



Full wwPDB EM Validation Report ⓘ

Aug 14, 2025 – 01:45 PM EDT

PDB ID : 9BMZ / pdb_00009bmz
EMDB ID : EMD-44716
Title : State-2 of motor domain from full-length human dynein-1 in apo condition
Authors : Chai, P.; Zhang, K.
Deposited on : 2024-05-02
Resolution : 2.97 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.dev126
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) : 2.45.1

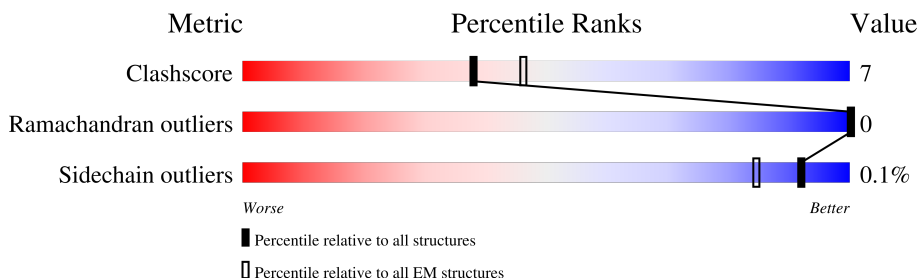
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.97 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	4646	9% 51% 12% 37%

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 23707 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 Cytoplasmic dynein 1 heavy chain 1.

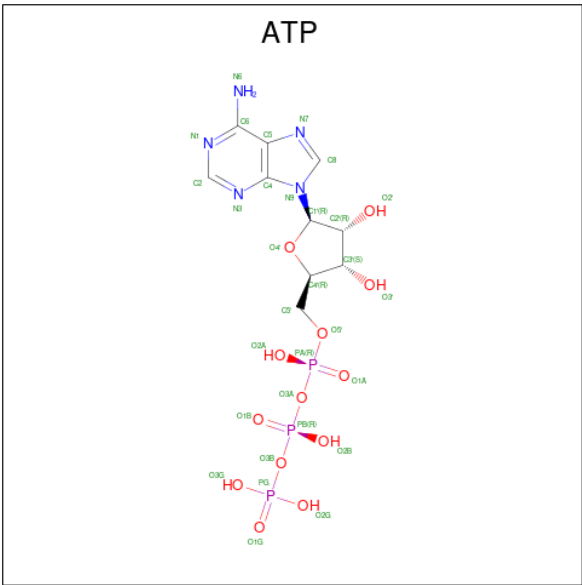
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	2937	23593	15028	4070	4378	117	0	0

- Molecule 2 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
2	A	1	27	10	5	10	2	0
2	A	1	27	10	5	10	2	0
2	A	1	27	10	5	10	2	0

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
3	A	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
4	A	2	Total	Mg	0
			2	2	

I1978	L1792	R1623	P1562	I1501	LYS	ALA	VAL	TRP	ARG	GLU	ALA	ASN	GLU	ASN	PHE
S1986	E1814	F1626	V1563	N1502	ASN	SER	ALA	GLU	PHE	PHE	LEU	LEU	LEU	LEU	PHE
M1987	E1814	P1627	E1564	S1503	ALA	TRP	GLU	GLU	THR	THR	VAL	THR	THR	THR	PHE
P1988	Q1818	R1628	T1565	V1504	ILE	PHE	VAL	LEU	PRO	PRO	ILE	MET	GLN	GLY	LYS
M1989	F1836	F1629	Q1566	S1505	VAL	GLN	GLN	GLN	SER	SER	ARG	PRO	ASN	ASN	GLY
Y1990	D1634	G1633	R1567	A1506	ASP	ARG	ASP	ASP	TRP	TRP	LYS	ASP	VAL	VAL	VAL
D1991	L1839	E1635	F1568	M1507	VAL	LEU	LEU	LEU	THR	THR	SER	GLY	THR	THR	ASP
K1992	R1843	E1636	Q1569	K1508	LEU	LEU	LEU	LEU	TYR	TYR	ARG	PRO	TYR	ILE	ASP
T1993	L1637	D1637	I1571	S1509	VAL	GLY	VAL	VAL	ASP	ASP	GLY	LEU	ASN	GLY	LEU
T1994	K1849	L1638	S1572	P1511	ALA	TRP	TRP	TRP	ASN	ASN	PHE	PRO	ASN	ILE	ILE
S1994	Q1850	E1639	T1573	Y1512	GLY	SER	SER	SER	ILE	GLU	ASP	GLU	ARG	VAL	GLU
A1995	I1640	I1640	E1574	Y1513	GLU	LEU	LEU	GLU	GLY	GLU	ASN	PRO	ARG	VAL	GLU
V2006	V1853	K1649	F1575	K1514	M1457	MET	VAL	GLN	GLY	GLY	LYS	VAL	ARG	LEU	LEU
D2011	L1854	L1649	L1576	V1515	A1458	LEU	VAL	ALA	GLY	GLY	ASP	ARG	LEU	LEU	GLY
M2012	Q1855	K1652	A1577	F1516	L1459	ILE	GLU	THR	PHE	GLY	VAL	MET	ALA	ALA	VAL
T2017	Q1856	L1653	L1578	E1517	E1460	GLU	GLN	ILE	ASN	GLY	THR	GLY	THR	THR	THR
A2023	I1859	F1654	M1579	E1518	E1461	LEU	ILE	TYR	ASP	ILE	PRO	GLY	GLN	GLN	GLY
D2030	N1867	K1655	K1580	D1519	F1462	SER	ASP	GLY	ILE	SER	VAL	VAL	VAL	VAL	GLY
R2037	Y1868	I1664	K1581	A1520	L1463	GLU	TRP	LYS	ARG	SER	VAL	GLU	GLU	GLU	THR
L2038	K1878	E1668	V1582	L1521	K1464	ALA	VAL	ASP	ARG	VAL	ILE	VAL	VAL	VAL	THR
L2039	Q1881	S1671	K1584	S1522	Q1465	LEU	GLU	GLY	LYS	VAL	THR	ASP	GLY	GLY	LYS
D2045	T1882	L1674	P1586	V1523	I1466	LYS	GLN	ARG	ASP	GLN	PHE	TRP	GLN	GLN	ALA
R2046	F1883	G1675	Y1587	E1524	R1467	ASP	PRO	LEU	SER	ILE	TYR	TYR	LYS	ALA	ASP
Q2047	L1884	L1676	L1587	D1525	P1469	HIS	TRP	VAL	ALA	THR	VAL	VAL	VAL	VAL	LYS
L2048	T1885	I1679	V1588	L1527	M1470	TRP	SER	GLN	ILE	TYR	GLN	VAL	VAL	VAL	THR
T2049	D1886	Y1889	M1589	N1528	N1471	LEU	GLN	PRO	GLN	GLN	SER	LEU	LEU	LEU	PHE
A2050	Y1890	M1685	D1590	R1529	T1472	MET	ARG	CYS	ALA	ASN	ASN	PRO	PRO	ASP	LYS
Q2051	A1895	T1693	V1591	T1530	Y1473	LYS	LYS	ALA	ALA	GLN	GLN	GLN	GLN	ASP	THR
V2052	P1904	K1697	L1592	M1531	L1475	ARG	LEU	LYS	LEU	LEU	TRP	TRP	TRP	ASP	ARG
G2053	F1905	I1698	I1594	A1532	D1476	HIS	GLN	LYS	MET	GLN	SER	ASP	GLN	ALA	VAL
E2063	G1906	P1699	Q1595	L1533	L1477	ASN	ASN	ALA	ILE	PHE	GLN	ASP	TRP	PRO	LYS
V2064	P1907	E1700	Q1596	F1534	V1478	TRP	ASP	LEU	VAL	GLU	GLN	VAL	VAL	ALA	ALA
L2065	T1910	E1700	G1596	D1535	N1479	VAL	ALA	GLU	GLU	LYS	GLN	VAL	VAL	VAL	VAL
A2066	G1911	V1721	V1597	R1542	M1479	VAL	VAL	LEU	GLU	GLU	GLU	GLY	SER	SER	ASP
N2067	K1912	V1721	Q1598	V1543	Y1480	SER	SER	THR	ASP	VAL	VAL	GLY	GLY	HIS	ASP
K2068	T1913	V1721	R1599	V1544	Q1481	GLU	ASN	ASP	ARG	GLU	LEU	ILE	VAL	LYS	LEU
L2069	F1930	V1724	Q1599	V1545	Q1482	LEU	GLN	THR	ALA	ALA	THR	TYR	VAL	PRO	ASN
V2070	F1930	V1724	S1600	L1547	N1483	LEU	LEU	GLY	VAL	VAL	TYR	ASN	GLY	GLY	LEU
P2071	F1945	K1729	L1601	G1549	K1483	LEU	LYS	LEU	GLU	ARG	GLU	ARG	THR	GLY	LEU
K2074	V1946	A1730	E1602	I1550	C1484	GLY	ASP	ALA	VAL	VAL	GLN	GLN	GLY	GLY	HIS
L2080	Q1950	Y1738	R1603	F1551	R1485	GLN	ASP	TRP	ILE	GLY	LYS	GLN	GLY	GLY	LEU
D2087	D1958	G1770	L1604	T1552	L1486	ILE	THR	ALA	THR	THR	PHE	VAL	GLY	GLY	LEU
E1959	E1959	G1771	A1605	G1554	I1487	TRP	ARG	ALA	SER	THR	GLN	GLY	GLY	PRO	TYR
R2091	R1962	G1772	D1606	S1554	R1488	VAL	LEU	ARG	GLU	THR	LEU	ASP	GLU	ILE	ASN
A2092	G1773	G1772	L1607	A1555	G1489	ASP	LEU	GLU	GLU	ASP	LEU	ASN	GLY	LYS	LYS
L2093	D1774	G1773	L1608	D1556	V1490	VAL	ARG	ARG	LEU	LEU	LEU	ASN	ASP	ASN	PRO
E2116	A1775	A1775	K1613	I1557	K1498	GLY	GLN	THR	LEU	GLY	GLY	VAL	GLY	VAL	ILE
			E1617	K1558	E1499	LEU	THR	THR	THR	THR	THR	THR	THR	THR	THR
			Y1618	H1559	H1500	GLN	TYR	ASP	ASP	GLN	GLN	GLN	GLN	GLN	VAL
			L1619	L1560				GLN	GLN	GLN	GLN	GLN	GLN	GLN	HIS
			E1620												
			R1621												
			E1622												





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	65852	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	45000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.158	Depositor
Minimum map value	-1.216	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.052	Depositor
Recommended contour level	0.33	Depositor
Map size ($\text{\AA}$)	444.4032, 444.4032, 444.4032	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.1573, 1.1573, 1.1573	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.16	0/24093	0.31	5/32651 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	2322	ASN	N-CA-C	-6.73	103.75	112.23
1	A	1885	THR	N-CA-C	-6.64	105.00	113.23
1	A	1883	PRO	N-CA-CB	-5.32	97.64	103.39
1	A	2093	LEU	N-CA-C	-5.25	105.23	111.69
1	A	2321	ASP	N-CA-C	-5.10	105.97	113.61

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	2091	ARG	Sidechain
1	A	2358	ARG	Sidechain

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	23593	0	23659	339	0
2	A	81	0	36	1	0
3	A	31	0	12	5	0
4	A	2	0	0	2	0
All	All	23707	0	23707	339	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 7.

All (339) 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:3127:PRO:HG3	1:A:3538:GLN:HG2	1.64	0.77
1:A:1959:GLU:HB3	1:A:1962:ARG:HD3	1.71	0.72
1:A:3178:ASP:OD2	1:A:3585:ARG:NE	2.22	0.72
1:A:2149:LEU:HD11	1:A:2157:LEU:HD13	1.72	0.71
1:A:1904:PRO:HG2	1:A:2017:THR:HG22	1.72	0.70
1:A:2231:SER:OG	4:A:4706:MG:MG	1.33	0.70
1:A:1470:TRP:HB3	1:A:1589:MET:HE2	1.72	0.70
1:A:2760:PRO:HA	1:A:2763:ARG:HG3	1.75	0.68
1:A:3782:ARG:NH1	1:A:3786:GLU:OE1	2.25	0.68
1:A:1504:VAL:HG12	1:A:1508:LYS:HE3	1.76	0.67
1:A:3129:VAL:HG21	1:A:3149:PHE:HB2	1.75	0.67
1:A:4088:VAL:HG11	1:A:4116:LEU:HD21	1.77	0.66
1:A:3114:ASP:O	1:A:3140:ARG:NH2	2.29	0.66
1:A:3499:GLN:O	1:A:3503:ILE:HG13	1.97	0.65
1:A:1503:SER:O	1:A:1507:MET:HG2	1.97	0.65
1:A:2970:GLU:OE2	1:A:2970:GLU:N	2.29	0.65
1:A:3791:MET:O	1:A:3795:GLU:HG2	1.97	0.65
1:A:2316:ASN:O	1:A:2320:ASP:CG	2.40	0.64
1:A:2181:GLU:HG3	1:A:2244:LEU:HB2	1.79	0.64
1:A:2320:ASP:OD1	1:A:2358:ARG:NE	2.31	0.63
1:A:3207:LYS:NZ	1:A:3756:VAL:O	2.32	0.63
1:A:3597:THR:HG23	1:A:3634:LEU:HD21	1.81	0.63
1:A:4168:ARG:NH2	1:A:4217:ASP:OD1	2.31	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1913:THR:OG1	4:A:4705:MG:MG	1.42	0.63
1:A:4611:LEU:HB2	1:A:4619:ILE:HD11	1.81	0.63
1:A:3510:SER:HB3	1:A:3553:LEU:HD21	1.81	0.62
1:A:3839:VAL:HG21	1:A:3863:LEU:HA	1.81	0.62
1:A:3581:LYS:HE3	1:A:3582:ARG:HG3	1.82	0.62
1:A:4190:ILE:HD12	1:A:4201:TRP:HZ2	1.65	0.62
1:A:2229:GLY:HA2	3:A:4702:ATP:O2A	2.00	0.61
1:A:4266:ASN:O	1:A:4270:GLU:HG2	2.00	0.61
1:A:2573:ASP:OD1	1:A:2576:ARG:NH2	2.33	0.61
1:A:2449:LEU:HA	1:A:2453:ARG:HH21	1.65	0.60
1:A:3177:LEU:O	1:A:3181:ASN:ND2	2.32	0.60
1:A:1850:GLN:HB3	1:A:1856:GLN:HG2	1.83	0.60
1:A:1962:ARG:NH2	1:A:2314:ASN:OD1	2.34	0.59
1:A:1521:LEU:O	1:A:1524:GLU:HG2	2.02	0.59
1:A:2775:GLU:OE1	1:A:2857:HIS:NE2	2.28	0.59
1:A:4540:CYS:HB3	1:A:4595:GLN:HG2	1.83	0.59
1:A:1883:PRO:HD2	1:A:2045:ASP:OD2	2.02	0.59
1:A:2590:PRO:HA	1:A:2708:PHE:O	2.03	0.59
1:A:2316:ASN:O	1:A:2320:ASP:OD1	2.20	0.59
1:A:2621:ASN:OD1	1:A:3014:ASN:ND2	2.35	0.59
1:A:2221:MET:HG2	1:A:2343:PHE:HB2	1.85	0.58
1:A:2172:ARG:NH1	1:A:2205:GLU:OE1	2.36	0.58
1:A:3517:ALA:HB1	1:A:3525:ARG:HG2	1.84	0.58
1:A:1958:ASP:OD1	1:A:2017:THR:OG1	2.19	0.58
1:A:2138:ILE:HD12	1:A:2161:LEU:HD22	1.86	0.58
1:A:2138:ILE:HD11	1:A:2165:PHE:CG	2.38	0.58
1:A:4326:ASN:ND2	1:A:4579:ASN:O	2.36	0.57
1:A:4027:LEU:HD11	1:A:4043:MET:HE1	1.86	0.57
1:A:4525:ARG:NH2	1:A:4536:LEU:O	2.30	0.57
1:A:1930:PHE:HA	1:A:2326:THR:HG21	1.85	0.57
1:A:2080:LEU:O	1:A:4415:ARG:NH1	2.38	0.57
1:A:3830:GLN:NE2	1:A:3834:ASP:OD1	2.37	0.57
1:A:3970:VAL:HB	1:A:3989:ARG:HD3	1.86	0.57
1:A:4541:LEU:HD11	1:A:4590:LEU:HB3	1.85	0.57
1:A:3214:GLN:HG3	1:A:3759:ARG:HD2	1.87	0.57
1:A:4569:THR:HG23	1:A:4578:SER:HB2	1.87	0.57
1:A:1491:ASP:OD1	1:A:1492:ASP:N	2.38	0.56
1:A:2297:LYS:O	1:A:2338:ASN:ND2	2.36	0.56
1:A:3459:GLN:HA	1:A:3462:LYS:HD2	1.88	0.56
1:A:3520:PHE:HB3	1:A:3524:MET:HB3	1.88	0.56
1:A:4496:ALA:HB2	1:A:4504:LEU:HD21	1.86	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2050:ALA:O	1:A:2051:GLN:C	2.48	0.55
1:A:3005:LEU:HD11	1:A:3078:ARG:HH11	1.71	0.55
1:A:3558:GLU:HG3	1:A:3561:ARG:HH12	1.71	0.55
1:A:2788:THR:HG22	1:A:2789:GLN:HG2	1.88	0.55
1:A:2818:VAL:O	1:A:2822:ILE:HG12	2.06	0.54
1:A:1671:SER:HB2	1:A:1693:THR:HG23	1.89	0.54
1:A:3486:ARG:NH1	1:A:3487:GLU:OE2	2.40	0.54
1:A:2942:GLY:HA2	2:A:4704:ADP:O1A	2.07	0.54
1:A:2773:MET:HG2	1:A:2825:TRP:HE1	1.72	0.54
1:A:1623:ARG:NH2	1:A:1634:ASP:OD1	2.40	0.54
1:A:1512:TYR:O	1:A:1515:VAL:HG12	2.08	0.54
1:A:3655:ARG:HG2	1:A:3660:VAL:HG22	1.90	0.54
1:A:3932:ALA:O	1:A:3936:VAL:HG23	2.07	0.54
1:A:2433:VAL:HG22	1:A:2498:ILE:HD11	1.89	0.54
1:A:1561:LEU:O	1:A:1565:THR:OG1	2.20	0.54
1:A:2457:SER:OG	1:A:2732:PRO:HB3	2.07	0.54
1:A:2049:ILE:O	1:A:2053:MET:HG3	2.09	0.53
1:A:3559:ARG:O	1:A:3563:GLN:HG2	2.07	0.53
1:A:4042:LEU:HD22	1:A:4128:MET:HE1	1.90	0.53
1:A:4020:ILE:HG23	1:A:4021:MET:HE2	1.91	0.53
1:A:2498:ILE:HG23	1:A:2502:LEU:HD22	1.90	0.53
1:A:3154:LEU:HG	1:A:3516:TYR:CD1	2.44	0.53
1:A:3691:ASP:OD1	1:A:3692:LEU:N	2.42	0.53
1:A:4609:VAL:HG22	1:A:4642:VAL:HB	1.91	0.53
1:A:3215:VAL:HG21	1:A:3479:LEU:HD11	1.91	0.53
1:A:4566:GLN:O	1:A:4640:VAL:HA	2.09	0.52
1:A:2175:MET:HE3	1:A:2208:LEU:HD22	1.91	0.52
1:A:2308:ASP:O	1:A:2312:VAL:HG12	2.08	0.52
1:A:4096:LEU:HD13	1:A:4105:TRP:HH2	1.75	0.52
1:A:2557:VAL:O	1:A:2757:ARG:NH2	2.42	0.52
1:A:2039:LEU:HD12	1:A:4254:GLY:HA2	1.92	0.52
1:A:2454:CYS:HB3	1:A:2502:LEU:HD12	1.92	0.52
1:A:2967:TYR:OH	1:A:2975:ASP:OD2	2.24	0.52
1:A:3017:VAL:HB	1:A:3020:LEU:HB2	1.92	0.52
1:A:4095:MET:HE3	1:A:4097:LYS:HE2	1.92	0.52
1:A:4150:PRO:O	1:A:4195:ARG:NH2	2.38	0.52
1:A:4574:LYS:HB3	1:A:4627:ALA:HB2	1.91	0.52
1:A:2905:LEU:HD11	1:A:3652:GLU:HB3	1.91	0.52
1:A:2452:LEU:HD11	3:A:4702:ATP:H4'	1.92	0.52
1:A:2925:ILE:HG21	1:A:2933:LEU:HG	1.91	0.52
1:A:1839:LEU:O	1:A:1843:ARG:NH1	2.43	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2974:GLU:OE1	1:A:2977:ARG:NH1	2.43	0.51
1:A:2863:ARG:HG2	1:A:2863:ARG:HH11	1.75	0.51
1:A:3099:THR:HG23	1:A:3148:VAL:HG11	1.93	0.51
1:A:1508:LYS:NZ	1:A:1524:GLU:OE1	2.28	0.51
1:A:2174:GLU:OE1	1:A:2176:THR:OG1	2.27	0.51
1:A:4525:ARG:HD3	1:A:4536:LEU:HD23	1.92	0.51
1:A:2581:LEU:HD11	1:A:2593:LEU:HD21	1.93	0.51
1:A:2980:LEU:HB3	1:A:3054:PHE:HZ	1.76	0.51
1:A:3176:TYR:O	1:A:3180:ILE:HG12	2.11	0.51
1:A:1881:GLN:NE2	1:A:1886:ASP:OD1	2.43	0.50
1:A:3172:THR:HG21	1:A:3694:SER:HB3	1.93	0.50
1:A:1855:GLN:OE1	1:A:1867:ASN:ND2	2.43	0.50
1:A:1946:VAL:HG22	1:A:2006:VAL:HG21	1.93	0.50
1:A:4485:ARG:HG2	1:A:4513:GLY:HA2	1.92	0.50
1:A:3135:GLN:O	1:A:3137:PRO:HD3	2.12	0.50
1:A:2132:PRO:HB2	1:A:2135:GLU:HB2	1.94	0.50
1:A:2623:SER:OG	1:A:3006:GLU:OE1	2.28	0.50
1:A:2784:PHE:HB2	1:A:2794:TYR:HE2	1.76	0.50
1:A:3927:LEU:HD11	1:A:3957:PHE:HE2	1.77	0.50
1:A:3935:VAL:HG13	1:A:3947:LEU:HD23	1.94	0.50
1:A:1907:PRO:HG2	1:A:1910:THR:HG21	1.93	0.49
1:A:2087:ASP:O	1:A:2148:LYS:NZ	2.45	0.49
1:A:3100:GLU:OE1	1:A:3132:LYS:NZ	2.45	0.49
1:A:2688:GLU:OE1	1:A:2730:HIS:NE2	2.43	0.49
1:A:1507:MET:O	1:A:1513:TYR:HB2	2.12	0.49
1:A:2030:ASP:HB2	1:A:4050:ASP:HB2	1.94	0.49
1:A:1587:LEU:HB3	1:A:1590:ASP:HB2	1.95	0.49
1:A:1664:ILE:HG22	1:A:1676:ILE:HG22	1.94	0.49
1:A:2354:ALA:O	1:A:2358:ARG:HD2	2.13	0.49
1:A:2388:ASP:OD1	1:A:2389:GLU:N	2.46	0.49
1:A:3741:ARG:HD3	1:A:3745:LEU:HG	1.95	0.49
1:A:3650:ASN:HD21	1:A:3695:ARG:HH11	1.60	0.49
1:A:2290:SER:HB2	1:A:2295:LEU:HG	1.95	0.49
1:A:4160:THR:HG23	1:A:4212:LEU:HD21	1.94	0.49
1:A:4503:GLU:O	1:A:4507:ILE:HG23	2.13	0.49
1:A:2275:TRP:NE1	1:A:2277:ASP:OD1	2.43	0.49
1:A:3127:PRO:HG2	1:A:3539:ALA:HB2	1.95	0.49
1:A:4505:LYS:NZ	1:A:4554:ASP:O	2.46	0.49
1:A:1721:VAL:HA	1:A:1724:VAL:HG12	1.95	0.48
1:A:2972:PHE:HB2	1:A:3004:PHE:HE1	1.77	0.48
1:A:1627:PRO:HB3	1:A:1950:GLN:HB3	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2211:TYR:O	1:A:2214:THR:OG1	2.30	0.48
1:A:2972:PHE:HB2	1:A:3004:PHE:CE1	2.49	0.48
1:A:1619:LEU:HD11	1:A:1638:LEU:HG	1.96	0.48
1:A:1674:LEU:HB3	1:A:1685:MET:HE1	1.96	0.48
1:A:3239:LYS:HB3	1:A:3451:TYR:CD1	2.49	0.48
1:A:4453:ASN:O	1:A:4457:LYS:HG2	2.13	0.48
1:A:1978:ILE:HG23	1:A:2012:MET:HE1	1.95	0.48
1:A:3161:LEU:HD23	1:A:3168:THR:HG22	1.95	0.48
1:A:2257:LYS:NZ	1:A:2308:ASP:OD2	2.45	0.48
1:A:3624:GLU:HG3	1:A:3669:ILE:HD13	1.95	0.48
1:A:2956:LEU:HD22	1:A:2989:LYS:HB3	1.95	0.47
1:A:3716:VAL:HG21	1:A:3804:LEU:HD23	1.96	0.47
1:A:3727:LYS:O	1:A:3731:LEU:HD13	2.14	0.47
1:A:3825:TYR:OH	1:A:3879:ASP:OD2	2.27	0.47
1:A:4179:LEU:HD12	1:A:4223:LEU:HD22	1.96	0.47
1:A:3109:PHE:CD2	1:A:3180:ILE:HG22	2.50	0.47
1:A:4176:ARG:NH1	1:A:4220:ASP:OD1	2.47	0.47
1:A:2074:LYS:HB3	1:A:2074:LYS:HE2	1.75	0.47
1:A:2373:MET:HE2	3:A:4702:ATP:C6	2.50	0.47
1:A:2912:PHE:HE2	1:A:2914:GLU:HB2	1.80	0.47
1:A:2066:ALA:HA	1:A:2069:ILE:HG22	1.96	0.47
1:A:2492:ARG:HG2	1:A:2545:TRP:NE1	2.30	0.47
1:A:4215:ALA:HB1	1:A:4247:MET:HE2	1.97	0.47
1:A:2912:PHE:CE2	1:A:2914:GLU:HB2	2.50	0.47
1:A:2224:GLY:O	1:A:2346:GLN:HA	2.15	0.47
1:A:2452:LEU:HD13	1:A:2729:ARG:HE	1.80	0.47
1:A:3471:LYS:HG3	1:A:3474:ARG:HH21	1.80	0.47
1:A:2063:GLU:O	1:A:2067:ASN:ND2	2.48	0.46
1:A:3225:LYS:HZ1	1:A:3464:ASP:HB3	1.80	0.46
1:A:3627:LEU:HD12	1:A:3664:LEU:HD22	1.97	0.46
1:A:3753:LEU:HD21	1:A:3770:LEU:HD11	1.96	0.46
1:A:2892:TYR:HE2	1:A:2953:MET:HE1	1.80	0.46
1:A:4499:GLY:HA3	1:A:4503:GLU:HG3	1.97	0.46
1:A:1853:VAL:HA	1:A:1856:GLN:HG3	1.98	0.46
1:A:2751:PHE:HB3	1:A:2803:VAL:HG11	1.97	0.46
1:A:3721:ARG:HE	1:A:3724:VAL:HG21	1.80	0.46
1:A:3741:ARG:HD3	1:A:3741:ARG:O	2.15	0.46
1:A:4400:ARG:HD2	1:A:4405:ILE:HD11	1.97	0.46
1:A:1895:ALA:HB2	1:A:2037:ARG:HB2	1.97	0.46
1:A:2134:GLN:O	1:A:2138:ILE:HG12	2.16	0.46
1:A:2665:GLU:HB3	1:A:2668:LEU:HD12	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3966:PRO:HD2	1:A:4000:ARG:HG3	1.97	0.46
1:A:2070:VAL:HB	1:A:2071:PRO:HD3	1.96	0.46
1:A:2894:LYS:O	1:A:2898:LYS:HG3	2.16	0.46
1:A:3514:ILE:HD11	1:A:3553:LEU:HD22	1.97	0.46
1:A:2285:ARG:NH1	1:A:2331:GLU:OE2	2.30	0.45
1:A:2590:PRO:O	1:A:2732:PRO:HD2	2.16	0.45
1:A:3133:LEU:HD11	1:A:3141:GLU:HB3	1.97	0.45
1:A:3154:LEU:HD21	1:A:3532:TRP:HZ2	1.81	0.45
1:A:1606:ASP:O	1:A:1610:LYS:HG3	2.16	0.45
1:A:1912:LYS:HB2	1:A:1912:LYS:HE3	1.57	0.45
1:A:2220:LEU:HD22	1:A:2342:MET:HE2	1.99	0.45
1:A:4394:THR:O	1:A:4490:GLN:NE2	2.32	0.45
1:A:4517:PRO:HG2	1:A:4619:ILE:HD12	1.97	0.45
1:A:4009:VAL:HG13	1:A:4013:LEU:HD12	1.99	0.45
1:A:1882:THR:HG22	1:A:2048:LEU:HD23	1.97	0.45
1:A:3457:GLU:O	1:A:3461:ILE:HG12	2.17	0.45
1:A:3588:LEU:HD11	1:A:3638:VAL:HG11	1.98	0.45
1:A:3891:LYS:HD2	1:A:4013:LEU:HD23	1.98	0.45
1:A:3211:THR:O	1:A:3215:VAL:HG13	2.17	0.44
1:A:4186:PHE:O	1:A:4190:ILE:HG12	2.17	0.44
1:A:4381:HIS:HB2	1:A:4438:CYS:HB3	1.99	0.44
1:A:2452:LEU:HD23	1:A:2452:LEU:HA	1.77	0.44
1:A:2961:ILE:HD11	1:A:2998:ASN:HB3	1.99	0.44
1:A:3644:VAL:HG22	1:A:3664:LEU:HD12	1.99	0.44
1:A:3924:ILE:HG12	1:A:3948:ILE:HG23	1.99	0.44
1:A:4516:VAL:HG12	1:A:4519:ALA:H	1.82	0.44
1:A:1885:THR:O	1:A:1889:TYR:CD1	2.70	0.44
1:A:3692:LEU:O	1:A:3696:VAL:HG22	2.18	0.44
1:A:2231:SER:HA	1:A:2234:TRP:CD1	2.53	0.44
1:A:3239:LYS:HB3	1:A:3451:TYR:CE1	2.52	0.44
1:A:4037:PRO:HB2	1:A:4118:PRO:HG2	1.98	0.44
1:A:4209:GLU:O	1:A:4213:ARG:HG3	2.17	0.44
1:A:1699:ASN:OD1	1:A:1700:GLU:N	2.50	0.44
1:A:3783:LYS:O	1:A:3786:GLU:HG2	2.17	0.44
1:A:2671:MET:HG2	1:A:2675:GLY:HA2	1.99	0.44
1:A:3013:ALA:HA	1:A:3088:ARG:HG3	1.98	0.44
1:A:3150:VAL:O	1:A:3154:LEU:HD23	2.17	0.44
1:A:1906:GLY:C	1:A:1907:PRO:O	2.59	0.44
1:A:3731:LEU:HD21	1:A:3790:VAL:HG12	1.99	0.44
1:A:3780:VAL:HA	1:A:3783:LYS:HD2	2.00	0.44
1:A:4069:ILE:HD13	1:A:4080:ALA:HA	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1907:PRO:HG2	1:A:1910:THR:CG2	2.48	0.44
1:A:2369:LEU:HD21	3:A:4702:ATP:O4'	2.18	0.44
1:A:2465:ALA:HB2	1:A:2493:TYR:CD1	2.53	0.44
1:A:2694:ARG:O	1:A:2698:GLN:N	2.51	0.44
1:A:3024:ASP:N	1:A:3024:ASP:OD1	2.51	0.44
1:A:3482:LEU:HD11	1:A:3770:LEU:HD13	2.00	0.43
1:A:4178:ARG:NH2	1:A:4297:PRO:O	2.51	0.43
1:A:3781:THR:O	1:A:3785:GLU:OE1	2.36	0.43
1:A:3792:GLN:O	1:A:3796:THR:HG23	2.19	0.43
1:A:4175:GLU:OE1	1:A:4175:GLU:N	2.50	0.43
1:A:4430:ASP:OD2	1:A:4447:TYR:OH	2.36	0.43
1:A:2776:PHE:HZ	1:A:2846:THR:HG23	1.82	0.43
1:A:3182:HIS:NE2	1:A:3582:ARG:O	2.46	0.43
1:A:3229:LEU:HD11	1:A:3462:LYS:HG3	1.99	0.43
1:A:4190:ILE:HD12	1:A:4201:TRP:CZ2	2.50	0.43
1:A:2012:MET:HE3	1:A:2012:MET:HB3	1.63	0.43
1:A:4318:PRO:HG2	1:A:4325:ASN:HA	1.99	0.43
1:A:1619:LEU:HD21	1:A:1638:LEU:HD23	2.01	0.43
1:A:1945:PHE:HB3	1:A:1978:ILE:HD11	2.01	0.43
1:A:2694:ARG:HG3	1:A:2701:VAL:HG21	2.00	0.43
1:A:3568:PRO:HG2	1:A:3573:CYS:SG	2.59	0.43
1:A:4629:LYS:HE2	1:A:4629:LYS:HB3	1.87	0.43
1:A:1477:LEU:HB3	1:A:1485:ARG:HB3	2.01	0.43
1:A:3010:THR:HG21	1:A:3018:PRO:HD3	2.01	0.43
1:A:4157:MET:HE2	1:A:4157:MET:HB3	1.87	0.43
1:A:2802:TRP:CZ2	1:A:2829:ALA:HB2	2.53	0.42
1:A:3114:ASP:O	1:A:3116:GLU:HG2	2.19	0.42
1:A:3477:ALA:O	1:A:3480:LYS:HG3	2.18	0.42
1:A:3558:GLU:OE2	1:A:3581:LYS:HD3	2.19	0.42
1:A:4448:LEU:HD23	1:A:4448:LEU:HA	1.88	0.42
1:A:1859:ILE:HD11	1:A:1868:TYR:HD1	1.84	0.42
1:A:3741:ARG:HH11	1:A:3745:LEU:HD21	1.84	0.42
1:A:1547:LEU:HD12	1:A:1608:LEU:HD22	2.01	0.42
1:A:1884:LEU:HG	1:A:1884:LEU:O	2.20	0.42
1:A:2773:MET:HG2	1:A:2825:TRP:NE1	2.33	0.42
1:A:3659:ARG:HE	1:A:3661:LEU:HD21	1.84	0.42
1:A:2697:ASP:OD1	1:A:2697:ASP:N	2.53	0.42
1:A:2867:MET:HB3	1:A:2869:ARG:HH21	1.85	0.42
1:A:3478:LEU:HD11	1:A:3767:ILE:HG23	2.00	0.42
1:A:3741:ARG:HG3	1:A:3780:VAL:HG21	2.00	0.42
1:A:4525:ARG:HG3	1:A:4592:TRP:CZ3	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3238:ASP:HA	1:A:3241:LYS:HD2	2.00	0.42
1:A:1547:LEU:HD23	1:A:1547:LEU:HA	1.89	0.42
1:A:1598:GLN:O	1:A:1602:GLU:HG3	2.18	0.42
1:A:1626:PHE:HB3	1:A:1629:PHE:CD2	2.54	0.42
1:A:2538:GLU:HB3	1:A:2548:TRP:CE2	2.55	0.42
1:A:2615:MET:SD	1:A:2707:GLN:NE2	2.93	0.42
1:A:2446:ILE:HD12	1:A:2446:ILE:HA	1.93	0.42
1:A:2688:GLU:HB2	1:A:2730:HIS:CE1	2.54	0.42
1:A:4452:ILE:O	1:A:4456:VAL:HG23	2.19	0.42
1:A:1738:TYR:HE2	1:A:1792:LEU:HD21	1.85	0.42
1:A:2245:GLU:OE1	1:A:2298:ARG:NH2	2.43	0.42
1:A:4258:ASN:HB3	1:A:4261:ASP:HB2	2.02	0.42
1:A:2065:LEU:HD22	1:A:2137:LEU:HD22	2.00	0.41
1:A:3994:GLN:HB2	1:A:4001:LEU:HD13	2.02	0.41
1:A:1543:ARG:HA	1:A:1546:TYR:CE2	2.55	0.41
1:A:2571:THR:H	1:A:2574:THR:HB	1.84	0.41
1:A:2633:LYS:HD2	1:A:3019:GLY:HA3	2.02	0.41
1:A:2896:ARG:HG3	1:A:2953:MET:HE3	2.02	0.41
1:A:2901:TYR:CZ	1:A:2908:PRO:HA	2.54	0.41
1:A:4276:ARG:HE	1:A:4276:ARG:HA	1.84	0.41
1:A:1836:PHE:HA	1:A:1839:LEU:HB2	2.03	0.41
1:A:2047:GLN:HA	1:A:2070:VAL:HG21	2.02	0.41
1:A:2320:ASP:HB3	1:A:2321:ASP:H	1.57	0.41
1:A:2374:ILE:HD13	1:A:2452:LEU:HD21	2.01	0.41
1:A:2413:LEU:HD12	1:A:2413:LEU:HA	1.89	0.41
1:A:1550:ILE:O	1:A:1554:SER:OG	2.35	0.41
1:A:4260:PHE:CE2	1:A:4608:PRO:HB3	2.56	0.41
1:A:4288:VAL:HG21	1:A:4292:LYS:HE2	2.01	0.41
1:A:4534:TRP:HE3	1:A:4539:LEU:HD21	1.86	0.41
1:A:1538:ILE:HG23	1:A:1539:ASP:H	1.86	0.41
1:A:2069:ILE:HD12	1:A:2069:ILE:HA	1.91	0.41
1:A:3096:ASP:OD1	1:A:3097:TRP:N	2.51	0.41
1:A:4511:LEU:HD23	1:A:4511:LEU:HA	1.92	0.41
1:A:1493:LEU:HD21	1:A:1534:PHE:CD2	2.56	0.41
1:A:3873:ARG:HD3	1:A:3873:ARG:HA	1.83	0.41
1:A:4260:PHE:HZ	1:A:4621:THR:HG22	1.86	0.41
1:A:2231:SER:OG	1:A:2344:GLU:OE2	2.39	0.41
1:A:2307:VAL:HA	1:A:2311:TRP:HE1	1.84	0.41
1:A:2490:ILE:HD13	1:A:2490:ILE:HA	1.93	0.41
1:A:3115:LEU:HD22	1:A:3143:ILE:HG13	2.03	0.41
1:A:4215:ALA:HA	1:A:4251:ILE:HD13	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:4002:LEU:HD11	1:A:4335:GLN:HB3	2.01	0.41
1:A:4248:ALA:O	1:A:4253:GLY:HA3	2.21	0.41
1:A:1640:ILE:HD11	1:A:1653:HIS:HB3	2.03	0.41
1:A:1878:LYS:HE3	1:A:1878:LYS:HB3	1.61	0.41
1:A:2629:GLU:OE1	1:A:2633:LYS:HE3	2.21	0.41
1:A:3039:LYS:HB3	1:A:3039:LYS:HE3	1.74	0.41
1:A:3127:PRO:O	1:A:3145:ASN:ND2	2.51	0.41
1:A:3786:GLU:O	1:A:3790:VAL:HG23	2.20	0.41
1:A:4312:LEU:HD23	1:A:4312:LEU:HA	1.93	0.41
1:A:4401:THR:O	1:A:4405:ILE:HG12	2.20	0.41
1:A:2548:TRP:CD1	1:A:2576:ARG:HG2	2.56	0.41
1:A:3113:MET:HE1	1:A:3183:TYR:CD2	2.56	0.41
1:A:3148:VAL:O	1:A:3152:GLN:HG3	2.20	0.41
1:A:4543:VAL:HG13	1:A:4588:THR:HG23	2.02	0.41
1:A:3214:GLN:O	1:A:3217:GLU:HG2	2.21	0.40
1:A:4099:VAL:HB	1:A:4106:LEU:HD21	2.03	0.40
1:A:4297:PRO:HG3	1:A:4308:TRP:CD2	2.55	0.40
1:A:2068:LYS:NZ	1:A:2164:VAL:O	2.43	0.40
1:A:3085:LEU:HD23	1:A:3085:LEU:HA	1.92	0.40
1:A:1814:GLU:O	1:A:1818:GLN:HG3	2.21	0.40
1:A:2231:SER:HB2	3:A:4702:ATP:O1A	2.21	0.40
1:A:2413:LEU:O	1:A:2417:ARG:HG3	2.21	0.40
1:A:3909:LEU:HB3	1:A:4344:LEU:HD13	2.02	0.40
1:A:2894:LYS:HG3	1:A:2911:LEU:HD12	2.03	0.40
1:A:2975:ASP:O	1:A:2979:VAL:HG23	2.21	0.40
1:A:3731:LEU:HD21	1:A:3790:VAL:CG1	2.51	0.40
1:A:4415:ARG:HE	1:A:4415:ARG:HB3	1.72	0.40
1:A:3199:MET:HE3	1:A:3200:HIS:CE1	2.56	0.40
1:A:3546:ASP:OD1	1:A:3546:ASP:N	2.52	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	2929/4646 (63%)	2879 (98%)	50 (2%)	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	2605/4125 (63%)	2602 (100%)	3 (0%)	92	97

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1878	LYS
1	A	2047	GLN
1	A	4573	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (36) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1465	GLN
1	A	1598	GLN
1	A	1855	GLN
1	A	1867	ASN
1	A	1894	GLN
1	A	2057	GLN
1	A	2109	GLN
1	A	2134	GLN
1	A	2217	ASN
1	A	2263	HIS
1	A	2464	GLN
1	A	2713	ASN
1	A	3009	ASN
1	A	3152	GLN
1	A	3200	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	3233	ASN
1	A	3237	ASN
1	A	3499	GLN
1	A	3526	GLN
1	A	3602	ASN
1	A	3622	ASN
1	A	3709	GLN
1	A	3744	GLN
1	A	3820	GLN
1	A	3838	ASN
1	A	3877	HIS
1	A	3968	GLN
1	A	4012	ASN
1	A	4098	ASN
1	A	4114	HIS
1	A	4156	ASN
1	A	4231	GLN
1	A	4249	GLN
1	A	4307	GLN
1	A	4429	GLN
1	A	4477	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 2 are monoatomic - leaving 4 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
2	ADP	A	4703	-	24,29,29	0.93	1 (4%)	29,45,45	0.79	1 (3%)
2	ADP	A	4704	-	24,29,29	0.79	0	29,45,45	0.91	2 (6%)
2	ADP	A	4701	4	24,29,29	0.80	0	29,45,45	0.74	1 (3%)
3	ATP	A	4702	4	28,33,33	0.85	1 (3%)	34,52,52	0.87	1 (2%)

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	ADP	A	4703	-	-	2/12/32/32	0/3/3/3
2	ADP	A	4704	-	-	5/12/32/32	0/3/3/3
2	ADP	A	4701	4	-	0/12/32/32	0/3/3/3
3	ATP	A	4702	4	-	4/18/38/38	0/3/3/3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	4702	ATP	C1'-N9	-2.12	1.44	1.49
2	A	4703	ADP	C8-N7	-2.05	1.31	1.34

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	4703	ADP	C5-C6-N6	2.46	124.05	120.31
2	A	4704	ADP	C5-C6-N6	2.28	123.78	120.31
3	A	4702	ATP	C5-C6-N6	2.26	123.75	120.31
2	A	4701	ADP	C5-C6-N6	2.25	123.74	120.31
2	A	4704	ADP	C4'-O4'-C1'	-2.24	107.88	109.92

There are no chirality outliers.

All (11) torsion outliers are listed below:

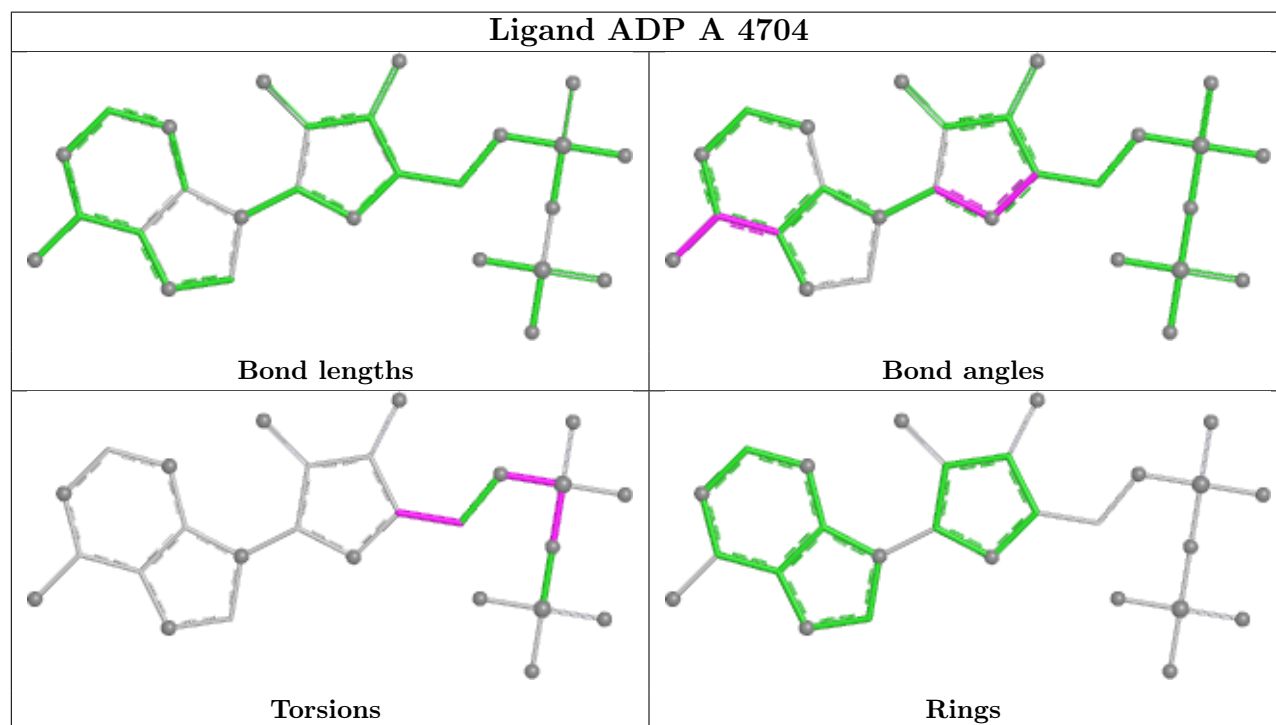
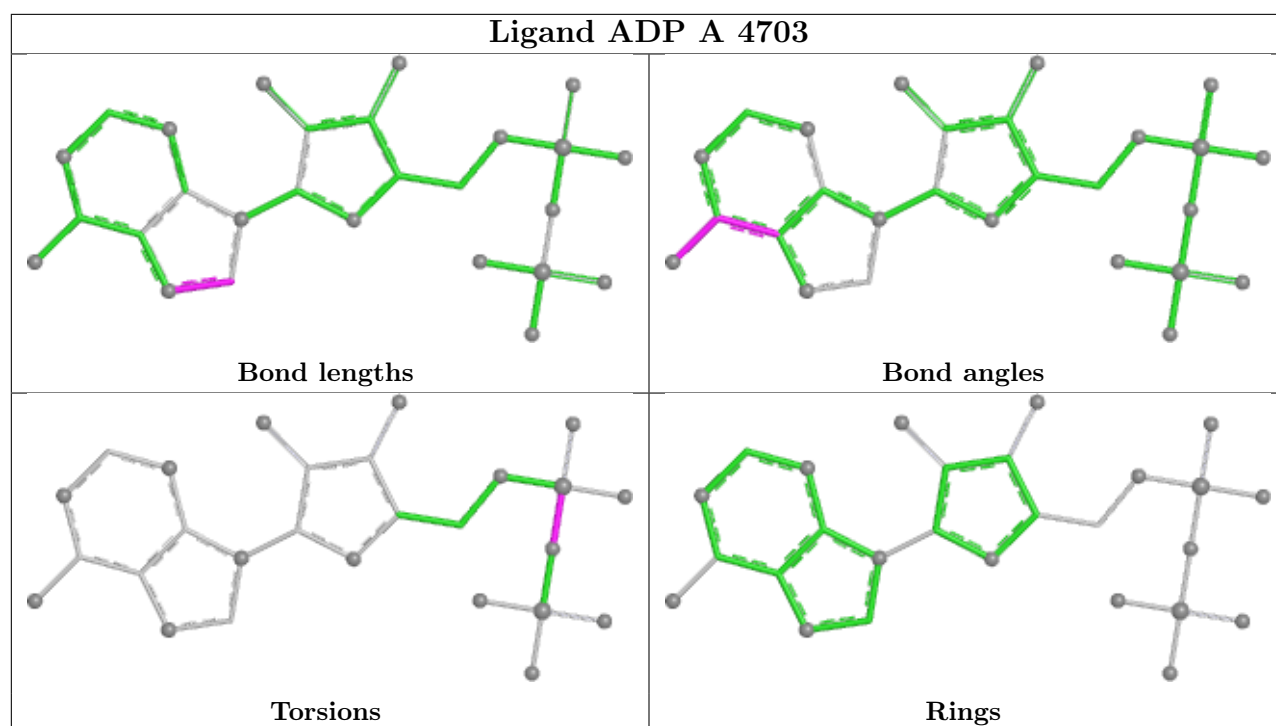
Mol	Chain	Res	Type	Atoms
2	A	4704	ADP	C5'-O5'-PA-O1A
3	A	4702	ATP	O4'-C4'-C5'-O5'
2	A	4704	ADP	O4'-C4'-C5'-O5'
2	A	4704	ADP	C3'-C4'-C5'-O5'
3	A	4702	ATP	C3'-C4'-C5'-O5'
2	A	4703	ADP	PB-O3A-PA-O2A
2	A	4704	ADP	PB-O3A-PA-O2A
2	A	4704	ADP	PB-O3A-PA-O1A
3	A	4702	ATP	PA-O3A-PB-O1B
3	A	4702	ATP	PA-O3A-PB-O2B
2	A	4703	ADP	PB-O3A-PA-O1A

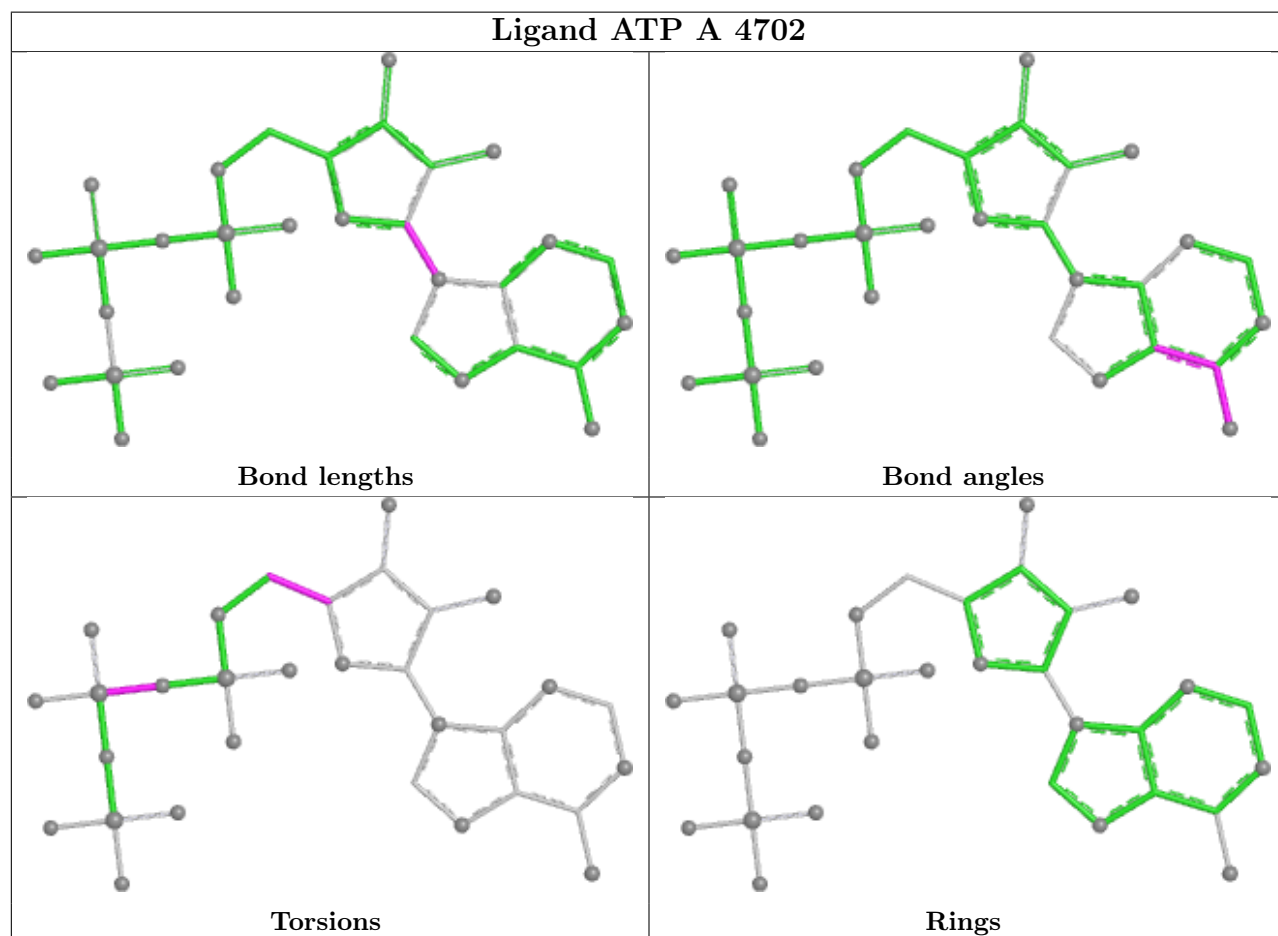
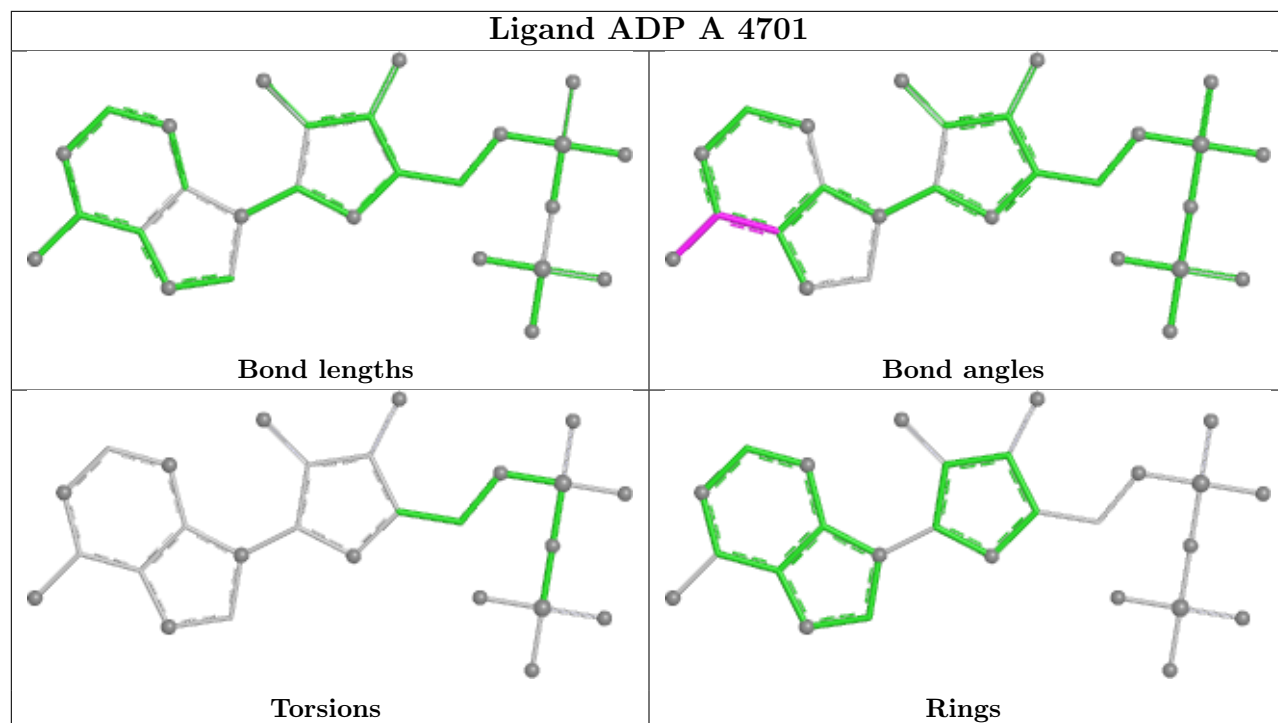
There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	4704	ADP	1	0
3	A	4702	ATP	5	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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

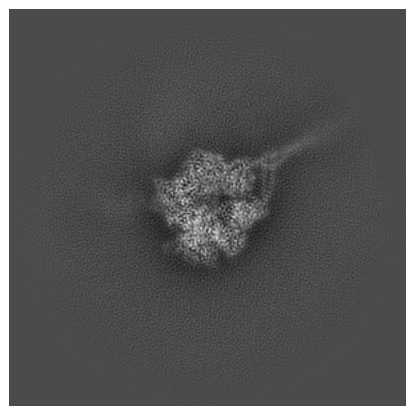
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-44716. These allow visual inspection of the internal detail of the map and identification of artifacts.

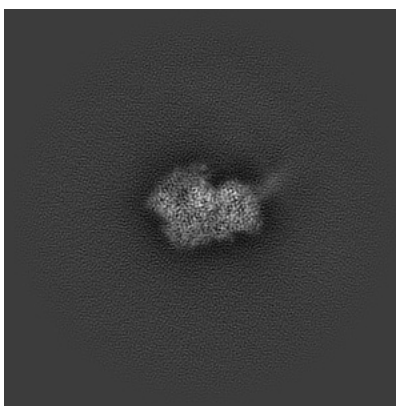
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

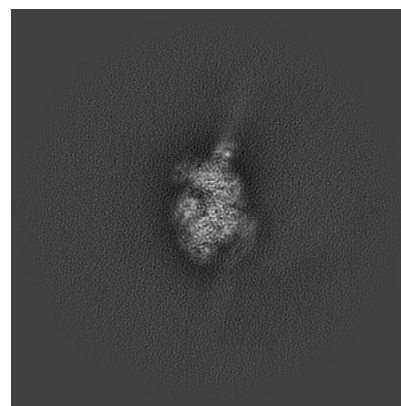
6.1.1 Primary map



X

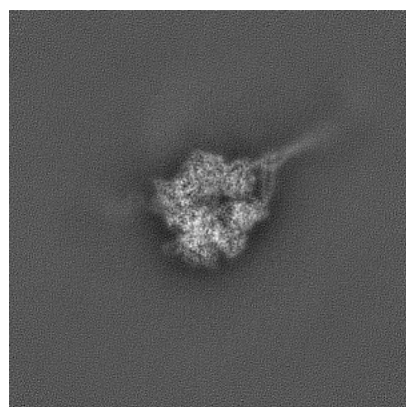


Y

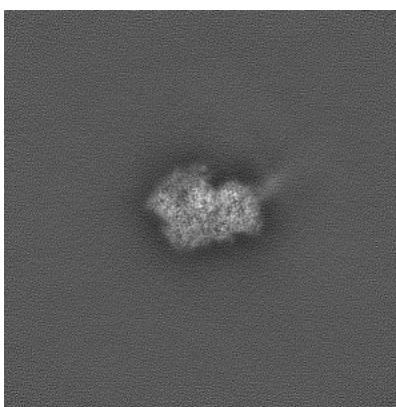


Z

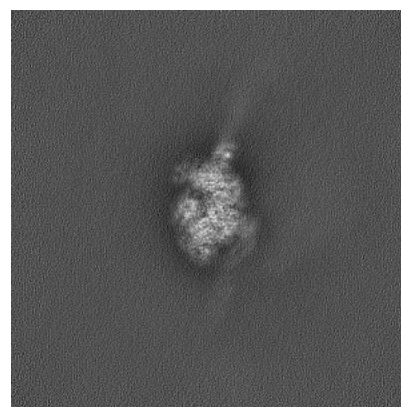
6.1.2 Raw map



X



Y

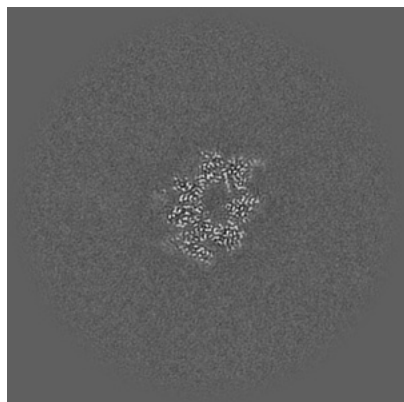


Z

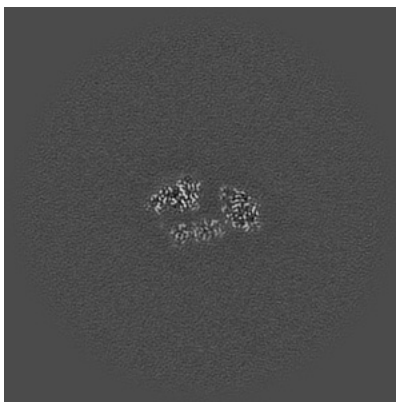
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

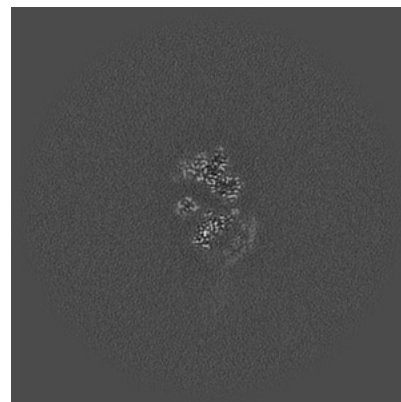
6.2.1 Primary map



X Index: 192

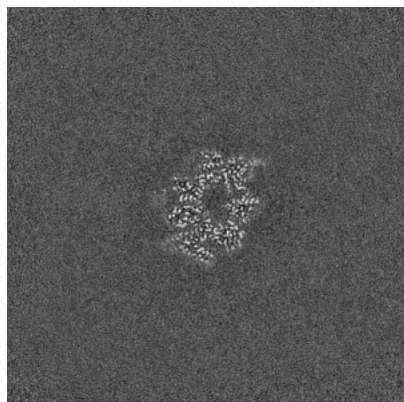


Y Index: 192

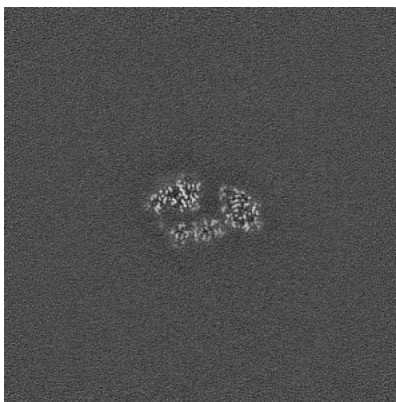


Z Index: 192

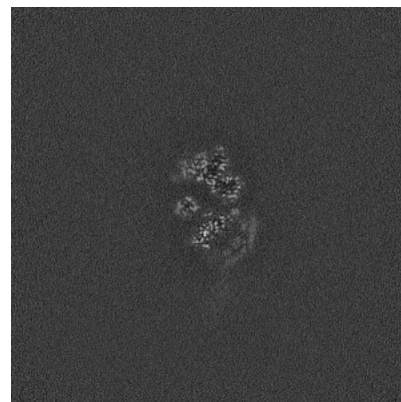
6.2.2 Raw map



X Index: 192



Y Index: 192

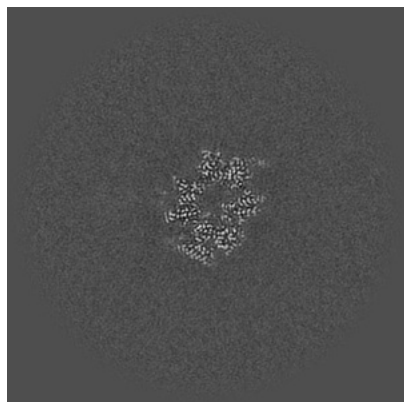


Z Index: 192

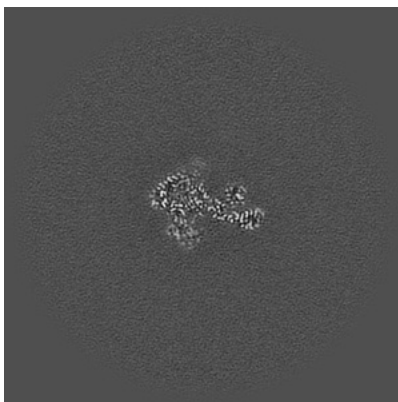
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

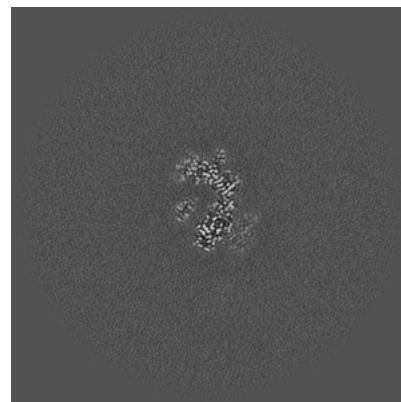
6.3.1 Primary map



X Index: 194

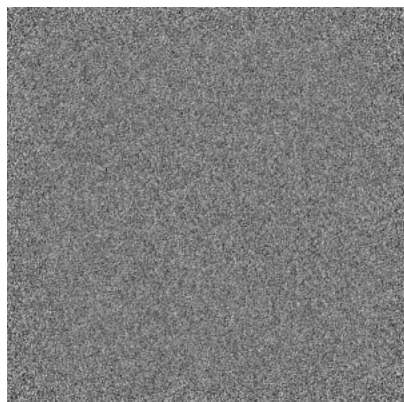


Y Index: 181

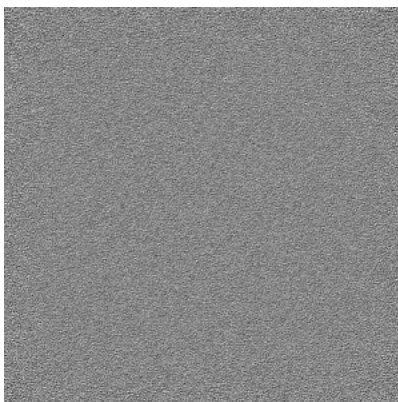


Z Index: 185

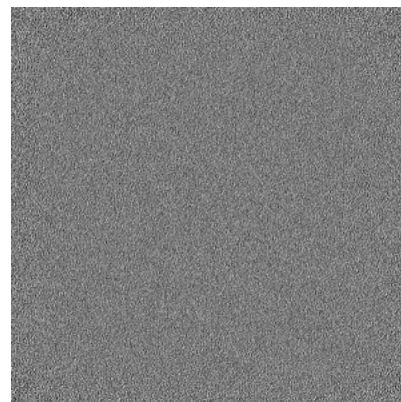
6.3.2 Raw map



X Index: 0



Y Index: 0

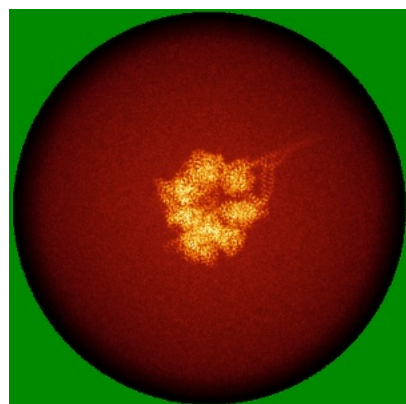


Z Index: 0

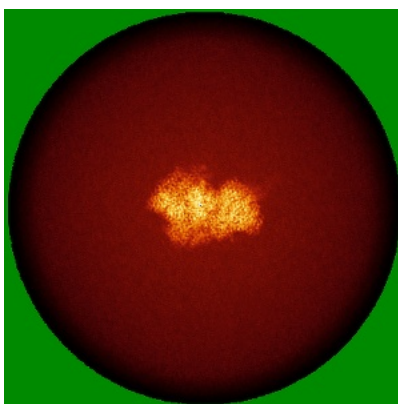
The images above show the largest variance slices of the map in three orthogonal directions.

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

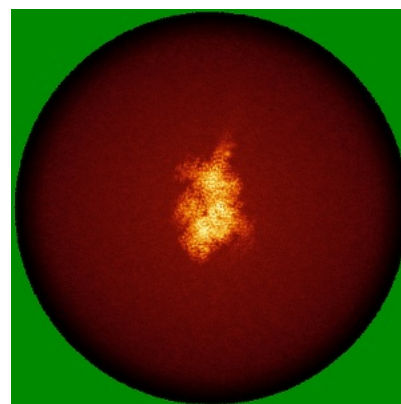
6.4.1 Primary map



X

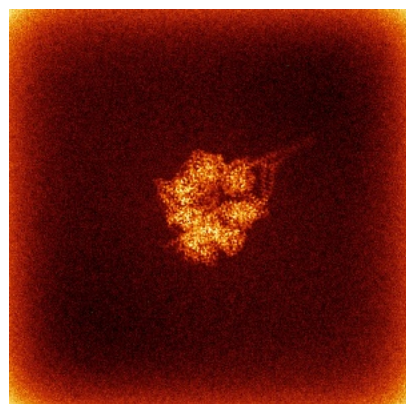


Y

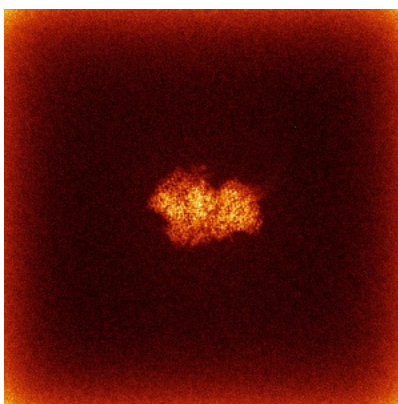


Z

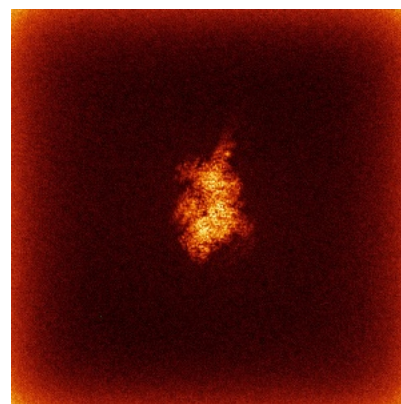
6.4.2 Raw map



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



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.33. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X



Y



Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

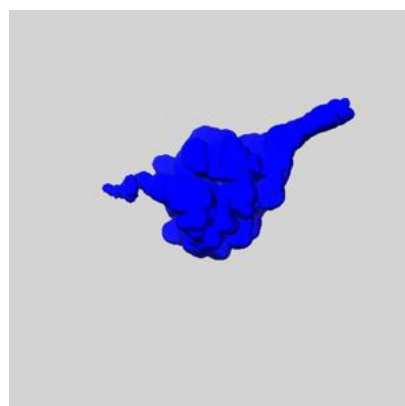
6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

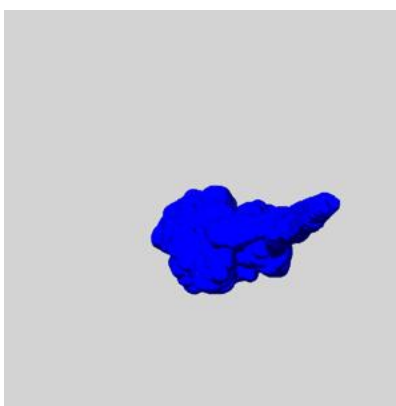
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

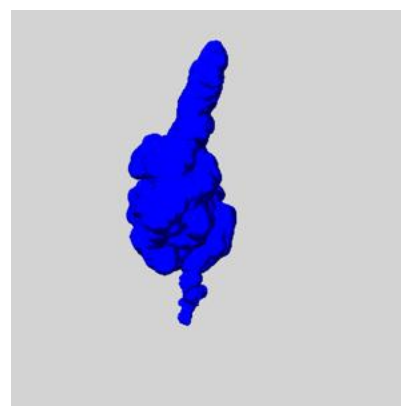
6.6.1 emd_44716_msk_1.map [i](#)



X



Y

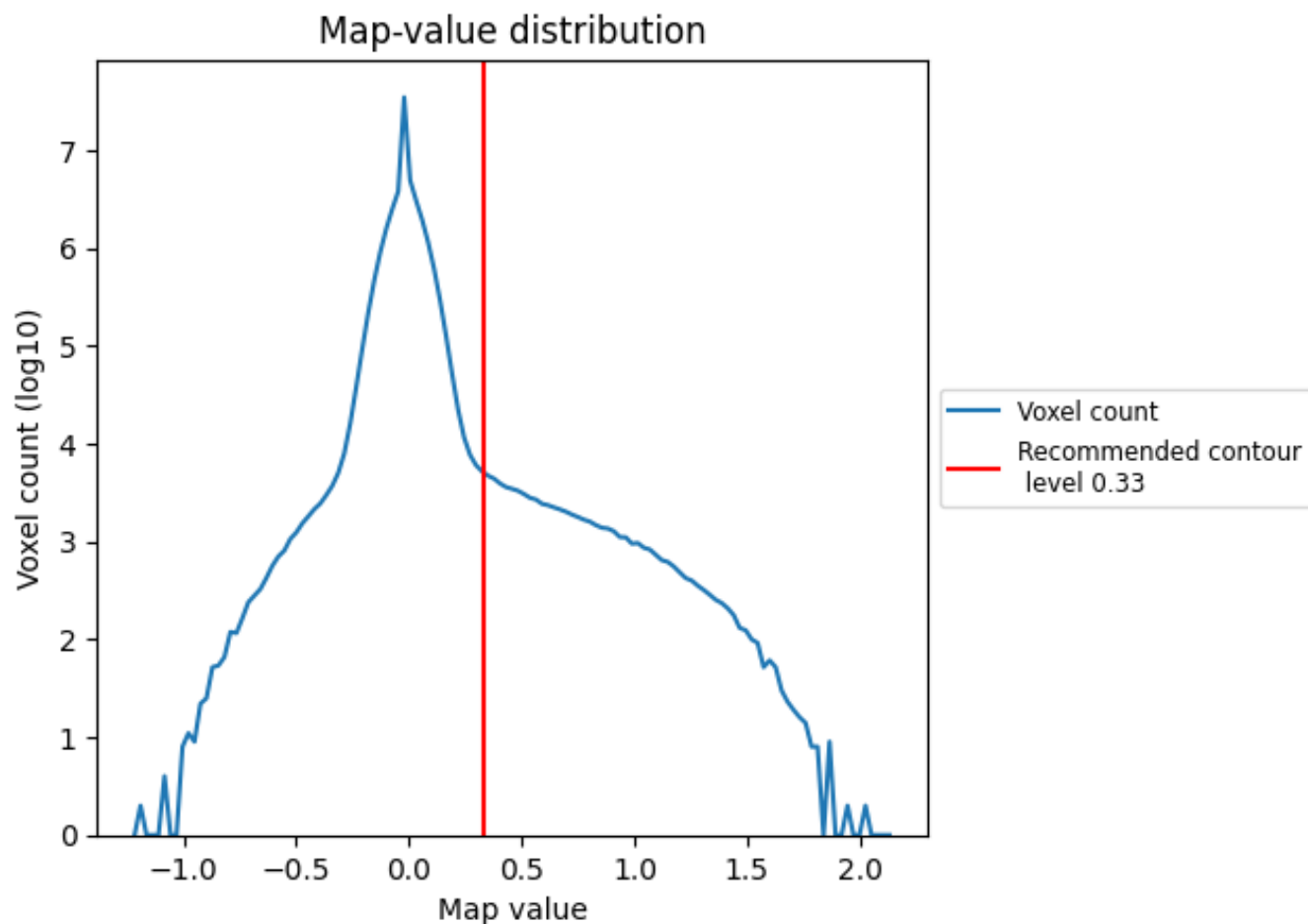


Z

7 Map analysis [i](#)

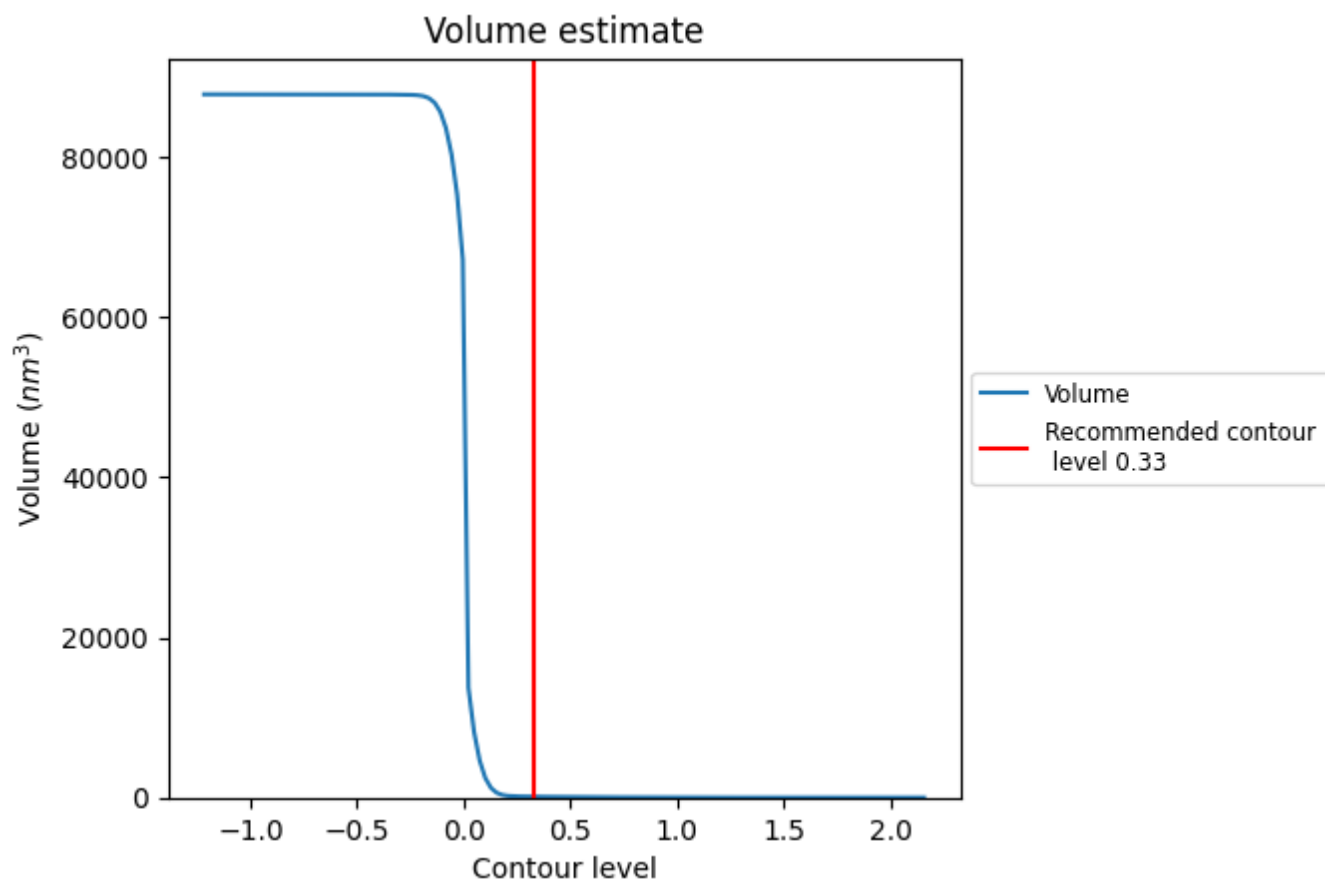
This section contains the results of statistical analysis of the map.

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.

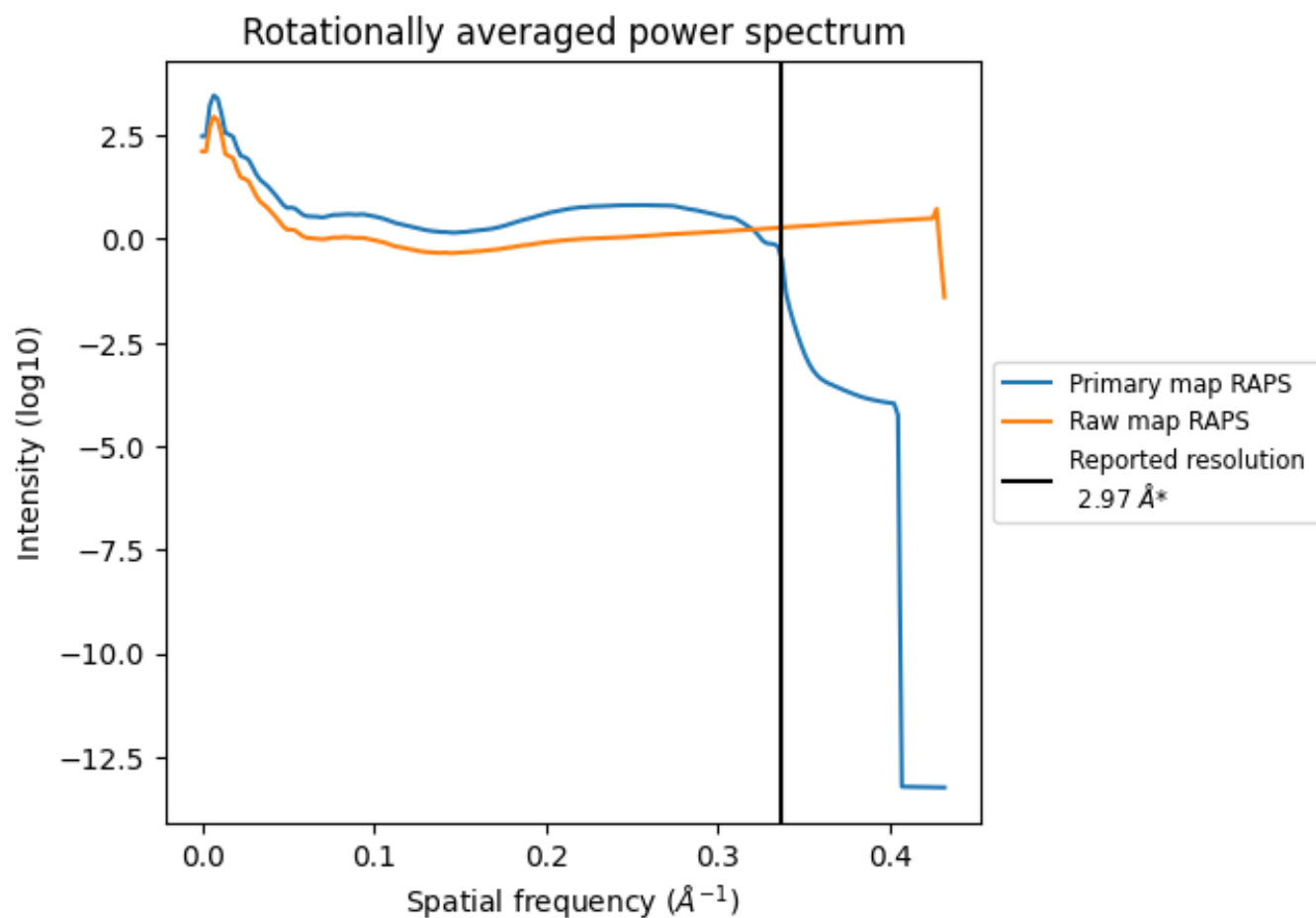
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 112 nm³; this corresponds to an approximate mass of 101 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 ⓘ

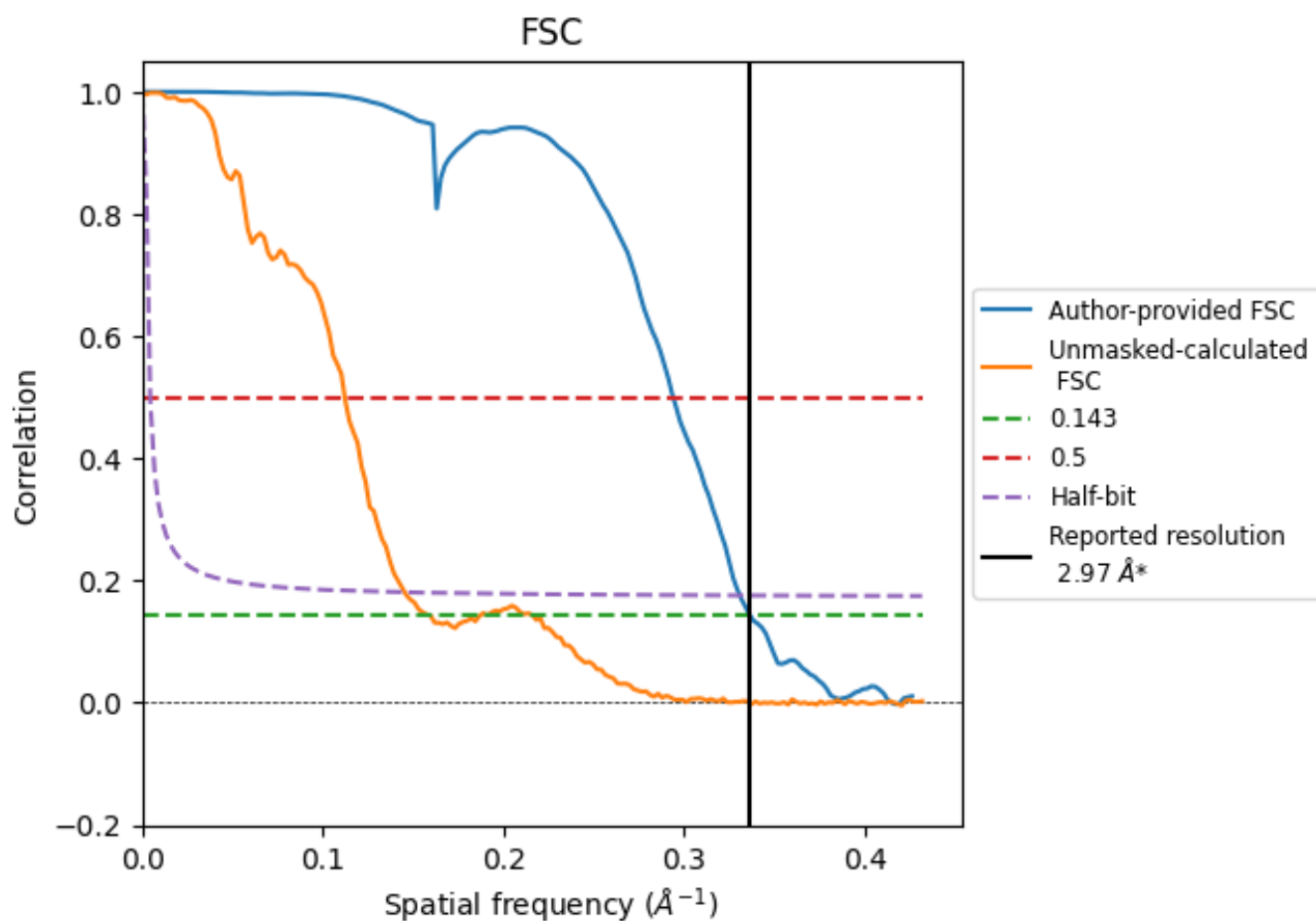


*Reported resolution corresponds to spatial frequency of 0.337 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of $0.337 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

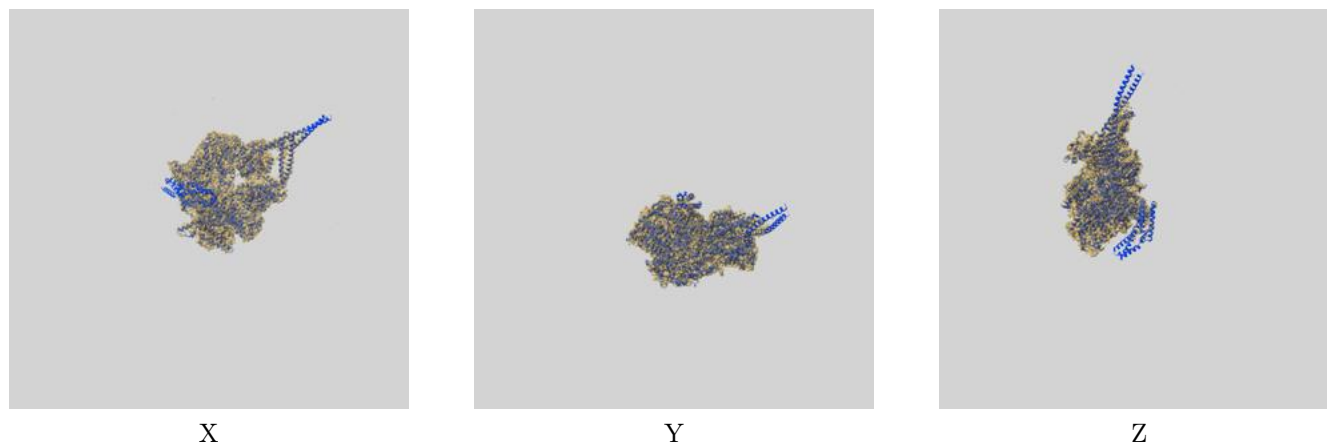
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.97	-	-
Author-provided FSC curve	2.97	3.40	3.02
Unmasked-calculated*	6.29	8.91	6.88

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.29 differs from the reported value 2.97 by more than 10 %

9 Map-model fit [i](#)

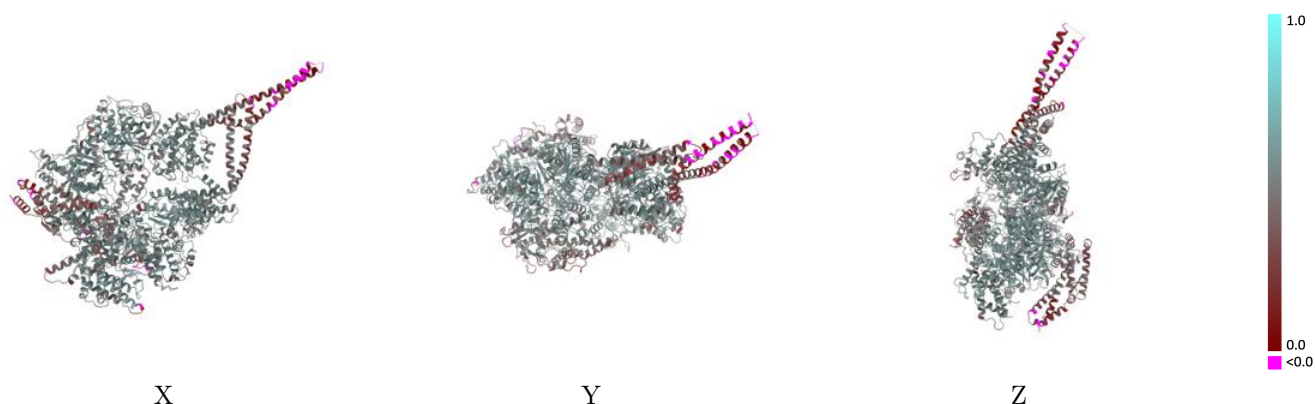
This section contains information regarding the fit between EMDB map EMD-44716 and PDB model 9BMZ. Per-residue inclusion information can be found in [section 3](#) on [page 5](#).

9.1 Map-model overlay [i](#)



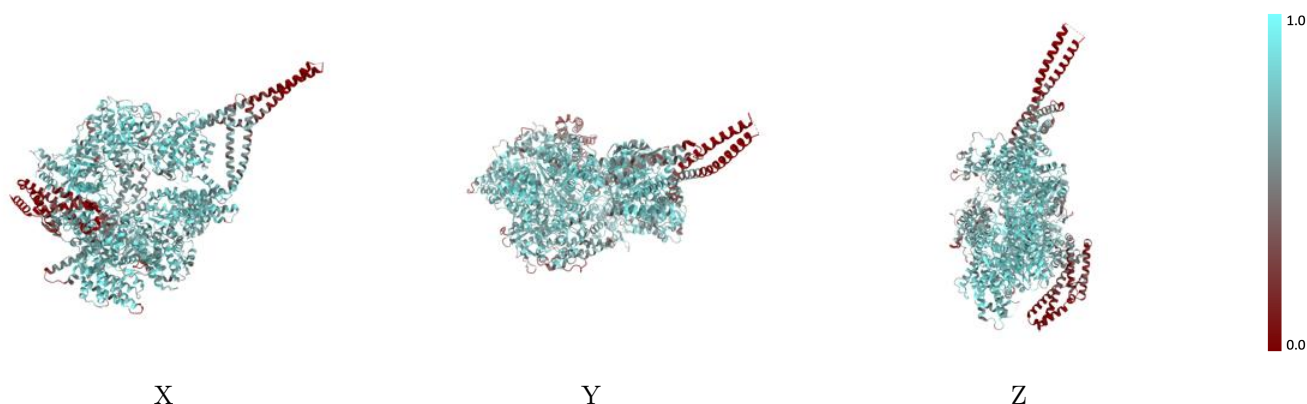
The images above show the 3D surface view of the map at the recommended contour level 0.33 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



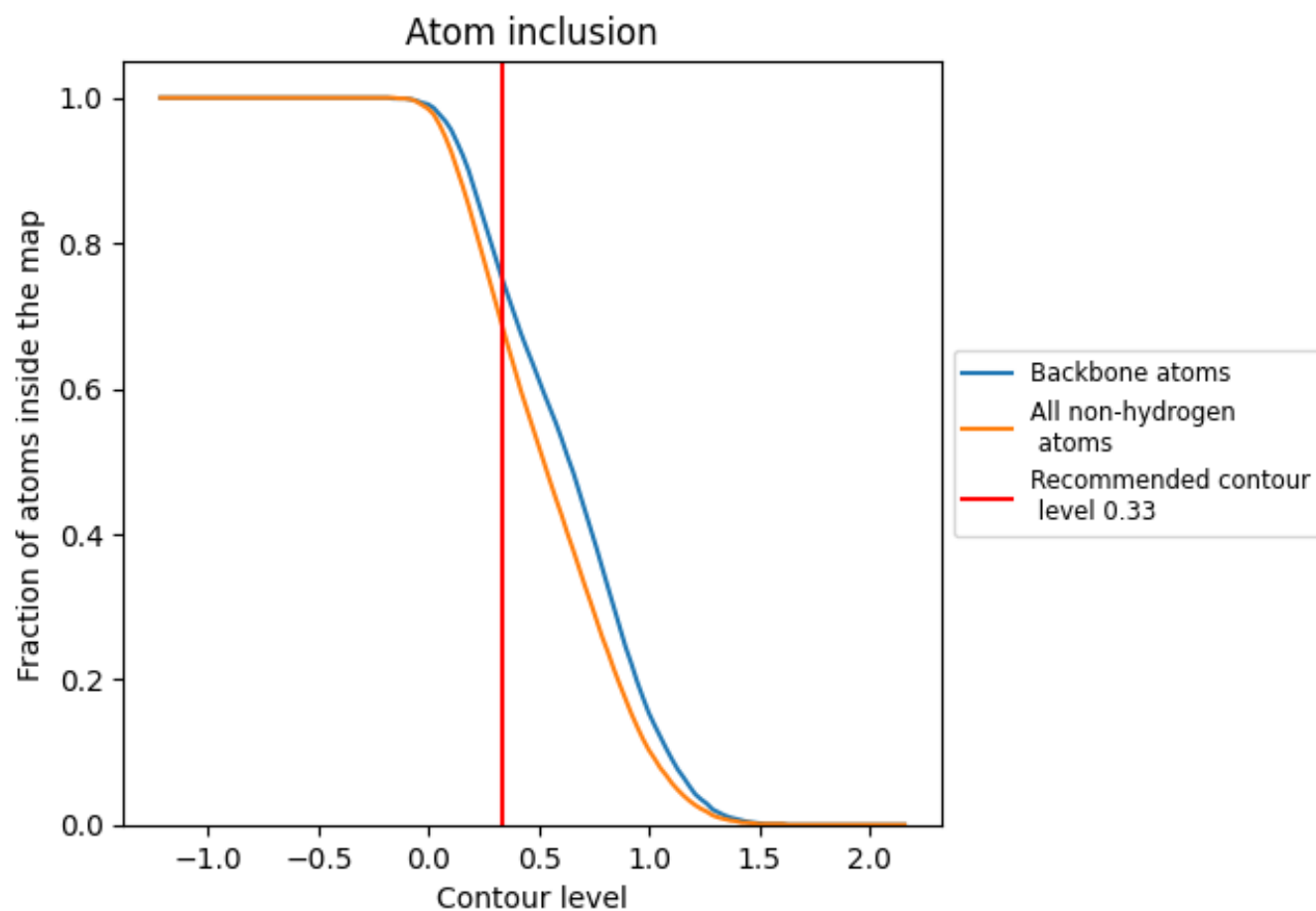
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.33).

9.4 Atom inclusion [i](#)



At the recommended contour level, 75% of all backbone atoms, 69% 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 (0.33) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6890	0.4900
A	0.6890	0.4900

