



Full wwPDB EM Validation Report ⓘ

Jan 26, 2026 – 05:11 PM EST

PDB ID : 9MFV / pdb_00009mfv
EMDB ID : EMD-48239
Title : Motor domain with Apo AAA1 and ADP AAA3 from yeast full-length dynein-1 in 0.1 mM ATP condition
Authors : Geohring, I.C.; Chai, P.; Iyer, B.R.
Deposited on : 2024-12-10
Resolution : 3.30 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.dev129
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.47

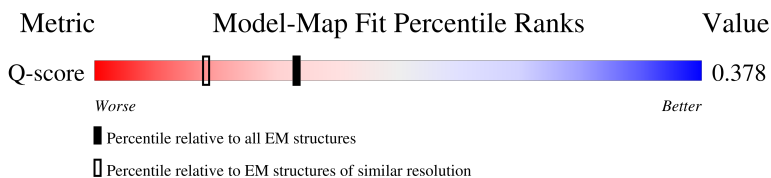
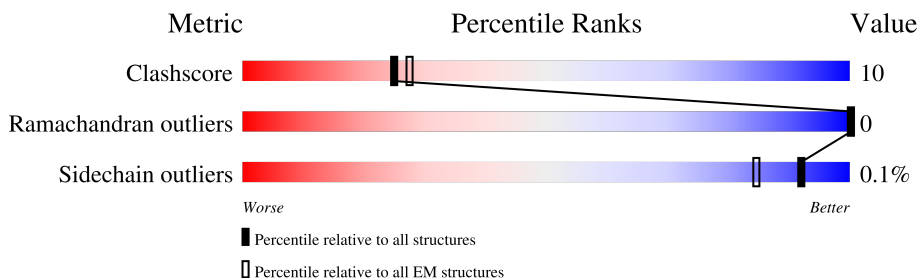
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.30 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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	15087 (2.80 - 3.80)

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	4092	

2 Entry composition [i](#)

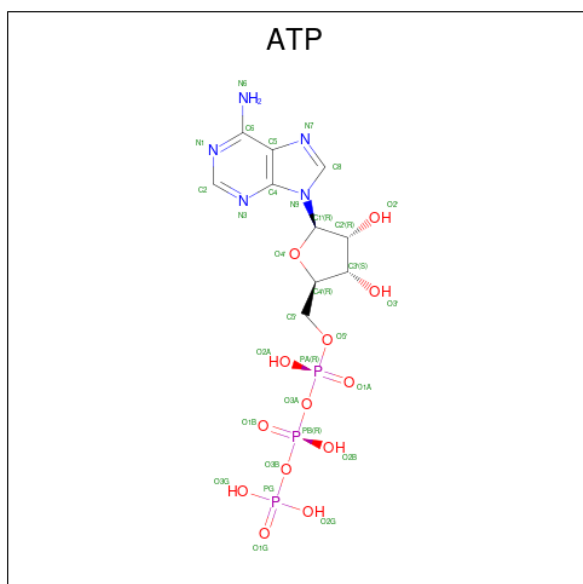
There are 4 unique types of molecules in this entry. The entry contains 21010 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Dynein heavy chain, cytoplasmic.

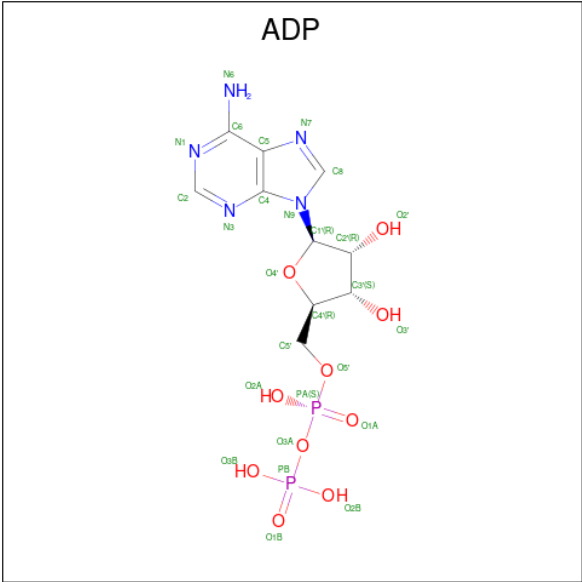
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	2583	20924	13431	3476	3920	97	0	0

- Molecule 2 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
			Total	C	N	O	P	
2	A	1	31	10	5	13	3	0

- Molecule 3 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
3	A	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	A	1	Total	C	N	O	P	0
			27	10	5	10	2	

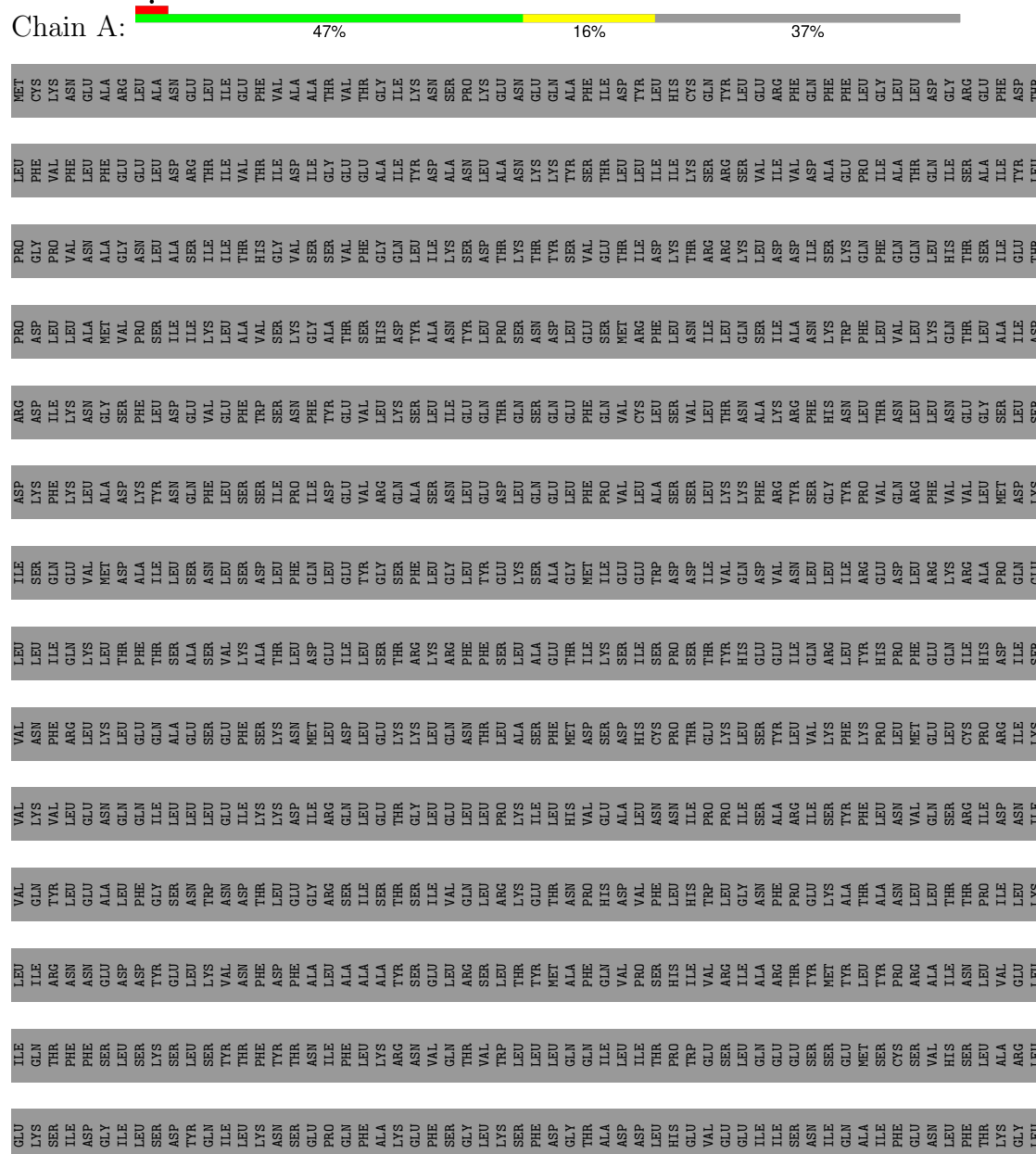
- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

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

3 Residue-property plots

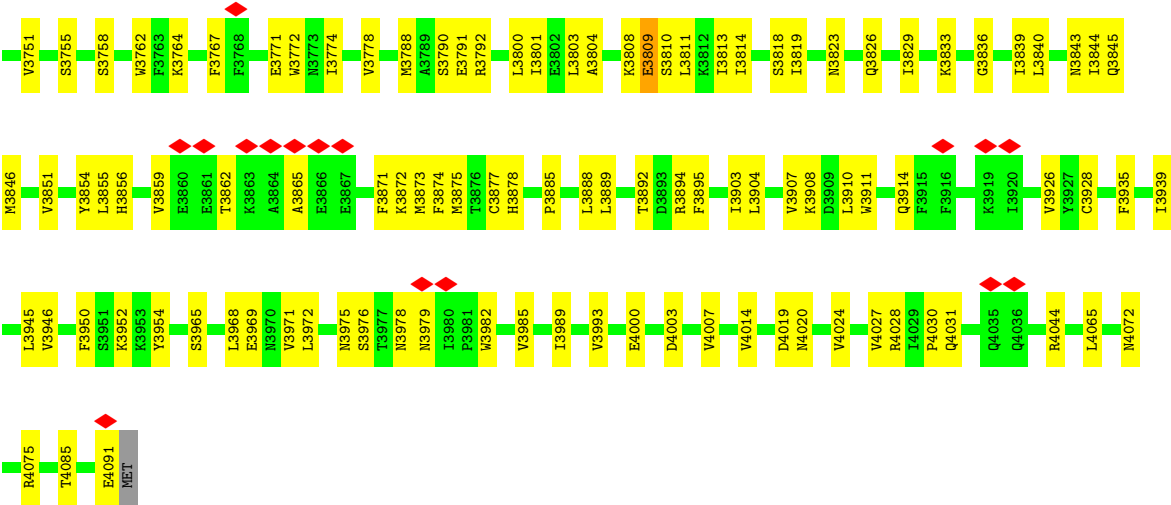
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Dynein heavy chain, cytoplasmic





K3659	K3660	S3661	K3662	E3663	T3664	R3665	A3666	A3667	R3668	T3669	V3670	D3672	W3676	Y3679	Q3680	Q3685	F3686	S3687	A3688	L3689	L3690	K3694	N3695	N3696	K3700	Y3706	K3707	I3710	V3719	L3720	T3721	K3722	L3723	G3724	V3725	L3726	S3727	E3728	V3738	D3739	T3740	N3741	K3742	D3743	L3744	R3745	L3746	K3747	W3748
L3567	L3570	S3573	Q3574	G3575	N3576	M3577	L3578	E3579	N3580	L3581	E3582	V3585	T3586	L3587	N3588	L3589	K3590	K3591	E3592	A3593	K3594	M3595	N3596	K3600	L3601	S3602	E3603	S3604	E3605	F3611	V3615	E3616	E3617	Y3618	G3622	K3623	I3628	M3631	L3632	E3633	K3634	G3643	I3644	L3650	R3655	I3658			
F3458	D3459	P3460	I3461	S3462	K3463	S3467	R3468	E3469	N3475	R3476	V3477	V3488	H3497	D3500	S3511	R3512	V3513	F3518	V3519	S3524	T3525	E3526	T3527	R3528	S3529	F3530	D3531	I3532	T3533	L3534	T3535	Q3542	L3548	I3549	K3550	L3551	N3552	T3553	E3554	Y3555	K3556	L3557	K3558	N3561	L3562	E3563	K3564		
SER	LEU	LYS	THR	LYS	ALA	ASN	LEU	LEU	ALA	GLU	THR	GLN	ASP	LEU	GLU	ALA	ARG	TYR	LEU	LEU	LEU	ILE	ASP	ASN	ARG	VAL	GLN	ALA	ILE	LYS	THR	GLU	THR	MET	ASN	VAL	GLN	ALA	SER	ILE	SER	LEU	VAL	K3297	K3298	L3299			
ILE	ARG	LYS	TYR	MET	GLU	SER	PHE	LEU	LEU	ASN	THR	GLU	GLY	VAL	THR	ILE	GLY	GLN	PRO	ASN	ASN	PHE	THR	GLU	ASN	VAL	THR	ALA	ALA	LYS	TRP	ARG	VAL	ASN	ILE	GLN	ASN	ILE	ASN	THR	THR	THR	THR	GLN	GLN				
LEU	THR	GLU	ILE	ARG	GLU	SER	VAL	ASN	PRO	PRO	GLY	ALA	THR	LYS	VAL	ILE	GLY	GLN	PHE	ASN	VAL	GLY	ASP	GLU	THR	ASN	ILE	GLN	ALA	ILE	TRP	ARG	ASP	ILE	GLN	ASN	ILE	GLN	ASN	THR	THR	THR	THR	GLN					
W3306	F3313	S3314	K3315	T3316	S3317	Q3318	I3325	I3326	S3327	Y3330	F3334	R3342	A3343	D3344	K3345	L3346	L3349	K3350	F3366	I3367	L3370	L3373	D3374	E3375	K3376	M3377	W3379	E3392	N3393	F3406	D3409	P3410	S3411	S3412	I3415	S3419	T3426	F3431	L3432	F3457									
F3458	D3459	P3460	I3461	S3462	K3463	S3467	R3468	E3469	N3475	R3476	V3477	V3488	H3497	D3500	S3511	R3512	V3513	F3518	V3519	S3524	T3525	E3526	T3527	R3528	S3529	F3530	D3531	I3532	T3533	L3534	T3535	Q3542	L3548	I3549	K3550	L3551	N3552	T3553	E3554	Y3555	K3556	L3557	K3558	N3561	L3562	E3563	K3564		
L3567	L3570	S3573	Q3574	G3575	N3576	M3577	L3578	E3579	N3580	L3581	E3582	V3585	T3586	L3587	N3588	L3589	K3590	K3591	E3592	A3593	K3594	M3595	N3596	K3600	L3601	S3602	E3603	S3604	E3605	F3611	V3615	E3616	E3617	Y3618	G3622	K3623	I3628	M3631	L3632	E3633	K3634	G3643	I3644	L3650	R3655	I3658			
K3659	K3660	S3661	K3662	E3663	T3664	R3665	A3666	A3667	R3668	T3669	V3670	D3672	W3676	Y3679	Q3680	Q3685	F3686	S3687	A3688	L3689	L3690	K3694	N3695	N3696	K3700	Y3706	K3707	I3710	V3719	L3720	T3721	K3722	L3723	G3724	V3725	L3726	S3727	E3728	V3738	D3739	T3740	N3741	K3742	D3743	L3744	R3745	L3746	K3747	W3748



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	63405	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	45000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.080	Depositor
Minimum map value	-0.450	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.037	Depositor
Recommended contour level	0.2	Depositor
Map size ($\text{\AA}$)	333.312, 333.312, 333.312	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.302, 1.302, 1.302	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: ADP, ATP, MG

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	0.19	0/21345	0.33	0/28844

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	3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	2471	LEU	Peptide
1	A	3655	ARG	Sidechain
1	A	3809	GLU	Peptide

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	20924	0	21050	434	0
2	A	31	0	12	1	0
3	A	54	0	24	4	0
4	A	1	0	0	0	0
All	All	21010	0	21086	434	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 10.

All (434) 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:1630:LEU:HD21	1:A:1639:VAL:HG11	1.57	0.87
1:A:1878:HIS:HA	1:A:1886:THR:O	1.81	0.80
1:A:3561:ASN:HA	1:A:3564:LYS:HE2	1.65	0.78
1:A:3410:PRO:HD3	1:A:3519:VAL:HG12	1.67	0.77
1:A:2401:GLU:OE2	1:A:2430:ASN:ND2	2.18	0.76
1:A:3809:GLU:HG2	1:A:3810:SER:HB3	1.67	0.75
1:A:1569:ILE:HA	1:A:1584:SER:HA	1.72	0.71
1:A:1331:LEU:HD12	1:A:1336:GLU:HG3	1.71	0.71
1:A:2489:ILE:HG22	1:A:2535:CYS:HB3	1.72	0.71
1:A:2286:THR:OG1	1:A:2412:ARG:NH1	2.24	0.71
1:A:1930:ALA:HB2	1:A:1973:LEU:HD21	1.72	0.70
1:A:3412:SER:HB3	1:A:3415:ILE:HD12	1.72	0.70
1:A:3928:CYS:HB3	1:A:3968:LEU:HD13	1.74	0.69
1:A:3689:ALA:HA	1:A:3895:PHE:HA	1.75	0.69
1:A:2838:ALA:HB3	1:A:2878:VAL:HG13	1.75	0.69
1:A:3342:ARG:NH2	1:A:3393:ASN:OD1	2.21	0.69
1:A:1910:GLU:OE2	1:A:3792:ARG:NH1	2.26	0.69
1:A:2064:GLN:NE2	1:A:2091:MET:SD	2.66	0.68
1:A:2127:ASP:O	1:A:2131:THR:OG1	2.11	0.68
1:A:1680:ILE:HD13	1:A:1706:LEU:HD23	1.76	0.68
1:A:3844:ILE:HG23	1:A:3851:VAL:HG21	1.76	0.68
1:A:1680:ILE:HD12	1:A:1709:ASN:HD22	1.58	0.68
1:A:3979:ASN:HB2	1:A:3982:TRP:NE1	2.09	0.67
1:A:3722:MET:HE1	1:A:3748:TRP:HE3	1.59	0.67
1:A:3801:ILE:HD13	1:A:3811:LEU:HD23	1.75	0.66
1:A:2042:GLY:HA3	1:A:2049:MET:HE3	1.75	0.66
1:A:2087:VAL:HG12	1:A:2091:MET:HE2	1.75	0.66
1:A:1749:ILE:HD13	1:A:1813:LEU:HD13	1.76	0.66
1:A:3662:ARG:NH1	1:A:3663:GLU:O	2.29	0.65
1:A:3743:ASP:HB3	1:A:3762:TRP:HZ2	1.61	0.65

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1742:ASP:OD2	1:A:1745:ASN:ND2	2.31	0.64
1:A:2465:VAL:O	1:A:2472:THR:HA	1.96	0.64
1:A:2953:VAL:HG23	1:A:2967:ASN:HD21	1.62	0.64
1:A:1706:LEU:HD12	1:A:1936:ILE:HD13	1.79	0.64
1:A:3330:TYR:OH	1:A:3392:GLU:OE1	2.16	0.63
1:A:1987:PHE:CE1	1:A:1992:LYS:HB2	2.34	0.63
1:A:2787:HIS:HB3	1:A:3461:ILE:HG23	1.80	0.63
1:A:2621:GLU:OE1	1:A:2659:ARG:NH2	2.33	0.62
1:A:3788:MET:HG3	1:A:3895:PHE:CE1	2.34	0.62
1:A:3845:GLN:HE21	1:A:3877:CYS:HB3	1.65	0.62
1:A:3690:LEU:HD23	1:A:3694:PHE:HB3	1.82	0.62
1:A:3989:ILE:HA	1:A:3993:VAL:HG12	1.82	0.62
1:A:3552:ASN:O	1:A:3556:LYS:HG3	1.99	0.62
1:A:3680:GLN:NE2	1:A:3767:PHE:O	2.29	0.62
1:A:1354:LEU:O	1:A:1358:ILE:HG12	1.99	0.61
1:A:2763:ARG:HD3	1:A:3512:ARG:HD3	1.81	0.61
1:A:1459:LEU:HD11	1:A:1523:LEU:HD21	1.80	0.61
1:A:3632:LEU:HB3	1:A:3644:ILE:HG21	1.82	0.61
1:A:3808:LYS:O	1:A:3809:GLU:HB2	2.00	0.61
1:A:3534:LEU:HG	1:A:3542:GLN:HB2	1.83	0.61
1:A:2761:ALA:HB3	1:A:2988:SER:HB2	1.83	0.61
1:A:2084:TRP:O	1:A:2088:ILE:HG12	2.00	0.61
1:A:3804:ALA:HB3	1:A:3811:LEU:HB2	1.84	0.60
1:A:3954:TYR:OH	1:A:4000:GLU:OE1	2.20	0.60
1:A:2441:VAL:HG23	1:A:2482:LEU:HD11	1.84	0.60
1:A:2230:LEU:HD11	1:A:2257:PHE:HZ	1.68	0.59
1:A:3313:PHE:HA	1:A:3316:THR:HG22	1.82	0.59
1:A:3801:ILE:HD11	1:A:3813:ILE:HD11	1.85	0.59
1:A:3524:SER:OG	1:A:3528:ARG:NH2	2.36	0.58
1:A:1279:VAL:HG12	1:A:1285:TYR:HB2	1.86	0.58
1:A:1455:LEU:HD12	1:A:1516:LEU:HD22	1.84	0.58
1:A:2475:PRO:HB3	1:A:2527:GLU:HB3	1.84	0.58
1:A:3910:LEU:O	1:A:3914:GLN:HG2	2.04	0.58
1:A:1394:LEU:HD11	1:A:1453:LEU:HD21	1.85	0.57
1:A:2981:LYS:HE3	1:A:2986:PRO:HD2	1.86	0.57
1:A:3558:LYS:HE3	1:A:3593:GLU:HG2	1.86	0.57
1:A:3591:LYS:O	1:A:3595:MET:HG3	2.03	0.57
1:A:2733:VAL:O	3:A:4103:ADP:N6	2.36	0.57
1:A:2779:LEU:HD23	1:A:2814:CYS:HB2	1.85	0.57
1:A:3562:LEU:HB3	1:A:3590:LEU:HD11	1.86	0.57
1:A:3965:SER:O	1:A:3969:GLU:HG2	2.04	0.57

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1531:ARG:NH1	1:A:1541:GLY:O	2.38	0.57
1:A:1655:MET:HE2	1:A:1659:LEU:HD11	1.87	0.57
1:A:2446:SER:H	1:A:2449:THR:HG23	1.70	0.56
1:A:3788:MET:HG3	1:A:3895:PHE:CZ	2.41	0.56
1:A:2171:ASP:OD1	1:A:2209:ARG:NH1	2.38	0.56
1:A:2624:ARG:NH2	1:A:2910:ASN:O	2.39	0.56
1:A:2310:LEU:O	1:A:2314:ILE:HG12	2.05	0.56
1:A:3696:MET:HG2	1:A:3764:LYS:HZ1	1.70	0.56
1:A:1371:LEU:HG	1:A:1415:MET:HE1	1.87	0.56
1:A:3778:VAL:O	1:A:3872:LYS:NZ	2.39	0.56
1:A:2316:LEU:HD23	1:A:2359:ILE:HD11	1.88	0.55
1:A:1851:ASN:ND2	1:A:1899:ASN:O	2.40	0.55
1:A:2981:LYS:NZ	1:A:2982:VAL:O	2.36	0.55
1:A:1661:GLU:OE1	1:A:1728:TRP:NE1	2.36	0.55
1:A:2074:GLY:O	1:A:2080:LYS:NZ	2.33	0.55
1:A:3553:THR:HA	1:A:3556:LYS:HE3	1.87	0.55
1:A:2169:VAL:HG13	1:A:2186:ILE:HD13	1.88	0.55
1:A:1256:VAL:HB	1:A:1306:LYS:HZ2	1.71	0.55
1:A:2129:LEU:HD13	1:A:2521:ASN:HB3	1.88	0.55
1:A:4019:ASP:HA	1:A:4031:GLN:HG3	1.88	0.55
1:A:2574:TYR:HB3	1:A:2626:VAL:HG11	1.88	0.55
1:A:2752:VAL:HG13	1:A:2753:GLN:H	1.71	0.55
1:A:2222:ILE:HG23	1:A:2284:LEU:HD11	1.89	0.54
1:A:2362:ALA:HB3	1:A:2365:LYS:HG2	1.88	0.54
1:A:2938:MET:HB3	1:A:2961:ILE:HG21	1.89	0.54
1:A:2248:LYS:O	1:A:2252:LEU:HG	2.06	0.54
1:A:2989:PRO:HB2	1:A:2992:PHE:HB3	1.89	0.54
1:A:4030:PRO:O	1:A:4044:ARG:NH2	2.39	0.54
1:A:3979:ASN:HB2	1:A:3982:TRP:HE1	1.70	0.54
1:A:3643:GLY:O	1:A:3894:ARG:NH2	2.41	0.54
1:A:2356:TYR:HB2	1:A:2372:CYS:HB2	1.88	0.54
1:A:1245:VAL:HG21	1:A:1288:LEU:HD13	1.88	0.54
1:A:2476:LYS:NZ	1:A:2528:ARG:HD3	2.22	0.54
1:A:2697:SER:HB2	1:A:2743:LEU:HD22	1.89	0.54
1:A:2241:LEU:HB3	1:A:2246:LEU:HD12	1.90	0.54
1:A:3843:ASN:HB3	1:A:3846:MET:HE3	1.89	0.54
1:A:1244:ASP:OD1	1:A:1247:ARG:NH2	2.41	0.53
1:A:1640:VAL:HG13	1:A:1697:LYS:HD2	1.90	0.53
1:A:2856:LEU:HD21	1:A:2877:PHE:HB2	1.90	0.53
1:A:2518:THR:CG2	1:A:2519:PRO:HD3	2.38	0.53
1:A:1607:TRP:HA	1:A:1610:ILE:HG22	1.89	0.53

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1974:LYS:O	1:A:1978:ARG:HG3	2.08	0.53
1:A:3976:SER:OG	1:A:3978:ASN:OD1	2.26	0.53
1:A:1932:MET:O	1:A:1936:ILE:HG12	2.08	0.53
1:A:2137:VAL:HA	1:A:2145:PHE:CD2	2.43	0.53
1:A:3664:THR:HB	1:A:3676:TRP:HZ3	1.72	0.53
1:A:1604:ALA:HA	1:A:1607:TRP:NE1	2.24	0.53
1:A:3700:MET:SD	1:A:4085:THR:HG21	2.48	0.53
1:A:3889:LEU:HG	1:A:3894:ARG:HD3	1.91	0.53
1:A:1301:ILE:HG21	1:A:1347:LEU:HB3	1.92	0.52
1:A:2252:LEU:O	1:A:2256:SER:HB3	2.09	0.52
1:A:1362:GLN:O	1:A:1366:VAL:HG23	2.09	0.52
1:A:2787:HIS:HA	1:A:3460:PRO:HD2	1.92	0.52
1:A:3655:ARG:HA	1:A:3658:ILE:HB	1.91	0.52
1:A:2016:ASP:OD1	1:A:2017:GLU:N	2.43	0.52
1:A:3531:ASP:O	1:A:3535:THR:OG1	2.24	0.52
1:A:2824:GLU:HG3	1:A:2826:ALA:H	1.75	0.52
1:A:1558:VAL:HG21	1:A:1607:TRP:CH2	2.45	0.51
1:A:2017:GLU:HA	1:A:2020:LYS:HG2	1.92	0.51
1:A:2099:ASN:ND2	1:A:2151:TRP:HE1	2.09	0.51
1:A:2426:MET:HE1	3:A:4102:ADP:C8	2.45	0.51
1:A:3928:CYS:SG	1:A:3972:LEU:HD11	2.50	0.51
1:A:1987:PHE:HE1	1:A:1992:LYS:HB2	1.75	0.51
1:A:2233:SER:HB3	1:A:2292:VAL:HG11	1.92	0.51
1:A:2445:PHE:HA	1:A:2449:THR:HG21	1.91	0.51
1:A:2761:ALA:O	1:A:2764:THR:OG1	2.22	0.51
1:A:2291:ALA:O	1:A:2295:ILE:HG12	2.10	0.51
1:A:3554:GLU:HA	1:A:3557:LEU:HG	1.93	0.51
1:A:1411:GLU:O	1:A:1415:MET:HG3	2.10	0.51
1:A:3530:PHE:CE2	1:A:3615:VAL:HA	2.46	0.51
1:A:1487:THR:O	1:A:1491:PHE:HD2	1.94	0.51
1:A:3593:GLU:HA	1:A:3596:ASN:ND2	2.26	0.51
1:A:1568:SER:HB2	1:A:1816:VAL:HG11	1.92	0.50
1:A:1636:ILE:O	1:A:1640:VAL:HG23	2.09	0.50
1:A:2476:LYS:HE2	1:A:2479:ILE:HA	1.94	0.50
1:A:3851:VAL:HG13	1:A:3855:LEU:HB3	1.91	0.50
1:A:1575:LEU:HG	1:A:1576:GLU:OE1	2.11	0.50
1:A:1739:ASP:OD1	1:A:1739:ASP:N	2.44	0.50
1:A:3593:GLU:HA	1:A:3596:ASN:HD22	1.75	0.50
1:A:2001:VAL:HG12	1:A:2002:ILE:HD13	1.93	0.50
1:A:3551:LEU:HD12	1:A:3600:LYS:HE2	1.92	0.50
1:A:3611:PHE:O	1:A:3615:VAL:HG23	2.11	0.50

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2518:THR:HG23	1:A:2519:PRO:HD3	1.94	0.50
1:A:1575:LEU:HG	1:A:1576:GLU:H	1.77	0.50
1:A:2081:THR:HA	1:A:2084:TRP:CD1	2.46	0.50
1:A:2258:ASP:OD1	1:A:2258:ASP:N	2.45	0.50
1:A:3669:THR:HG23	1:A:3672:ASP:H	1.76	0.50
1:A:3687:SER:OG	1:A:3771:GLU:OE1	2.29	0.50
1:A:3829:ILE:HG22	1:A:3839:ILE:HD13	1.93	0.50
1:A:1664:LEU:HD12	1:A:1669:PHE:HZ	1.77	0.49
1:A:1558:VAL:HG21	1:A:1607:TRP:HH2	1.76	0.49
1:A:3299:LEU:HB2	1:A:3587:LEU:HD13	1.94	0.49
1:A:3555:TYR:CE1	1:A:3558:LYS:HE2	2.46	0.49
1:A:3409:ASP:OD1	1:A:3409:ASP:N	2.45	0.49
1:A:2011:GLU:O	1:A:2015:LYS:HG2	2.13	0.49
1:A:3885:PRO:HG2	1:A:3888:LEU:HB3	1.92	0.49
1:A:4072:ASN:OD1	1:A:4075:ARG:NH1	2.45	0.49
1:A:2386:MET:HB3	1:A:2627:ARG:NH2	2.28	0.49
1:A:2458:LEU:HD11	1:A:2484:LEU:HD11	1.94	0.49
1:A:3367:ILE:HD12	1:A:3367:ILE:H	1.77	0.49
1:A:2485:PHE:HA	1:A:2532:VAL:O	2.13	0.49
1:A:2709:LYS:HE2	1:A:2736:GLU:HG2	1.94	0.49
1:A:3334:PHE:HB3	1:A:3342:ARG:HG2	1.94	0.49
1:A:3375:GLU:OE1	1:A:3379:TRP:NE1	2.46	0.49
1:A:1527:LEU:HD22	1:A:1545:LEU:HD22	1.94	0.49
1:A:3748:TRP:HA	1:A:3751:VAL:HG12	1.95	0.49
1:A:2923:LYS:HG3	1:A:2927:GLN:HE21	1.77	0.48
1:A:2112:GLU:OE2	1:A:2112:GLU:N	2.46	0.48
1:A:1466:GLN:HB3	1:A:1473:THR:HG21	1.96	0.48
1:A:3800:LEU:HD23	1:A:3840:LEU:HD12	1.95	0.48
1:A:1373:ARG:NH2	1:A:1411:GLU:OE1	2.47	0.48
1:A:2795:PHE:CE2	1:A:2831:MET:HE3	2.49	0.48
1:A:3804:ALA:CB	1:A:3811:LEU:HB2	2.43	0.48
1:A:3836:GLY:HA2	1:A:3871:PHE:HB3	1.95	0.48
1:A:3865:ALA:HB1	1:A:3871:PHE:HE1	1.78	0.48
1:A:1363:LYS:HB2	1:A:1420:TYR:HD2	1.78	0.48
1:A:2275:ILE:HD11	1:A:2537:PRO:HB3	1.96	0.48
1:A:4024:VAL:HG22	1:A:4027:VAL:HG12	1.94	0.48
1:A:2421:GLY:HA3	1:A:2618:SER:HB2	1.95	0.48
1:A:2728:LEU:HB2	1:A:2771:ARG:HH22	1.78	0.48
1:A:3530:PHE:HE2	1:A:3615:VAL:HA	1.78	0.48
1:A:1551:SER:O	1:A:1551:SER:OG	2.32	0.48
1:A:2174:LYS:HD2	1:A:2186:ILE:HD11	1.96	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1988:GLY:O	1:A:1993:THR:OG1	2.21	0.48
1:A:2427:ILE:HD12	1:A:2559:LEU:HD13	1.96	0.48
1:A:2752:VAL:HG13	1:A:2753:GLN:N	2.29	0.48
1:A:1359:GLU:O	1:A:1363:LYS:HG2	2.13	0.47
1:A:1772:THR:HG23	1:A:1775:LEU:H	1.79	0.47
1:A:2126:ARG:CZ	1:A:2126:ARG:HA	2.43	0.47
1:A:2240:LYS:O	1:A:2299:ARG:NH1	2.47	0.47
1:A:2569:GLN:O	1:A:2573:ILE:HG12	2.14	0.47
1:A:1685:ASP:OD1	1:A:1686:LYS:N	2.46	0.47
1:A:1827:ASP:HB3	1:A:1830:VAL:HG22	1.96	0.47
1:A:3634:LYS:NZ	1:A:4091:GLU:OE1	2.31	0.47
1:A:2285:GLU:OE1	1:A:2412:ARG:NH2	2.47	0.47
1:A:2763:ARG:HD2	3:A:4103:ADP:H4'	1.96	0.47
1:A:2467:THR:HB	1:A:2470:GLY:HA3	1.97	0.47
1:A:3555:TYR:CD1	1:A:3558:LYS:HE2	2.50	0.47
1:A:3774:ILE:HD13	1:A:3895:PHE:CZ	2.49	0.47
1:A:2295:ILE:HD12	1:A:2314:ILE:HD12	1.96	0.47
1:A:3526:GLU:OE1	1:A:3622:GLY:HA3	2.15	0.47
1:A:1316:ASN:HB2	1:A:1332:LEU:HD21	1.96	0.47
1:A:2428:MET:HE1	1:A:2485:PHE:CG	2.50	0.47
1:A:2494:LEU:H	1:A:2494:LEU:HD23	1.80	0.47
1:A:3814:ILE:HG13	1:A:3839:ILE:HD11	1.97	0.47
1:A:1327:ILE:HG23	1:A:1331:LEU:HD23	1.97	0.46
1:A:3409:ASP:OD1	1:A:3497:HIS:NE2	2.49	0.46
1:A:1318:ILE:HG13	1:A:1357:ILE:HD13	1.96	0.46
1:A:1849:GLU:HG2	1:A:1852:ARG:HG3	1.97	0.46
1:A:2257:PHE:HD2	1:A:2318:ILE:HD13	1.81	0.46
1:A:2763:ARG:NH1	1:A:3511:SER:O	2.48	0.46
1:A:3532:ILE:HD12	1:A:3650:LEU:HD12	1.98	0.46
1:A:3755:SER:OG	1:A:3758:SER:OG	2.17	0.46
1:A:3582:GLU:HA	1:A:3585:VAL:HG22	1.96	0.46
1:A:2092:ALA:HB2	1:A:2099:ASN:OD1	2.15	0.46
1:A:2702:LEU:HD23	1:A:2702:LEU:H	1.81	0.46
1:A:2923:LYS:HG3	1:A:2927:GLN:NE2	2.30	0.46
1:A:3939:ILE:HD11	1:A:3950:PHE:CZ	2.50	0.46
1:A:1540:LEU:HD11	1:A:1565:MET:HE2	1.98	0.46
1:A:1363:LYS:HB2	1:A:1420:TYR:CD2	2.51	0.46
1:A:2787:HIS:HB2	1:A:3459:ASP:HB2	1.96	0.46
1:A:3366:PHE:CZ	1:A:3370:LEU:HD12	2.50	0.46
1:A:1615:ILE:HG13	1:A:1616:LYS:N	2.30	0.46
1:A:3548:LEU:HD21	1:A:3604:SER:HB3	1.97	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1575:LEU:HD23	1:A:1578:PHE:HB2	1.97	0.46
1:A:2107:LYS:NZ	1:A:2499:SER:OG	2.39	0.46
1:A:2118:MET:HB2	1:A:2125:TRP:HE3	1.81	0.46
1:A:2282:ASN:CG	1:A:2552:ARG:HG3	2.41	0.46
1:A:3500:ASP:OD1	1:A:3500:ASP:N	2.41	0.46
1:A:2765:GLY:O	1:A:2769:LEU:HB2	2.15	0.46
1:A:3979:ASN:HB2	1:A:3982:TRP:CD1	2.51	0.46
1:A:1422:LYS:HA	1:A:1422:LYS:HD2	1.76	0.46
1:A:2632:ALA:HB3	1:A:2647:LEU:HD21	1.97	0.46
1:A:2330:SER:HB3	1:A:2334:SER:OG	2.16	0.45
1:A:2949:ASN:HB3	1:A:2952:LEU:HD23	1.98	0.45
1:A:1317:MET:HB3	1:A:1357:ILE:HD11	1.98	0.45
1:A:2979:LYS:NZ	1:A:3344:ASP:OD2	2.32	0.45
1:A:3326:ILE:HA	1:A:3349:LEU:HD21	1.97	0.45
1:A:1914:LYS:HB3	1:A:1914:LYS:HE3	1.81	0.45
1:A:1966:TYR:OH	1:A:2007:GLY:N	2.38	0.45
1:A:2013:VAL:O	1:A:2017:GLU:HG2	2.16	0.45
1:A:2712:LEU:HD21	1:A:2743:LEU:HD21	1.98	0.45
1:A:1984:ILE:HD13	1:A:1993:THR:HG21	1.99	0.45
1:A:2717:GLU:HG2	1:A:2734:ILE:HD13	1.98	0.45
1:A:3873:MET:HE3	1:A:3875:MET:HG3	1.98	0.45
1:A:3945:LEU:HD22	1:A:4065:LEU:HD11	1.97	0.45
1:A:1781:THR:HG21	1:A:1919:PHE:HB2	1.97	0.45
1:A:2867:LEU:HD22	1:A:2872:GLU:HB3	1.98	0.45
1:A:2894:PRO:HG3	1:A:2916:TRP:CH2	2.52	0.45
1:A:1640:VAL:HG11	1:A:1698:ILE:HD11	1.99	0.45
1:A:2463:ASN:O	1:A:2475:PRO:HD2	2.16	0.45
1:A:2835:LEU:HD12	1:A:2908:LEU:HD22	1.99	0.45
1:A:2955:THR:OG1	1:A:2956:GLU:N	2.49	0.45
1:A:2417:CYS:HA	1:A:2535:CYS:O	2.17	0.45
1:A:3550:LYS:HD2	1:A:3551:LEU:HD23	1.99	0.45
1:A:1836:VAL:HG21	1:A:1882:LEU:HD13	1.99	0.45
1:A:1979:ASN:ND2	1:A:1979:ASN:O	2.47	0.45
1:A:2685:ASP:OD1	1:A:2685:ASP:N	2.50	0.45
1:A:3460:PRO:O	1:A:3463:SER:HB3	2.16	0.45
1:A:2673:LEU:HD12	1:A:2673:LEU:HA	1.88	0.44
1:A:3719:VAL:O	1:A:3723:ILE:HG12	2.18	0.44
1:A:3800:LEU:HD21	1:A:3874:PHE:CD1	2.52	0.44
1:A:3971:VAL:O	1:A:3975:ASN:HB2	2.18	0.44
1:A:2472:THR:O	1:A:2524:VAL:HA	2.17	0.44
1:A:3859:VAL:HA	1:A:3862:THR:HG22	1.98	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3904:LEU:HG	1:A:3908:LYS:HE3	1.99	0.44
1:A:2929:ALA:HB2	1:A:2992:PHE:HZ	1.82	0.44
1:A:1844:TRP:CD1	1:A:1893:ALA:HB3	2.53	0.44
1:A:2650:TYR:HB2	1:A:2694:LEU:HD13	1.99	0.44
1:A:1878:HIS:HB3	1:A:1885:GLU:HG2	1.99	0.44
1:A:2137:VAL:HA	1:A:2145:PHE:HD2	1.82	0.44
1:A:3617:GLU:HB3	1:A:3671:VAL:HG21	1.98	0.44
1:A:1534:PHE:CE2	1:A:1536:ARG:HB2	2.53	0.44
1:A:1352:ILE:HG13	1:A:1353:LEU:N	2.32	0.44
1:A:2407:LEU:HD12	1:A:2557:LEU:HD11	2.00	0.44
1:A:3747:LEU:HD12	1:A:3762:TRP:CE3	2.53	0.44
1:A:3903:ILE:O	1:A:3907:VAL:HG23	2.18	0.44
1:A:3911:TRP:HH2	1:A:3926:VAL:HG13	1.83	0.44
1:A:1488:THR:O	1:A:1492:GLN:HG2	2.18	0.44
1:A:1950:VAL:O	1:A:1954:GLU:HG2	2.17	0.44
1:A:2223:SER:HB3	1:A:2259:MET:HG2	1.99	0.44
1:A:2645:ILE:HG21	1:A:2686:LEU:HD11	1.98	0.44
1:A:2859:LYS:HE3	1:A:2863:LEU:HD11	1.99	0.44
1:A:3346:LEU:HD11	1:A:3350:LYS:HE3	2.00	0.44
1:A:1967:HIS:O	1:A:1972:THR:OG1	2.24	0.43
1:A:2965:VAL:HG22	1:A:3325:ILE:HD11	2.00	0.43
1:A:3726:LEU:HD23	1:A:3726:LEU:HA	1.84	0.43
1:A:3809:GLU:HG2	1:A:3810:SER:CB	2.44	0.43
1:A:1801:GLY:HA2	1:A:1804:GLU:OE1	2.17	0.43
1:A:3706:TYR:CZ	1:A:3710:ILE:HG13	2.53	0.43
1:A:3856:HIS:HD2	1:A:3888:LEU:HB2	1.83	0.43
1:A:1599:LYS:O	1:A:1602:ILE:HG22	2.18	0.43
1:A:3551:LEU:HA	1:A:3554:GLU:HG3	2.00	0.43
1:A:3721:THR:O	1:A:3725:VAL:HG23	2.18	0.43
1:A:3888:LEU:O	1:A:3892:THR:HG22	2.19	0.43
1:A:3935:PHE:HB2	1:A:4014:VAL:HG11	2.00	0.43
1:A:1469:LEU:HB3	1:A:1472:GLU:HG2	1.98	0.43
1:A:1636:ILE:HA	1:A:1639:VAL:HG12	1.99	0.43
1:A:2272:LEU:HD21	1:A:2338:PHE:HB2	2.00	0.43
1:A:2424:LYS:N	3:A:4102:ADP:O1B	2.51	0.43
1:A:3002:LEU:HD21	1:A:3327:SER:HB2	2.01	0.43
1:A:3512:ARG:HG2	1:A:3512:ARG:HH11	1.83	0.43
1:A:3628:ILE:HD11	1:A:3679:TYR:CZ	2.53	0.43
1:A:1395:VAL:HG22	1:A:1491:PHE:HZ	1.83	0.43
1:A:1827:ASP:OD1	1:A:1829:GLN:N	2.49	0.43
1:A:2549:ARG:NE	2:A:4101:ATP:O3G	2.48	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2935:VAL:HG13	1:A:2936:ILE:HG23	2.01	0.43
1:A:1294:MET:HG2	1:A:1343:MET:HG2	2.01	0.43
1:A:3530:PHE:CD2	1:A:3618:TYR:HB2	2.54	0.43
1:A:3939:ILE:HD11	1:A:3950:PHE:HZ	1.84	0.43
1:A:1367:ILE:HG23	1:A:1415:MET:CE	2.48	0.43
1:A:1573:ILE:HD11	1:A:1583:ARG:HB3	2.00	0.43
1:A:2877:PHE:CZ	1:A:2881:ILE:HD11	2.53	0.43
1:A:3467:SER:O	1:A:3469:GLU:N	2.52	0.43
1:A:2158:LEU:HD23	1:A:2158:LEU:H	1.83	0.43
1:A:2178:LEU:O	1:A:2183:ARG:NH1	2.50	0.43
1:A:2481:ASN:OD1	1:A:2528:ARG:HB2	2.18	0.43
1:A:2651:GLU:O	1:A:2655:ILE:HG12	2.19	0.43
1:A:3459:ASP:OD1	1:A:3459:ASP:N	2.43	0.43
1:A:3790:SER:OG	1:A:3791:GLU:N	2.52	0.43
1:A:2386:MET:HB3	1:A:2627:ARG:CZ	2.49	0.42
1:A:3655:ARG:HH22	1:A:3685:GLN:HB2	1.84	0.42
1:A:1536:ARG:HD3	1:A:1841:ILE:HD13	2.01	0.42
1:A:2689:ILE:O	1:A:2689:ILE:HG22	2.19	0.42
1:A:3631:MET:HE2	1:A:3631:MET:HB3	1.95	0.42
1:A:3432:LEU:HD11	1:A:3457:PHE:HD2	1.84	0.42
1:A:3829:ILE:HD11	1:A:3854:TYR:HE2	1.84	0.42
1:A:2159:ASP:OD1	1:A:2159:ASP:N	2.53	0.42
1:A:3406:PHE:HB2	1:A:3513:VAL:CG2	2.49	0.42
1:A:1259:LEU:HD12	1:A:1259:LEU:HA	1.90	0.42
1:A:1692:ASP:HA	1:A:1695:LYS:HE3	2.01	0.42
1:A:2441:VAL:CG2	1:A:2482:LEU:HD11	2.49	0.42
1:A:2447:LYS:HA	1:A:2447:LYS:HD3	1.87	0.42
1:A:2061:TYR:O	1:A:2064:GLN:HG3	2.20	0.42
1:A:2230:LEU:HD11	1:A:2257:PHE:CZ	2.52	0.42
1:A:3460:PRO:O	1:A:3463:SER:CB	2.67	0.42
1:A:1379:LYS:HA	1:A:1379:LYS:HD3	1.68	0.42
1:A:1532:ARG:HH12	1:A:1886:THR:HG22	1.84	0.42
1:A:2118:MET:HB2	1:A:2125:TRP:CE3	2.54	0.42
1:A:3409:ASP:HB3	1:A:3518:PHE:HB2	2.02	0.42
1:A:3774:ILE:HG23	1:A:3803:LEU:CD1	2.50	0.42
1:A:3774:ILE:O	1:A:3778:VAL:HG12	2.20	0.42
1:A:2203:THR:HG23	1:A:2206:THR:H	1.85	0.42
1:A:4020:ASN:OD1	1:A:4028:ARG:NH1	2.40	0.42
1:A:2391:VAL:HG11	1:A:2430:ASN:ND2	2.34	0.42
1:A:2640:THR:HG23	1:A:2643:SER:H	1.84	0.42
1:A:2762:SER:O	1:A:2988:SER:HB3	2.20	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2835:LEU:HD23	1:A:2835:LEU:HA	1.74	0.42
1:A:3623:LYS:HD3	1:A:3623:LYS:HA	1.79	0.42
1:A:3774:ILE:HD12	1:A:3774:ILE:HA	1.87	0.42
1:A:3823:ASN:O	1:A:3826:GLN:HG2	2.20	0.42
1:A:1392:LEU:HD21	1:A:1483:TYR:CD2	2.55	0.42
1:A:2788:ARG:NH1	1:A:3431:PHE:O	2.52	0.42
1:A:2925:MET:HE3	1:A:2970:ILE:HG23	2.01	0.42
1:A:3528:ARG:HE	1:A:3528:ARG:HB2	1.70	0.42
1:A:3576:ASN:ND2	1:A:3579:GLU:OE1	2.53	0.42
1:A:3829:ILE:O	1:A:3833:LYS:HG3	2.20	0.42
1:A:1592:LEU:HD22	1:A:1614:GLU:HG3	2.02	0.41
1:A:1831:LEU:HD11	1:A:1847:PHE:HE2	1.85	0.41
1:A:1995:VAL:HG13	1:A:2018:LEU:HD21	2.01	0.41
1:A:2111:LYS:HE2	1:A:2111:LYS:HB3	1.71	0.41
1:A:2780:LYS:HE3	1:A:2813:THR:HG22	2.01	0.41
1:A:1354:LEU:O	1:A:1357:ILE:HG22	2.21	0.41
1:A:1545:LEU:O	1:A:1549:ILE:HG12	2.20	0.41
1:A:1830:VAL:O	1:A:1834:LEU:HG	2.20	0.41
1:A:2056:LYS:HD3	1:A:2056:LYS:HA	1.82	0.41
1:A:2464:TYR:CZ	1:A:2474:LEU:HD13	2.55	0.41
1:A:3406:PHE:HB2	1:A:3513:VAL:HG21	2.01	0.41
1:A:3771:GLU:OE2	1:A:3772:TRP:N	2.53	0.41
1:A:3800:LEU:HD12	1:A:3800:LEU:HA	1.87	0.41
1:A:3952:LYS:HB2	1:A:3954:TYR:CZ	2.55	0.41
1:A:3968:LEU:HD21	1:A:3985:VAL:HG13	2.02	0.41
1:A:1392:LEU:HD12	1:A:1392:LEU:HA	1.95	0.41
1:A:1576:GLU:OE1	1:A:1576:GLU:N	2.52	0.41
1:A:2017:GLU:OE1	1:A:2020:LYS:HD3	2.20	0.41
1:A:2081:THR:HA	1:A:2084:TRP:NE1	2.35	0.41
1:A:2494:LEU:HD12	1:A:2498:GLY:HA2	2.01	0.41
1:A:3719:VAL:HG12	1:A:3744:LEU:HD21	2.03	0.41
1:A:3707:LYS:HA	1:A:3707:LYS:HD3	1.84	0.41
1:A:1989:GLU:OE1	1:A:1989:GLU:N	2.52	0.41
1:A:2008:ASP:OD1	1:A:2009:THR:N	2.52	0.41
1:A:2109:LEU:O	1:A:2162:TYR:OH	2.21	0.41
1:A:1507:THR:O	1:A:1511:LEU:HG	2.21	0.41
1:A:2135:ARG:HG3	1:A:2184:LEU:HD21	2.03	0.41
1:A:2634:ASN:C	1:A:2634:ASN:HD22	2.27	0.41
1:A:3314:SER:O	1:A:3318:GLN:HG2	2.21	0.41
1:A:2051:GLU:HG2	1:A:2052:GLU:N	2.35	0.41
1:A:2564:GLY:HA2	1:A:2567:LEU:HD12	2.03	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2581:LEU:HD11	1:A:2630:TYR:CE1	2.56	0.41
1:A:3742:ASN:O	1:A:3746:TYR:HD2	2.04	0.41
1:A:3810:SER:O	1:A:3810:SER:OG	2.27	0.41
1:A:2238:ASP:HA	1:A:2246:LEU:HD11	2.03	0.41
1:A:3818:SER:OG	1:A:3819:ILE:N	2.53	0.41
1:A:1388:HIS:HE1	1:A:1392:LEU:HB3	1.86	0.41
1:A:2476:LYS:HZ2	1:A:2528:ARG:HD3	1.86	0.41
1:A:2806:CYS:SG	1:A:2813:THR:OG1	2.70	0.41
1:A:3373:LEU:O	1:A:3377:MET:HG2	2.21	0.41
1:A:3477:VAL:HG13	1:A:3488:VAL:HB	2.01	0.41
1:A:3655:ARG:HG2	1:A:3659:LYS:HG3	2.03	0.41
1:A:3845:GLN:HE21	1:A:3878:HIS:H	1.67	0.41
1:A:1388:HIS:NE2	1:A:1390:SER:HB3	2.36	0.41
1:A:1528:GLU:OE2	1:A:1532:ARG:NH2	2.54	0.41
1:A:2266:PHE:CD1	1:A:2326:LEU:HD21	2.56	0.41
1:A:2342:ILE:HG23	1:A:2346:PHE:CE2	2.56	0.41
1:A:2546:MET:HE3	1:A:2546:MET:HB2	1.96	0.40
1:A:3774:ILE:HG23	1:A:3803:LEU:HD12	2.03	0.40
1:A:4003:ASP:O	1:A:4007:VAL:HG23	2.21	0.40
1:A:3856:HIS:CD2	1:A:3888:LEU:HB2	2.56	0.40
1:A:3788:MET:N	1:A:3875:MET:O	2.44	0.40
1:A:1552:GLY:O	1:A:1555:HIS:NE2	2.54	0.40
1:A:1608:LEU:HD23	1:A:1608:LEU:HA	1.91	0.40
1:A:1629:GLN:HG2	1:A:1634:THR:HG21	2.02	0.40
1:A:1706:LEU:CD1	1:A:1936:ILE:HD13	2.50	0.40
1:A:2839:ASP:N	1:A:2839:ASP:OD1	2.55	0.40
1:A:2933:VAL:O	1:A:2962:ARG:NH1	2.54	0.40
1:A:3419:SER:HA	1:A:3426:THR:OG1	2.21	0.40
1:A:3741:ASN:HB2	1:A:3744:LEU:HB2	2.02	0.40
1:A:1273:ASP:OD1	1:A:1274:GLU:N	2.54	0.40
1:A:1706:LEU:HD22	1:A:1935:GLN:CD	2.47	0.40
1:A:1728:TRP:CZ2	1:A:1733:LYS:HG2	2.56	0.40
1:A:1975:GLY:HA2	1:A:1978:ARG:NH1	2.37	0.40
1:A:2275:ILE:HG21	1:A:2558:TYR:CD1	2.57	0.40
1:A:2500:GLN:NE2	1:A:2503:VAL:HG21	2.37	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	2579/4092 (63%)	2475 (96%)	104 (4%)	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	2358/3759 (63%)	2356 (100%)	2 (0%)	92	96

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3741	ASN
1	A	3946	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1293	ASN
1	A	1350	ASN
1	A	1382	GLN
1	A	1668	GLN
1	A	1709	ASN
1	A	1745	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	1878	HIS
1	A	1891	HIS
1	A	2099	ASN
1	A	2201	HIS
1	A	2228	HIS
1	A	2282	ASN
1	A	2521	ASN
1	A	2634	ASN
1	A	2735	HIS
1	A	2930	ASN
1	A	2931	ASN
1	A	3308	ASN
1	A	3336	HIS
1	A	3401	GLN
1	A	3475	ASN
1	A	3580	ASN
1	A	3596	ASN
1	A	3890	GLN
1	A	3914	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 4 ligands modelled in this entry, 1 is monoatomic - leaving 3 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	ATP	A	4101	4	28,33,33	0.80	0	34,52,52	0.60	1 (2%)
3	ADP	A	4103	-	24,29,29	0.86	0	29,45,45	1.24	2 (6%)
3	ADP	A	4102	-	24,29,29	0.86	0	29,45,45	1.17	2 (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
2	ATP	A	4101	4	-	4/18/38/38	0/3/3/3
3	ADP	A	4103	-	-	2/12/32/32	0/3/3/3
3	ADP	A	4102	-	-	1/12/32/32	0/3/3/3

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	4102	ADP	N3-C2-N1	-3.68	123.68	128.67
3	A	4103	ADP	N3-C2-N1	-3.63	123.74	128.67
3	A	4103	ADP	C4-C5-N7	-2.46	106.74	109.34
2	A	4101	ATP	C5-C6-N6	2.31	123.84	120.31
3	A	4102	ADP	C4-C5-N7	-2.25	106.96	109.34

There are no chirality outliers.

All (7) torsion outliers are listed below:

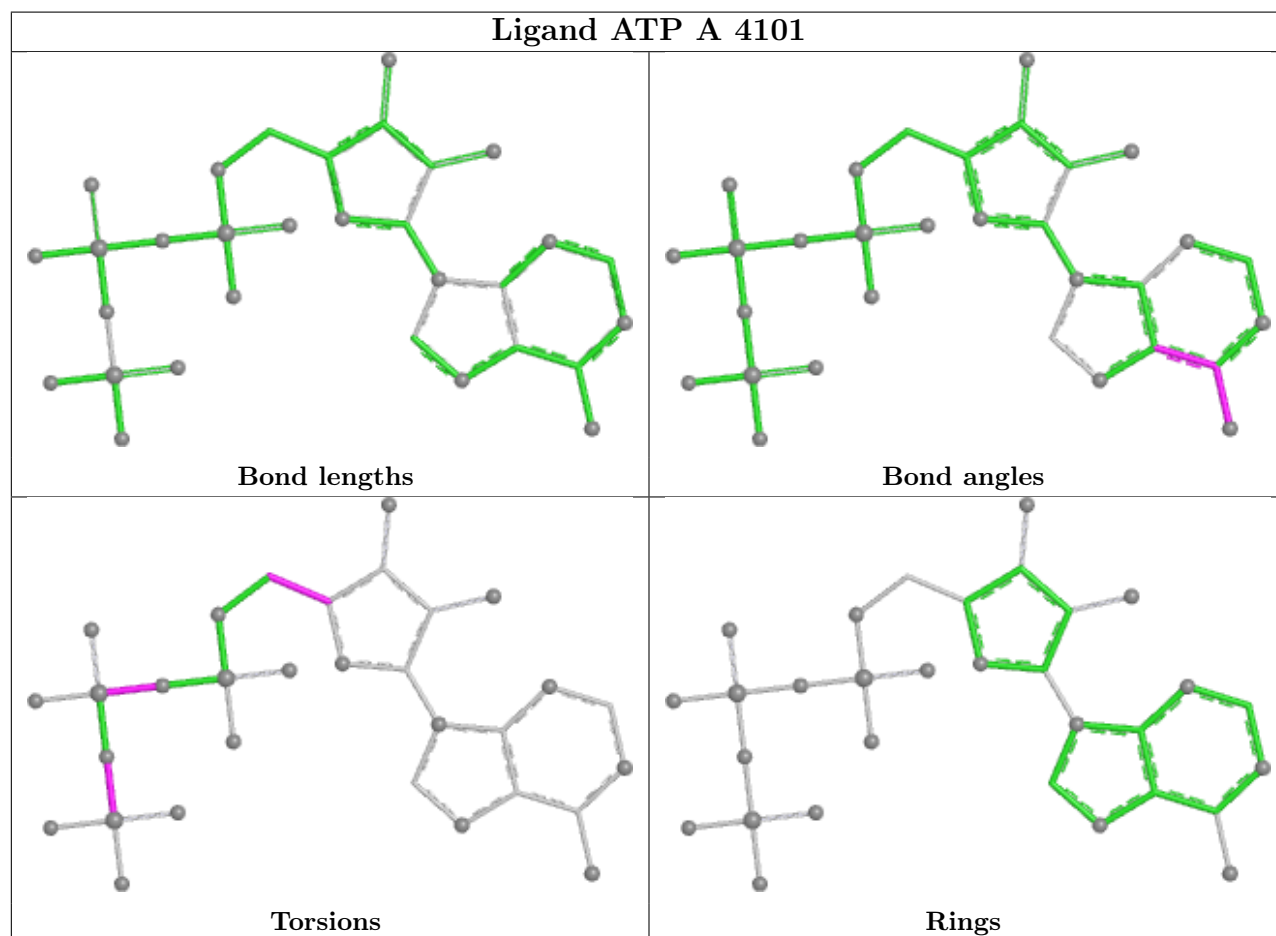
Mol	Chain	Res	Type	Atoms
2	A	4101	ATP	PB-O3B-PG-O2G
2	A	4101	ATP	O4'-C4'-C5'-O5'
3	A	4103	ADP	PB-O3A-PA-O1A
3	A	4103	ADP	PB-O3A-PA-O2A
2	A	4101	ATP	PA-O3A-PB-O2B
3	A	4102	ADP	O4'-C4'-C5'-O5'
2	A	4101	ATP	PA-O3A-PB-O1B

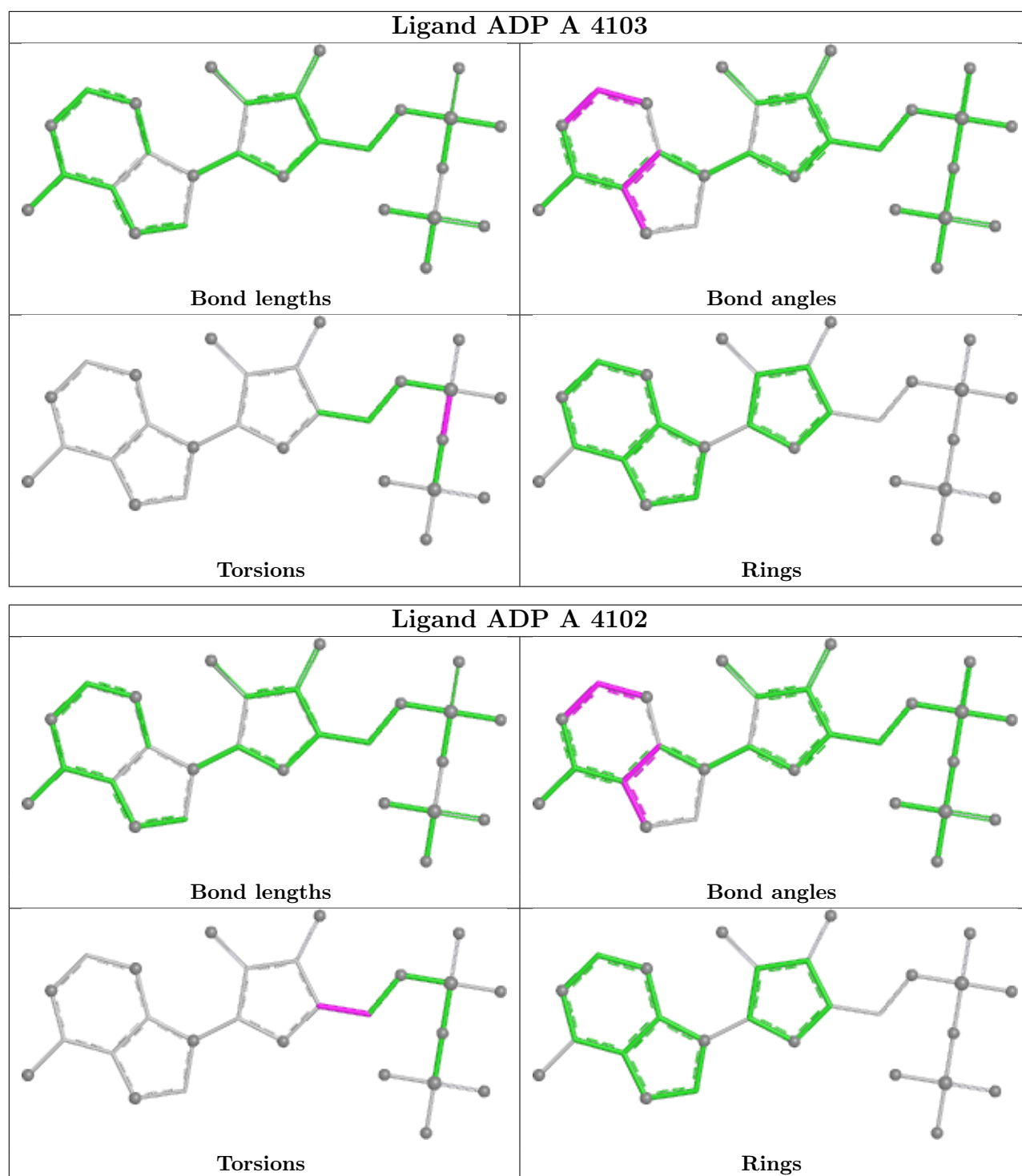
There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	4101	ATP	1	0
3	A	4103	ADP	2	0
3	A	4102	ADP	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

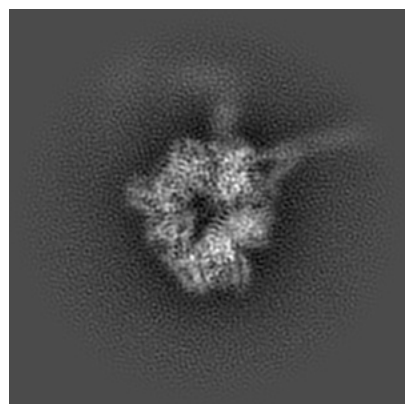
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-48239. These allow visual inspection of the internal detail of the map and identification of artifacts.

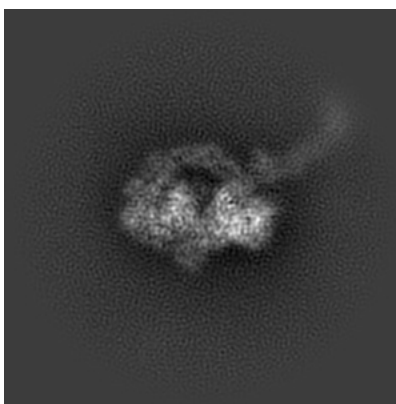
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

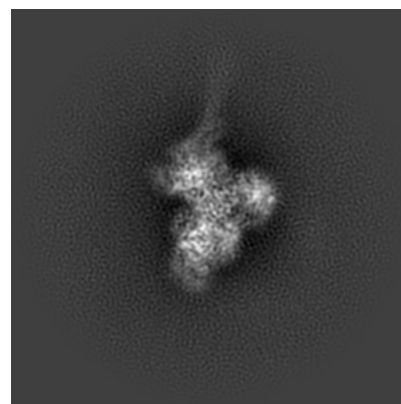
6.1.1 Primary map



X

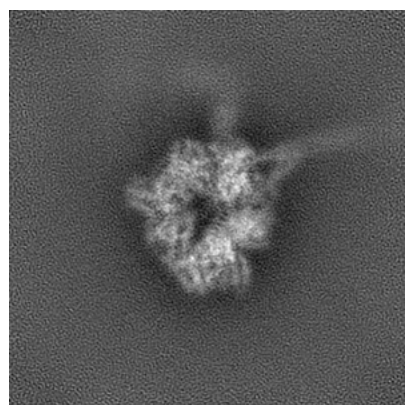


Y

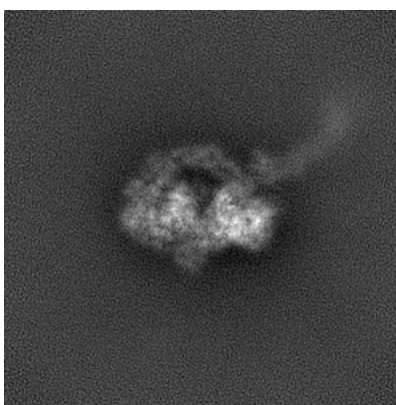


Z

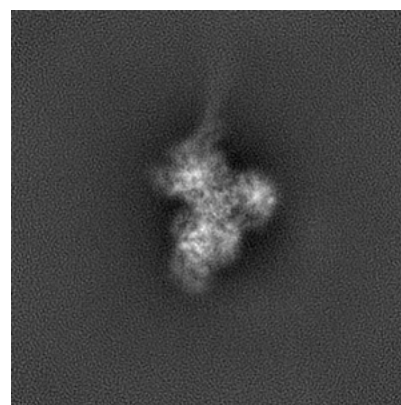
6.1.2 Raw map



X



Y

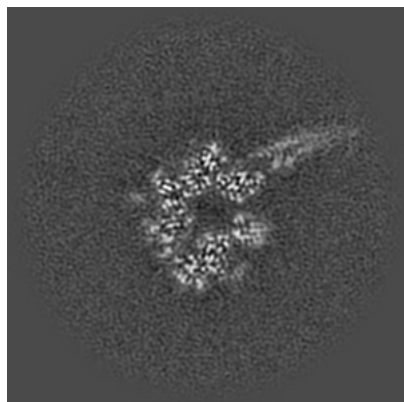


Z

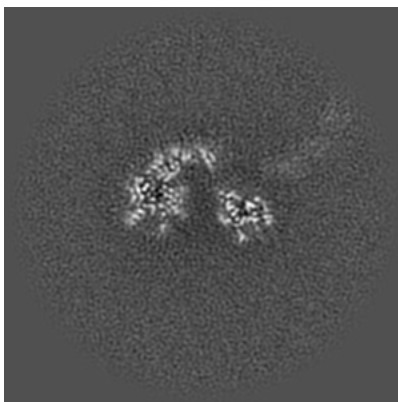
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

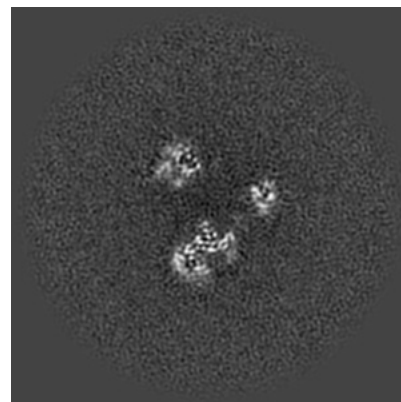
6.2.1 Primary map



X Index: 128

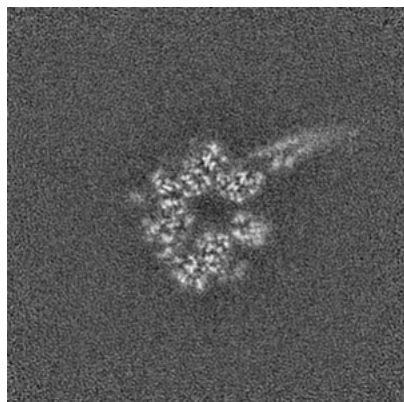


Y Index: 128

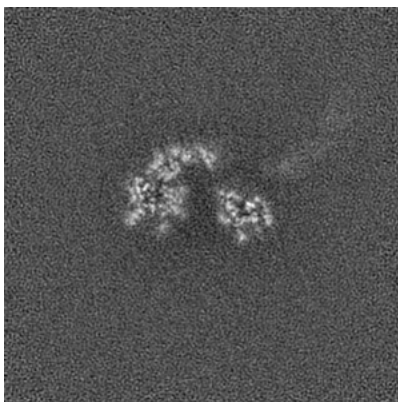


Z Index: 128

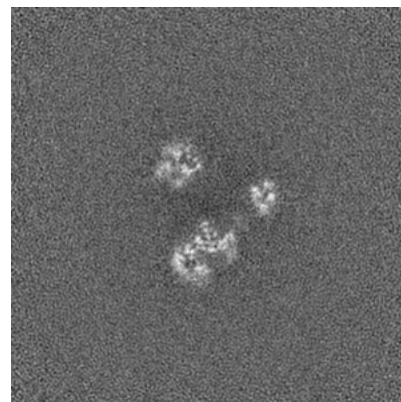
6.2.2 Raw map



X Index: 128



Y Index: 128

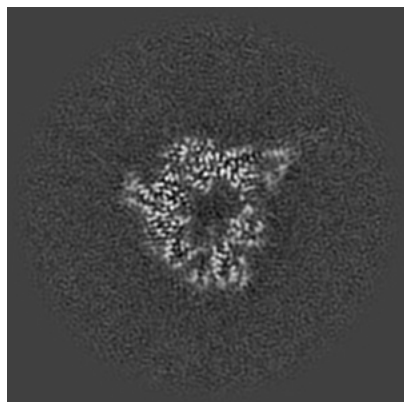


Z Index: 128

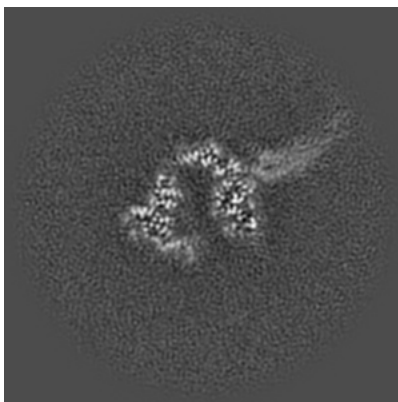
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

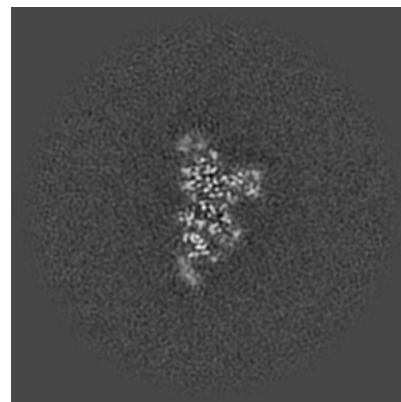
6.3.1 Primary map



X Index: 120

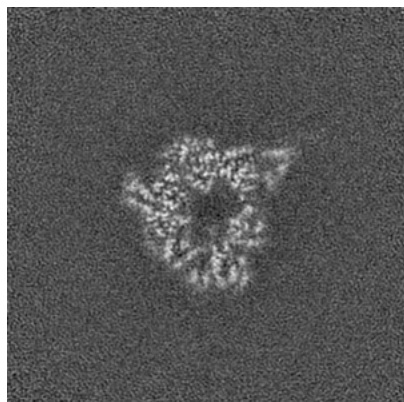


Y Index: 139

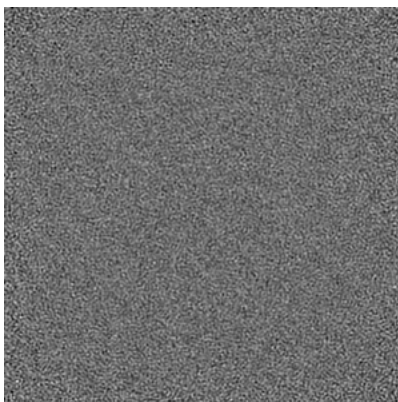


Z Index: 146

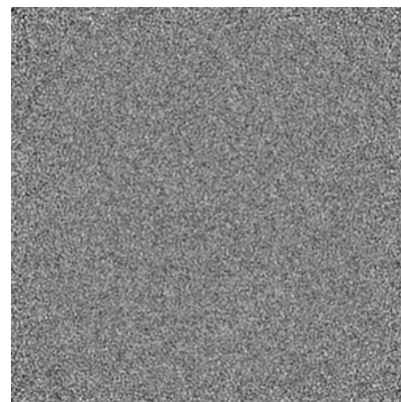
6.3.2 Raw map



X Index: 120



Y Index: 0

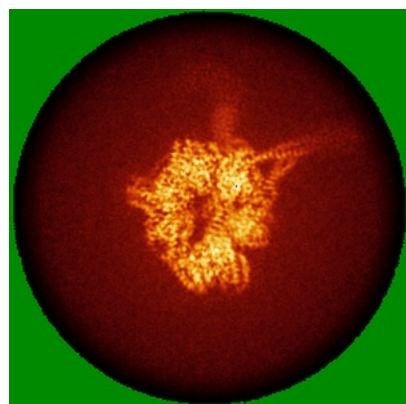


Z Index: 0

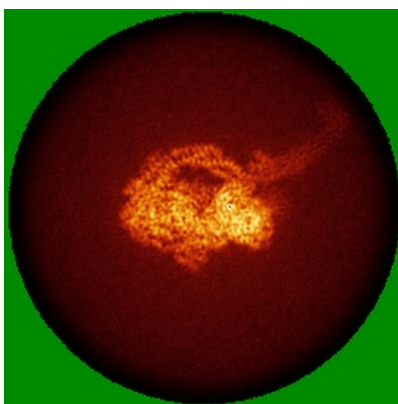
The images above show the largest variance slices of the map in three orthogonal directions.

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

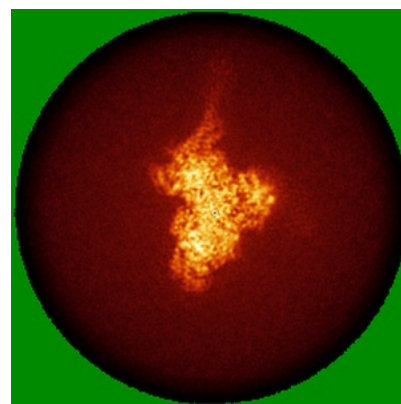
6.4.1 Primary map



X

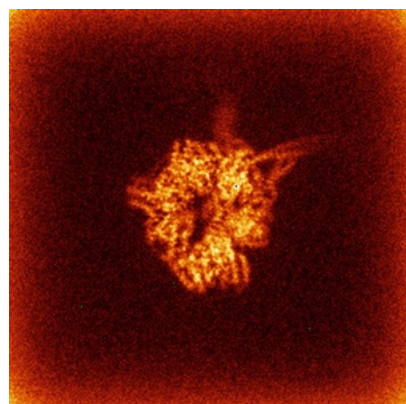


Y

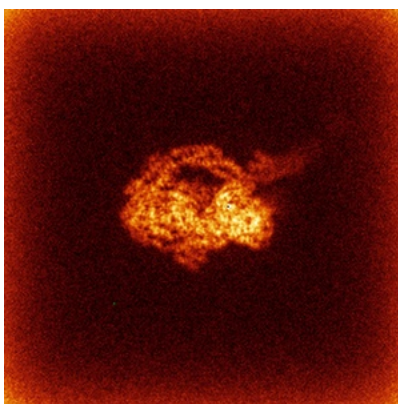


Z

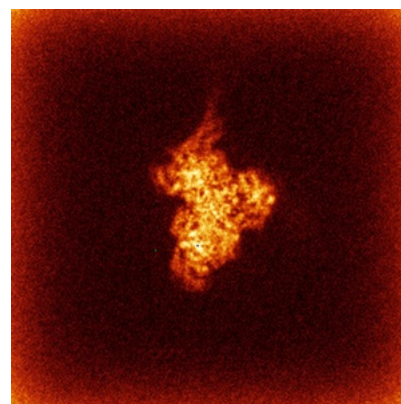
6.4.2 Raw map



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.

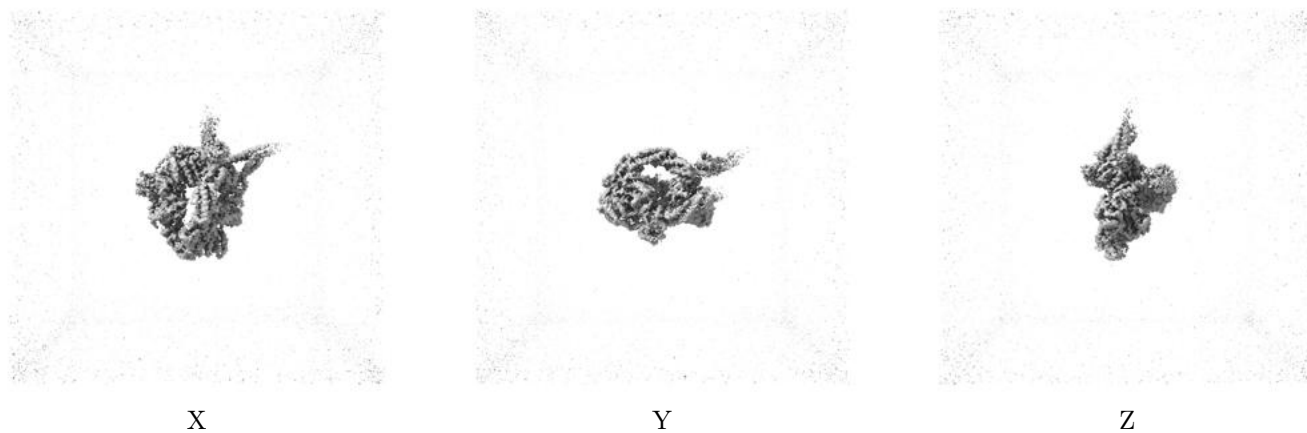
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.2. 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



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.

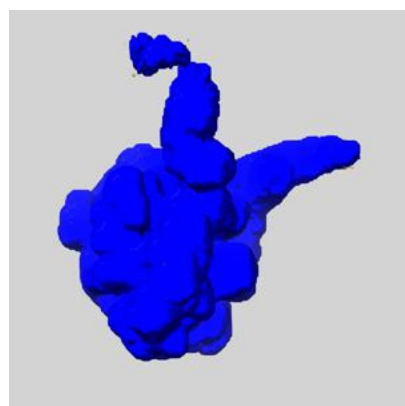
6.6 Mask visualisation [i](#)

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

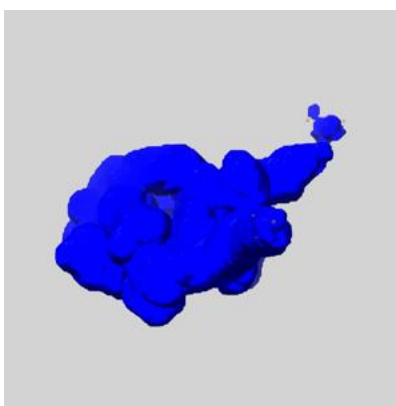
A mask typically either:

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

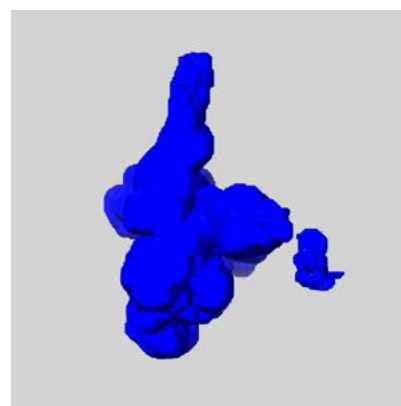
6.6.1 emd_48239_msk_1.map [i](#)



X



Y

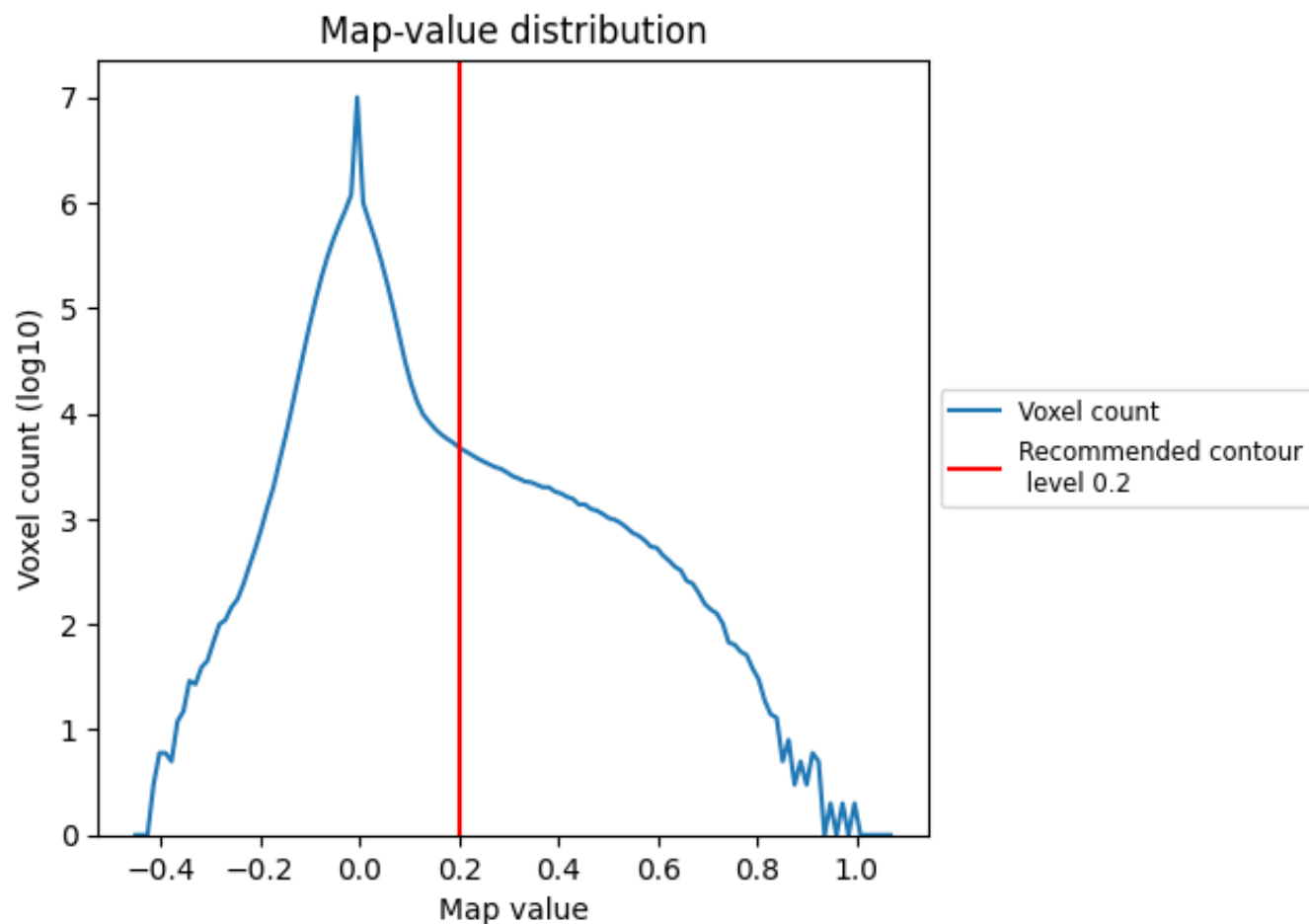


Z

7 Map analysis [i](#)

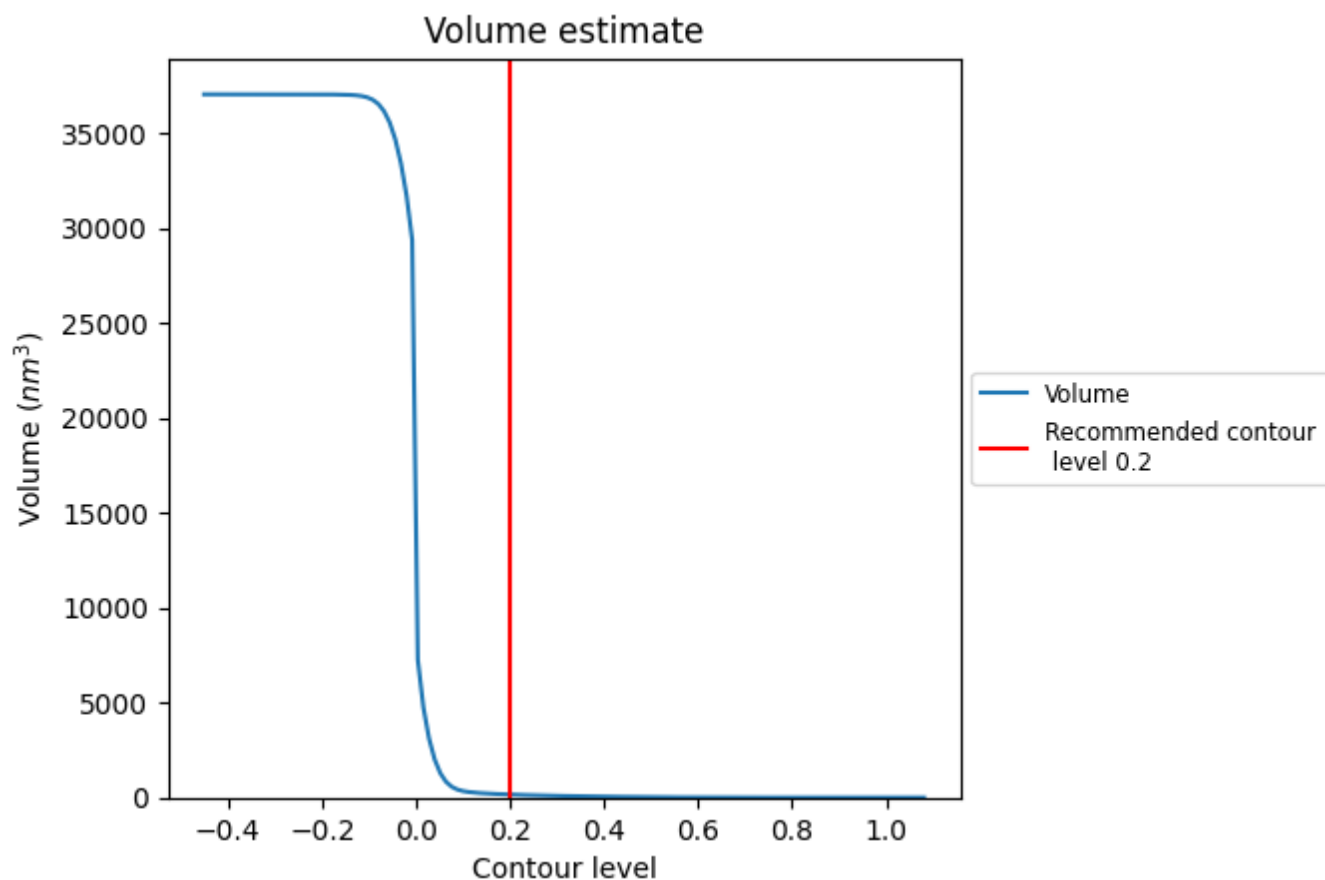
This section contains the results of statistical analysis of the map.

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.

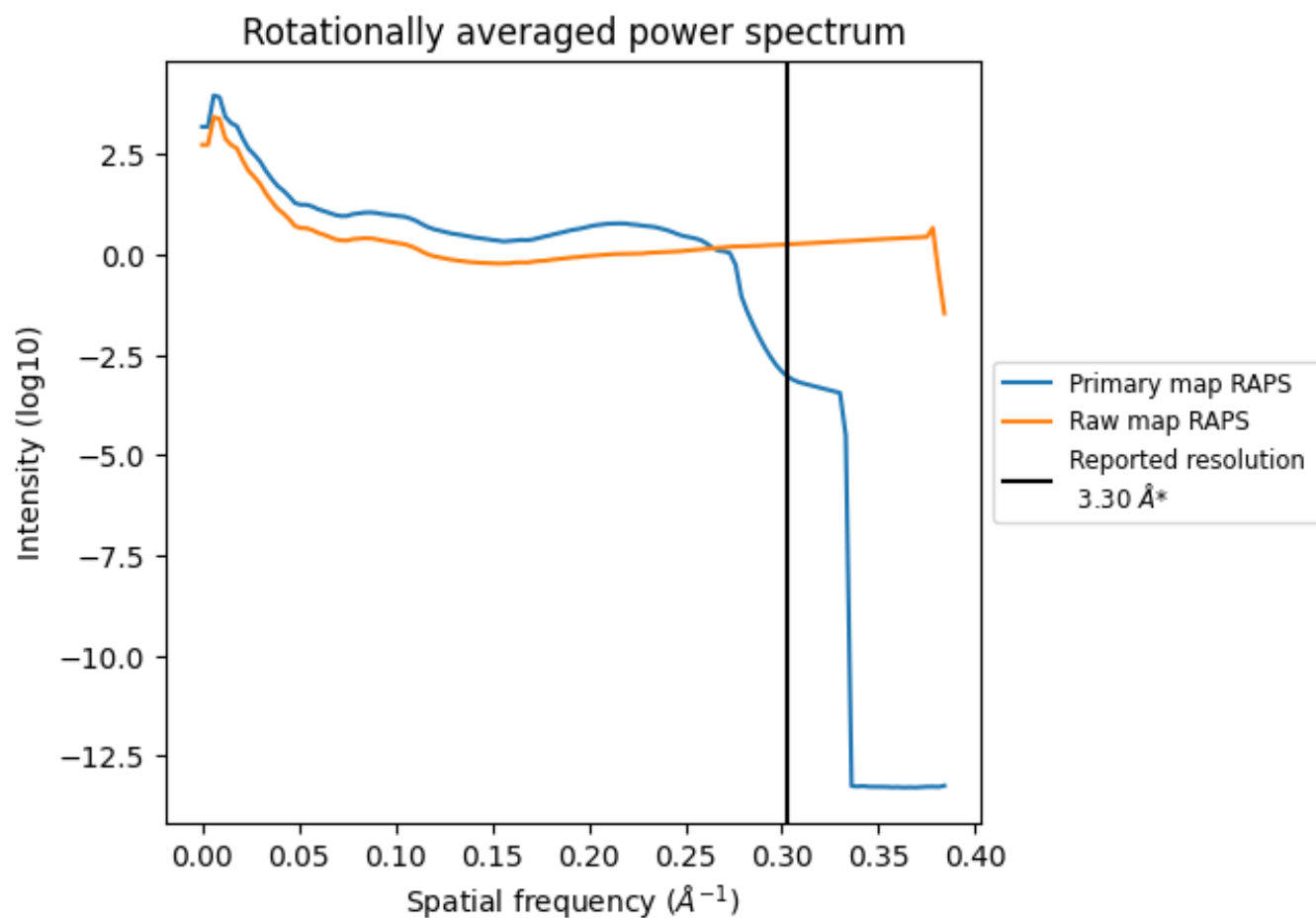
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 158 nm³; this corresponds to an approximate mass of 143 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 ⓘ

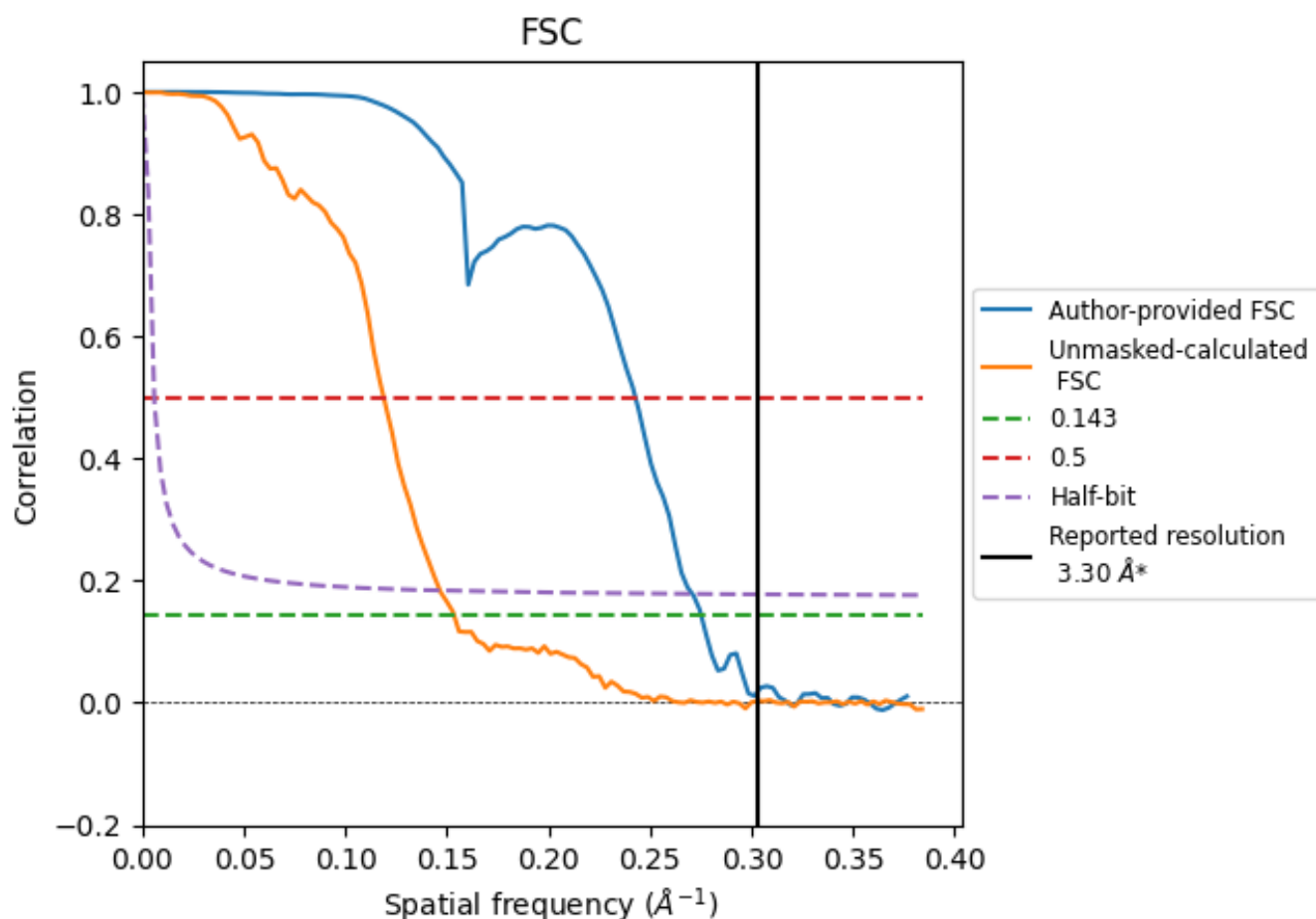


*Reported resolution corresponds to spatial frequency of 0.303 $\text{\AA}^{-1}$

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 $0.303 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	3.63	4.12	3.69
Unmasked-calculated*	6.51	8.41	6.82

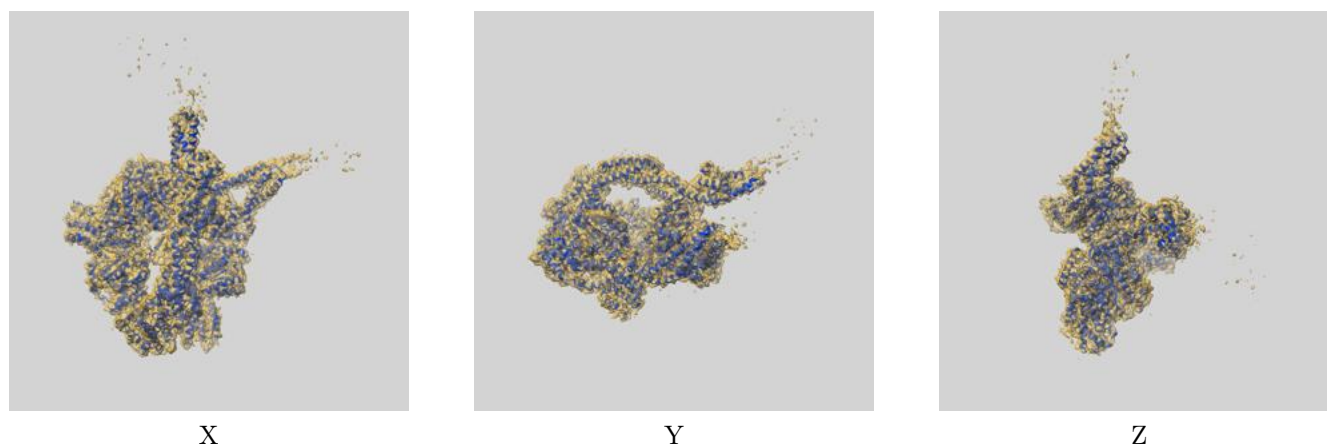
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 3.63 differs from the reported value 3.3 by more than 10 %

The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.51 differs from the reported value 3.3 by more than 10 %

9 Map-model fit [i](#)

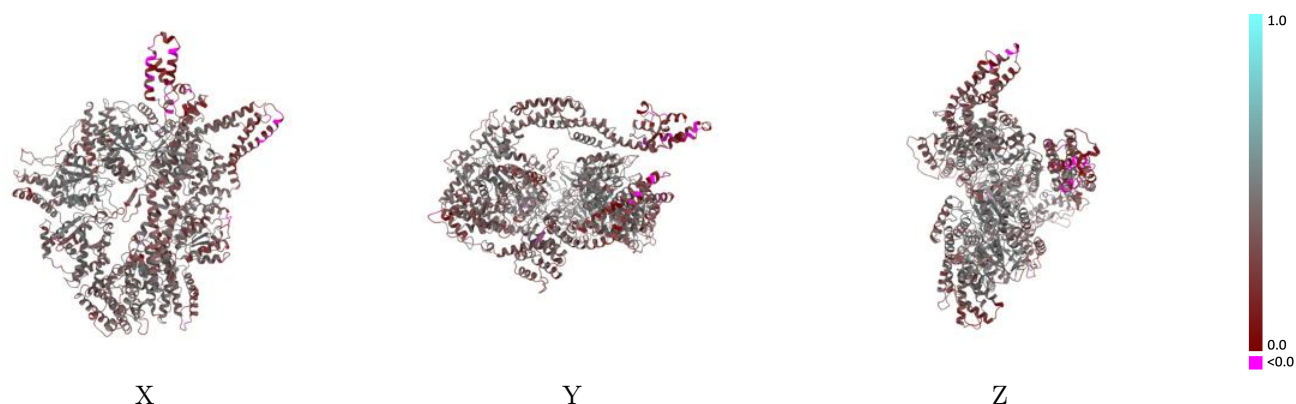
This section contains information regarding the fit between EMDB map EMD-48239 and PDB model 9MFV. Per-residue inclusion information can be found in [section 3](#) on [page 5](#).

9.1 Map-model overlay [i](#)



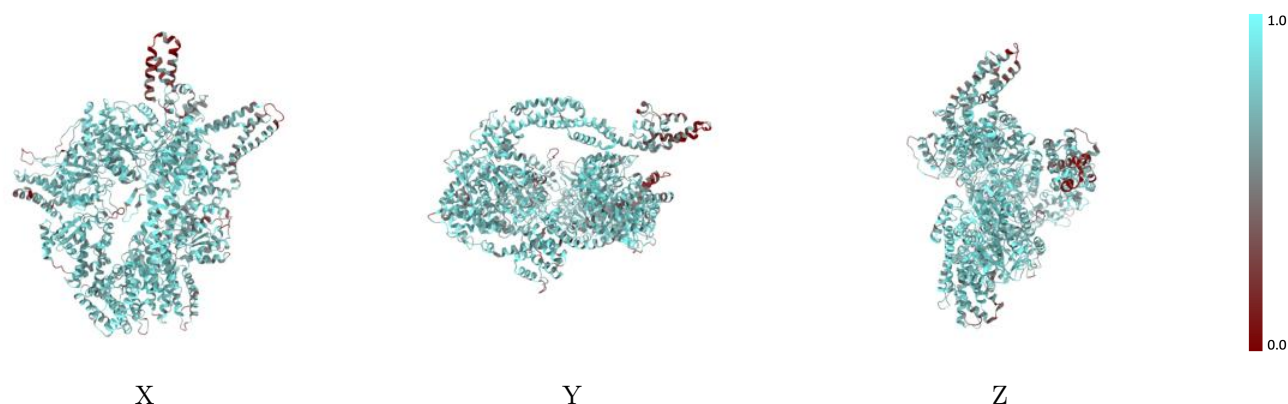
The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



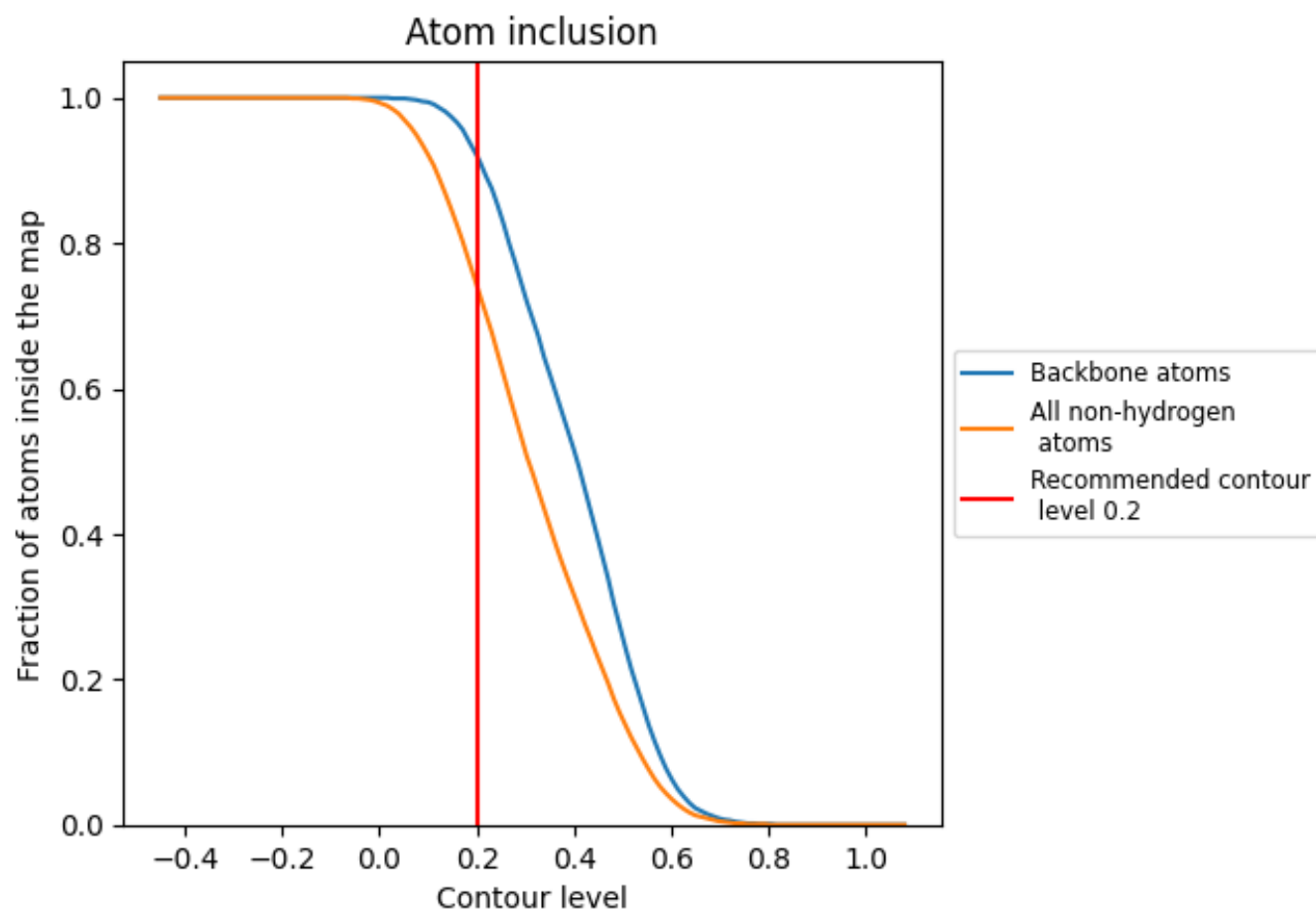
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.2).

9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 74% 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 (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7430	0.3780
A	0.7430	0.3780

