	1:A:943:LEU:HD23	2.12	0.49
1:A:1012:ASP:N	1:A:1012:ASP:OD1	2.44	0.49
1:A:1330:PHE:HE1	1:A:1427:VAL:HG22	1.78	0.49
2:B:76:LEU:HG	2:B:393:LEU:HD21	1.95	0.49
1:A:520:HIS:CD2	1:A:522:ASN:HD22	2.29	0.49
1:A:706:ILE:HD12	1:A:1169:LEU:HB2	1.95	0.49
1:A:1079:LEU:HA	1:A:1082:LYS:HE2	1.94	0.49
1:A:1157:VAL:HA	1:A:1160:VAL:HG12	1.95	0.49
1:A:1013:GLY:O	1:A:1017:SER:OG	2.30	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:891:ARG:HH11	1:A:893:ARG:HG3	1.78	0.49
3:D:1:NAG:H4	3:D:2:NAG:H2	1.63	0.49
1:A:882:LEU:HD11	1:A:899:LYS:HB2	1.95	0.49
1:A:1101:LYS:NZ	1:A:1165:ASP:OD1	2.45	0.49
1:A:1137:CYS:HB2	1:A:1143:VAL:HG21	1.95	0.49
2:B:121:ILE:HA	2:B:142:TRP:NE1	2.28	0.49
1:A:259:ILE:O	1:A:263:ILE:HG23	2.12	0.48
1:A:1252:ASN:ND2	1:A:1257:SER:OG	2.46	0.48
2:B:113:ASN:HB2	2:B:142:TRP:HH2	1.77	0.48
1:A:1450:ASP:O	1:A:1454:VAL:HG13	2.13	0.48
1:A:891:ARG:HE	1:A:893:ARG:HG3	1.77	0.48
1:A:1182:GLN:NE2	1:A:1201:CYS:SG	2.86	0.48
1:A:306:LEU:O	1:A:309:GLU:HG3	2.14	0.48
1:A:726:LYS:HA	1:A:734:TYR:O	2.13	0.48
1:A:1348:LEU:O	1:A:1349:ASP:HB3	2.14	0.48
1:A:911:ALA:HB3	1:A:961:LEU:HB2	1.96	0.48
1:A:649:VAL:HA	1:A:652:ILE:HG22	1.96	0.48
1:A:1128:GLU:HG3	1:A:1132:LYS:HE2	1.95	0.48
1:A:1280:LEU:O	1:A:1284:ASP:HB2	2.13	0.48
1:A:867:GLY:H	1:A:881:VAL:HG12	1.78	0.48
1:A:887:PHE:HB2	1:A:894:MET:HB2	1.94	0.48
1:A:1014:VAL:O	1:A:1018:ILE:HG12	2.13	0.48
1:A:1176:ASN:OD1	1:A:1177:ASP:N	2.46	0.48
2:B:103:VAL:HG23	2:B:128:PHE:CD1	2.48	0.48
1:A:507:ILE:CD1	1:A:564:MET:HE2	2.44	0.48
1:A:980:VAL:HG12	1:A:981:THR:N	2.27	0.48
2:B:110:CYS:HA	2:B:142:TRP:CZ3	2.49	0.48
1:A:288:ILE:HG22	1:A:664:ILE:HD12	1.96	0.48
1:A:1034:ASP:OD1	1:A:1034:ASP:N	2.47	0.48
1:A:1169:LEU:HD11	1:A:1188:VAL:HG12	1.96	0.47
2:B:195:GLU:OE1	2:B:199:ARG:NH1	2.41	0.47
1:A:814:HIS:HE1	1:A:912:LEU:HD21	1.79	0.47
1:A:1353:PHE:HA	1:A:1356:VAL:HG12	1.96	0.47
1:A:1229:GLU:O	1:A:1233:GLN:HG2	2.14	0.47
1:A:1400:THR:HG21	1:A:1412:ALA:N	2.28	0.47
2:B:162:ARG:HG2	2:B:341:GLN:HB2	1.97	0.47
2:B:391:ILE:HG13	2:B:395:PHE:CE2	2.50	0.47
1:A:265:LEU:HD11	1:A:285:LEU:HD23	1.95	0.47
1:A:712:ASP:OD1	1:A:713:LYS:N	2.42	0.47
1:A:1208:GLN:HE21	1:A:1210:ARG:HB3	1.80	0.47
1:A:1223:CYS:HA	1:A:1226:ARG:HE	1.79	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1308:TRP:HD1	1:A:1312:LYS:NZ	1.99	0.47
1:A:1341:VAL:HG13	1:A:1341:VAL:O	2.15	0.47
1:A:1444:LYS:HG3	2:B:70:LEU:HD11	1.97	0.47
1:A:859:SER:OG	1:A:871:GLU:HB2	2.15	0.47
1:A:897:ILE:HG13	1:A:913:LEU:HD13	1.97	0.47
1:A:937:GLU:N	1:A:937:GLU:OE1	2.46	0.47
1:A:1050:ASN:ND2	1:A:1052:ASP:OD1	2.48	0.47
4:A:1702:CLR:H183	4:A:1702:CLR:H20	1.79	0.47
2:B:291:LYS:HE2	3:C:2:NAG:H61	1.96	0.47
1:A:678:TYR:CE1	1:A:693:THR:HG22	2.49	0.47
1:A:796:ILE:HA	1:A:799:ASP:OD2	2.15	0.47
1:A:854:ARG:NH2	1:A:854:ARG:O	2.48	0.47
1:A:551:LEU:HD23	1:A:552:LEU:O	2.15	0.47
1:A:1424:VAL:HA	1:A:1427:VAL:HG12	1.97	0.47
1:A:1342:THR:HB	1:A:1348:LEU:HD12	1.97	0.47
1:A:1409:TYR:CB	2:B:272:ARG:HH21	2.27	0.47
2:B:181:LYS:HB2	2:B:355:GLY:HA2	1.96	0.47
2:B:298:ASN:H	2:B:301:ASN:ND2	2.13	0.46
1:A:814:HIS:HD2	1:A:1001:LEU:HD22	1.79	0.46
2:B:102:GLU:HG3	2:B:129:VAL:CG2	2.45	0.46
2:B:391:ILE:HA	2:B:394:THR:HG22	1.98	0.46
1:A:1058:VAL:HG22	1:A:1079:LEU:HD21	1.96	0.46
1:A:1237:LYS:NZ	1:A:1274:SER:HA	2.30	0.46
2:B:388:MET:HA	2:B:391:ILE:HG22	1.97	0.46
1:A:1206:ILE:HD13	1:A:1212:VAL:HG23	1.97	0.46
1:A:1409:TYR:CD1	2:B:272:ARG:CZ	2.97	0.46
1:A:1352:TYR:CD2	1:A:1407:GLU:HG2	2.50	0.46
1:A:1410:LYS:HG3	2:B:269:ASP:CG	2.41	0.46
1:A:1435:PRO:O	1:A:1439:ILE:HG12	2.15	0.46
1:A:474:GLY:HA3	1:A:494:SER:HB3	1.98	0.46
1:A:938:LYS:O	1:A:941:LEU:HG	2.16	0.46
1:A:1165:ASP:OD1	1:A:1165:ASP:N	2.48	0.46
1:A:457:ASN:HA	1:A:558:ARG:NH2	2.31	0.46
1:A:1058:VAL:N	1:A:1114:ILE:O	2.31	0.46
1:A:1268:TYR:HA	1:A:1272:PHE:CD2	2.51	0.46
1:A:520:HIS:HD2	1:A:522:ASN:ND2	2.12	0.45
1:A:771:MET:HE3	1:A:775:LEU:HD21	1.97	0.45
1:A:1282:VAL:HG22	1:A:1283:LEU:HD22	1.98	0.45
1:A:1383:LEU:O	1:A:1387:LEU:HD23	2.16	0.45
1:A:1085:ARG:NE	1:A:1091:SER:OG	2.49	0.45
1:A:464:MET:HB3	1:A:551:LEU:HB3	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:942:HIS:O	1:A:945:GLU:HG2	2.15	0.45
2:B:377:VAL:HA	2:B:380:ILE:HG22	1.98	0.45
2:B:247:LEU:HD21	2:B:259:LEU:HD11	1.98	0.45
1:A:322:LYS:HD2	1:A:322:LYS:N	2.28	0.45
1:A:758:ARG:O	1:A:762:GLU:HG2	2.16	0.45
1:A:854:ARG:NH2	1:A:859:SER:HB3	2.32	0.45
1:A:1124:LEU:HD12	1:A:1130:ARG:HG2	1.98	0.45
1:A:1234:PHE:HA	1:A:1237:LYS:HD3	1.99	0.45
1:A:1339:MET:HB2	2:B:324:THR:HG22	1.97	0.45
2:B:109:ASP:OD1	2:B:109:ASP:N	2.48	0.45
2:B:118:TRP:CD2	2:B:143:ARG:HD3	2.52	0.45
1:A:1161:LYS:HZ1	1:A:1167:MET:HA	1.82	0.45
2:B:169:MET:SD	2:B:363:HIS:HB2	2.57	0.45
2:B:295:ASP:OD2	2:B:295:ASP:N	2.48	0.45
1:A:1248:TYR:HA	1:A:1328:PHE:CE2	2.51	0.45
4:A:1701:CLR:H221	4:A:1701:CLR:H162	1.57	0.45
2:B:288:TYR:HB3	3:C:1:NAG:H62	1.98	0.45
2:B:362:THR:HG22	2:B:364:GLY:H	1.81	0.45
1:A:259:ILE:HG13	1:A:260:TYR:CD1	2.52	0.44
1:A:1173:ASP:OD1	1:A:1195:GLY:HA3	2.17	0.44
1:A:1226:ARG:HD2	1:A:1281:ALA:O	2.16	0.44
1:A:284:PRO:HA	1:A:287:VAL:HG22	1.98	0.44
1:A:477:TYR:CE2	1:A:491:VAL:HG12	2.52	0.44
1:A:959:ARG:HB2	1:A:998:LEU:HD23	1.99	0.44
1:A:1235:PHE:HD2	1:A:1313:PHE:CE2	2.35	0.44
1:A:1350:HIS:NE2	1:A:1407:GLU:OE2	2.50	0.44
1:A:710:PHE:CD1	1:A:1029:TRP:HB2	2.52	0.44
1:A:545:VAL:HG13	1:A:549:ASN:HB3	2.00	0.44
1:A:689:ASP:O	2:B:51:ARG:NH2	2.51	0.44
1:A:794:LYS:O	1:A:797:VAL:HG22	2.17	0.44
1:A:913:LEU:O	1:A:958:GLN:HA	2.17	0.44
1:A:1016:ASP:OD1	1:A:1017:SER:N	2.51	0.44
1:A:1150:PRO:HA	1:A:1153:LYS:HE2	1.98	0.44
1:A:287:VAL:HA	1:A:290:ILE:HG12	1.98	0.44
1:A:867:GLY:N	1:A:881:VAL:HG12	2.33	0.44
1:A:1031:LEU:HD22	1:A:1145:CYS:HB2	2.00	0.44
2:B:222:ASN:OD1	2:B:226:LYS:N	2.50	0.44
1:A:724:PHE:O	1:A:790:THR:OG1	2.33	0.44
1:A:1458:TRP:HD1	1:A:1463:PHE:HB2	1.82	0.44
2:B:298:ASN:H	2:B:301:ASN:HD21	1.66	0.44
1:A:727:CYS:SG	1:A:734:TYR:HB2	2.58	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:275:VAL:HG23	1:A:648:TRP:HE1	1.83	0.43
1:A:288:ILE:HG13	1:A:289:VAL:N	2.33	0.43
1:A:468:SER:CB	1:A:507:ILE:HD13	2.47	0.43
1:A:590:ILE:HG13	1:A:1308:TRP:CH2	2.53	0.43
1:A:859:SER:HG	1:A:871:GLU:HB2	1.83	0.43
1:A:1219:HIS:O	1:A:1220:GLY:C	2.60	0.43
2:B:177:TYR:HE2	2:B:239:PHE:CE2	2.36	0.43
1:A:593:GLU:HB2	1:A:1308:TRP:CH2	2.53	0.43
1:A:690:TYR:OH	1:A:1205:ALA:HB3	2.18	0.43
2:B:72:PRO:HA	2:B:75:VAL:HG22	1.99	0.43
1:A:1088:PHE:HB2	1:A:1090:MET:HE3	1.99	0.43
2:B:301:ASN:HB3	3:D:1:NAG:H2	2.01	0.43
1:A:664:ILE:O	1:A:667:GLU:HG3	2.18	0.43
1:A:774:GLU:O	1:A:778:MET:HG3	2.18	0.43
1:A:1093:SER:HB3	1:A:1131:ARG:HD2	1.98	0.43
1:A:1206:ILE:HD12	1:A:1208:GLN:O	2.18	0.43
1:A:1221:LYS:O	1:A:1222:TRP:C	2.61	0.43
2:B:224:ASP:OD1	2:B:225:GLY:N	2.52	0.43
2:B:324:THR:O	2:B:325:LYS:HD3	2.18	0.43
2:B:401:ARG:CD	2:B:401:ARG:H	2.31	0.43
1:A:314:ARG:HH12	1:A:438:PHE:HE2	1.65	0.43
1:A:514:VAL:HG13	1:A:530:PHE:HE1	1.83	0.43
1:A:942:HIS:HA	1:A:945:GLU:HG2	2.00	0.43
1:A:1108:GLN:N	1:A:1141:LYS:HD3	2.34	0.43
1:A:1037:GLU:O	1:A:1041:ASN:ND2	2.51	0.43
1:A:882:LEU:HD13	1:A:966:TYR:CE1	2.54	0.43
1:A:1149:SER:O	1:A:1153:LYS:HG2	2.19	0.43
1:A:691:PRO:HD2	2:B:51:ARG:HH12	1.83	0.43
1:A:758:ARG:NH2	1:A:1476:SER:HB3	2.33	0.43
1:A:760:GLU:O	1:A:764:ILE:HG12	2.18	0.43
1:A:815:PHE:O	1:A:819:LEU:HG	2.19	0.43
2:B:121:ILE:HG12	2:B:142:TRP:HD1	1.82	0.43
1:A:1096:GLU:OE2	1:A:1096:GLU:N	2.52	0.42
1:A:478:VAL:HG23	1:A:490:LYS:HB3	2.00	0.42
1:A:742:LEU:HD23	1:A:742:LEU:H	1.84	0.42
1:A:825:VAL:HG23	1:A:841:ALA:HA	1.99	0.42
1:A:1429:VAL:HA	1:A:1432:CYS:SG	2.58	0.42
1:A:795:GLU:HA	1:A:798:GLU:CD	2.45	0.42
1:A:673:GLN:NE2	1:A:700:SER:O	2.51	0.42
1:A:709:ILE:HD13	1:A:1169:LEU:HB3	2.00	0.42
2:B:147:ASP:O	2:B:156:ARG:NH2	2.51	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:612:ALA:O	1:A:1254:PHE:HD2	2.03	0.42
1:A:1357:PHE:CE1	1:A:1415:VAL:HG22	2.54	0.42
1:A:1380:PHE:CE1	1:A:1384:PHE:HE2	2.37	0.42
1:A:885:LEU:HD12	1:A:987:LEU:HD21	2.02	0.42
2:B:70:LEU:HD23	2:B:70:LEU:H	1.85	0.42
2:B:401:ARG:H	2:B:401:ARG:HD3	1.84	0.42
1:A:514:VAL:HG22	1:A:530:PHE:CE1	2.55	0.42
1:A:691:PRO:HD2	2:B:51:ARG:NH1	2.35	0.42
1:A:501:ILE:CD1	1:A:507:ILE:HG12	2.47	0.42
1:A:616:ASN:HA	1:A:619:TYR:CE1	2.55	0.42
1:A:882:LEU:HD12	1:A:897:ILE:HG22	2.02	0.42
2:B:204:SER:N	2:B:207:THR:OG1	2.51	0.42
1:A:659:PRO:HD2	1:A:1238:ASN:HD22	1.85	0.42
1:A:1038:THR:HA	1:A:1041:ASN:ND2	2.33	0.42
2:B:259:LEU:HD13	2:B:328:ARG:HB3	2.02	0.42
2:B:389:ALA:O	2:B:392:LEU:HG	2.20	0.42
1:A:507:ILE:HD12	1:A:564:MET:HE2	2.01	0.42
1:A:742:LEU:HA	1:A:745:LEU:HD23	2.02	0.42
1:A:919:ASP:N	1:A:919:ASP:OD1	2.53	0.42
1:A:1409:TYR:HB2	2:B:272:ARG:NH2	2.35	0.42
2:B:131:HIS:CE1	2:B:132:LYS:HG2	2.55	0.42
2:B:283:ILE:HG22	2:B:297:TYR:CD1	2.55	0.42
1:A:1017:SER:O	1:A:1021:LEU:HD23	2.20	0.41
1:A:1024:ALA:HB2	1:A:1296:PRO:HB2	2.02	0.41
1:A:1346:LEU:HD12	2:B:264:ILE:O	2.20	0.41
2:B:58:PHE:HA	2:B:63:LEU:HD11	2.02	0.41
1:A:315:THR:HG1	1:A:443:TRP:CD1	2.38	0.41
2:B:137:ASN:OD1	2:B:138:THR:N	2.41	0.41
1:A:306:LEU:HG	1:A:1200:MET:HE1	2.02	0.41
1:A:1343:GLU:H	2:B:368:GLY:CA	2.32	0.41
1:A:502:LYS:HE2	1:A:502:LYS:HB3	1.84	0.41
2:B:395:PHE:O	2:B:399:GLY:C	2.62	0.41
1:A:799:ASP:O	1:A:809:GLN:HG2	2.19	0.41
1:A:814:HIS:NE2	1:A:958:GLN:OE1	2.53	0.41
1:A:1128:GLU:OE1	1:A:1131:ARG:NH1	2.49	0.41
1:A:800:LEU:HD21	1:A:816:LEU:HD12	2.02	0.41
1:A:1360:ALA:HA	1:A:1363:VAL:HG12	2.02	0.41
1:A:1398:ILE:HD12	1:A:1398:ILE:HA	1.92	0.41
1:A:615:VAL:O	1:A:618:VAL:HG22	2.21	0.41
1:A:624:PRO:HB3	2:B:353:PHE:HB2	2.03	0.41
1:A:1341:VAL:HG23	2:B:367:LEU:O	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:437:ARG:HH21	1:A:438:PHE:HD1	1.69	0.41
1:A:501:ILE:HD12	1:A:507:ILE:CG1	2.48	0.41
1:A:673:GLN:CD	1:A:700:SER:HB3	2.46	0.41
1:A:1094:GLU:O	1:A:1098:LYS:HG2	2.21	0.41
1:A:1289:ASP:OD1	1:A:1289:ASP:N	2.54	0.41
1:A:1349:ASP:OD1	2:B:318:GLY:HA2	2.21	0.41
2:B:308:TRP:CE2	2:B:311:PHE:HB2	2.55	0.41
2:B:367:LEU:HD11	2:B:374:LEU:HD12	2.02	0.41
1:A:587:LYS:HD3	1:A:588:SER:O	2.20	0.41
1:A:1316:TYR:OH	1:A:1436:ARG:NH1	2.54	0.41
1:A:201:ARG:HG3	1:A:518:GLY:HA3	2.03	0.40
1:A:507:ILE:HD12	1:A:564:MET:CE	2.51	0.40
2:B:391:ILE:HG13	2:B:395:PHE:HE2	1.83	0.40
1:A:893:ARG:HD3	1:A:921:VAL:HG21	2.03	0.40
1:A:1341:VAL:HA	2:B:369:GLY:H	1.86	0.40
2:B:163:PHE:HE1	2:B:342:LEU:HD23	1.85	0.40
2:B:250:VAL:HB	2:B:339:GLU:HB3	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1155/1612 (72%)	1077 (93%)	78 (7%)	0	100	100
2	B	365/414 (88%)	343 (94%)	22 (6%)	0	100	100
All	All	1520/2026 (75%)	1420 (93%)	100 (7%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	1027/1426 (72%)	1026 (100%)	1 (0%)	92	95
2	B	320/364 (88%)	320 (100%)	0	100	100
All	All	1347/1790 (75%)	1346 (100%)	1 (0%)	92	95

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1099	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	255	ASN
1	A	277	ASN
1	A	520	HIS
1	A	616	ASN
1	A	698	ASN
1	A	855	GLN
1	A	888	ASN
1	A	1011	GLN
1	A	1041	ASN
1	A	1252	ASN
1	A	1323	GLN
2	B	131	HIS
2	B	246	GLN
2	B	282	GLN
2	B	301	ASN

5.3.3 RNA ⓘ

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](#)

6 monosaccharides 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	$\# Z > 2$
3	NAG	C	1	3	14,14,15	0.29	0	17,19,21	0.56	0
3	NAG	C	2	3	14,14,15	0.24	0	17,19,21	0.40	0
3	MAN	C	3	3	11,11,12	0.63	0	15,15,17	1.06	2 (13%)
3	NAG	D	1	3,2	14,14,15	0.47	0	17,19,21	0.49	0
3	NAG	D	2	3	14,14,15	0.32	0	17,19,21	0.49	0
3	MAN	D	3	3	11,11,12	0.64	0	15,15,17	0.90	1 (6%)

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
3	NAG	C	1	3	-	3/6/23/26	0/1/1/1
3	NAG	C	2	3	-	2/6/23/26	0/1/1/1
3	MAN	C	3	3	-	0/2/19/22	0/1/1/1
3	NAG	D	1	3,2	-	2/6/23/26	0/1/1/1
3	NAG	D	2	3	-	2/6/23/26	0/1/1/1
3	MAN	D	3	3	-	0/2/19/22	0/1/1/1

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	3	MAN	C1-O5-C5	2.77	115.90	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	3	MAN	O2-C2-C3	-2.18	105.64	110.15
3	C	3	MAN	O2-C2-C3	-2.17	105.65	110.15

There are no chirality outliers.

All (9) torsion outliers are listed below:

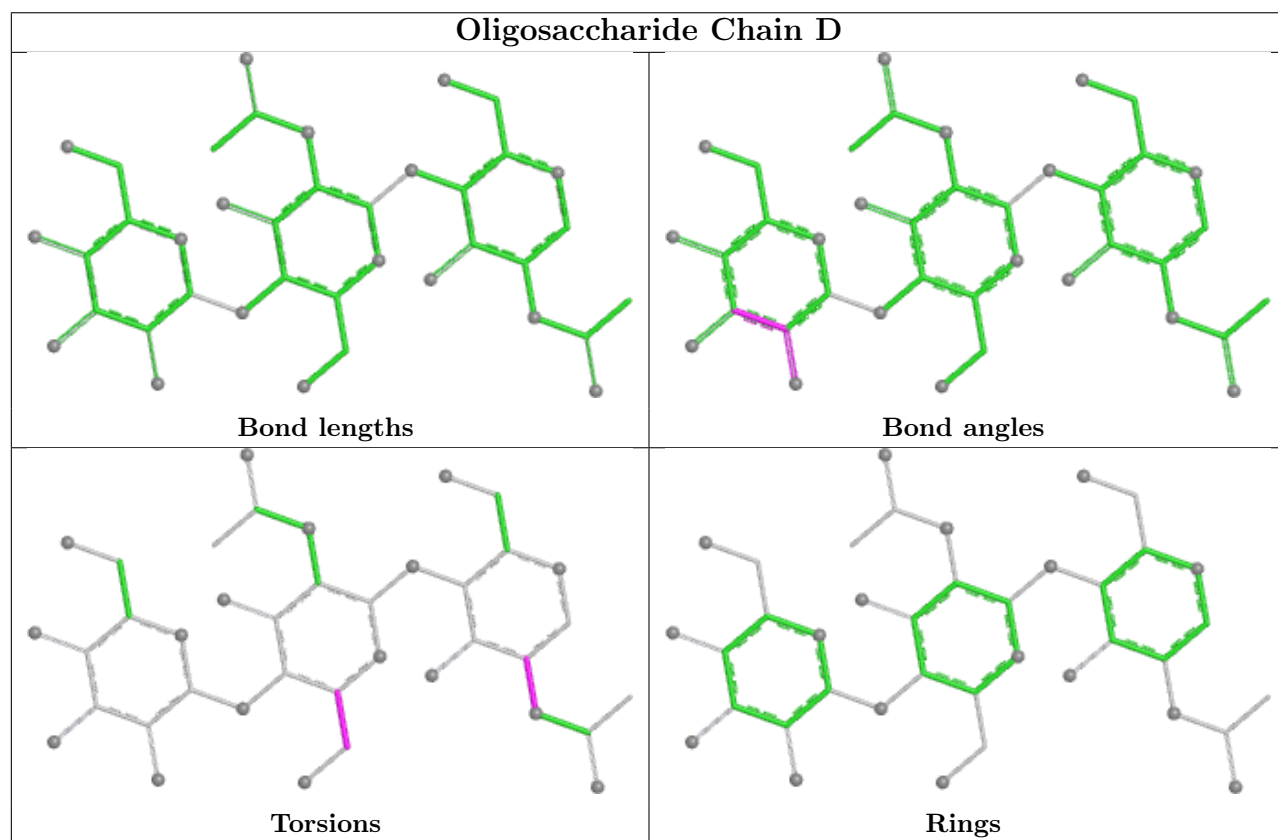
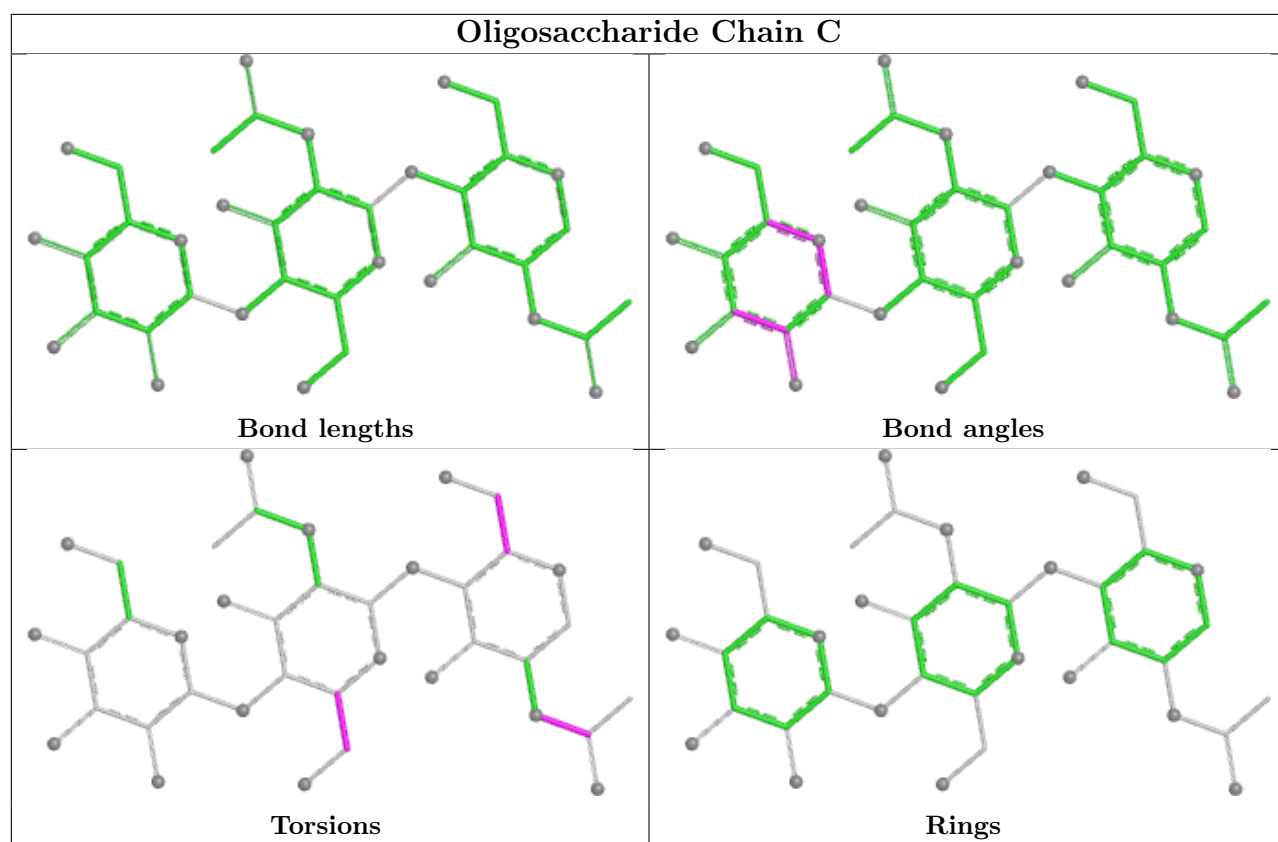
Mol	Chain	Res	Type	Atoms
3	C	1	NAG	C8-C7-N2-C2
3	C	1	NAG	O7-C7-N2-C2
3	D	2	NAG	C4-C5-C6-O6
3	D	2	NAG	O5-C5-C6-O6
3	C	2	NAG	O5-C5-C6-O6
3	C	2	NAG	C4-C5-C6-O6
3	C	1	NAG	O5-C5-C6-O6
3	D	1	NAG	C1-C2-N2-C7
3	D	1	NAG	C3-C2-N2-C7

There are no ring outliers.

4 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1	NAG	1	0
3	D	2	NAG	1	0
3	C	2	NAG	2	0
3	D	1	NAG	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.



5.6 Ligand geometry

Of 9 ligands modelled in this entry, 1 is monoatomic - leaving 8 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
7	NAG	B	503	-	15,15,15	0.11	0	21,21,21	0.10	0
4	CLR	A	1701	-	31,31,31	0.54	0	48,48,48	1.33	6 (12%)
7	NAG	B	501	2	14,14,15	0.21	0	17,19,21	0.42	0
7	NAG	B	505	-	15,15,15	0.10	0	21,21,21	0.11	0
7	NAG	B	504	2	14,14,15	0.22	0	17,19,21	0.38	0
4	CLR	A	1702	-	31,31,31	0.52	0	48,48,48	1.36	5 (10%)
7	NAG	B	502	2	14,14,15	0.28	0	17,19,21	0.42	0
5	ALF	A	1703	-	4,4,4	1.38	0	-	-	-

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	NAG	B	503	-	-	2/6/26/26	0/1/1/1
4	CLR	A	1701	-	-	7/10/68/68	0/4/4/4
7	NAG	B	501	2	-	2/6/23/26	0/1/1/1
7	NAG	B	505	-	-	0/6/26/26	0/1/1/1
7	NAG	B	504	2	-	1/6/23/26	0/1/1/1
4	CLR	A	1702	-	-	7/10/68/68	0/4/4/4
7	NAG	B	502	2	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1702	CLR	C13-C17-C20	-4.49	112.56	119.50
4	A	1701	CLR	C13-C17-C20	-4.35	112.77	119.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1701	CLR	C13-C14-C8	-2.92	110.26	114.41
4	A	1702	CLR	C13-C14-C8	-2.92	110.28	114.41
4	A	1702	CLR	C8-C7-C6	-2.48	109.33	112.76
4	A	1702	CLR	C23-C22-C20	-2.26	108.74	115.08
4	A	1701	CLR	C11-C9-C10	-2.26	110.30	113.08
4	A	1701	CLR	C10-C9-C8	-2.26	109.41	112.71
4	A	1701	CLR	C8-C7-C6	-2.11	109.84	112.76
4	A	1701	CLR	C11-C12-C13	-2.11	109.18	112.74
4	A	1702	CLR	C11-C12-C13	-2.05	109.28	112.74

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1702	CLR	C13-C17-C20-C21
4	A	1702	CLR	C16-C17-C20-C21
4	A	1701	CLR	C13-C17-C20-C21
4	A	1701	CLR	C13-C17-C20-C22
4	A	1702	CLR	C13-C17-C20-C22
4	A	1702	CLR	C16-C17-C20-C22
4	A	1702	CLR	C17-C20-C22-C23
4	A	1702	CLR	C21-C20-C22-C23
4	A	1701	CLR	C17-C20-C22-C23
4	A	1701	CLR	C16-C17-C20-C21
7	B	501	NAG	C8-C7-N2-C2
7	B	501	NAG	O7-C7-N2-C2
7	B	503	NAG	C4-C5-C6-O6
7	B	502	NAG	O5-C5-C6-O6
4	A	1701	CLR	C21-C20-C22-C23
4	A	1701	CLR	C16-C17-C20-C22
4	A	1702	CLR	C20-C22-C23-C24
7	B	503	NAG	O5-C5-C6-O6
7	B	504	NAG	O5-C5-C6-O6
4	A	1701	CLR	C22-C23-C24-C25
7	B	502	NAG	C4-C5-C6-O6

There are no ring outliers.

2 monomers are involved in 2 short contacts:

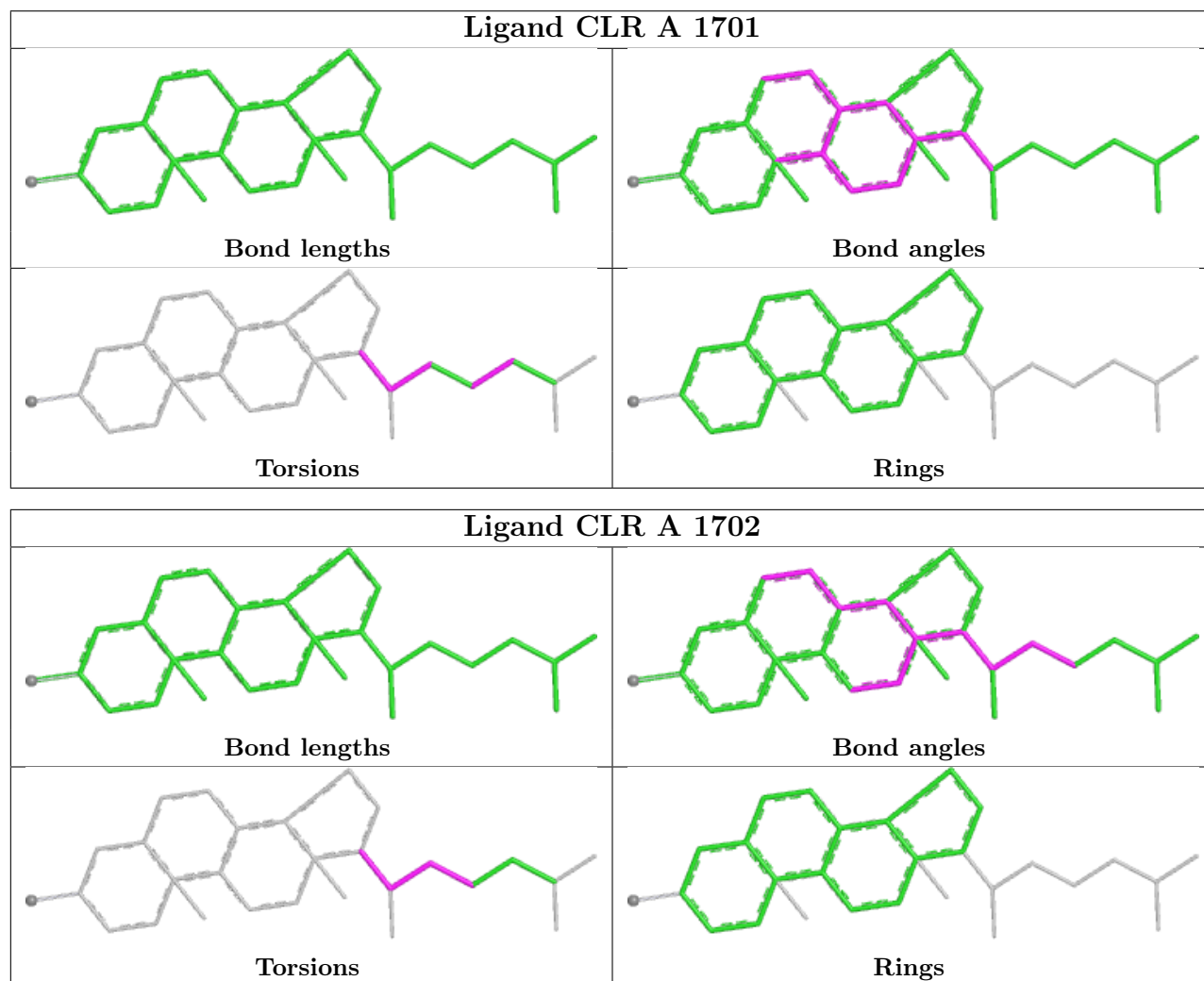
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1701	CLR	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1702	CLR	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.

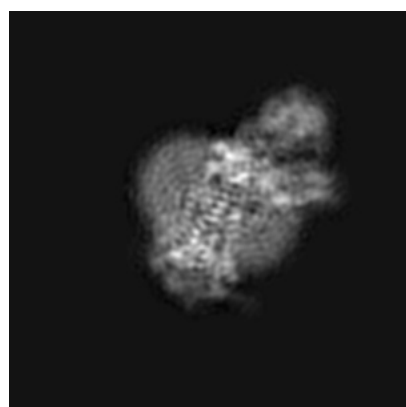
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-23068. These allow visual inspection of the internal detail of the map and identification of artifacts.

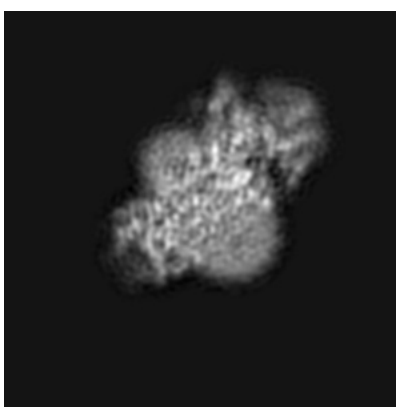
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

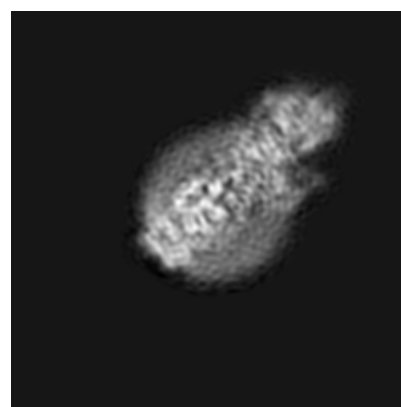
6.1.1 Primary map



X



Y

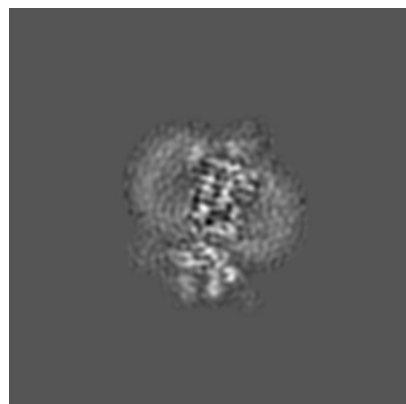


Z

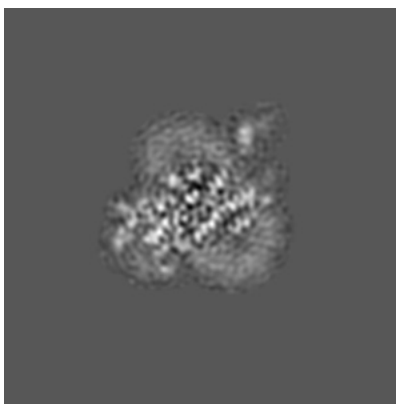
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

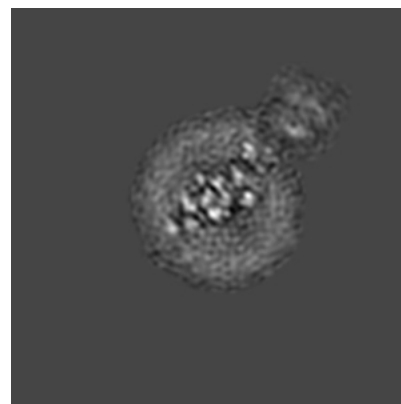
6.2.1 Primary map



X Index: 140



Y Index: 140

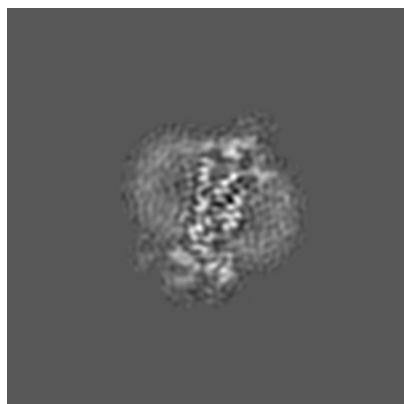


Z Index: 140

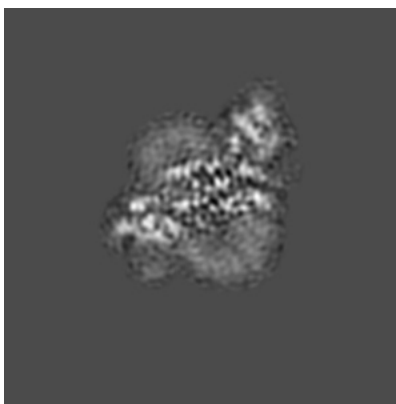
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

6.3.1 Primary map



X Index: 144



Y Index: 154

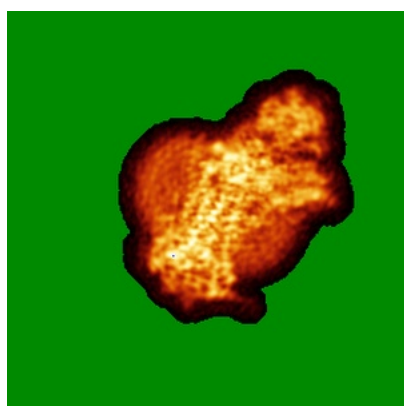


Z Index: 163

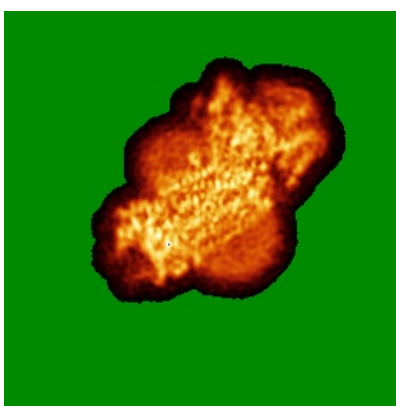
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

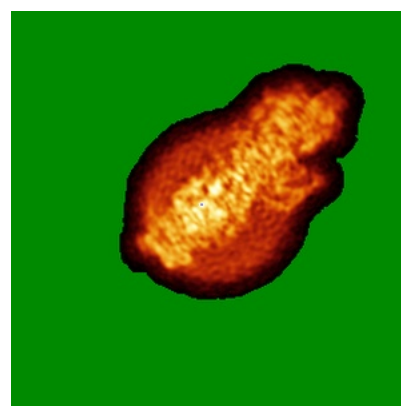
6.4.1 Primary map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.012. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

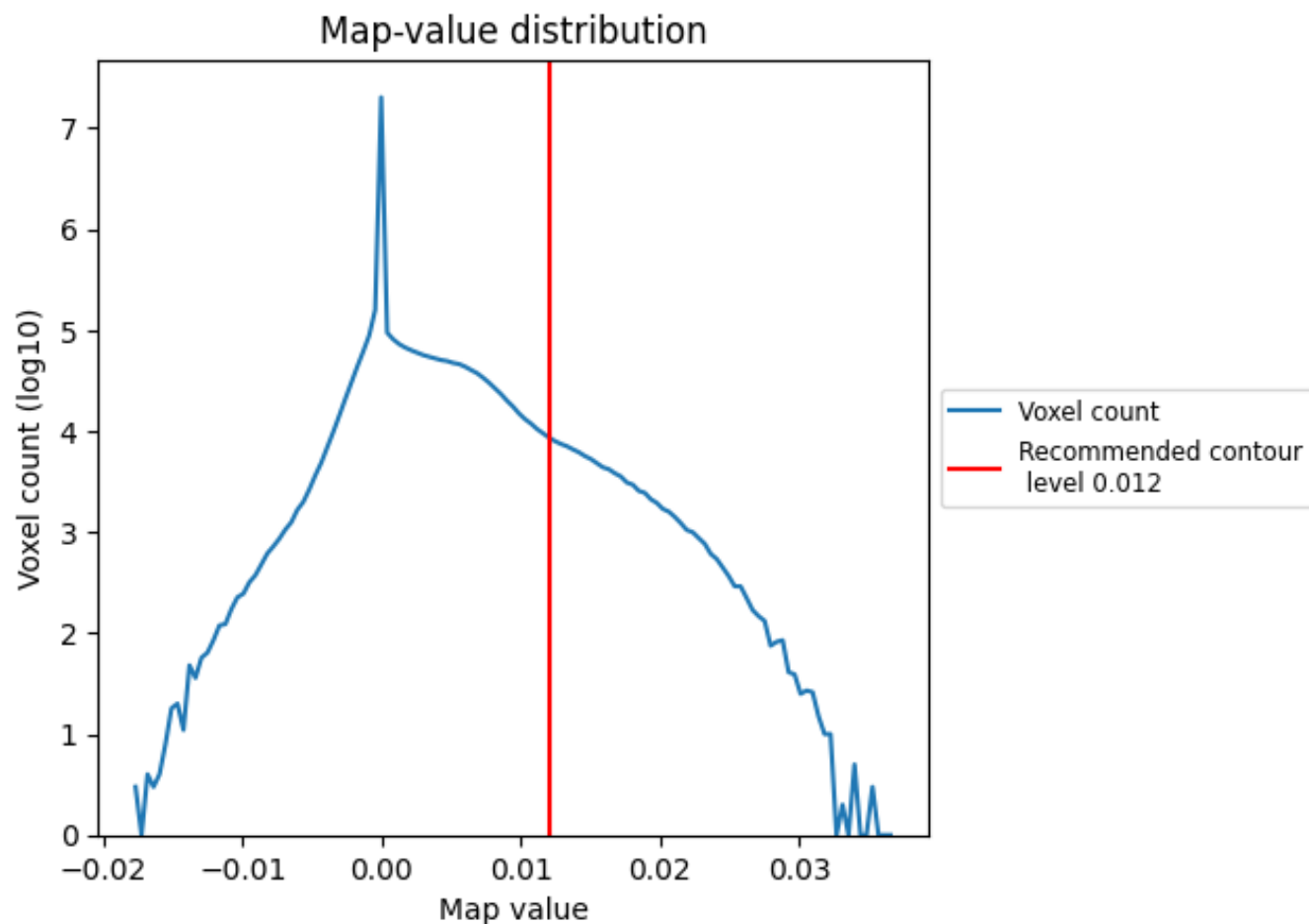
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

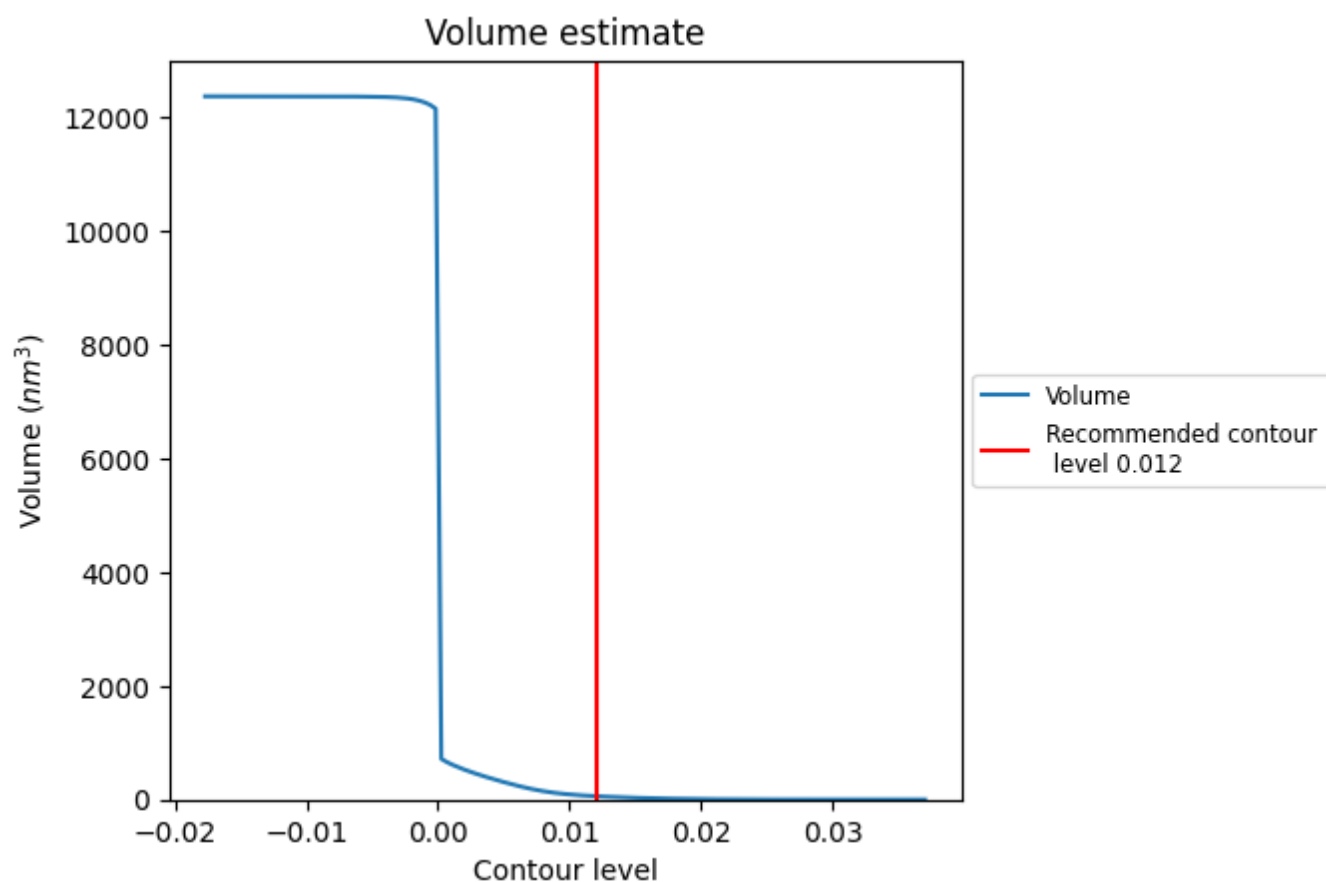
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

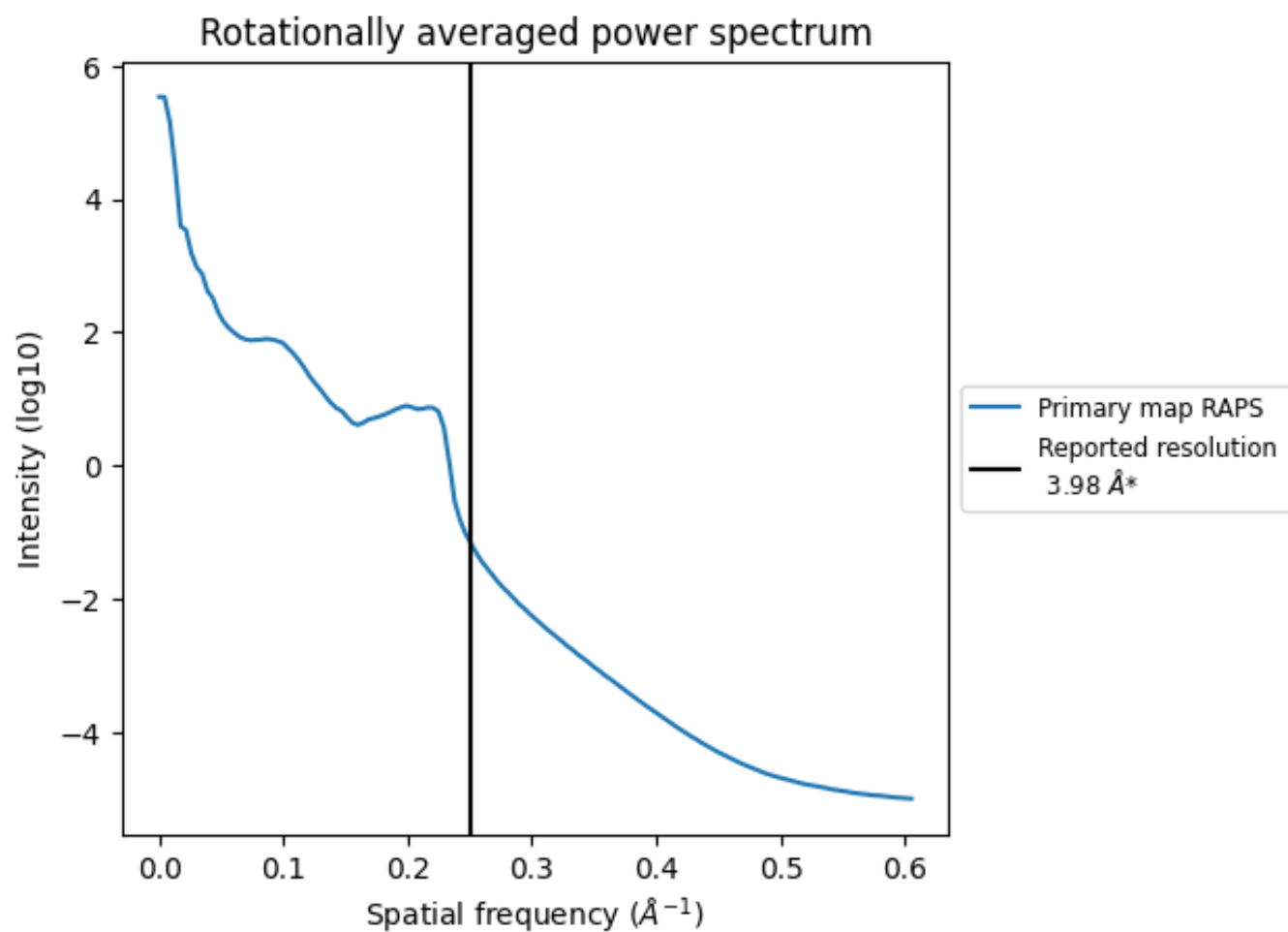
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 59 nm³; this corresponds to an approximate mass of 53 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ



*Reported resolution corresponds to spatial frequency of 0.251 $\text{\AA}^{-1}$

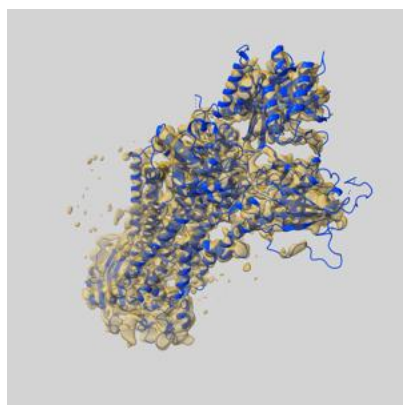
8 Fourier-Shell correlation ⓘ

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

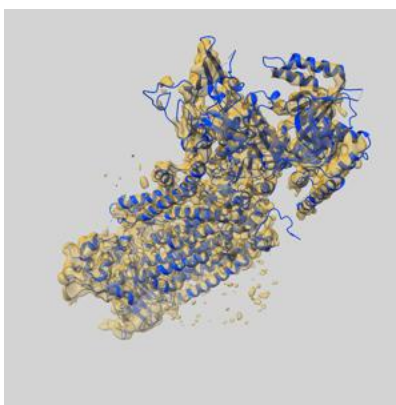
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-23068 and PDB model 7KY5. Per-residue inclusion information can be found in section [3](#) on page [6](#).

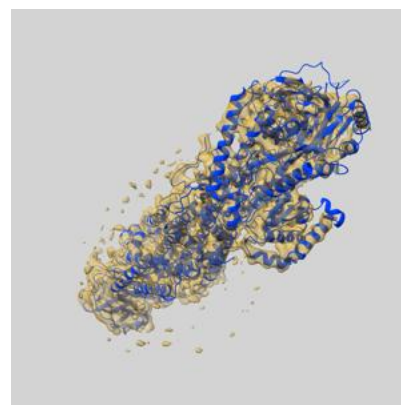
9.1 Map-model overlay [i](#)



X



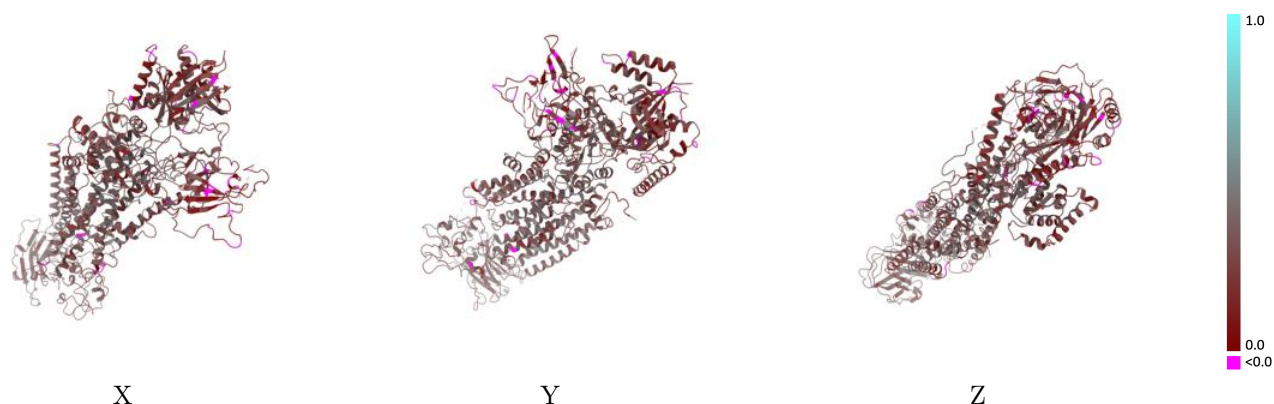
Y



Z

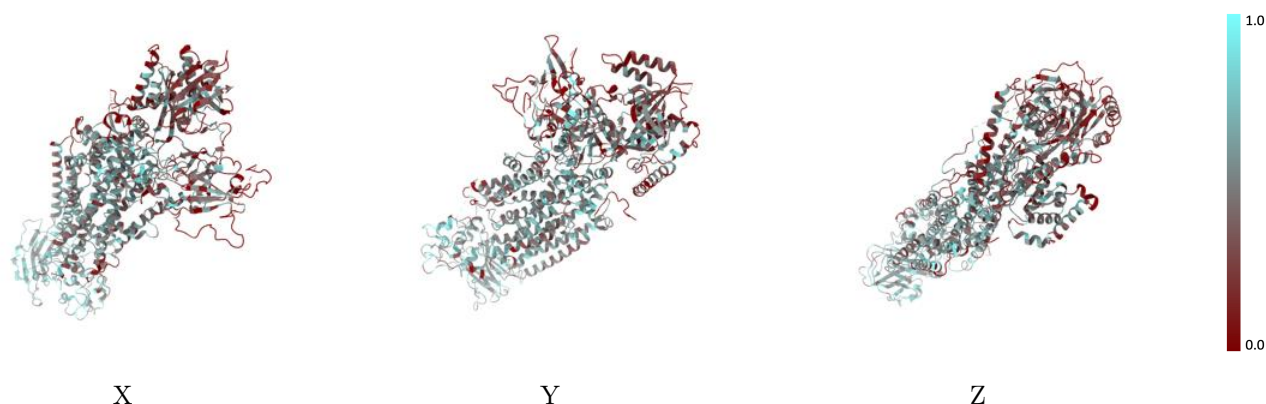
The images above show the 3D surface view of the map at the recommended contour level 0.012 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



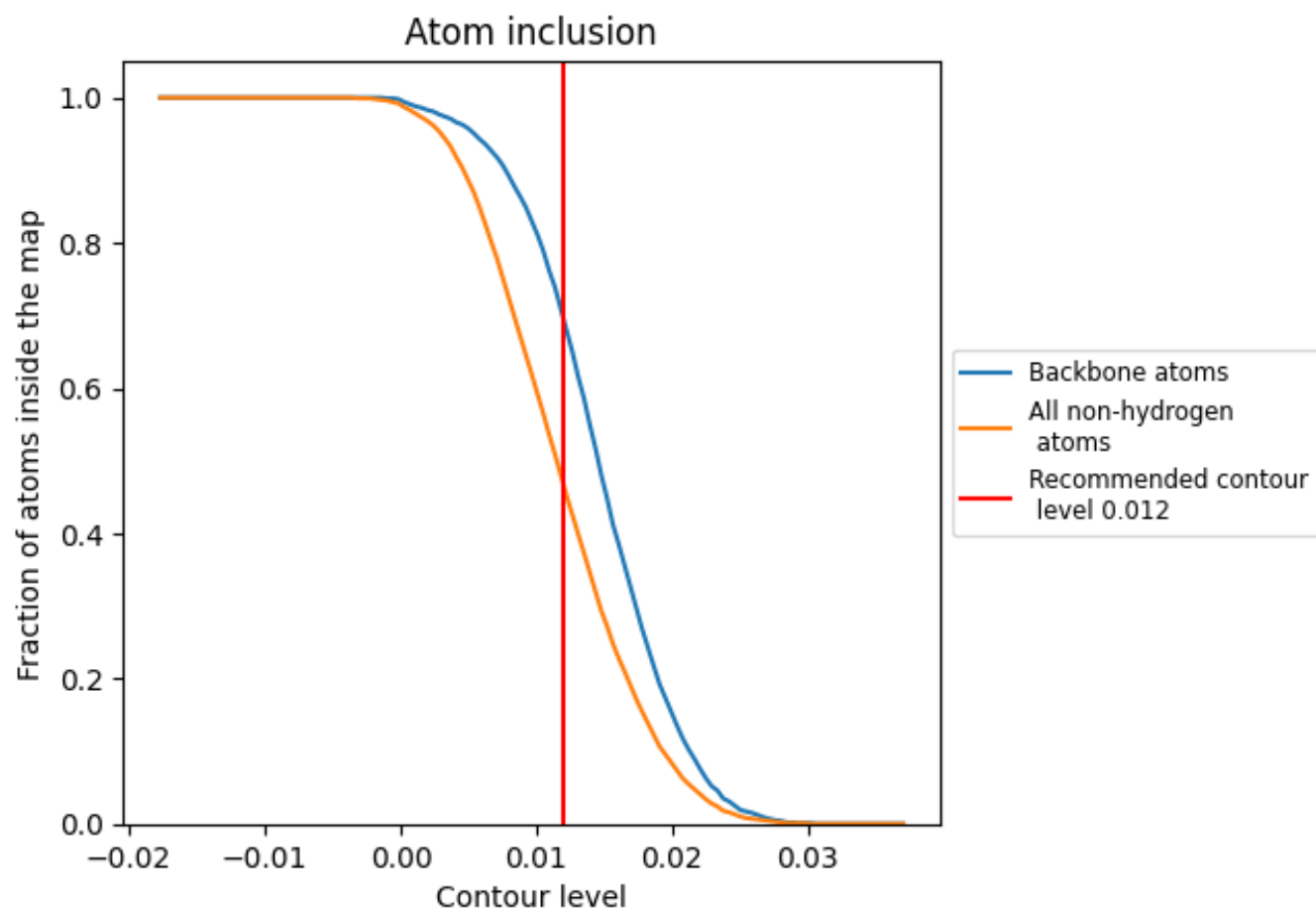
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.012).

9.4 Atom inclusion [i](#)



At the recommended contour level, 70% of all backbone atoms, 47% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.012) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4670	0.2950
A	0.4320	0.2850
B	0.5740	0.3260
C	0.6150	0.3380
D	0.2310	0.2730

