



Full wwPDB EM Validation Report ⓘ

Oct 13, 2024 – 12:27 PM EDT

PDB ID : 7SUD
EMDB ID : EMD-25440
Title : CryoEM structure of DNA-PK complex VIII
Authors : Chen, X.; Liu, L.; Gellert, M.; Yang, W.
Deposited on : 2021-11-16
Resolution : 3.60 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.dev113
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4.02b-467
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) : 2.39

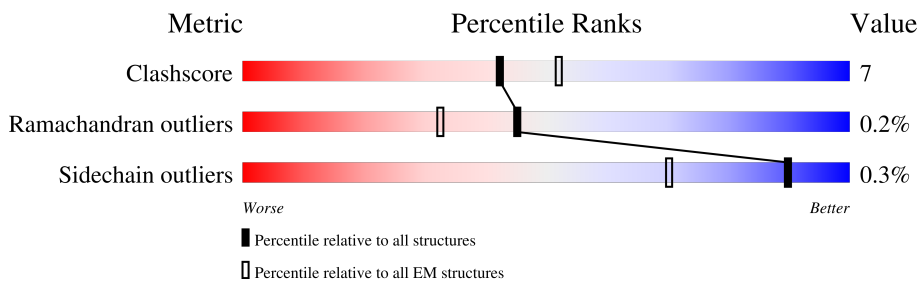
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.60 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	4128	
2	C	732	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 29980 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 DNA-dependent protein kinase catalytic subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	N	O	P			S
1	A	3740	29880	19157	5071	5454	4	194	4	0

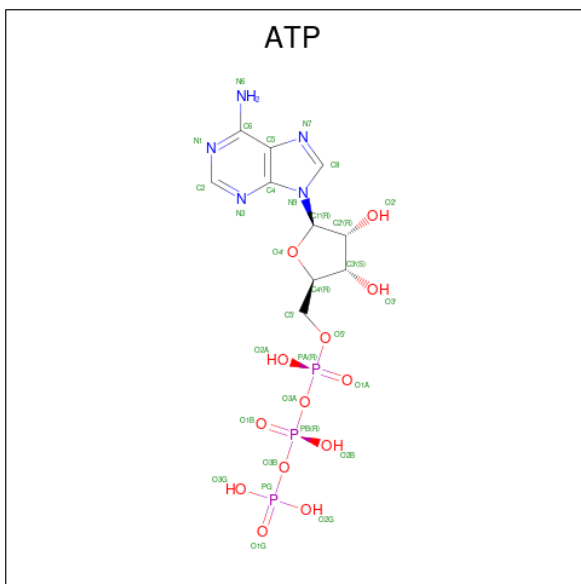
- Molecule 2 is a protein called X-ray repair cross-complementing protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	9	68	43	9	15	1	0	0

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

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

- Molecule 4 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: C₁₀H₁₆N₅O₁₃P₃) (labeled as "Ligand of Interest" by depositor).

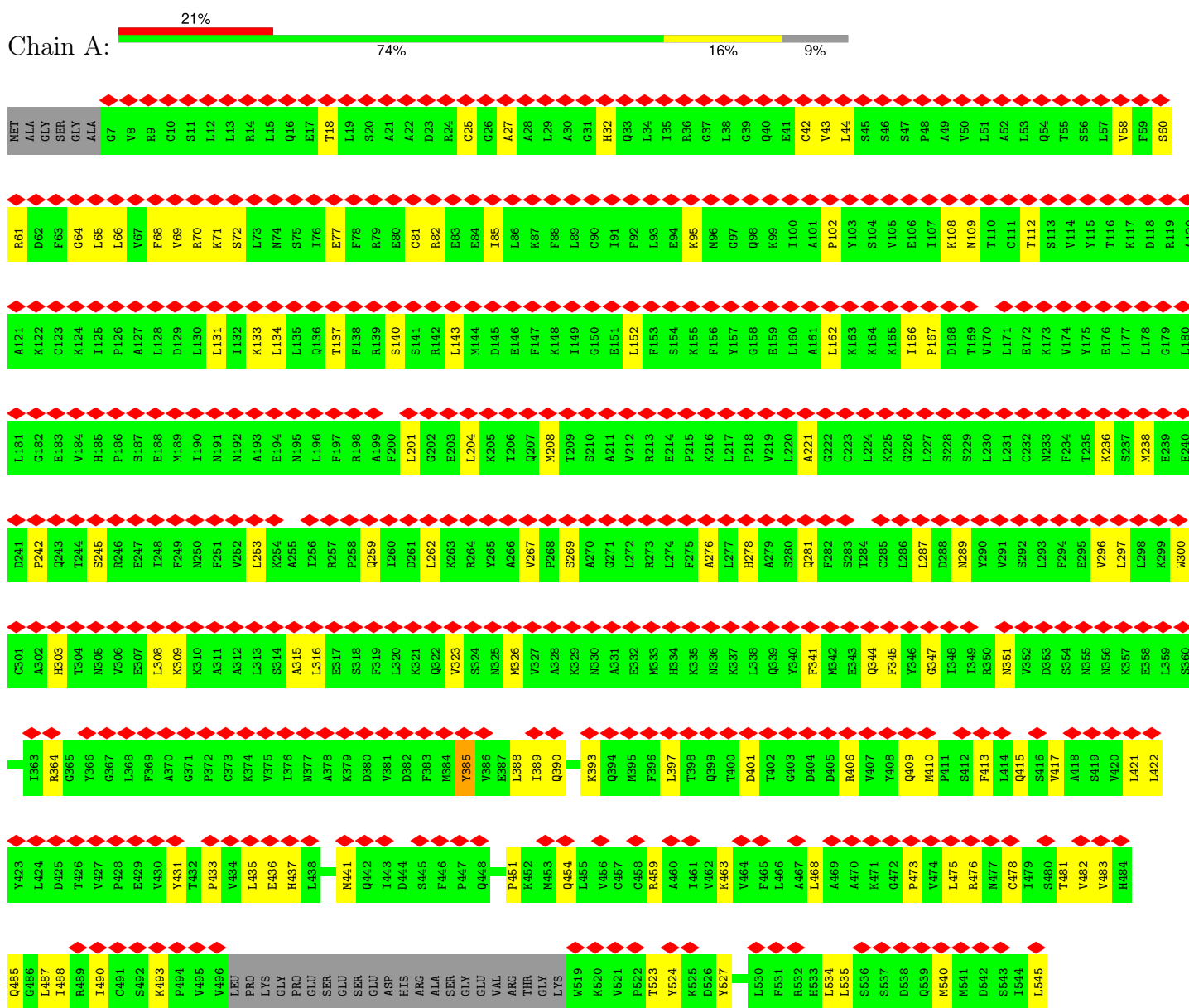


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
4	A	1	31	10	5	13	3	0

3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and 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: DNA-dependent protein kinase catalytic subunit



D1921	A1922	F1923	M1926	M1927	A1928	G1929	E1930	M1931	Q1932	L1933	L1934	E1935	R1936	R1937	Y1940	H1941	Y1945	V1955	F1956	M1957	E1958	L1959	K1960	F1961	Y1962	Q1963	G1964	F1965	L1966	F1967	S1968	E1969	F1971	E1972	K1973	M1974	L1975	L1976	F1977	F1978	E1979	M1980	L1981	I1982	D1983	L1984	K1985	R1986	R1987	Y1988	F1990	F1991	V1992							
E1993	V1994	E1995	V1996	K2002	R2008	K2009	E2010	A2011	R2012	E2013	A2014	A2015	N2016	G2017	D2018	S2019	D2020	G2021	S2022	Y2024	M2025	SER	SER	LEU	TYR	LEU	ALA	ASP	G1964	F1965	L1966	F1967	SER	GLU	GLU	PRO	MET	K1970	SER	GLN	PHE	ASP	PHE	ASP	ASP	THR	THR	GLY	VAL	GLN	TYR	SER	TRP	V2122	V2123	S2124	V2125	M2126	K2127	F2128
PRU	ALA	THR	GLY	ARG	PHE	ARG	ARG	ARG	GLU	GLN	ASP	ASP	PRO	THR	THR	VAL	HIS	ASP	ASP	VAL	LEU	LEU	LEU	LEU	GLU	MET	D2086	E2087	R2090	H2091	E2092	L2097	L2100	V2101	H2105	L2108	GLY	PRO	PRO	GLN	GLY	GLU	GLU	ASP	VAL	PRO	ARG	ASP	L2122	P2123	S2124	V2125	M2126	K2127	F2128					
L2129	H2130	G2134	I2137	V2138	P2139	R2143	L2144	F2145	L2146	A2147	K2148	I2151	N2152	V2156	P2159	K2162	H2163	F2167	Q2170	L2171	A2172	E2175	N2176	N2177	G2178	G2179	E2180	G2181	I2182	H2183	E2188	I2189	V2190	I2193	L2199	A2200	T2201	P2202	T2203	G2204	V2205	P2206	V2210	F2218																
L2219	M2220	K2221	H2222	V2223	W2245	C2248	L2249	S2250	I2251	P2252	L2255	I2256	F2257	S2261	G2262	S2271	I2274	Q2275	L2279	D2284	L2285	D2289	P2290	G2293	I2294	Q2296	S2297	E2298	Q2301	A2302	L2303	V2304	W2305	N2306	R2311	A2317	V2322	L2323	G2324	I2325	I2326	R2328	Y2329																	
V2330	K2333	K2334	M2335	I2336	L2337	E2338	E2339	S2340	E2343	K2347	Q2348	L2349	K2350	Q2351	H2352	Q2353	W2354	H2357	R2358	L2356	K2359	K2366	S2370	F2371	F2372	A2375	M2379	M2380	A2381	F2384	K2394	E2406	G2407	M2408	F2413	Q2414	L2415	K2416	S2417	L2418	D2419	D2429	L2436	I2439																
V2458	R2470	I2476	P2487	E2488	S2489	E2490	T2491	D2492	M2493	I2511	D2512	R2522	M2523	F2524	H2527	R2530	L2536	K2543	R2548	L2550	N2560	E2564	M2568	P2575	E2578	Q2587	T2590	I2591	D2592	S2593	D2594	M2595	R2596	F2597	R2598	S2599	T2600	V2601	L2602	T2603	P2604	T2609																		
Q2613	THR	GLY	THR	GLN	THR	ARG	THR	THR	ALA	I2511	D2512	R2522	M2523	F2524	H2527	R2530	L2536	K2543	R2548	L2550	N2560	E2564	M2568	P2575	E2578	Q2587	T2590	I2591	D2592	S2593	D2594	M2595	R2596	F2597	R2598	S2599	T2600	V2601	L2602	T2603	P2604	T2609																		
SER	ASP	SER	LEU	LEU	PHE	ALA	HIS	GLN	LYS	ARG	ARG	TRP	PRO	VAL	ALA	R2633	K2636	L2638	Q2639	Q2640	D2641	H2642	T2645	T2647	Q2648	THR	ALA	GLU	VAL	ASP	GLY	ASP	TRP	ALA	THR	GLY	THR	LEU	LEU	VAL	ARG	HIS	THR	PRO																
ARG	ASP	GLN	LYS	LEU	SER	LEU	MET	TYR	ALA	GLU	GLN	LYS	ARG	ILE	LYS	ASP	GLU	GLY	LEU	LYS	MET	LYS	GLN	ASP	ALA	GLN	V2769	R2772	R2773	S2774	V2775	R2776	Q2784	L2785	K2786	A2798	Q2799	T2804	K2818	E2819	M2820	K2824	E2828																	
T2847	F2848	S2849	L2870	L2871	L2881	Q2886	E2899	LEU	PRO	ALA	GLU	LEU	PRO	ALA	LYS	ARG	VAL	ARG	GLY	LYS	ALA	LEU	P2917	P2918	R2922	Y2930	K2950	Q2954	R2962	D2960	L3005	I3019	D3020	S3021	E3022	N3023	N3028	E3033	Q3037	L3041																				
L3049	L3053	L3062	K3067	H3081	Y3082	S3083	Q3084	L3089	Y3090	L3091	D3097	I3107	Q3108	S3109	N3113	R3125	E3137	S3164	R3167	R3186	L3190	T3198	PRO	LEU	PRO	GLU	ASP	ASN	SER	MET	ASN	VAL	GLN	ASP	ASP	GLY	PRO	SER	ASP	ARG	MET	GLU	VAL																	
G1N	GLU	GLU	GLU	D3226	K3235	K3239	D3244	R3247	K3257	K3260	F3261	L3262	T3268	R3269	D3270	L3283	R3287	S3288	Q3291	V3297	T3303	L3307	V3312	L3316	S3317	K3318	L3330	I3337	A3338	N3339	L3348	D3354	R3357	R3358	E3361	E3368																								

GLU	◆
GLY	◆
GLY	◆
D724	◆
V725	◆
D726	◆
D727	◆
L728	◆
L729	◆
D730	◆
M731	◆
I732	◆

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	42521	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)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.051	Depositor
Minimum map value	-0.024	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.0095	Depositor
Map size (Å)	399.84, 399.84, 399.84	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.833, 0.833, 0.833	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: TPO, 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	0.43	0/30454	0.64	14/41158 (0.0%)
2	C	0.34	0/67	0.50	0/90
All	All	0.43	0/30521	0.64	14/41248 (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	15

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	1828	LEU	CA-CB-CG	6.69	130.68	115.30
1	A	1933	LEU	CA-CB-CG	6.68	130.66	115.30
1	A	201	LEU	CA-CB-CG	6.68	130.66	115.30
1	A	422	LEU	CA-CB-CG	6.31	129.81	115.30
1	A	162	LEU	CA-CB-CG	5.86	128.78	115.30
1	A	662	LEU	CA-CB-CG	5.56	128.09	115.30
1	A	3695	LEU	CB-CG-CD2	5.42	120.22	111.00
1	A	1858	LEU	CA-CB-CG	5.41	127.75	115.30
1	A	475	LEU	CA-CB-CG	5.36	127.62	115.30
1	A	1981	LEU	CA-CB-CG	5.21	127.28	115.30
1	A	3651	LEU	CA-CB-CG	5.20	127.25	115.30
1	A	3599	THR	C-N-CD	-5.12	109.33	120.60
1	A	2249	LEU	CA-CB-CG	5.04	126.90	115.30
1	A	4027	TRP	CA-CB-CG	5.02	123.24	113.70

There are no chirality outliers.

All (15) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1273	GLU	Peptide
1	A	1306	ILE	Peptide
1	A	166	ILE	Peptide
1	A	1805	PHE	Peptide
1	A	1990	PHE	Peptide
1	A	1993	GLU	Peptide
1	A	2023	SER	Peptide
1	A	2250	SER	Peptide
1	A	2284	ASP	Peptide
1	A	2372	PRO	Peptide
1	A	3005	LEU	Peptide
1	A	345	PHE	Peptide
1	A	3600	PRO	Peptide
1	A	3653	ARG	Peptide
1	A	385	TYR	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	29880	0	30201	392	0
2	C	68	0	64	2	0
3	A	1	0	0	0	0
4	A	31	0	12	0	0
All	All	29980	0	30277	393	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 (393) 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:1837:ARG:O	1:A:1841:SER:HB3	1.64	0.98
1:A:1578:ALA:O	1:A:1582:LEU:HB2	1.83	0.78

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1802:TYR:O	1:A:1806:ARG:HB2	1.84	0.76
1:A:2220:MET:HG2	1:A:2255:LEU:HD13	1.68	0.76
1:A:3828:TYR:HH	1:A:4127:TRP:HE1	1.41	0.68
1:A:1717:LEU:O	1:A:1721:HIS:HB2	1.92	0.68
1:A:2511:ILE:HD13	1:A:2550:ILE:HD13	1.76	0.68
1:A:1837:ARG:HA	1:A:1840:PHE:HB3	1.76	0.67
1:A:3958:LEU:HD23	1:A:4081:ALA:HB2	1.76	0.66
1:A:1711:ARG:HG3	1:A:1761:LEU:HD21	1.77	0.66
1:A:1727:ARG:HE	1:A:1773:VAL:HG22	1.61	0.66
1:A:1277:GLY:H	1:A:1280:GLN:HE21	1.43	0.64
1:A:3303:THR:O	1:A:3307:LEU:HB2	1.96	0.64
1:A:390:GLN:NE2	1:A:431:TYR:OH	2.31	0.64
1:A:2594:ASP:OD1	1:A:2598:ARG:NH2	2.31	0.64
1:A:1937:ARG:O	1:A:1941:HIS:ND1	2.27	0.64
1:A:64:GLY:O	1:A:68:PHE:HB2	1.98	0.63
1:A:389:ILE:HD11	1:A:431:TYR:HB3	1.80	0.63
1:A:3244:ASP:OD1	1:A:3247:ARG:NH2	2.30	0.63
1:A:72:SER:O	1:A:82:ARG:NH1	2.32	0.62
1:A:858:MET:O	1:A:862:LEU:HB2	1.99	0.62
1:A:70[B]:ARG:HD2	1:A:71:LYS:HG3	1.82	0.62
1:A:451:PRO:HA	1:A:454:GLN:HE22	1.64	0.62
1:A:1711:ARG:HH11	1:A:1757:MET:HA	1.65	0.62
1:A:1766:LEU:O	1:A:1822:ARG:NH1	2.32	0.62
1:A:2330:VAL:HG13	1:A:2338:GLU:HG2	1.80	0.62
1:A:2126:MET:O	1:A:2130:HIS:HB2	2.01	0.61
1:A:3520:GLU:O	1:A:3524:ASN:ND2	2.34	0.61
1:A:259:GLN:HB2	1:A:262:LEU:HD12	1.82	0.61
1:A:3644:PHE:HB3	1:A:3651:LEU:HD23	1.82	0.61
1:A:1568:ASN:ND2	1:A:1599:GLY:O	2.34	0.60
1:A:415:GLN:HG2	1:A:463:LYS:HD3	1.83	0.60
1:A:2470:ARG:NH1	1:A:2512:ASP:OD2	2.35	0.60
1:A:58:VAL:HG22	1:A:65:LEU:HD13	1.84	0.59
1:A:1770:GLN:O	1:A:1822:ARG:NH2	2.34	0.59
1:A:3996:GLY:O	1:A:4000:ASN:ND2	2.35	0.59
1:A:2218:PHE:HA	1:A:2221:LYS:HD2	1.84	0.59
1:A:1202:ARG:NH2	1:A:1210:ASP:OD1	2.37	0.58
1:A:1528:LEU:HD21	1:A:1567:ILE:HG13	1.85	0.58
1:A:913:ARG:NH2	1:A:916:GLU:OE2	2.37	0.58
1:A:1623:LEU:HD21	1:A:1652:ILE:HD12	1.84	0.58
1:A:2918:PRO:O	1:A:2922:ARG:NH1	2.37	0.58
1:A:1361:LYS:NZ	1:A:1362:ASP:OD1	2.37	0.58

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:417:VAL:O	1:A:421:LEU:HB2	2.04	0.57
1:A:2604:PRO:O	1:A:3725:ARG:NH1	2.37	0.57
1:A:975:ASP:O	1:A:981:ARG:NH1	2.37	0.57
1:A:1591:LYS:NZ	1:A:1592:MET:SD	2.77	0.57
1:A:385:TYR:H	1:A:388:LEU:HD13	1.69	0.57
1:A:1146:ASN:HA	1:A:1165:LEU:H	1.70	0.57
1:A:3735:PRO:HB3	1:A:3753:LYS:HB3	1.87	0.57
1:A:2429:ASP:OD1	1:A:2429:ASP:N	2.37	0.56
1:A:3226:ASP:OD1	1:A:3226:ASP:N	2.38	0.56
1:A:1844:VAL:HG11	1:A:1899:VAL:HA	1.86	0.56
1:A:1225:GLU:HB3	1:A:1236:LEU:HB2	1.88	0.56
1:A:2348:GLN:O	1:A:2352:HIS:ND1	2.39	0.56
1:A:3257:LYS:HA	1:A:3260:LYS:HE3	1.87	0.56
1:A:131:LEU:HD12	1:A:134:LEU:HD21	1.87	0.55
1:A:817:ALA:O	1:A:821:ALA:HB2	2.06	0.55
1:A:3109:SER:O	1:A:3113:ASN:ND2	2.39	0.55
1:A:3479:THR:HG22	1:A:3482:LEU:HD23	1.86	0.55
1:A:401:ASP:OD2	1:A:406:ARG:NH1	2.40	0.55
1:A:3523:ASP:OD2	1:A:3561:LYS:NZ	2.38	0.55
1:A:1851:LEU:HA	1:A:1870:LYS:HE2	1.88	0.55
1:A:4037:ASN:HB3	1:A:4039:TYR:HE1	1.71	0.55
1:A:483:VAL:HG11	1:A:567:GLU:HB3	1.88	0.55
1:A:1642:LYS:HB3	1:A:1678:LEU:HD21	1.88	0.55
1:A:3268:THR:HG23	1:A:3269:ARG:HG2	1.88	0.55
1:A:534:LEU:O	1:A:561:ASN:ND2	2.40	0.54
1:A:2151:ILE:HD13	1:A:2188:GLU:HG3	1.89	0.54
1:A:2950:LYS:O	1:A:2954:GLN:NE2	2.38	0.54
1:A:627:VAL:HG23	1:A:669:LEU:HG	1.90	0.54
1:A:1530:SER:O	1:A:1534:ASN:ND2	2.40	0.54
1:A:3655:LYS:O	1:A:3658:ASP:N	2.40	0.54
1:A:2773:ARG:NH1	1:A:2774:SER:O	2.40	0.54
1:A:347:GLY:O	1:A:351:ASN:ND2	2.40	0.54
1:A:2349:LEU:O	1:A:2353:GLN:HB3	2.07	0.54
1:A:1356:TRP:O	1:A:1411:TYR:OH	2.25	0.54
1:A:3543:LYS:NZ	1:A:3545:THR:OG1	2.41	0.54
1:A:2578:GLU:O	1:A:2784:GLN:NE2	2.41	0.54
1:A:25:CYS:HB2	1:A:77:GLU:HB3	1.88	0.53
1:A:1693:VAL:HG11	1:A:1746:PHE:HE1	1.72	0.53
1:A:3288:SER:OG	1:A:3291:GLN:NE2	2.41	0.53
1:A:3667:LEU:HA	1:A:3670:MET:HB2	1.89	0.53
1:A:3676:PRO:HB2	1:A:3728:VAL:HG21	1.90	0.53

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1366:THR:OG1	1:A:1370:ARG:NH2	2.41	0.53
1:A:1646:LEU:HD11	1:A:1678:LEU:HD23	1.89	0.53
1:A:1431:LEU:HB3	1:A:1448:LEU:HD21	1.90	0.53
1:A:3097:ASP:N	1:A:3097:ASP:OD1	2.40	0.53
1:A:918:ALA:O	1:A:927:LYS:NZ	2.41	0.53
1:A:2322:VAL:HA	1:A:2325:LEU:HD12	1.90	0.53
1:A:3164:TRP:O	1:A:3186:ARG:NH1	2.41	0.53
1:A:1022:ASP:O	1:A:1026:ARG:NH1	2.42	0.53
1:A:2458:VAL:HG11	1:A:2476:ILE:HD11	1.91	0.53
1:A:3924:HIS:HD2	1:A:3926:ASN:H	1.55	0.53
1:A:993:HIS:NE2	1:A:1035:GLU:OE2	2.32	0.53
1:A:1608:ARG:HH22	1:A:1614:GLN:HB3	1.74	0.53
1:A:1750:LEU:HD12	1:A:1758:LEU:HB3	1.90	0.53
1:A:58:VAL:HG13	1:A:65:LEU:HB2	1.89	0.52
1:A:3354:ASP:OD2	1:A:3357:ARG:NH2	2.42	0.52
1:A:1582:LEU:HG	1:A:1593:VAL:HG23	1.91	0.52
1:A:2633:GLY:N	1:A:2773:ARG:O	2.42	0.52
1:A:2323:LEU:HD23	1:A:2326:ILE:HD12	1.92	0.52
1:A:253:LEU:HG	1:A:289:ASN:HD21	1.75	0.52
1:A:1594:SER:O	1:A:1598:ASN:ND2	2.43	0.52
1:A:2527:HIS:HB3	1:A:2530:ARG:HD3	1.91	0.52
1:A:3190:LEU:HD12	1:A:3235:LYS:HG3	1.92	0.52
1:A:1820:VAL:HG23	1:A:1824:LEU:HD22	1.91	0.52
1:A:3283:LEU:O	1:A:3287:ARG:HB2	2.09	0.52
1:A:69:VAL:HB	1:A:85:ILE:HD11	1.91	0.52
1:A:1234:GLY:HA2	1:A:1259:LEU:HD22	1.91	0.52
1:A:1586:SER:O	1:A:1632:TRP:NE1	2.32	0.52
1:A:998:ASN:OD1	1:A:1055:ASN:ND2	2.37	0.52
1:A:1992:VAL:HG23	1:A:2183:HIS:HA	1.91	0.52
1:A:3500:SER:OG	1:A:3763:ARG:NH2	2.43	0.52
1:A:3507:ASP:OD1	1:A:3508:LYS:NZ	2.40	0.51
1:A:4032:ASN:ND2	1:A:4033:VAL:O	2.42	0.51
1:A:303:HIS:H	1:A:309:LYS:HZ2	1.57	0.51
1:A:435:LEU:HD21	1:A:468:LEU:HD11	1.92	0.51
1:A:791:ASP:N	1:A:791:ASP:OD1	2.41	0.51
1:A:1281:VAL:HG13	1:A:1282:LEU:HG	1.93	0.51
1:A:1923:PHE:O	1:A:1980:ASN:ND2	2.43	0.51
1:A:3312:VAL:HG13	1:A:3316:LEU:HD12	1.91	0.51
1:A:1564:SER:O	1:A:1568:ASN:ND2	2.44	0.51
1:A:1734:PRO:O	1:A:1738:ASN:ND2	2.43	0.51
1:A:109:ASN:HA	1:A:112:THR:HG22	1.93	0.51

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3789:ARG:HG2	1:A:3938:ILE:HG12	1.93	0.51
1:A:2130:HIS:NE2	1:A:2163:HIS:O	2.44	0.50
1:A:2636:ARG:HA	1:A:2772:TYR:HA	1.92	0.50
1:A:410:MET:HA	1:A:413:PHE:HB2	1.92	0.50
1:A:3958:LEU:O	1:A:4110:GLN:NE2	2.41	0.50
1:A:2347:LYS:HA	1:A:2350:LYS:HE2	1.93	0.50
1:A:2487:PRO:HD2	1:A:2491:THR:HG21	1.93	0.50
1:A:2824:LYS:HD2	1:A:2828:GLU:HG3	1.94	0.50
1:A:1937:ARG:HH21	1:A:1940:TYR:HE2	1.60	0.50
1:A:1291:LEU:HA	1:A:1294:VAL:HG12	1.93	0.49
1:A:1714:LEU:HD23	1:A:1717:LEU:HD21	1.94	0.49
1:A:1404:LYS:HE3	1:A:1461:ALA:HA	1.93	0.49
1:A:3806:LEU:HD13	1:A:3938:ILE:HD13	1.94	0.49
1:A:2328:ARG:NH2	1:A:2370:SER:O	2.42	0.49
1:A:2375:ALA:O	1:A:2379:MET:N	2.45	0.49
1:A:4042:GLN:HE21	1:A:4066:LEU:HD21	1.76	0.49
1:A:624:ILE:HA	1:A:627:VAL:HG12	1.93	0.49
1:A:3601:VAL:HG11	1:A:3654:MET:HG2	1.94	0.49
1:A:4012:ASP:OD2	1:A:4015:ASN:ND2	2.39	0.49
1:A:4090:ARG:NH1	1:A:4113:ASP:OD1	2.40	0.49
1:A:42:CYS:O	1:A:95:LYS:NZ	2.38	0.49
1:A:459:ARG:NH2	1:A:540:MET:O	2.46	0.49
1:A:493:LYS:HE2	1:A:527:TYR:HE2	1.78	0.49
1:A:523:THR:OG1	1:A:524:TYR:N	2.45	0.49
1:A:718:MET:HE1	1:A:730:LEU:HG	1.93	0.49
1:A:722:LYS:HA	1:A:726:LEU:HD22	1.95	0.49
1:A:463:LYS:HG2	1:A:545:LEU:HD11	1.94	0.49
1:A:3760:GLN:OE1	1:A:4019:LYS:NZ	2.44	0.49
1:A:1646:LEU:HA	1:A:1649:LEU:HB2	1.95	0.49
1:A:1091:GLU:OE1	1:A:2642:HIS:ND1	2.45	0.49
1:A:1413:ASP:OD1	1:A:1413:ASP:N	2.46	0.49
1:A:1604:SER:O	1:A:1608:ARG:NE	2.44	0.49
1:A:1727:ARG:HH21	1:A:1773:VAL:HA	1.78	0.49
1:A:3760:GLN:NE2	1:A:3942:PHE:O	2.46	0.49
1:A:1603:GLN:HG2	1:A:1606:ARG:HH22	1.79	0.48
1:A:3358:ARG:NH2	1:A:3361:GLU:OE1	2.42	0.48
1:A:609:ALA:HA	1:A:612:LEU:HD12	1.94	0.48
1:A:1795:VAL:HG22	1:A:1836:LEU:HD21	1.95	0.48
1:A:561:ASN:O	1:A:565:TYR:HB2	2.13	0.48
1:A:433:PRO:O	1:A:437[B]:HIS:HB2	2.14	0.48
1:A:1684:LEU:HD12	1:A:1689:LYS:HE3	1.95	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2847:THR:OG1	1:A:2849:SER:O	2.31	0.48
1:A:3699:LEU:HB3	1:A:3719:ILE:HD12	1.95	0.48
1:A:3763:ARG:NH1	1:A:4008:GLU:OE1	2.46	0.48
1:A:60:SER:OG	1:A:61:ARG:N	2.46	0.48
1:A:1588:ASP:OD1	1:A:1589:ASN:ND2	2.47	0.48
1:A:1829:TRP:HE3	1:A:1879:VAL:HG13	1.77	0.48
1:A:1289:SER:O	1:A:1289:SER:OG	2.26	0.48
1:A:2252:PRO:HB2	1:A:2255:LEU:HD21	1.96	0.48
1:A:630:CYS:HA	1:A:633:ILE:HG22	1.95	0.48
1:A:1250:LEU:O	1:A:1253:THR:OG1	2.29	0.48
1:A:2257:PHE:O	1:A:2261:SER:CB	2.61	0.48
1:A:2522:ARG:NH2	1:A:2564:GLU:OE2	2.43	0.47
1:A:817:ALA:O	1:A:821:ALA:CB	2.62	0.47
1:A:891:ARG:N	1:A:908:ASP:OD2	2.45	0.47
1:A:1848:ILE:HG22	1:A:1852:LYS:HG3	1.95	0.47
1:A:863:GLY:HA2	1:A:3167:ARG:HG3	1.96	0.47
1:A:1478:SER:OG	1:A:1479:VAL:N	2.47	0.47
1:A:4037:ASN:HB3	1:A:4039:TYR:CE1	2.50	0.47
1:A:436:GLU:OE2	1:A:481:THR:OG1	2.33	0.47
1:A:4103:GLN:O	1:A:4107:LEU:HB2	2.13	0.47
1:A:1702:LEU:HD21	1:A:1707:LEU:HD13	1.97	0.47
1:A:297:LEU:HB3	1:A:316:LEU:HD12	1.96	0.47
1:A:3564:GLN:O	1:A:3697:ASN:ND2	2.47	0.47
1:A:221:ALA:HB2	1:A:267:VAL:HG22	1.95	0.47
1:A:875:SER:OG	1:A:877:ASP:OD1	2.31	0.47
1:A:994:TRP:O	1:A:997:ASN:ND2	2.39	0.47
1:A:1212:LEU:HD21	1:A:1217:VAL:HG23	1.97	0.47
1:A:1385:ASN:HD21	1:A:1388:ASP:HB2	1.80	0.47
1:A:1850:VAL:HG11	1:A:1869:LYS:HG3	1.96	0.47
1:A:814:GLU:HB2	1:A:3081:HIS:HE1	1.79	0.47
1:A:899:ARG:NH1	1:A:2568:MET:SD	2.88	0.47
1:A:913:ARG:O	1:A:917:LEU:HB2	2.14	0.47
1:A:1959:LEU:HD12	1:A:1962:TYR:HD2	1.80	0.47
1:A:393:LYS:HA	1:A:397:LEU:HD13	1.97	0.47
1:A:3541:SER:O	1:A:3541:SER:OG	2.33	0.47
1:A:1904:CYS:HB3	1:A:1906:THR:HG22	1.95	0.47
1:A:287:LEU:HD21	1:A:323:VAL:HG22	1.97	0.46
1:A:1104:LEU:HD23	1:A:1168:LEU:HD21	1.96	0.46
1:A:3729:MET:HB2	1:A:3735:PRO:HD2	1.97	0.46
1:A:1221:ILE:O	1:A:1225:GLU:HB2	2.15	0.46
1:A:3652:LEU:O	1:A:3653:ARG:NE	2.48	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:433:PRO:O	1:A:437[A]:HIS:HB2	2.14	0.46
1:A:1274:ARG:O	1:A:1276:VAL:N	2.48	0.46
1:A:708:VAL:HG22	1:A:740:ILE:HG23	1.96	0.46
1:A:1986:ARG:NH2	1:A:1988:TYR:OH	2.49	0.46
1:A:3840:LYS:HE3	1:A:3840:LYS:HB2	1.75	0.46
1:A:296:VAL:O	1:A:300:TRP:HB2	2.15	0.46
1:A:3137:GLU:OE1	1:A:3164:TRP:NE1	2.48	0.46
1:A:3871:PHE:O	1:A:3875:GLU:HB2	2.16	0.46
1:A:702:SER:HB2	1:A:1321:ARG:HH12	1.81	0.46
1:A:2148:LYS:O	1:A:2152:ASN:ND2	2.49	0.46
1:A:3649:SER:HA	1:A:3652:LEU:HD13	1.98	0.46
1:A:3700:GLU:OE2	1:A:3716:HIS:ND1	2.34	0.46
1:A:1366:THR:O	1:A:1370:ARG:CB	2.64	0.46
1:A:1849:ASP:OD1	1:A:1849:ASP:N	2.48	0.46
1:A:2251:ILE:HD11	1:A:2285:LEU:HD13	1.96	0.46
1:A:2271:SER:HB2	1:A:2275:GLN:HE22	1.80	0.46
1:A:1261:LEU:HD11	1:A:1340:ARG:HG3	1.98	0.45
1:A:3370:SER:HA	1:A:3373:VAL:HG12	1.97	0.45
1:A:1582:LEU:HD11	1:A:1596:VAL:HG11	1.98	0.45
1:A:1632:TRP:HE3	1:A:1645:VAL:HG22	1.81	0.45
1:A:3808:ASN:ND2	1:A:3933:GLU:OE1	2.43	0.45
1:A:43:VAL:HG12	1:A:44:LEU:HG	1.97	0.45
1:A:278:HIS:CD2	1:A:281:GLN:HG3	2.51	0.45
1:A:1456:LYS:HE2	1:A:1516:GLU:HB3	1.99	0.45
1:A:3049:LEU:HG	1:A:3053:LEU:HD13	1.99	0.45
1:A:561:ASN:HA	1:A:564:LEU:HB2	1.99	0.45
1:A:739:ASN:HA	1:A:742:GLU:HG2	1.99	0.45
1:A:741:ILE:HA	1:A:748:TYR:HE1	1.82	0.45
1:A:1987:ARG:HE	1:A:2178:GLY:HA2	1.81	0.45
1:A:2773:ARG:HH12	1:A:2776:ARG:HG2	1.81	0.45
1:A:2870:SER:HA	1:A:2922:ARG:HH21	1.82	0.45
1:A:3019:ILE:HG13	1:A:3020:ASP:H	1.82	0.45
1:A:535:LEU:HD23	1:A:561:ASN:HB3	1.97	0.45
1:A:1052:SER:O	1:A:1052:SER:OG	2.33	0.45
1:A:2024:TYR:HD2	1:A:2279:ILE:HD13	1.81	0.45
1:A:3973:PRO:O	1:A:3975:LYS:NZ	2.43	0.45
1:A:1658:SER:O	1:A:1658:SER:OG	2.31	0.45
1:A:3886:ALA:O	1:A:3890:MET:HB2	2.17	0.45
1:A:1638:PRO:O	1:A:1641:THR:OG1	2.34	0.45
1:A:1700:THR:HG21	1:A:1753:SER:HB2	1.98	0.45
1:A:242:PRO:HA	1:A:245:SER:HB3	1.97	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3137:GLU:OE2	1:A:3186:ARG:NH2	2.50	0.45
1:A:2012:ARG:NH2	1:A:2020:ASP:O	2.50	0.44
1:A:2144:LEU:HD23	1:A:2171:LEU:HD21	1.99	0.44
1:A:2560:ASN:ND2	1:A:2799:GLN:OE1	2.50	0.44
1:A:764:PRO:HA	1:A:767:GLU:HB3	1.98	0.44
1:A:487:LEU:HA	1:A:490:ILE:HG12	1.98	0.44
1:A:133:LYS:O	1:A:137:THR:OG1	2.31	0.44
1:A:3082:TYR:O	1:A:3084:GLN:N	2.46	0.44
1:A:3580:ASN:OD1	1:A:3736:LYS:NZ	2.51	0.44
1:A:683:PHE:O	1:A:739:ASN:ND2	2.50	0.44
1:A:1066:LEU:HB3	1:A:1078:ALA:HB2	2.00	0.44
1:A:2159:PRO:O	1:A:2162:LYS:NZ	2.38	0.44
1:A:473:PRO:HA	1:A:476:ARG:HD3	2.00	0.44
1:A:1151:ARG:NH1	1:A:1163:LEU:O	2.51	0.44
1:A:2257:PHE:O	1:A:2261:SER:HB2	2.18	0.44
1:A:2436:LEU:HA	1:A:2439:ILE:HD12	1.99	0.44
1:A:2575:PRO:HA	1:A:2786:LYS:HA	2.00	0.44
1:A:3307:LEU:HD13	1:A:3330:LEU:HD13	2.00	0.44
1:A:108:LYS:HE2	1:A:152:LEU:HD22	2.00	0.44
1:A:1155:ARG:HH21	1:A:3689:ASP:HA	1.83	0.44
1:A:1964:GLY:HA3	2:C:728:LEU:HD11	1.99	0.44
1:A:583:LEU:HA	1:A:614:PRO:HA	1.98	0.44
2:C:726:ASP:HA	2:C:729:LEU:HB3	1.99	0.44
1:A:3297:VAL:HG23	1:A:3337:ILE:HG23	1.99	0.43
1:A:2301:GLN:HA	1:A:2304:VAL:HG12	2.00	0.43
1:A:3472:ILE:HD11	1:A:3483:MET:HG2	1.99	0.43
1:A:3757:ASP:OD2	1:A:3759:ARG:NH1	2.49	0.43
1:A:66:LEU:HD23	1:A:66:LEU:HA	1.85	0.43
1:A:655:LEU:HD13	1:A:1324:PRO:HB3	2.00	0.43
1:A:3758:LEU:HD22	1:A:3801:GLY:HA3	1.98	0.43
1:A:3925:LEU:HD23	1:A:3925:LEU:HA	1.86	0.43
1:A:678:LYS:HD3	1:A:737:PRO:HA	1.99	0.43
1:A:948:MET:SD	1:A:2587:GLN:NE2	2.91	0.43
1:A:3638:LYS:H	1:A:3638:LYS:HG2	1.68	0.43
1:A:269:SER:HB3	1:A:308:LEU:HB2	1.99	0.43
1:A:1195:VAL:HB	1:A:1204:PRO:HG3	2.00	0.43
1:A:2536:LEU:HD21	1:A:2820:MET:HG3	2.00	0.43
1:A:741:ILE:HD13	1:A:776:TRP:NE1	2.34	0.43
1:A:851:ILE:HD13	1:A:851:ILE:HA	1.88	0.43
1:A:962:TYR:HA	1:A:965:THR:HG22	2.00	0.43
1:A:1923:PHE:HB2	1:A:1981:LEU:HD23	2.01	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2271:SER:HA	1:A:2274:ILE:HD12	1.99	0.43
1:A:4032:ASN:HB3	1:A:4036:LYS:HE3	2.01	0.43
1:A:276:ALA:HB2	1:A:315:ALA:HB2	1.99	0.43
1:A:278:HIS:HD2	1:A:281:GLN:HG3	1.83	0.43
1:A:737:PRO:HD2	1:A:740:ILE:HD12	1.99	0.43
1:A:856:VAL:HG11	1:A:3107:ILE:HG23	2.00	0.43
1:A:1208:LEU:HA	1:A:1211:VAL:HG12	2.00	0.43
1:A:1851:LEU:HB3	1:A:1918:LEU:HD23	2.01	0.43
1:A:633:ILE:HD12	1:A:633:ILE:HA	1.83	0.43
1:A:1605:PHE:HD1	1:A:1655:ILE:HG13	1.84	0.43
1:A:1681:ASP:OD1	1:A:1681:ASP:N	2.46	0.43
1:A:1782:PHE:HA	1:A:1785:ILE:HG12	2.00	0.43
1:A:3992:ARG:NH1	1:A:4103:GLN:OE1	2.51	0.43
1:A:2257:PHE:O	1:A:2261:SER:OG	2.31	0.43
1:A:1241:LEU:HD11	1:A:1253:THR:HG22	2.00	0.42
1:A:1651:LYS:HA	1:A:1651:LYS:HD2	1.69	0.42
1:A:341:PHE:HA	1:A:344:GLN:HG2	2.01	0.42
1:A:1045:THR:HG23	1:A:1048:GLN:H	1.84	0.42
1:A:1805:PHE:O	1:A:1816:ARG:NH2	2.52	0.42
1:A:2295:GLN:NE2	1:A:2297:SER:OG	2.52	0.42
1:A:2524:PHE:O	1:A:2530:ARG:NH2	2.52	0.42
1:A:2881:LEU:HD23	1:A:2886:GLN:HE21	1.85	0.42
1:A:1321:ARG:HA	1:A:1321:ARG:HD2	1.83	0.42
1:A:1923:PHE:HA	1:A:1941:HIS:CD2	2.54	0.42
1:A:1956:PHE:O	1:A:1962:TYR:OH	2.37	0.42
1:A:2171:LEU:O	1:A:2177:ASN:ND2	2.52	0.42
1:A:2962:ARG:NH1	1:A:4101:GLU:OE1	2.52	0.42
1:A:3028:ASN:OD1	1:A:3067:LYS:NZ	2.34	0.42
1:A:300:TRP:O	1:A:309:LYS:NZ	2.39	0.42
1:A:478:CYS:O	1:A:482:VAL:HG23	2.20	0.42
1:A:1730:PRO:O	1:A:1733:THR:OG1	2.33	0.42
1:A:236:LYS:HA	1:A:236:LYS:HD2	1.82	0.42
1:A:493:LYS:HE2	1:A:527:TYR:CE2	2.55	0.42
1:A:1747:LEU:HD21	1:A:1778:PHE:HD1	1.84	0.42
1:A:1784:ARG:O	1:A:1788:ARG:NH1	2.53	0.42
1:A:2317:ALA:HB1	1:A:2366:LYS:HE3	2.01	0.42
1:A:2350:LYS:HE2	1:A:2350:LYS:HB3	1.89	0.42
1:A:3843:LEU:HD23	1:A:3843:LEU:HA	1.87	0.42
1:A:1346:THR:O	1:A:1350:ASN:ND2	2.53	0.42
1:A:1981:LEU:HD12	1:A:1982:ILE:HG12	2.00	0.42
1:A:2219:LEU:O	1:A:2223:VAL:HG13	2.20	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3499:ILE:HD12	1:A:3499:ILE:HA	1.89	0.42
1:A:3823:GLU:O	1:A:3827:ALA:CB	2.68	0.42
1:A:409:GLN:NE2	1:A:410:MET:SD	2.93	0.42
1:A:2202:PRO:HG3	1:A:2245:TRP:CD2	2.55	0.42
1:A:485:GLN:HA	1:A:488:ILE:HG12	2.01	0.41
1:A:3091:LEU:HD23	1:A:3091:LEU:HA	1.92	0.41
1:A:140:SER:O	1:A:140:SER:OG	2.36	0.41
1:A:204:LEU:O	1:A:208:MET:CB	2.68	0.41
1:A:927:LYS:HE3	1:A:980:THR:HG21	2.02	0.41
1:A:2012:ARG:HG2	1:A:2017:GLY:HA2	2.02	0.41
1:A:2824:LYS:HB3	1:A:2828:GLU:HG2	2.01	0.41
1:A:3701:ILE:HA	1:A:3702:PRO:HD3	1.92	0.41
1:A:897:PRO:HA	1:A:902:LYS:HG3	2.01	0.41
1:A:2303:LEU:O	1:A:2306:ASN:ND2	2.53	0.41
1:A:3318:LYS:HD3	1:A:3318:LYS:HA	1.79	0.41
1:A:3538:GLU:OE1	1:A:3797:THR:OG1	2.38	0.41
1:A:3813:LYS:HB2	1:A:3925:LEU:HB3	2.03	0.41
1:A:3956:PRO:HG2	1:A:3958:LEU:HD11	2.02	0.41
1:A:876:SER:HA	1:A:879:MET:HB3	2.01	0.41
1:A:1306:ILE:O	1:A:1308:ALA:N	2.52	0.41
1:A:1431:LEU:HD12	1:A:1448:LEU:HG	2.02	0.41
1:A:1742:CYS:HA	1:A:1745:LYS:HE3	2.03	0.41
1:A:1784:ARG:HG2	1:A:1788:ARG:HH22	1.85	0.41
1:A:3239:LYS:HD3	1:A:3262:LEU:HD21	2.02	0.41
1:A:711:GLY:HA2	1:A:714:VAL:HG12	2.02	0.41
1:A:1146:ASN:HB3	1:A:1165:LEU:HB3	2.02	0.41
1:A:1641:THR:O	1:A:1645:VAL:HG23	2.20	0.41
1:A:1852:LYS:HG2	1:A:1918:LEU:HD22	2.03	0.41
1:A:2818:LYS:HE2	1:A:2818:LYS:HB2	1.81	0.41
1:A:913:ARG:HD2	1:A:913:ARG:HA	1.84	0.41
1:A:1560:TYR:CZ	1:A:1596:VAL:HA	2.55	0.41
1:A:1572:LEU:HD12	1:A:1575:LEU:HD21	2.03	0.41
1:A:1608:ARG:HH12	1:A:1614:GLN:HB3	1.85	0.41
1:A:1676:ILE:HD13	1:A:1679:LEU:HD12	2.02	0.41
1:A:2798:ALA:HA	1:A:2804:ILE:HG23	2.01	0.41
1:A:1592:MET:O	1:A:1596:VAL:HG23	2.20	0.41
1:A:2394:LYS:HD2	1:A:2394:LYS:HA	1.75	0.41
1:A:3963:LEU:HD12	1:A:3963:LEU:HA	1.87	0.41
1:A:18:THR:HB	1:A:27:ALA:HB1	2.03	0.41
1:A:32:HIS:CE1	1:A:81:CYS:HG	2.34	0.41
1:A:1191:PHE:O	1:A:1195:VAL:HG23	2.21	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1407:LYS:NZ	1:A:1461:ALA:O	2.54	0.41
1:A:1463:LEU:HD22	1:A:1466:ASN:HD22	1.86	0.41
1:A:2105:HIS:HB2	1:A:2156:VAL:HG22	2.02	0.41
1:A:2189:ILE:HD13	1:A:2189:ILE:HA	1.96	0.41
1:A:2190:VAL:HA	1:A:2193:ILE:HG12	2.02	0.41
1:A:3889:ARG:HE	1:A:3889:ARG:HB3	1.72	0.41
1:A:3772:ASN:HA	1:A:3775:LEU:HB2	2.02	0.41
1:A:583:LEU:HD22	1:A:614:PRO:HG3	2.03	0.40
1:A:3062:LEU:HA	1:A:3089:LEU:HD21	2.02	0.40
1:A:3270:ASP:N	1:A:3270:ASP:OD1	2.54	0.40
1:A:1022:ASP:OD2	1:A:1023:SER:N	2.54	0.40
1:A:2086:ASP:O	1:A:2090:ARG:NH1	2.55	0.40
1:A:3037:GLN:HA	1:A:3041:LEU:HB2	2.03	0.40
1:A:1445:ARG:NH1	1:A:1504:ASP:OD2	2.52	0.40
1:A:1701:SER:O	1:A:1701:SER:OG	2.33	0.40
1:A:3339:ASN:OD1	1:A:3378:TYR:OH	2.38	0.40
1:A:102:PRO:HA	1:A:143:LEU:HD21	2.04	0.40
1:A:478:CYS:O	1:A:481:THR:OG1	2.29	0.40
1:A:2097:LEU:O	1:A:2101:VAL:HG22	2.21	0.40
1:A:323:VAL:HA	1:A:326:MET:HG2	2.04	0.40
1:A:3959:MET:H	1:A:3959:MET:HG2	1.74	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	3704/4128 (90%)	3338 (90%)	357 (10%)	9 (0%)	44	73
2	C	7/732 (1%)	7 (100%)	0	0	100	100
All	All	3711/4860 (76%)	3345 (90%)	357 (10%)	9 (0%)	45	73

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1307	ILE
1	A	3601	VAL
1	A	1275	THR
1	A	3083	SER
1	A	2871	LEU
1	A	167	PRO
1	A	2548	PRO
1	A	3623	PRO
1	A	3600	PRO

5.3.2 Protein sidechains [i](#)

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	3303/3667 (90%)	3294 (100%)	9 (0%)	91	96
2	C	8/649 (1%)	8 (100%)	0	100	100
All	All	3311/4316 (77%)	3302 (100%)	9 (0%)	90	96

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	238	MET
1	A	364	ARG
1	A	1816	ARG
1	A	1986	ARG
1	A	2008	ARG
1	A	2090	ARG
1	A	2930	TYR
1	A	3067	LYS
1	A	3125	ARG

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	185	HIS
1	A	351	ASN
1	A	390	GLN
1	A	394	GLN
1	A	415	GLN
1	A	771	ASN
1	A	1084	ASN
1	A	1280	GLN
1	A	1350	ASN
1	A	1466	ASN
1	A	1534	ASN
1	A	1568	ASN
1	A	1898	GLN
1	A	2152	ASN
1	A	2170	GLN
1	A	2177	ASN
1	A	2275	GLN
1	A	2283	ASN
1	A	2295	GLN
1	A	2306	ASN
1	A	2365	ASN
1	A	2414	GLN
1	A	2456	ASN
1	A	2475	ASN
1	A	2553	HIS
1	A	2560	ASN
1	A	2799	GLN
1	A	3081	HIS
1	A	3113	ASN
1	A	3291	GLN
1	A	3379	GLN
1	A	3524	ASN
1	A	3664	ASN
1	A	3766	GLN
1	A	3924	HIS
1	A	4042	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	TPO	A	2638	1	8,10,11	1.70	1 (12%)	10,14,16	2.37	2 (20%)
1	TPO	A	2609	1	8,10,11	1.18	0	10,14,16	1.51	2 (20%)
1	TPO	A	2647	1	8,10,11	1.21	1 (12%)	10,14,16	1.18	0
1	TPO	A	2645	1	8,10,11	1.08	0	10,14,16	2.21	1 (10%)

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
1	TPO	A	2638	1	-	0/9/11/13	-
1	TPO	A	2609	1	-	6/9/11/13	-
1	TPO	A	2647	1	-	5/9/11/13	-
1	TPO	A	2645	1	-	1/9/11/13	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	2638	TPO	P-O1P	3.49	1.61	1.50
1	A	2647	TPO	P-OG1	2.02	1.63	1.59

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	2638	TPO	P-OG1-CB	-6.71	105.09	123.33
1	A	2645	TPO	P-OG1-CB	-6.48	105.71	123.33
1	A	2638	TPO	CG2-CB-CA	-2.48	108.43	113.26
1	A	2609	TPO	CG2-CB-CA	-2.28	108.81	113.26
1	A	2609	TPO	O3P-P-OG1	2.16	114.25	105.85

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	2609	TPO	N-CA-CB-OG1
1	A	2609	TPO	C-CA-CB-CG2
1	A	2609	TPO	O-C-CA-CB
1	A	2609	TPO	CG2-CB-OG1-P
1	A	2645	TPO	O-C-CA-CB
1	A	2647	TPO	N-CA-CB-OG1
1	A	2647	TPO	O-C-CA-CB
1	A	2647	TPO	CG2-CB-OG1-P
1	A	2647	TPO	C-CA-CB-CG2
1	A	2609	TPO	CB-OG1-P-O3P
1	A	2609	TPO	N-CA-CB-CG2
1	A	2647	TPO	N-CA-CB-CG2

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 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
4	ATP	A	4202	3	28,33,33	0.83	0	34,52,52	1.06	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
4	ATP	A	4202	3	-	5/18/38/38	0/3/3/3

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	4202	ATP	N3-C2-N1	-3.84	123.46	128.67

There are no chirality outliers.

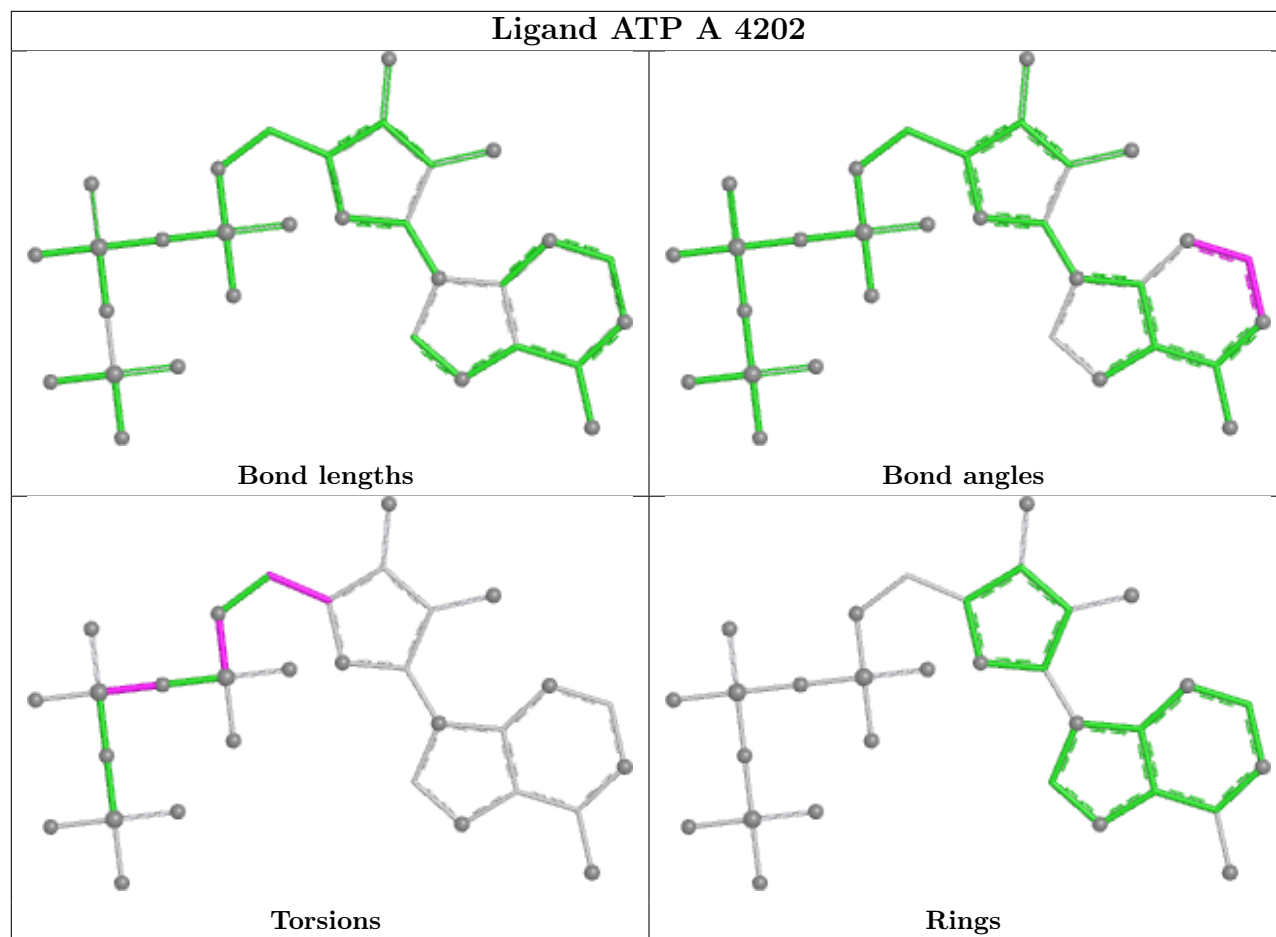
All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	4202	ATP	C5'-O5'-PA-O1A
4	A	4202	ATP	C5'-O5'-PA-O2A
4	A	4202	ATP	C5'-O5'-PA-O3A
4	A	4202	ATP	O4'-C4'-C5'-O5'
4	A	4202	ATP	PA-O3A-PB-O2B

There are no ring outliers.

No monomer is involved in short contacts.

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



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

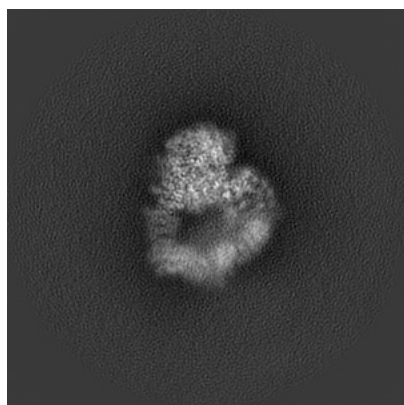
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-25440. These allow visual inspection of the internal detail of the map and identification of artifacts.

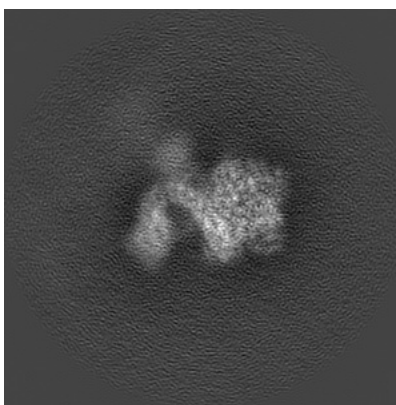
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

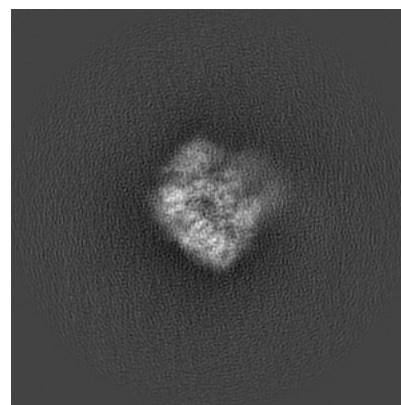
6.1.1 Primary map



X



Y

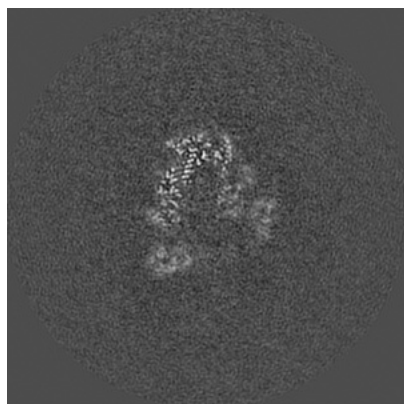


Z

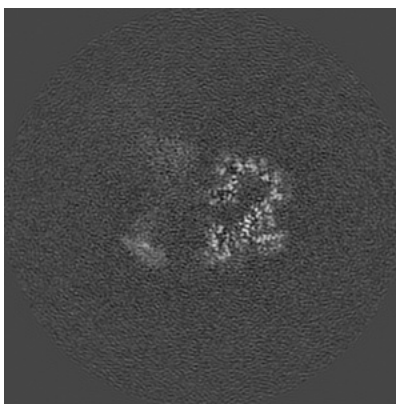
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

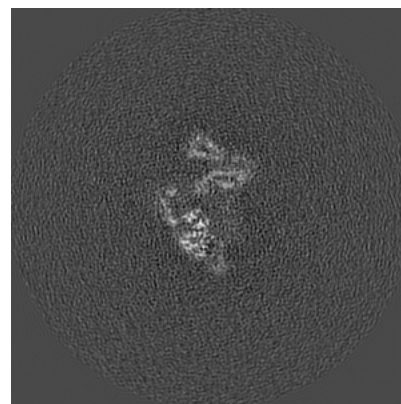
6.2.1 Primary map



X Index: 240



Y Index: 240

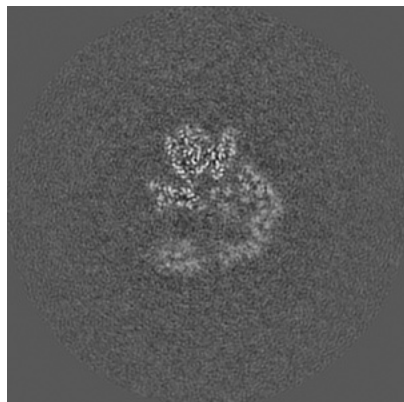


Z Index: 240

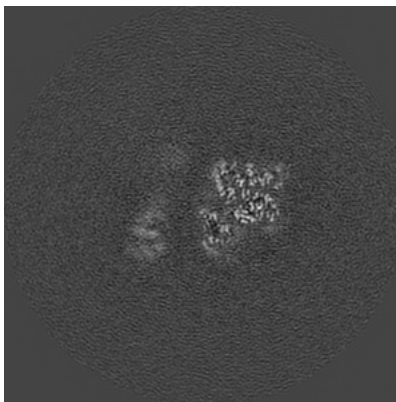
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

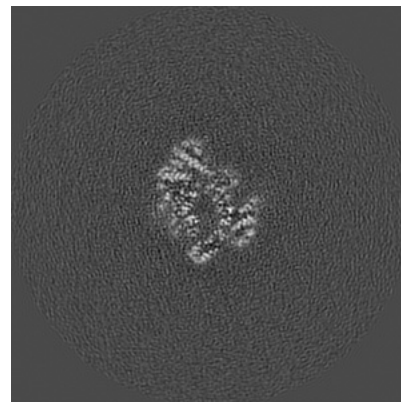
6.3.1 Primary map



X Index: 225



Y Index: 223

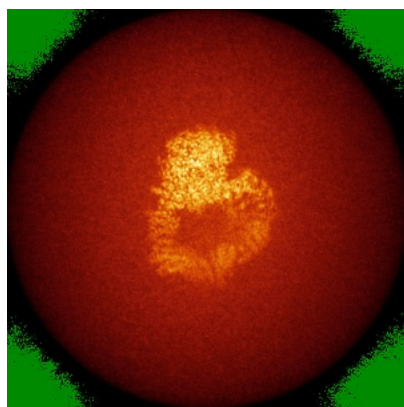


Z Index: 262

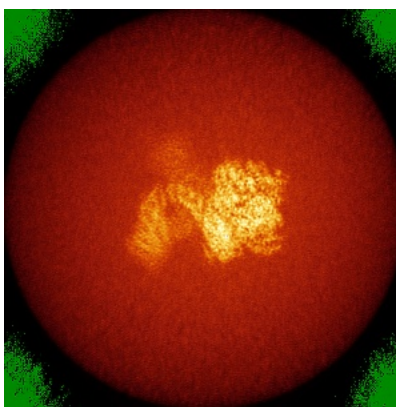
The images above show the largest variance slices of the map in three orthogonal directions.

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

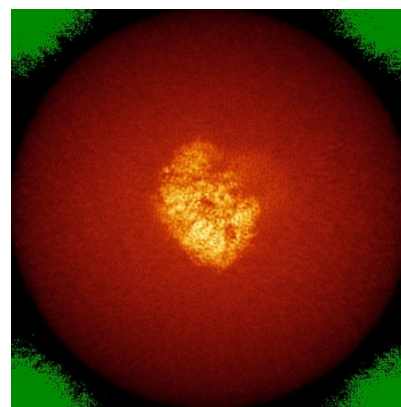
6.4.1 Primary map



X



Y

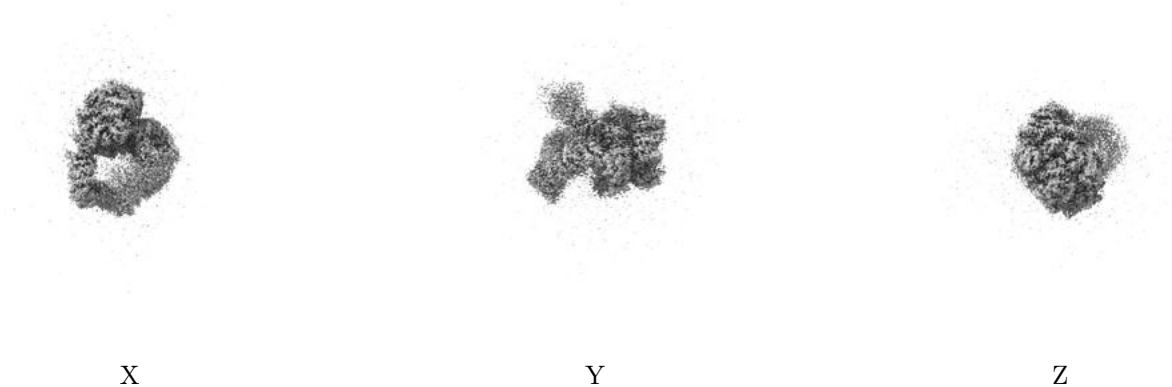


Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0095. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

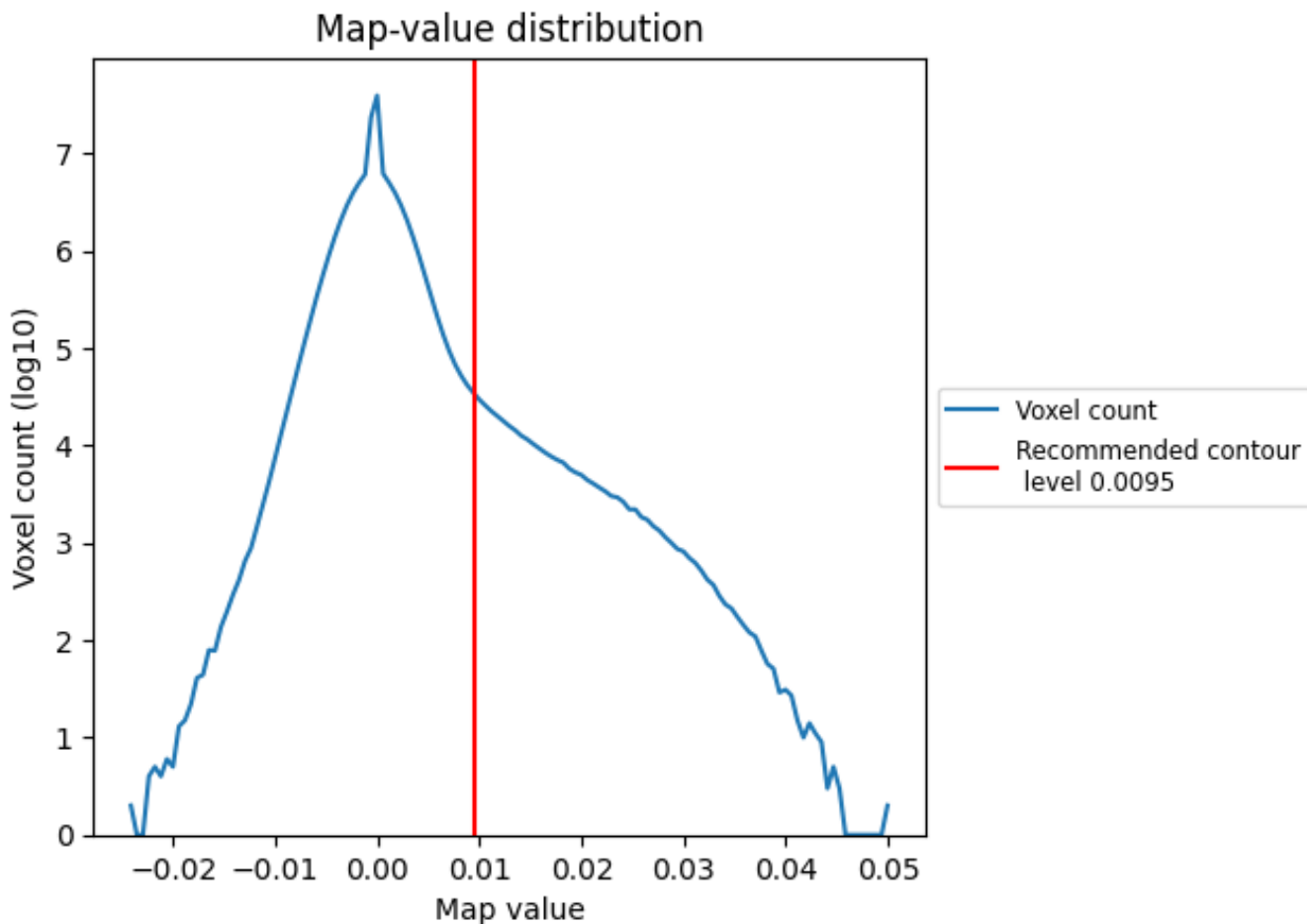
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

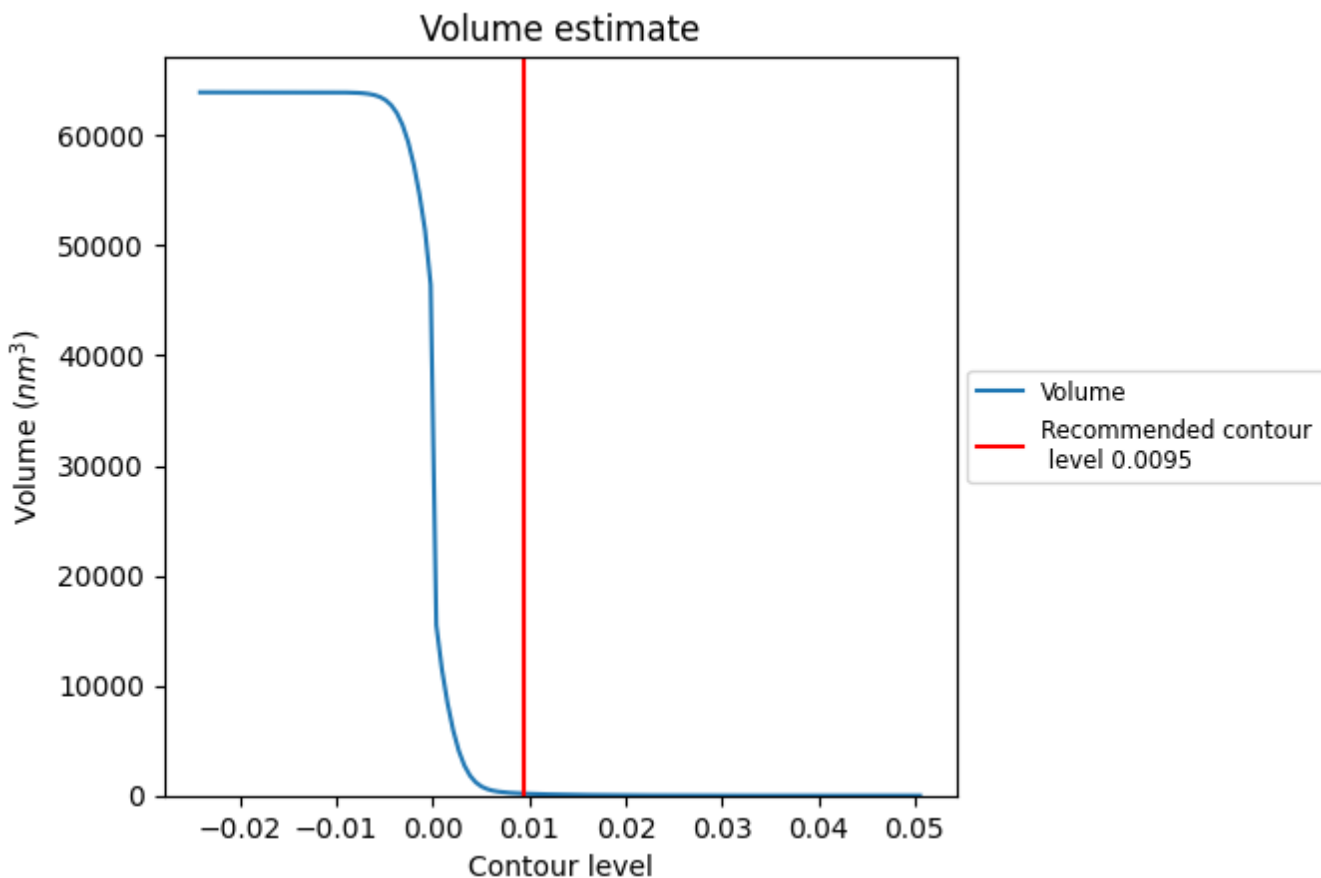
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

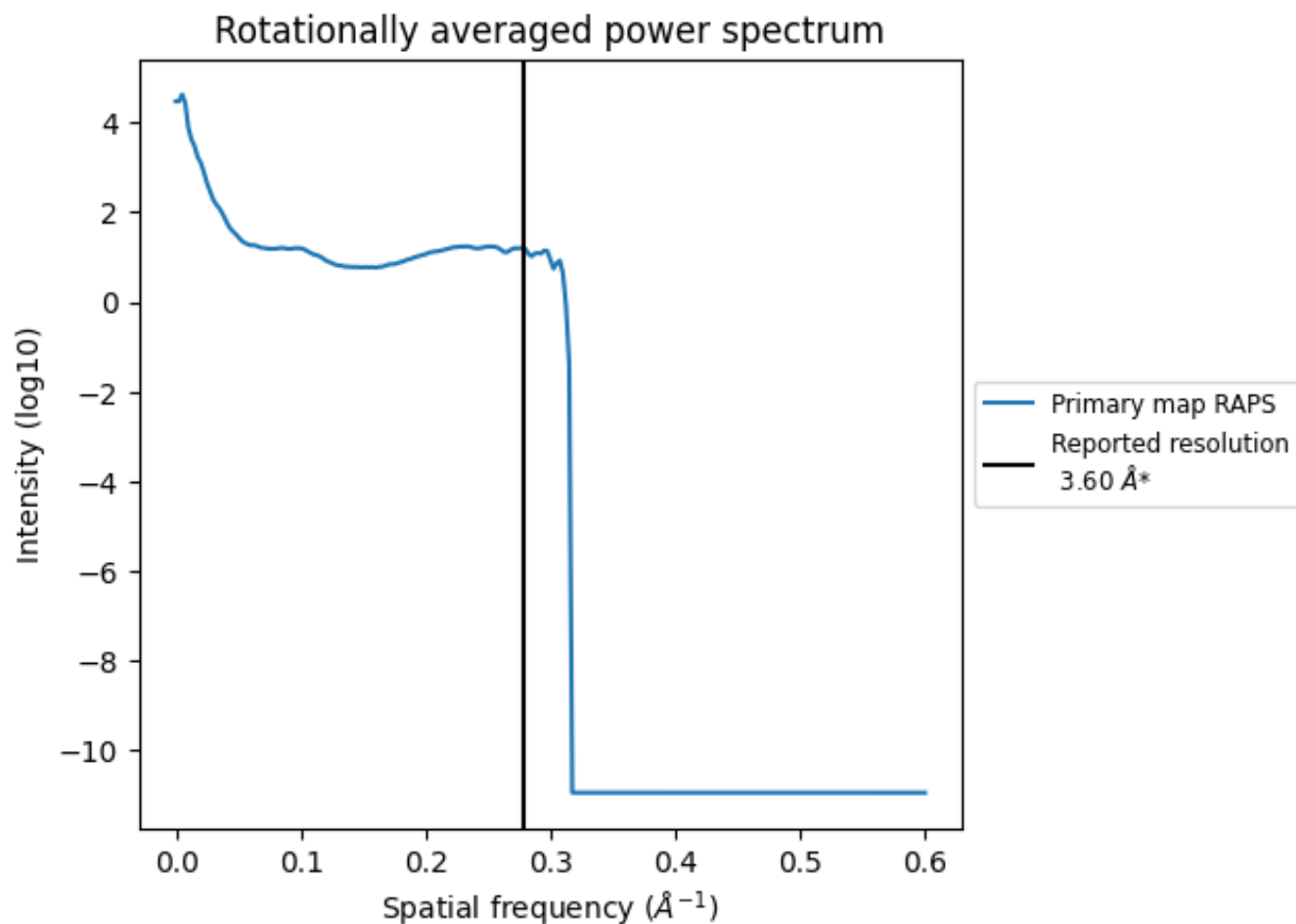
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 177 nm³; this corresponds to an approximate mass of 160 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 [\(i\)](#)



*Reported resolution corresponds to spatial frequency of 0.278\AA^{-1}

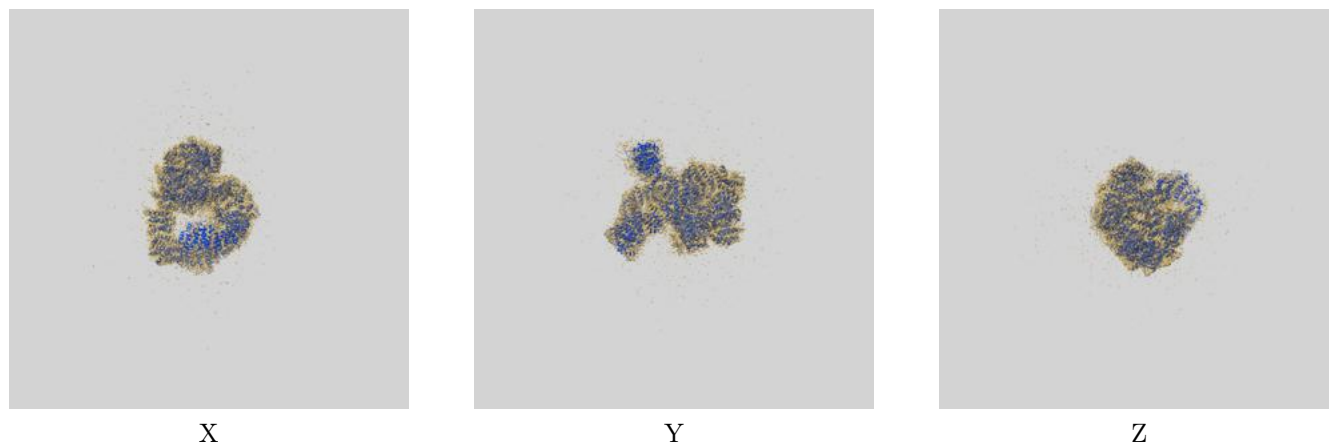
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

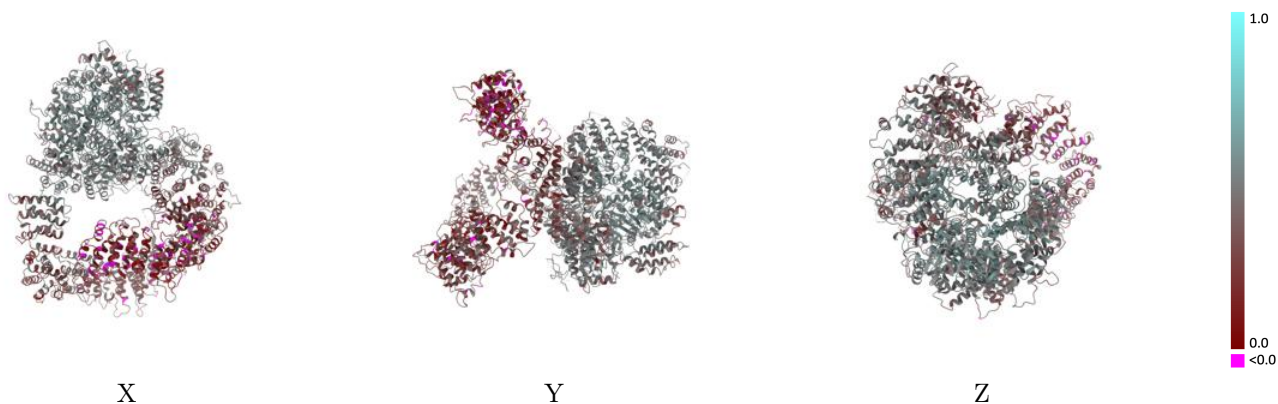
This section contains information regarding the fit between EMDB map EMD-25440 and PDB model 7SUD. Per-residue inclusion information can be found in section 3 on page 5.

9.1 Map-model overlay [i](#)



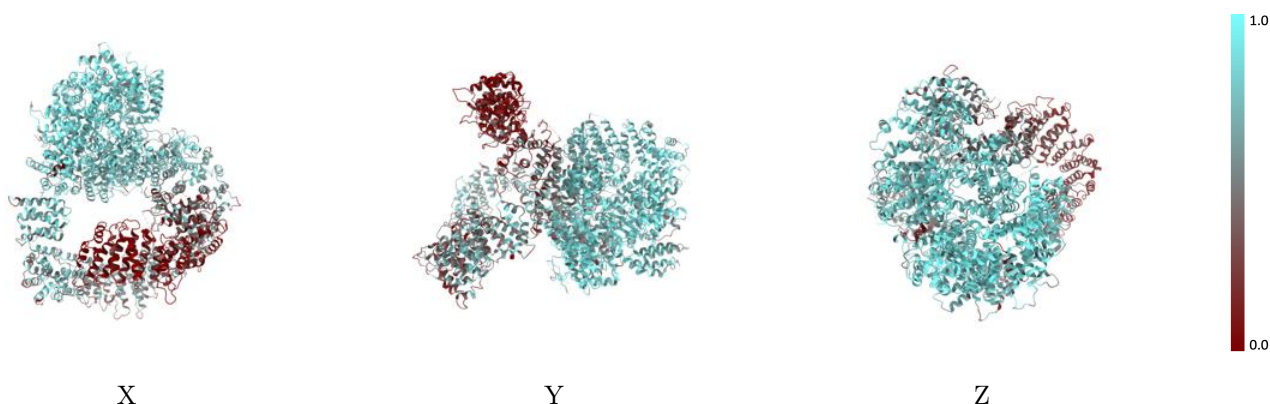
The images above show the 3D surface view of the map at the recommended contour level 0.0095 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



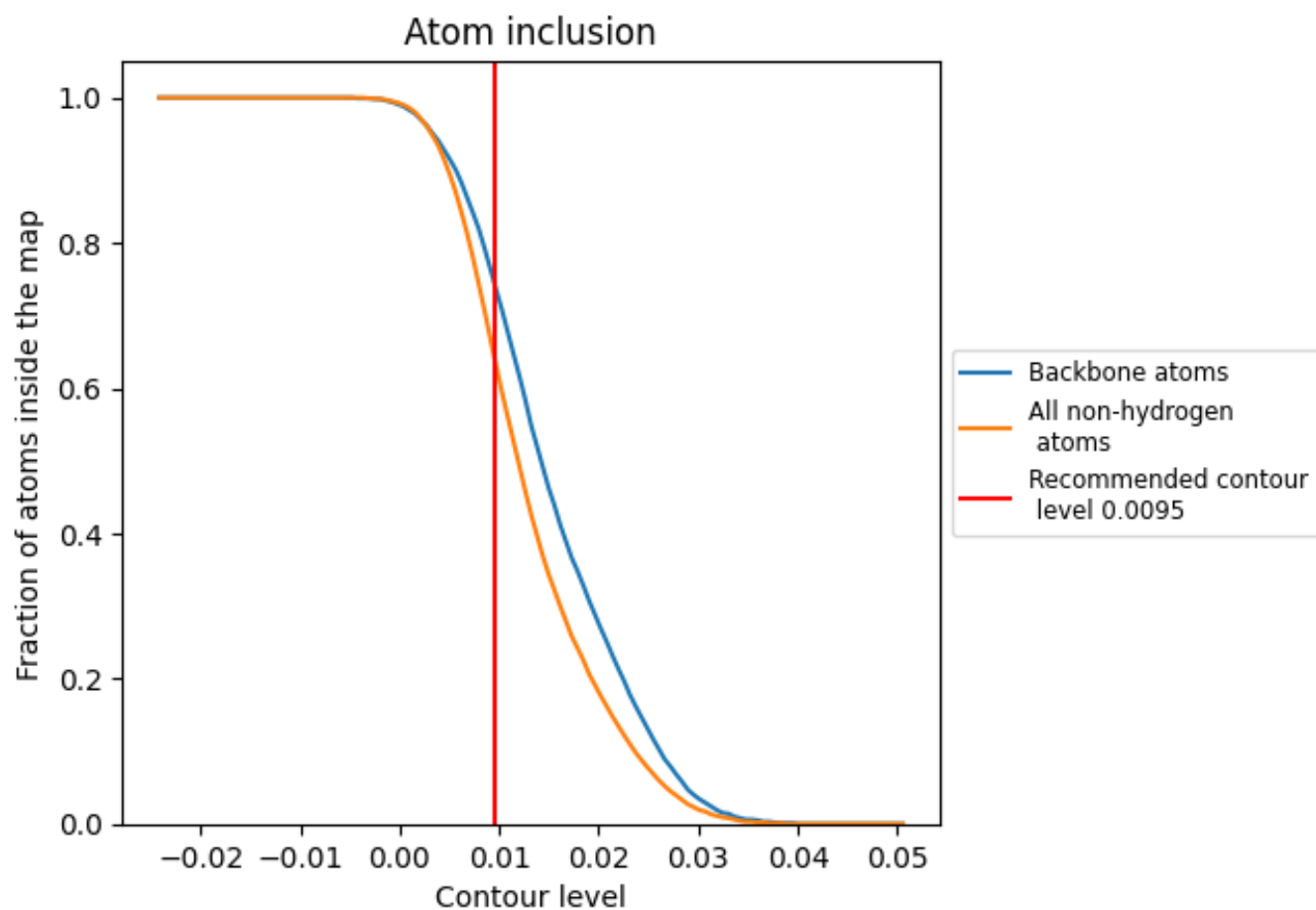
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0095).







9.4 Atom inclusion [i](#)



At the recommended contour level, 75% of all backbone atoms, 64% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.0095) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6420	 0.4030
A	 0.6440	 0.4030
C	 0.1180	 0.2840

