



wwPDB EM Validation Summary Report ⓘ

Aug 5, 2026 – 03:29 AM EDT

PDB ID : 6OAB / pdb_00006oab
EMDB ID : EMD-20000
Title : Cdc48-Npl4 complex processing poly-ubiquitinated substrate in the presence of ADP-BeFx, state 2
Authors : Twomey, E.C.; Ji, Z.; Wales, T.E.; Bodnar, N.O.; Engen, J.R.; Rapoport, T.A.
Deposited on : 2019-03-15
Resolution : 3.60 Å(reported)

This is a wwPDB EM Validation Summary 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.dev133
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
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) : 2.50

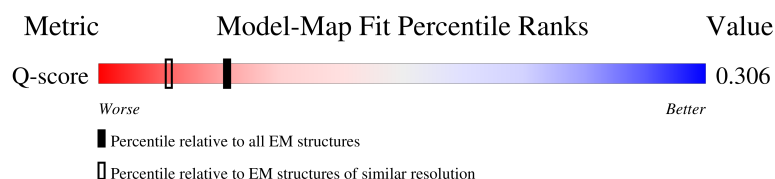
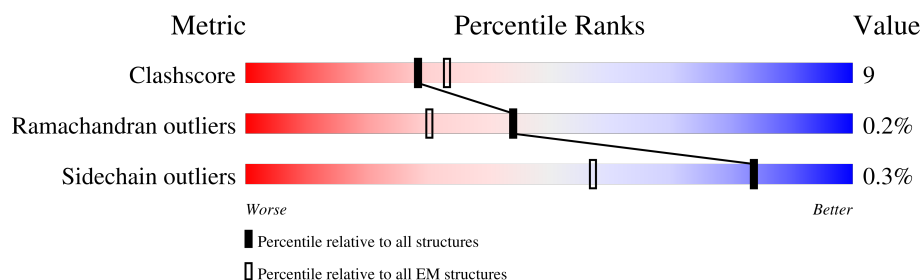
1 Overall quality at a glance i

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.



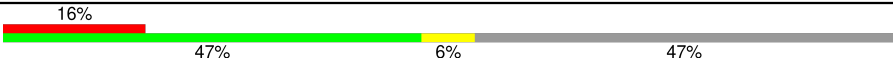
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	12797 (3.10 - 4.10)

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	835	34% 53% 6% 41%
1	B	835	13% 52% 9% 39%
1	C	835	7% 51% 12% 36%
1	D	835	10% 52% 11% 36%

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Mol	Chain	Length	Quality of chain
1	E	835	
2	H	24	

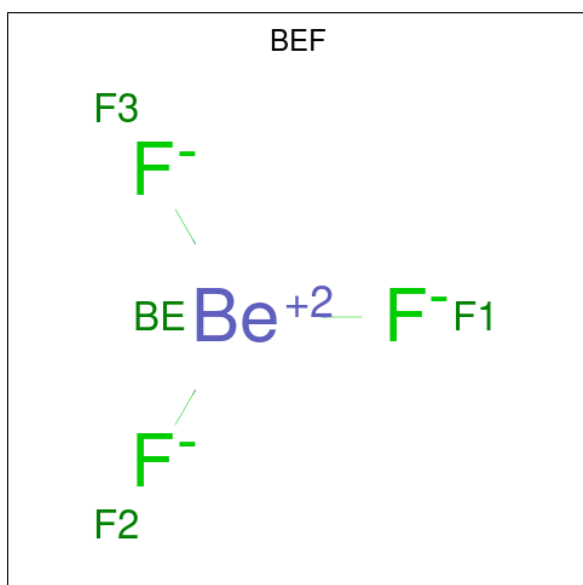
The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	ADP	A	901	-	-	X	-
3	ADP	A	902	-	-	X	-
3	ADP	B	905	-	-	X	-
3	ADP	C	901	-	-	X	-
3	ADP	C	902	-	-	X	-
3	ADP	D	901	-	-	X	-
3	ADP	D	904	-	-	X	-
3	ADP	E	902	-	-	X	-



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

- Molecule 4 is BERYLLIUM TRIFLUORIDE ION (CCD ID: BEF) (formula: BeF₃).



Mol	Chain	Residues	Atoms			AltConf
4	D	1	Total	Be	F	0
			4	1	3	
4	D	1	Total	Be	F	0
			4	1	3	

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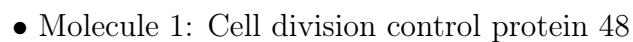
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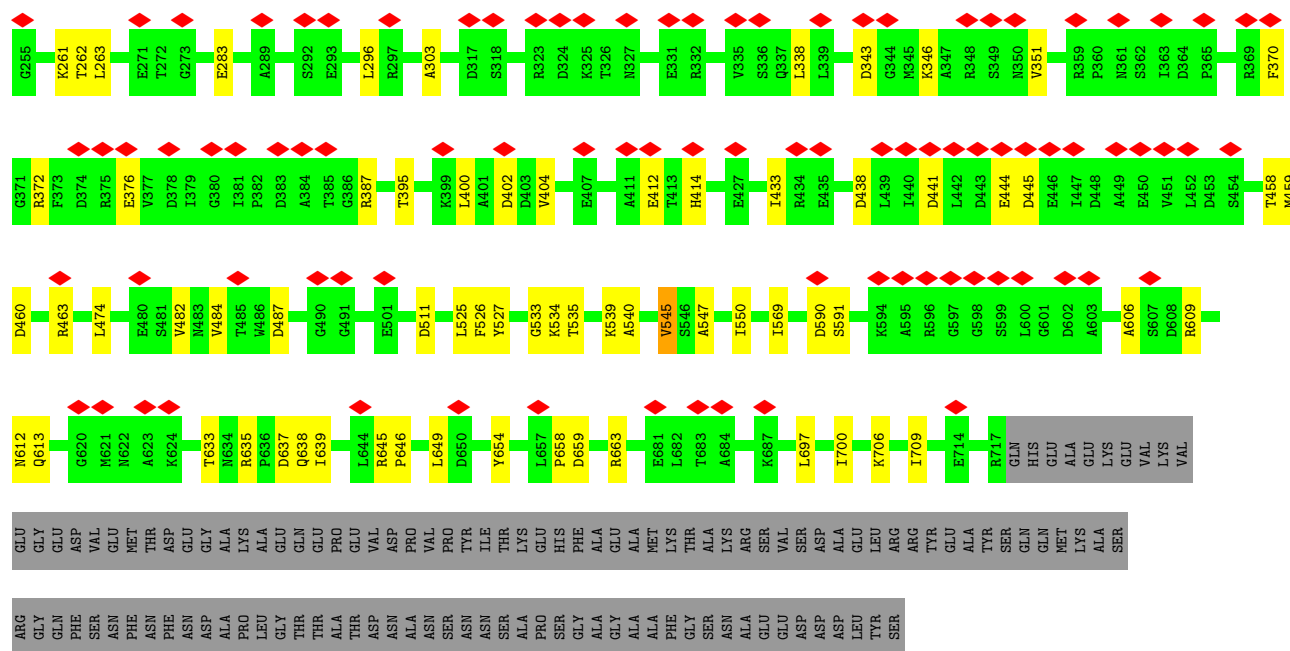
Mol	Chain	Residues	Atoms			AltConf
4	B	1	Total 4	Be 1	F 3	0
4	B	1	Total 4	Be 1	F 3	0
4	B	1	Total 4	Be 1	F 3	0
4	C	1	Total 4	Be 1	F 3	0
4	C	1	Total 4	Be 1	F 3	0
4	A	1	Total 4	Be 1	F 3	0

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.

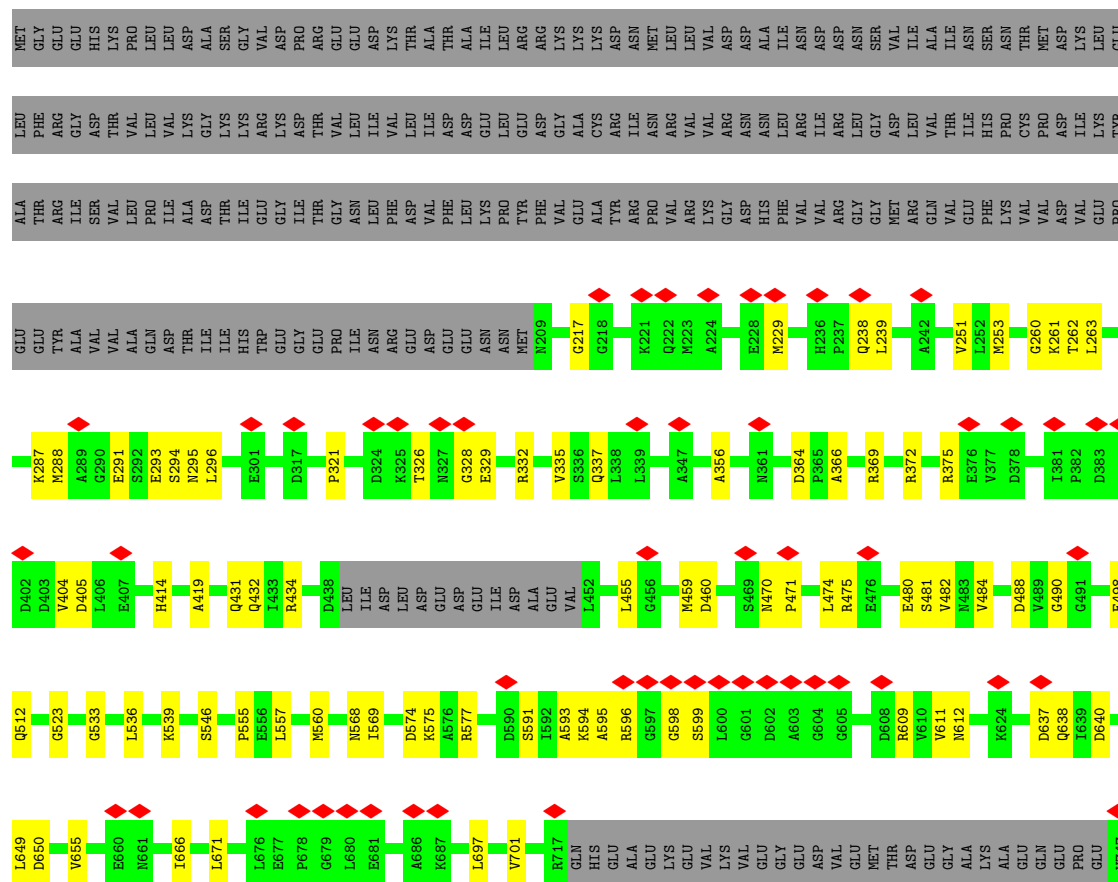
- Chain D:
-
- Sequence logo for Chain D. The y-axis represents information content in bits, ranging from 0 to 1.5. The x-axis shows positions 1 to 100. A color scale at the top indicates conservation levels: 10% (red), 52% (green), 11% (yellow), and 36% (grey).
- Key residues and positions (from left to right):
- Position 1: MET (1.5 bits)
 - Position 2: GLY (1.5 bits)
 - Position 3: GLU (1.5 bits)
 - Position 4: HIS (1.5 bits)
 - Position 5: LYS (1.5 bits)
 - Position 6: PRO (1.5 bits)
 - Position 7: LEU (1.5 bits)
 - Position 8: LEU (1.5 bits)
 - Position 9: ASP (1.5 bits)
 - Position 10: ALA (1.5 bits)
 - Position 11: SER (1.5 bits)
 - Position 12: GLY (1.5 bits)
 - Position 13: VAL (1.5 bits)
 - Position 14: ARG (1.5 bits)
 - Position 15: ASP (1.5 bits)
 - Position 16: THR (1.5 bits)
 - Position 17: ARG (1.5 bits)
 - Position 18: GLU (1.5 bits)
 - Position 19: LEU (1.5 bits)
 - Position 20: ASP (1.5 bits)
 - Position 21: LYS (1.5 bits)
 - Position 22: THR (1.5 bits)
 - Position 23: ALA (1.5 bits)
 - Position 24: THR (1.5 bits)
 - Position 25: THR (1.5 bits)
 - Position 26: THR (1.5 bits)
 - Position 27: VAL (1.5 bits)
 - Position 28: VAL (1.5 bits)
 - Position 29: LEU (1.5 bits)
 - Position 30: ILE (1.5 bits)
 - Position 31: VAL (1.5 bits)
 - Position 32: THR (1.5 bits)
 - Position 33: ASP (1.5 bits)
 - Position 34: PHE (1.5 bits)
 - Position 35: ARG (1.5 bits)
 - Position 36: THR (1.5 bits)
 - Position 37: THR (1.5 bits)
 - Position 38: THR (1.5 bits)
 - Position 39: THR (1.5 bits)
 - Position 40: THR (1.5 bits)
 - Position 41: THR (1.5 bits)
 - Position 42: THR (1.5 bits)
 - Position 43: THR (1.5 bits)
 - Position 44: THR (1.5 bits)
 - Position 45: THR (1.5 bits)
 - Position 46: THR (1.5 bits)
 - Position 47: THR (1.5 bits)
 - Position 48: THR (1.5 bits)
 - Position 49: THR (1.5 bits)
 - Position 50: THR (1.5 bits)
 - Position 51: THR (1.5 bits)
 - Position 52: THR (1.5 bits)
 - Position 53: THR (1.5 bits)
 - Position 54: THR (1.5 bits)
 - Position 55: THR (1.5 bits)
 - Position 56: THR (1.5 bits)
 - Position 57: THR (1.5 bits)
 - Position 58: THR (1.5 bits)
 - Position 59: THR (1.5 bits)
 - Position 60: THR (1.5 bits)
 - Position 61: THR (1.5 bits)
 - Position 62: THR (1.5 bits)
 - Position 63: THR (1.5 bits)
 - Position 64: THR (1.5 bits)
 - Position 65: THR (1.5 bits)
 - Position 66: THR (1.5 bits)
 - Position 67: THR (1.5 bits)
 - Position 68: THR (1.5 bits)
 - Position 69: THR (1.5 bits)
 - Position 70: THR (1.5 bits)
 - Position 71: THR (1.5 bits)
 - Position 72: THR (1.5 bits)
 - Position 73: THR (1.5 bits)
 - Position 74: THR (1.5 bits)
 - Position 75: THR (1.5 bits)
 - Position 76: THR (1.5 bits)
 - Position 77: THR (1.5 bits)
 - Position 78: THR (1.5 bits)
 - Position 79: THR (1.5 bits)
 - Position 80: THR (1.5 bits)
 - Position 81: THR (1.5 bits)
 - Position 82: THR (1.5 bits)
 - Position 83: THR (1.5 bits)
 - Position 84: THR (1.5 bits)
 - Position 85: THR (1.5 bits)
 - Position 86: THR (1.5 bits)
 - Position 87: THR (1.5 bits)
 - Position 88: THR (1.5 bits)
 - Position 89: THR (1.5 bits)
 - Position 90: THR (1.5 bits)
 - Position 91: THR (1.5 bits)
 - Position 92: THR (1.5 bits)
 - Position 93: THR (1.5 bits)
 - Position 94: THR (1.5 bits)
 - Position 95: THR (1.5 bits)
 - Position 96: THR (1.5 bits)
 - Position 97: THR (1.5 bits)
 - Position 98: THR (1.5 bits)
 - Position 99: THR (1.5 bits)
 - Position 100: THR (1.5 bits)

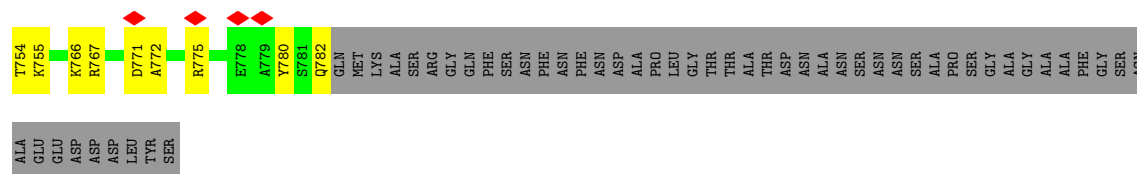
- Molecule 1: Cell division control protein 48



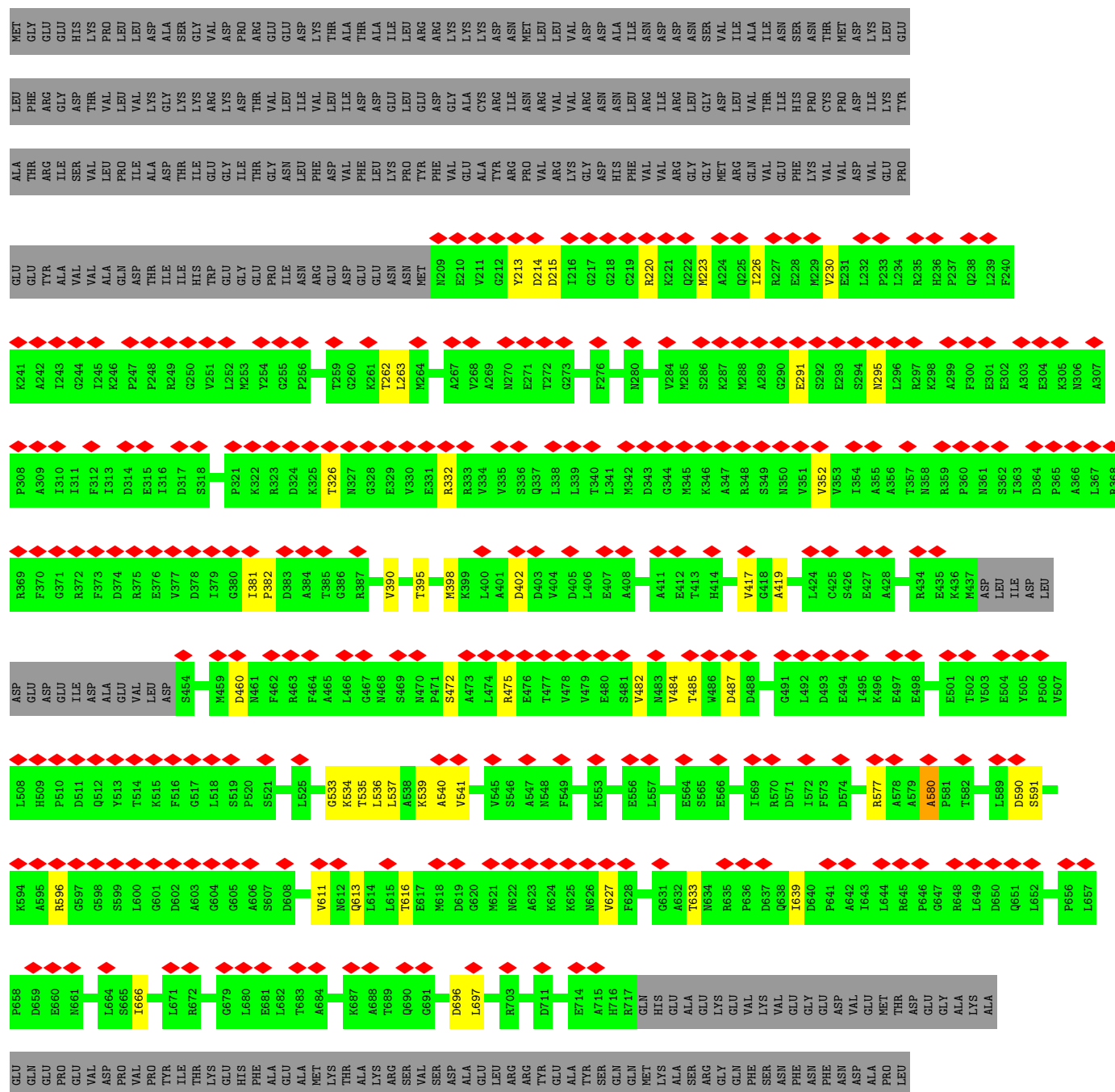


• Molecule 1: Cell division control protein 48





● Molecule 1: Cell division control protein 48



GLY	THR	THR	ALA	THR	ASP	ASN	ALA	ASN	SER	ASN	ASN	SER	ALA	PRO	SER	SER	GLY	ALA	GLY	ALA	ALA	PHE	GLY	SER	ASN	ALA	GLU	GLU	ASP	ASP	ASP	LEU	TYR	SER
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

● Molecule 2: poly(alanine) substrate



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	93395	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	44.7	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	2.613	Depositor
Minimum map value	-1.082	Depositor
Average map value	0.014	Depositor
Map value standard deviation	0.087	Depositor
Recommended contour level	0.5	Depositor
Map size ($\text{\AA}$)	269.1, 269.1, 269.1	wwPDB
Map dimensions	234, 234, 234	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.15, 1.15, 1.15	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.18	0/3831	0.50	1/5180 (0.0%)
1	B	0.18	0/3959	0.53	1/5357 (0.0%)
1	C	0.17	0/4155	0.47	0/5617
1	D	0.20	0/4198	0.52	2/5671 (0.0%)
1	E	0.20	0/3438	0.53	2/4650 (0.0%)
2	H	0.94	0/119	1.32	0/165
All	All	0.20	0/19700	0.52	6/26640 (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	1
1	D	0	1
All	All	0	2

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	290	GLY	N-CA-C	-7.22	105.09	111.95
1	D	290	GLY	CA-C-O	-5.24	118.82	122.22
1	A	541	VAL	N-CA-C	-5.23	107.65	112.83
1	E	593	ALA	CA-C-N	5.22	131.51	121.54
1	E	593	ALA	C-N-CA	5.22	131.51	121.54

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	580	ALA	Peptide
1	D	289	ALA	Peptide

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3770	0	3810	55	0
1	B	3897	0	3921	64	0
1	C	4088	0	4112	99	0
1	D	4130	0	4159	112	0
1	E	3383	0	3399	55	0
2	H	120	0	122	15	0
3	A	54	0	22	29	0
3	B	54	0	24	21	0
3	C	54	0	22	26	0
3	D	54	0	24	32	0
3	E	54	0	24	28	0
4	A	4	0	0	0	0
4	B	12	0	0	1	0
4	C	8	0	0	1	0
4	D	8	0	0	1	0
All	All	19690	0	19639	372	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 9.

The worst 5 of 372 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:D:263:LEU:HD13	3:D:901:ADP:C3'	1.32	1.58
1:E:263:LEU:CD1	3:E:902:ADP:H3'	1.26	1.55
1:E:263:LEU:CD1	3:E:902:ADP:C3'	1.92	1.44
1:C:533:GLY:HA2	3:C:902:ADP:C5'	1.48	1.44
1:C:482:VAL:CG1	1:C:539:LYS:HE3	1.49	1.40

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	489/835 (59%)	451 (92%)	38 (8%)	0	100	100
1	B	507/835 (61%)	469 (92%)	38 (8%)	0	100	100
1	C	526/835 (63%)	495 (94%)	31 (6%)	0	100	100
1	D	531/835 (64%)	482 (91%)	46 (9%)	3 (1%)	21	54
1	E	438/835 (52%)	402 (92%)	36 (8%)	0	100	100
2	H	22/24 (92%)	15 (68%)	5 (23%)	2 (9%)	0	6
All	All	2513/4199 (60%)	2314 (92%)	194 (8%)	5 (0%)	44	72

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	565	SER
2	H	12	ALA
2	H	17	ALA
1	D	564	GLU
1	D	780	TYR

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	401/695 (58%)	400 (100%)	1 (0%)	87	85
1	B	416/695 (60%)	415 (100%)	1 (0%)	87	85
1	C	435/695 (63%)	434 (100%)	1 (0%)	87	85

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	438/695 (63%)	435 (99%)	3 (1%)	76	78
1	E	362/695 (52%)	361 (100%)	1 (0%)	86	83
All	All	2052/3475 (59%)	2045 (100%)	7 (0%)	84	83

5 of 7 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	287	LYS
1	B	545	VAL
1	A	627	VAL
1	C	655	VAL
1	D	782	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 35 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	222	GLN
1	A	238	GLN
1	A	622	ASN
1	E	432	GLN
1	E	414	HIS

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](#)

18 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	ADP	D	901	1	28,29,29	0.47	0	43,45,45	0.44	0
3	ADP	E	901	1	28,29,29	0.46	0	43,45,45	0.43	0
4	BEF	D	903	-	0,3,3	-	-	-		
3	ADP	D	904	1	28,29,29	0.47	0	43,45,45	0.44	0
3	ADP	A	901	1	28,29,29	0.47	0	43,45,45	0.44	0
4	BEF	D	902	-	0,3,3	-	-	-		
3	ADP	C	901	1	28,29,29	0.47	0	43,45,45	0.44	0
3	ADP	E	902	1	28,29,29	0.46	0	43,45,45	0.44	0
3	ADP	B	901	-	28,29,29	0.47	0	43,45,45	0.44	0
3	ADP	A	902	1	28,29,29	0.48	0	43,45,45	0.44	0
4	BEF	C	903	-	0,3,3	-	-	-		
4	BEF	A	903	-	0,3,3	-	-	-		
3	ADP	B	905	4	28,29,29	0.47	0	43,45,45	0.44	0
3	ADP	C	902	1	28,29,29	0.47	0	43,45,45	0.44	0
4	BEF	C	904	1	0,3,3	-	-	-		
4	BEF	B	903	3	0,3,3	-	-	-		
4	BEF	B	902	-	0,3,3	-	-	-		
4	BEF	B	904	-	0,3,3	-	-	-		

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADP	D	901	1	-	7/16/32/32	0/3/3/3
3	ADP	E	901	1	-	8/16/32/32	0/3/3/3
3	ADP	D	904	1	-	5/16/32/32	0/3/3/3
3	ADP	A	901	1	-	4/16/32/32	0/3/3/3
3	ADP	C	901	1	-	2/16/32/32	0/3/3/3
3	ADP	E	902	1	-	4/16/32/32	0/3/3/3
3	ADP	B	901	-	-	6/16/32/32	0/3/3/3
3	ADP	A	902	1	-	3/16/32/32	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADP	B	905	4	-	3/16/32/32	0/3/3/3
3	ADP	C	902	1	-	5/16/32/32	0/3/3/3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 47 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	901	ADP	C5'-O5'-PA-O1A
3	D	901	ADP	O4'-C4'-C5'-O5'
3	D	901	ADP	C2'-C1'-N9-C4
3	D	904	ADP	PA-O3A-PB-O2B
3	E	901	ADP	C5'-O5'-PA-O1A

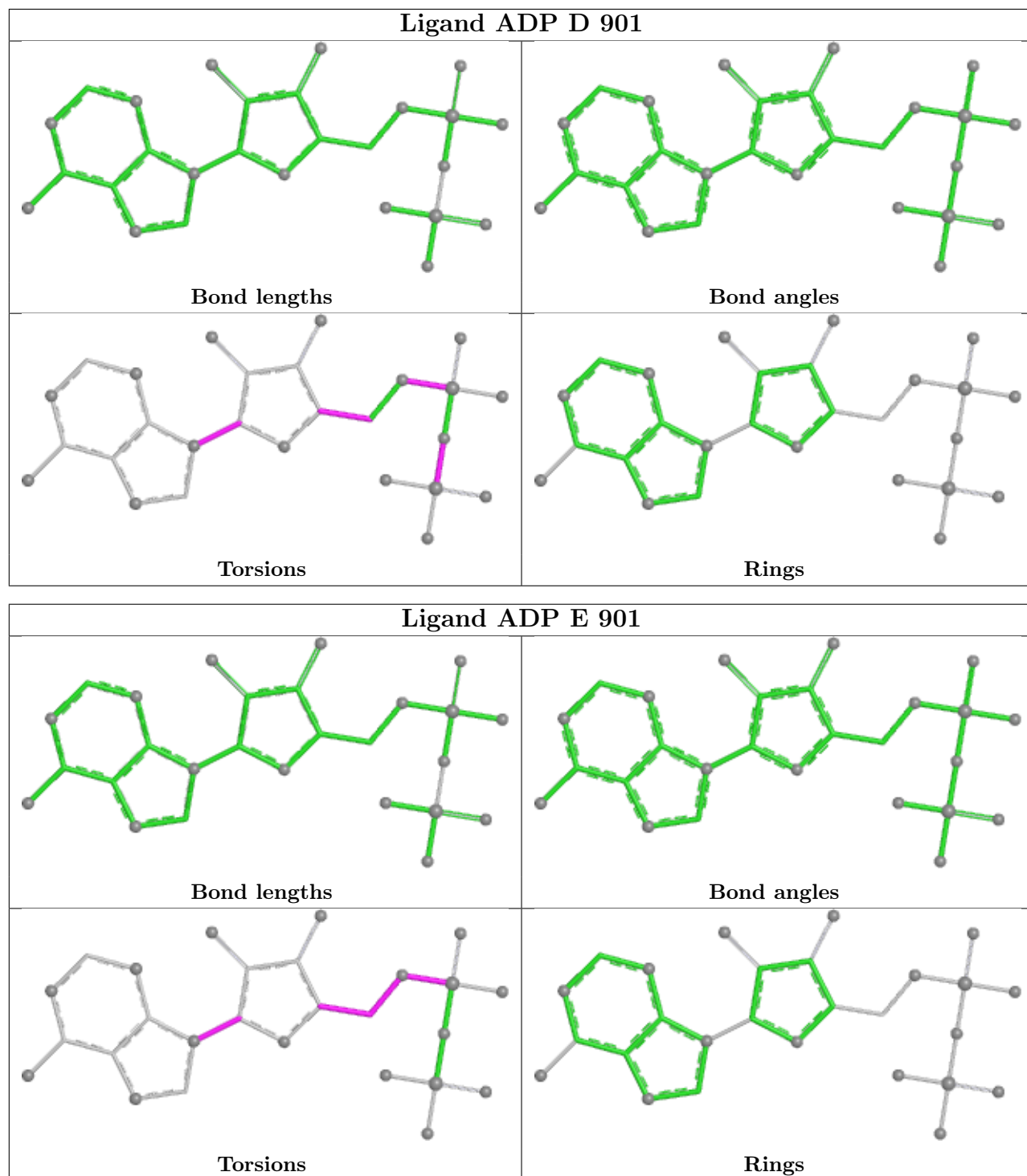
There are no ring outliers.

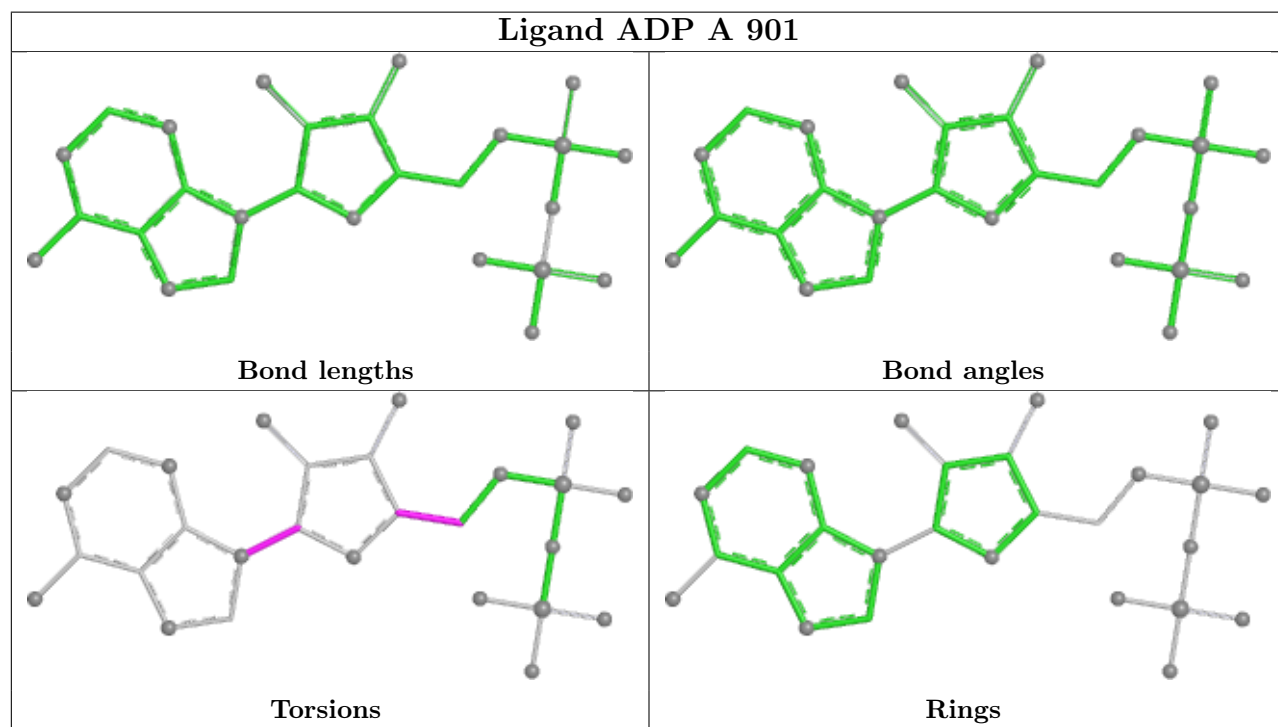
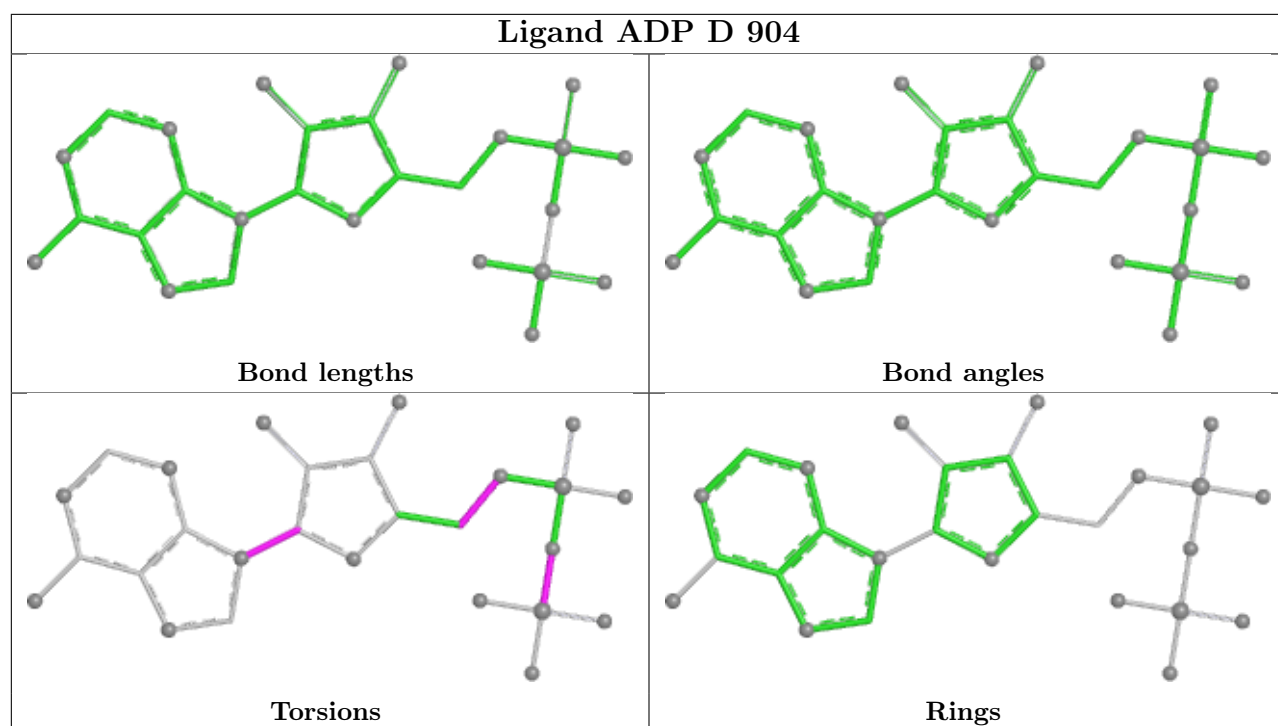
13 monomers are involved in 136 short contacts:

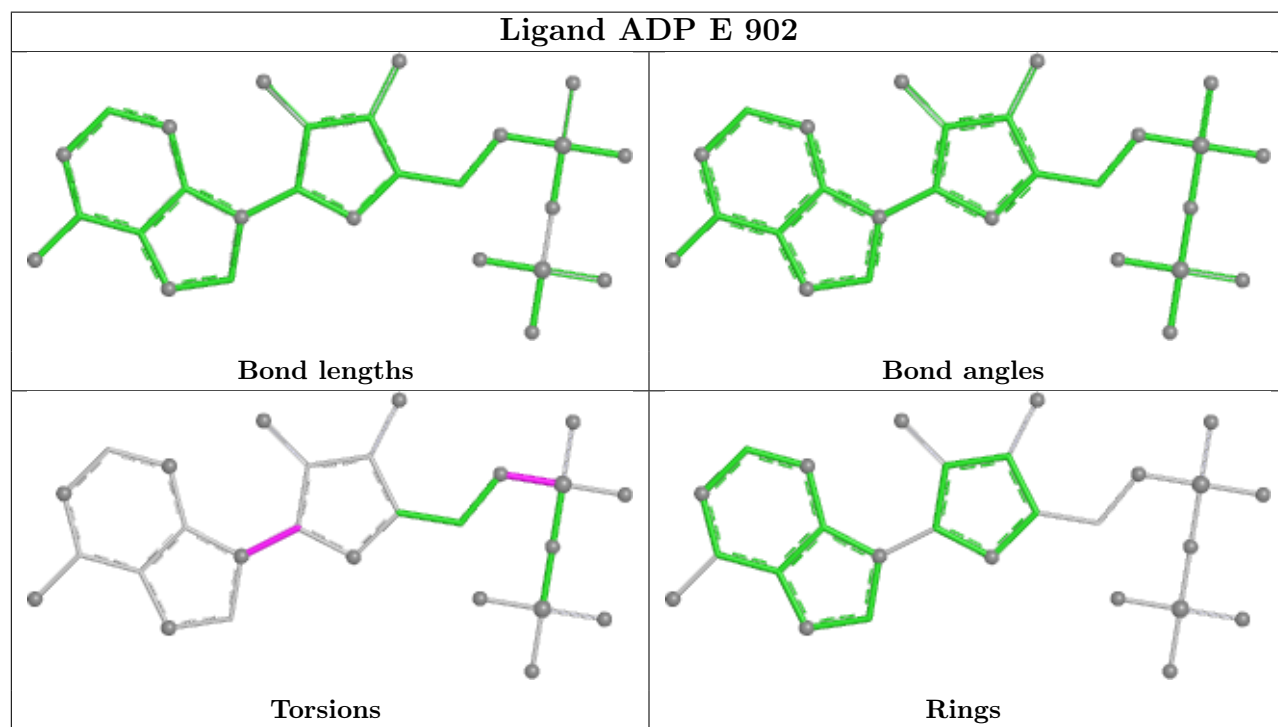
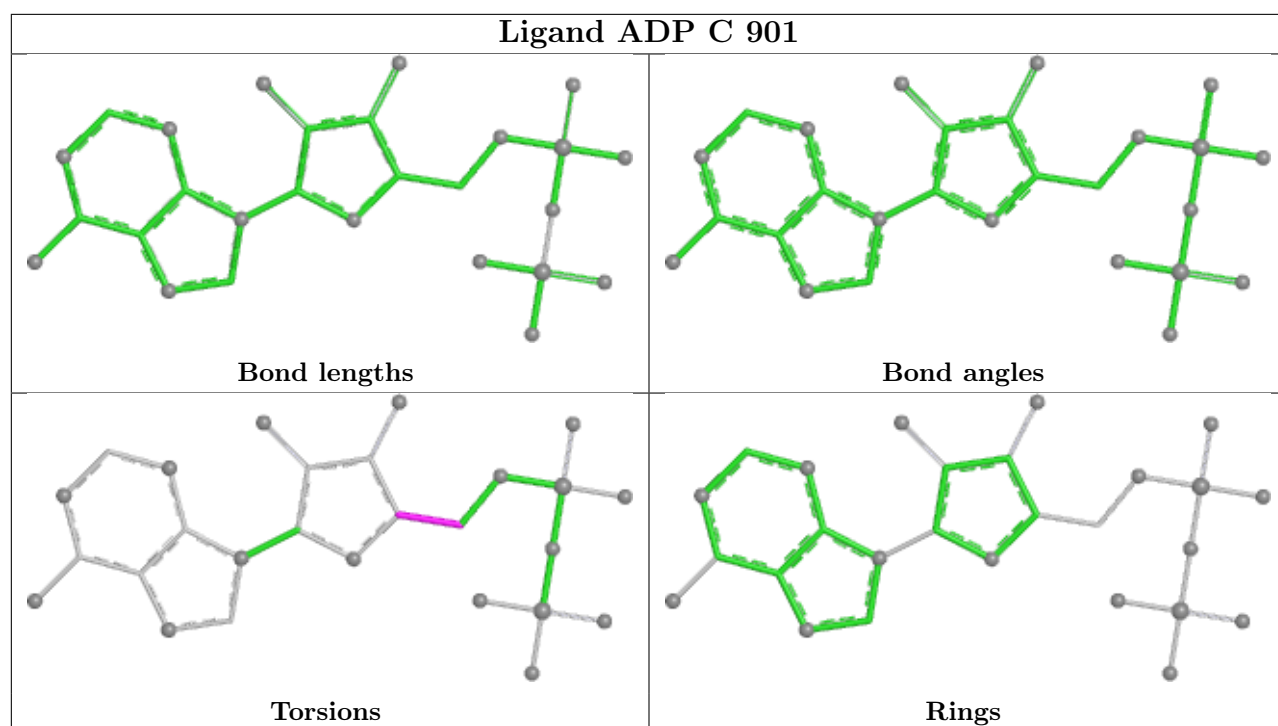
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	901	ADP	22	0
3	E	901	ADP	6	0
3	D	904	ADP	10	0
3	A	901	ADP	18	0
4	D	902	BEF	1	0
3	C	901	ADP	13	0
3	E	902	ADP	22	0
3	B	901	ADP	5	0
3	A	902	ADP	11	0
3	B	905	ADP	16	0
3	C	902	ADP	13	0
4	C	904	BEF	1	0
4	B	904	BEF	1	0

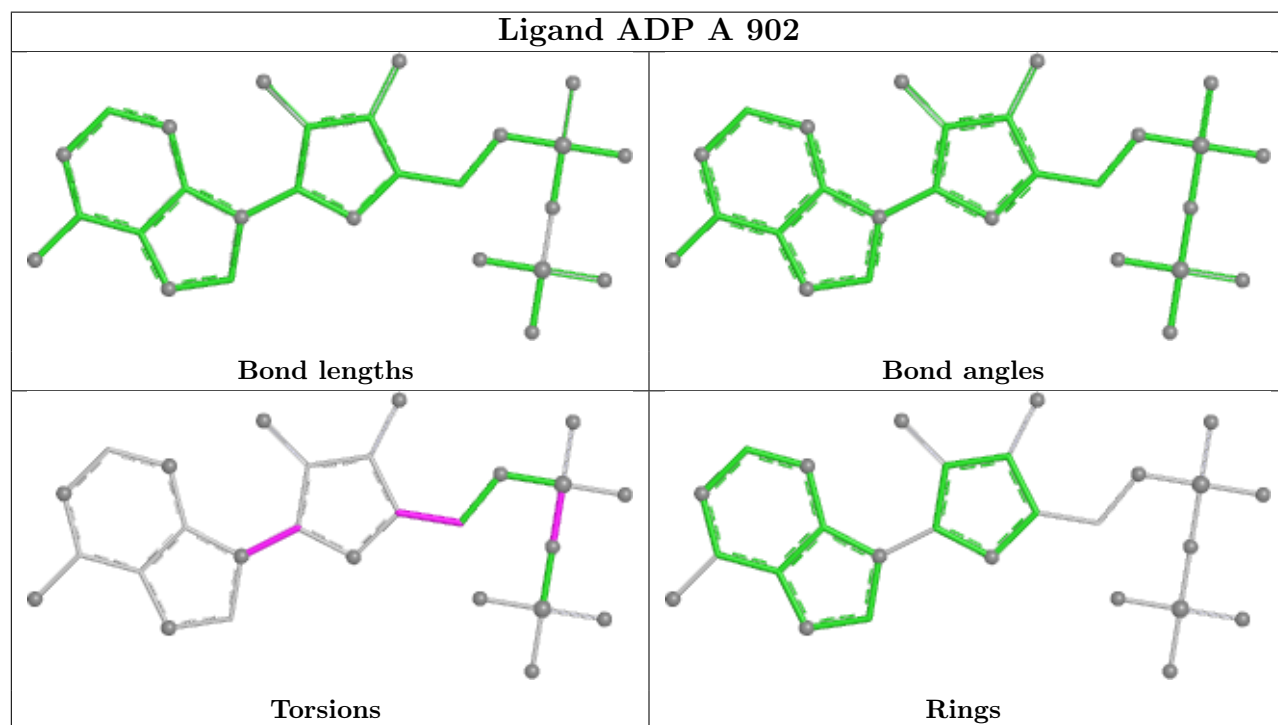
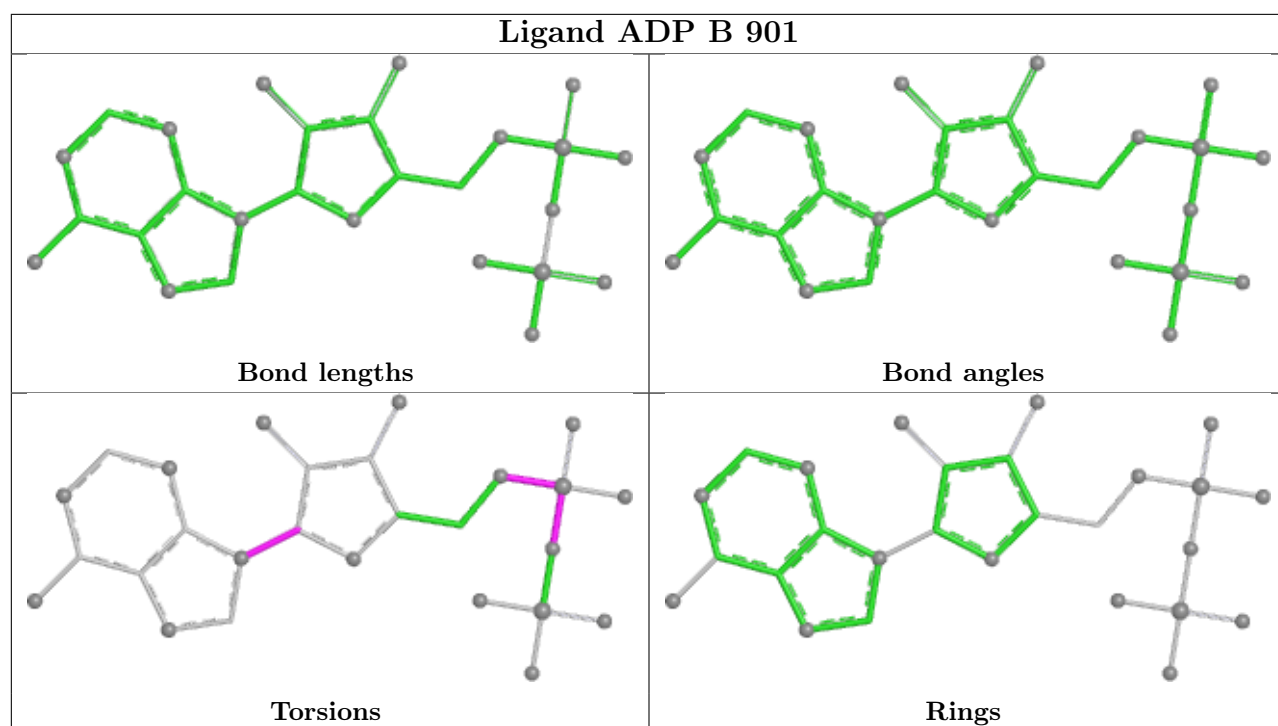
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring

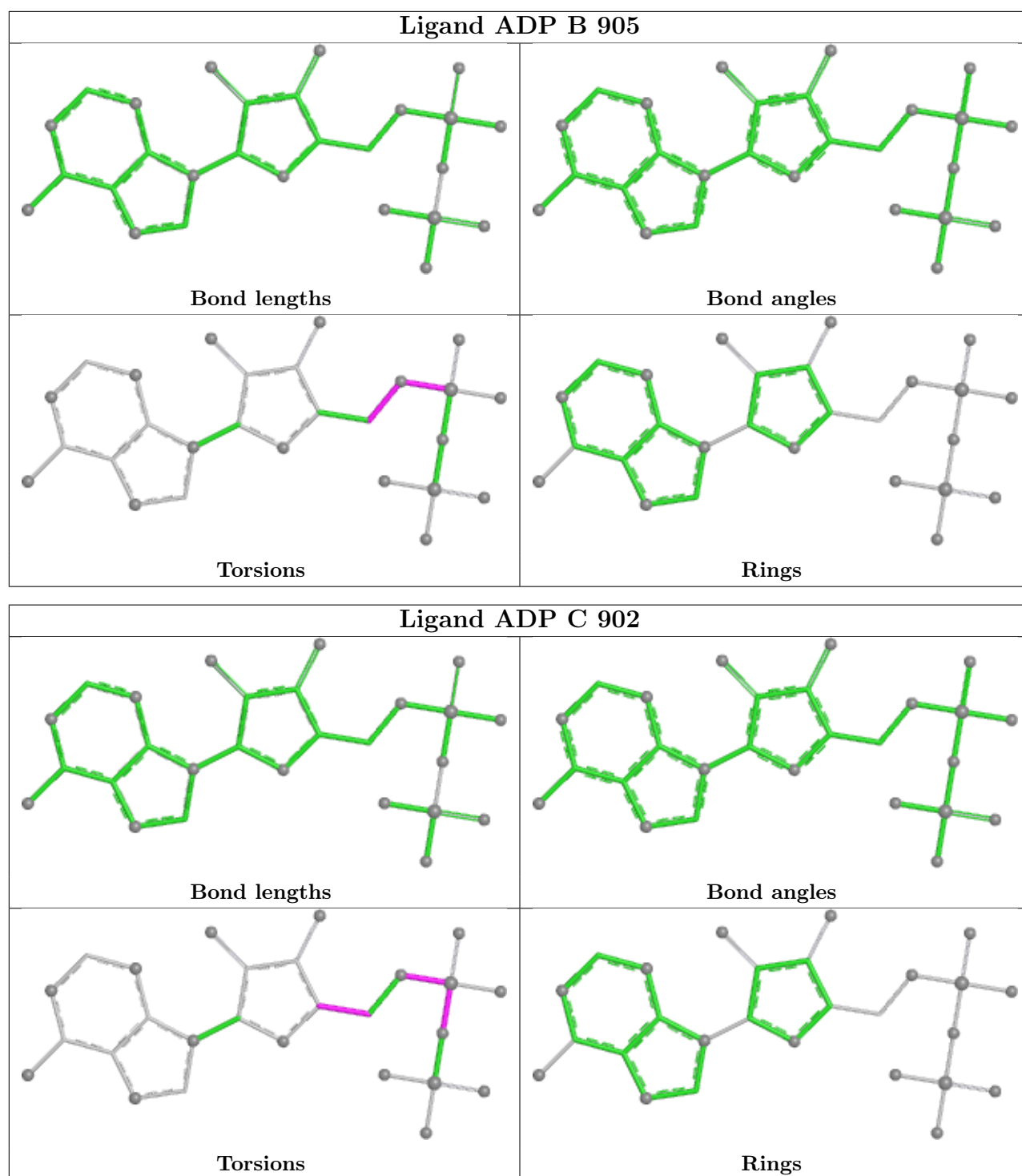
in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.











5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

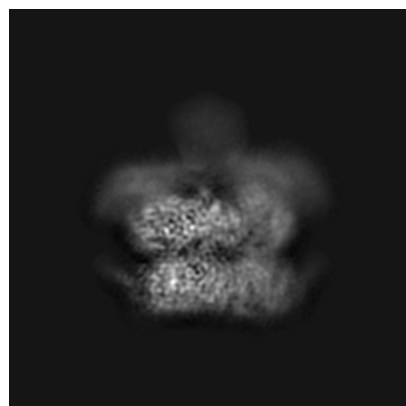
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-20000. These allow visual inspection of the internal detail of the map and identification of artifacts.

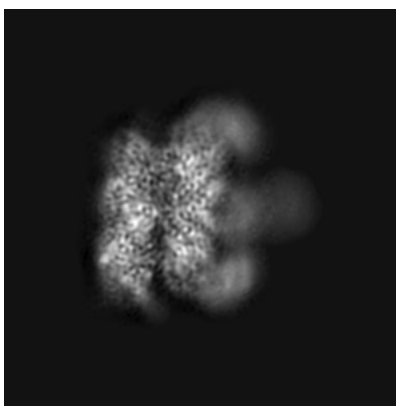
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

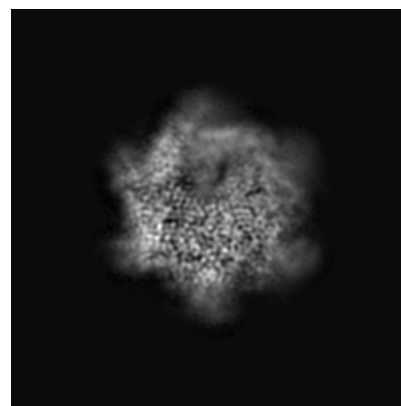
6.1.1 Primary map



X

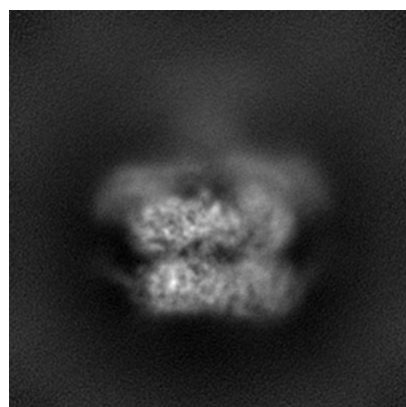


Y

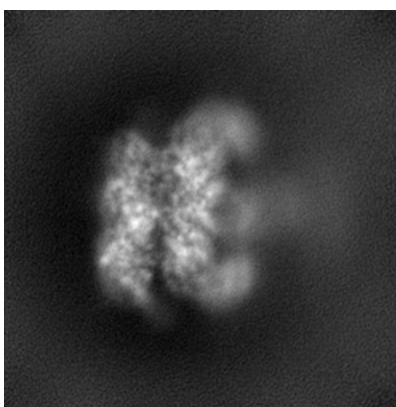


Z

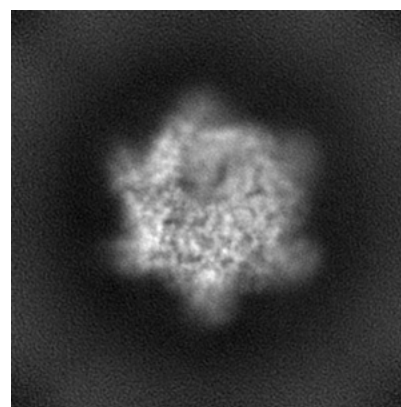
6.1.2 Raw map



X



Y

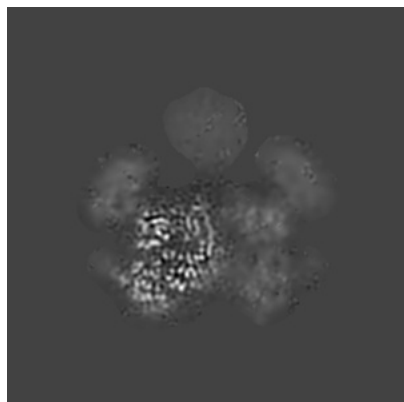


Z

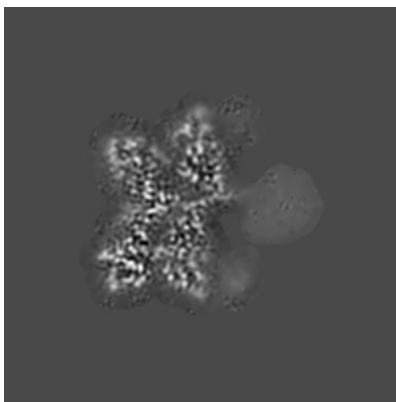
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

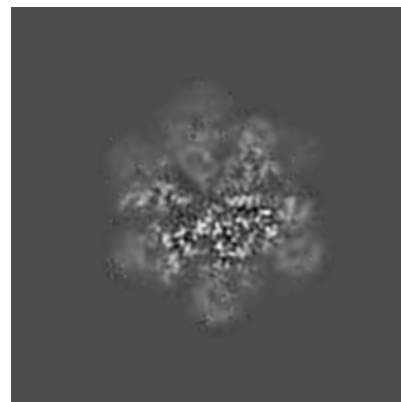
6.2.1 Primary map



X Index: 117

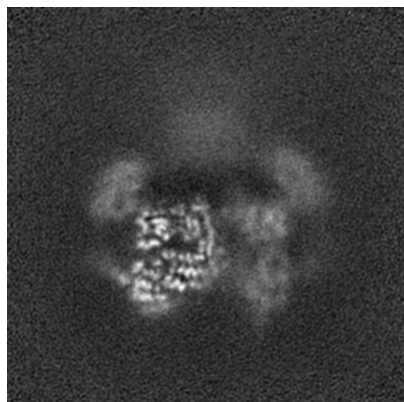


Y Index: 117

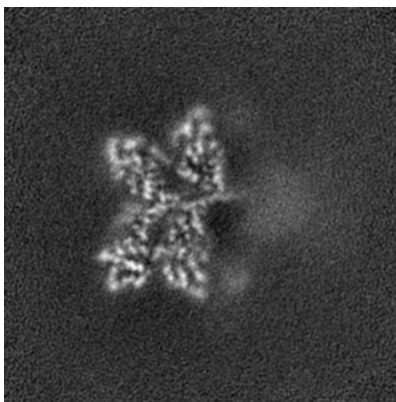


Z Index: 117

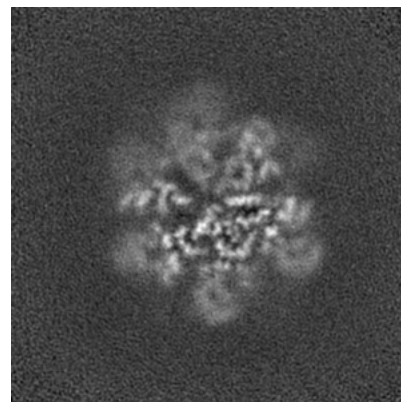
6.2.2 Raw map



X Index: 117



Y Index: 117

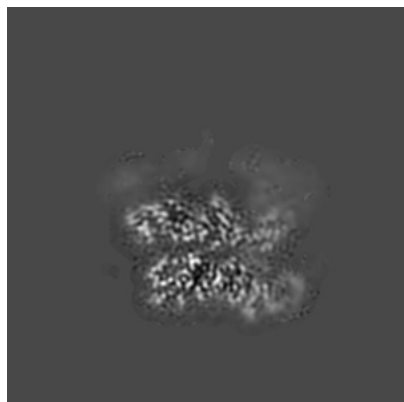


Z Index: 117

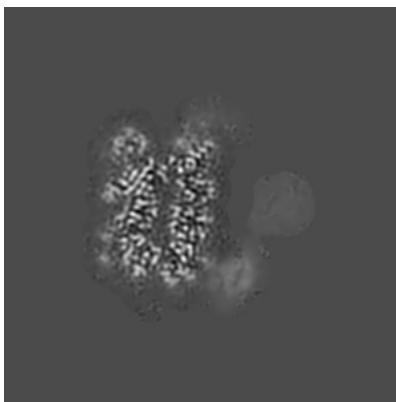
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

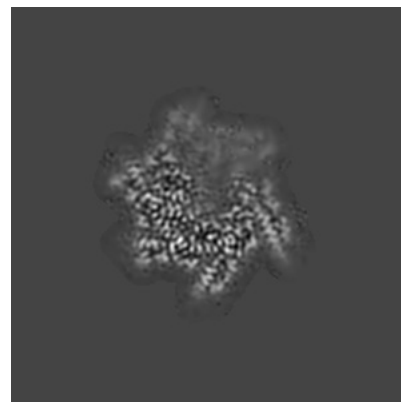
6.3.1 Primary map



X Index: 95

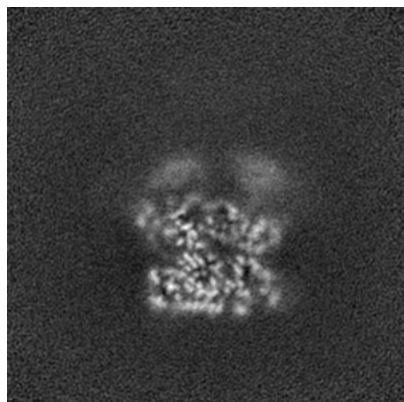


Y Index: 104

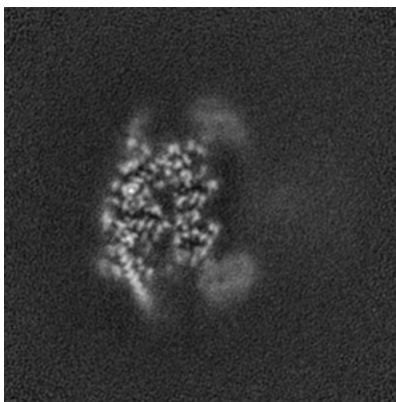


Z Index: 73

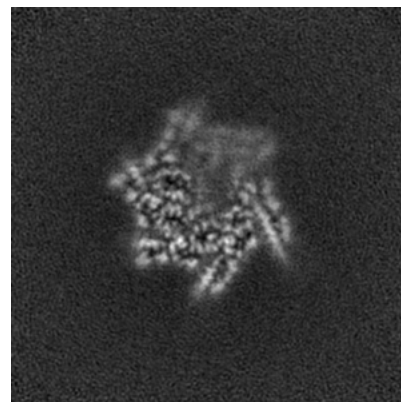
6.3.2 Raw map



X Index: 86



Y Index: 96

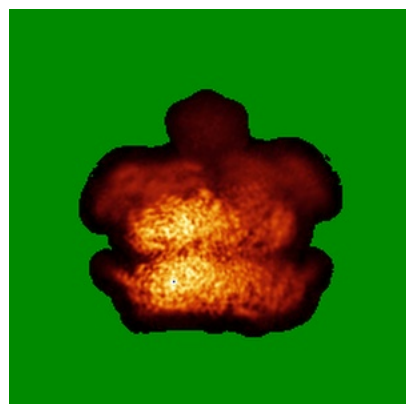


Z Index: 73

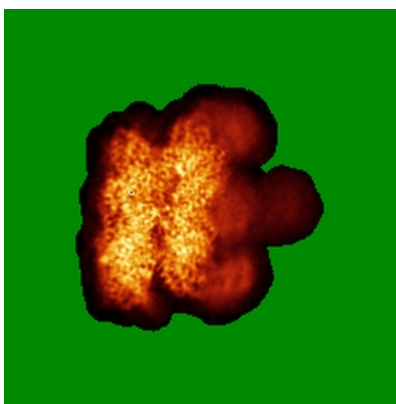
The images above show the largest variance slices of the map in three orthogonal directions.

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

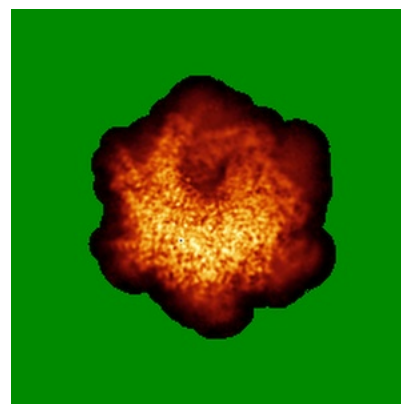
6.4.1 Primary map



X

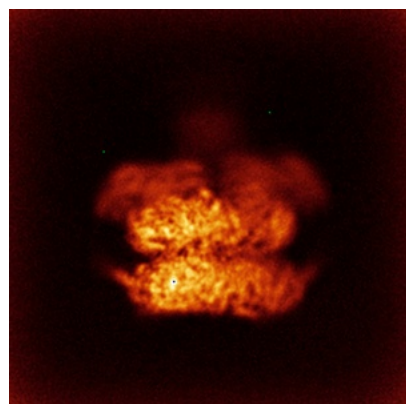


Y

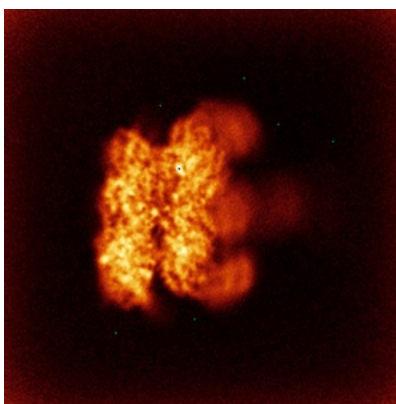


Z

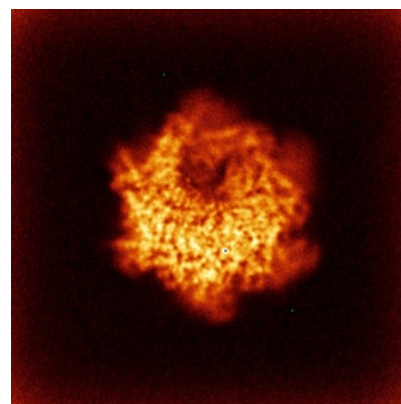
6.4.2 Raw map



X



Y

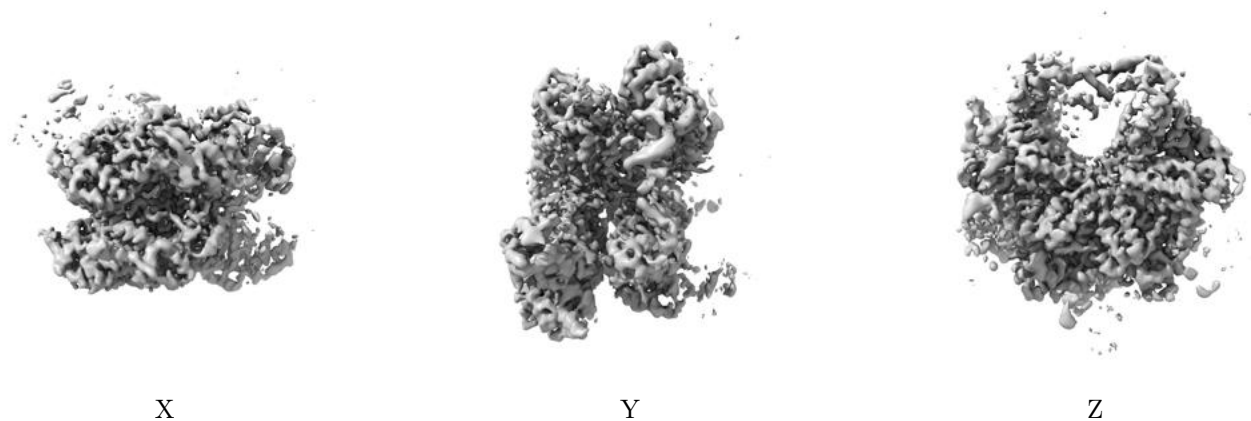


Z

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.

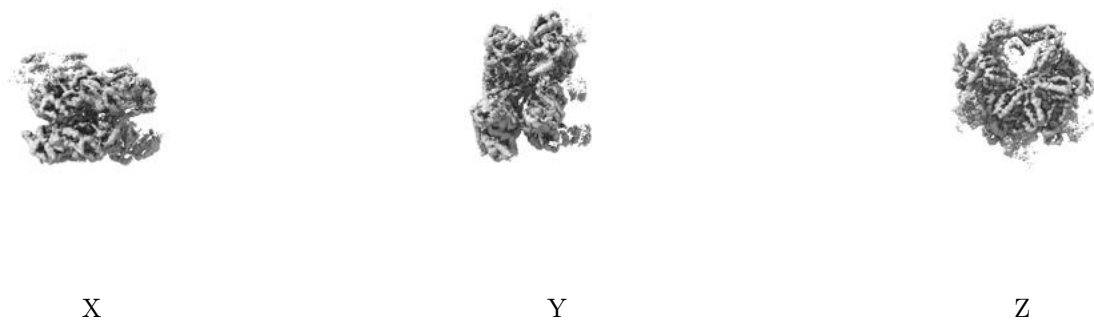
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.5. 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.

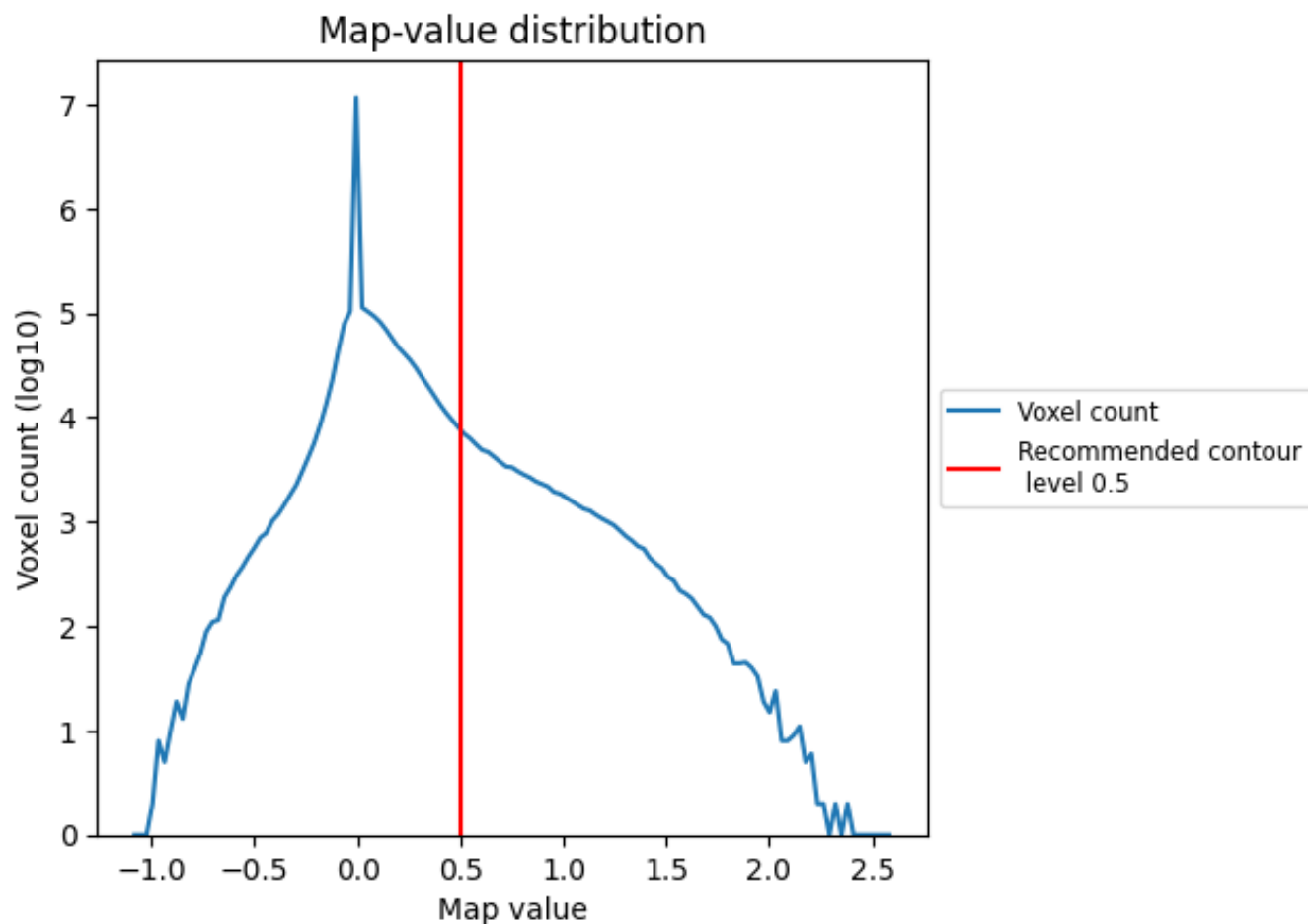
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

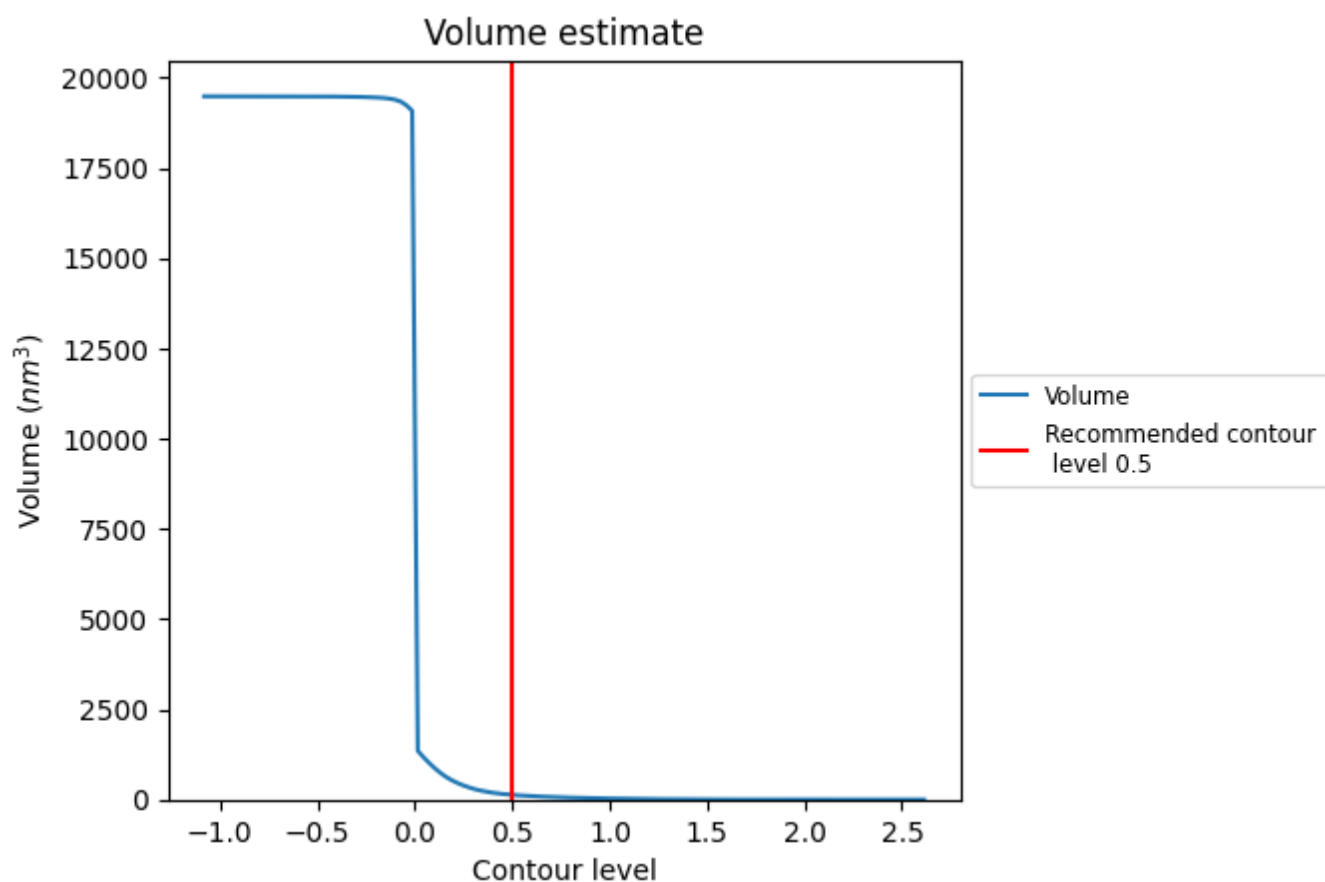
This section contains the results of statistical analysis of the map.

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.

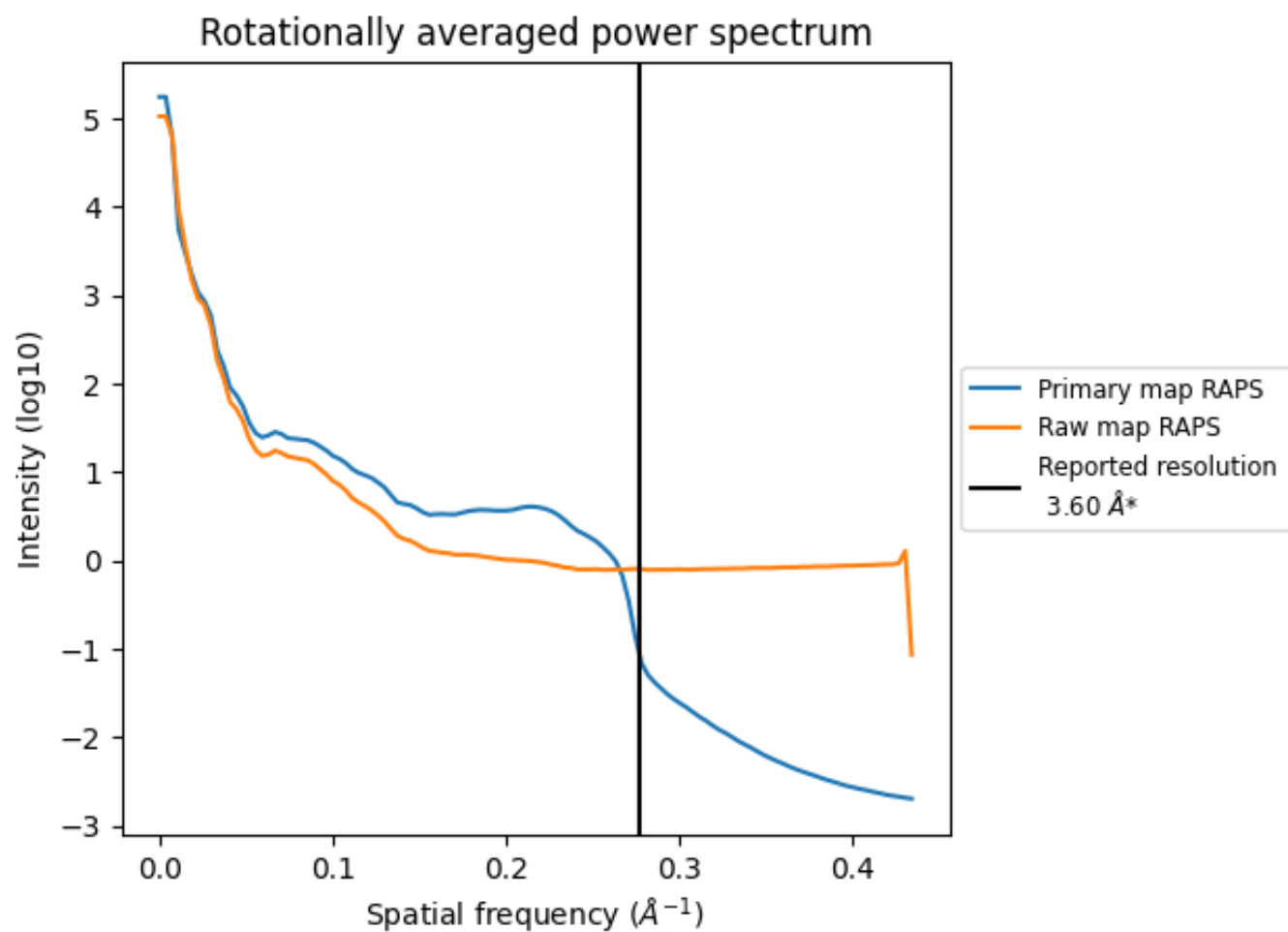
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 130 nm³; this corresponds to an approximate mass of 118 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 ⓘ

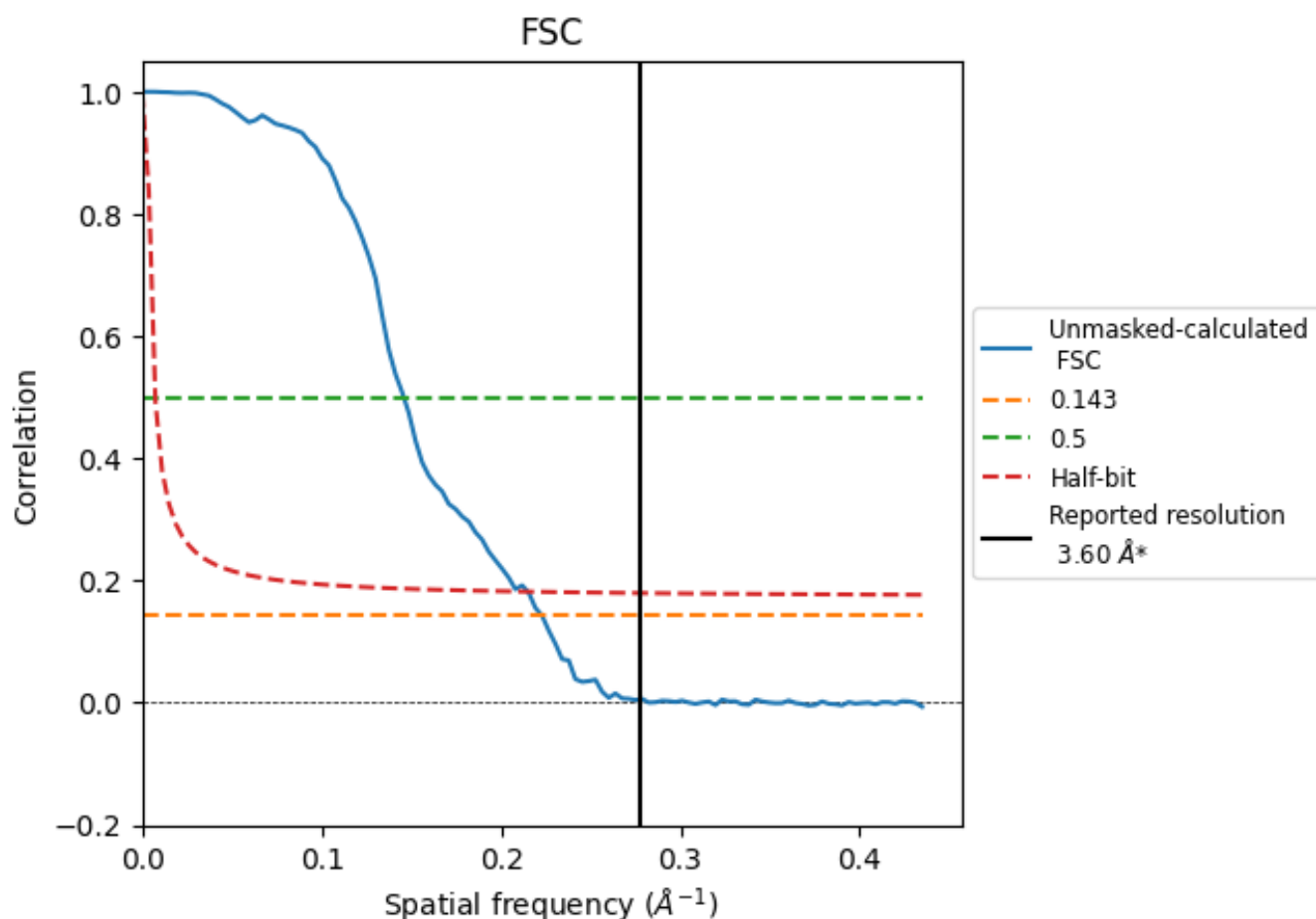


*Reported resolution corresponds to spatial frequency of 0.278 $\text{\AA}^{-1}$

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 0.278 Å⁻¹

8.2 Resolution estimates [i](#)

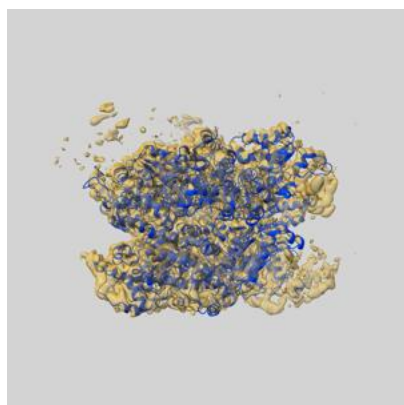
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.60	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.49	6.86	4.65

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.49 differs from the reported value 3.6 by more than 10 %

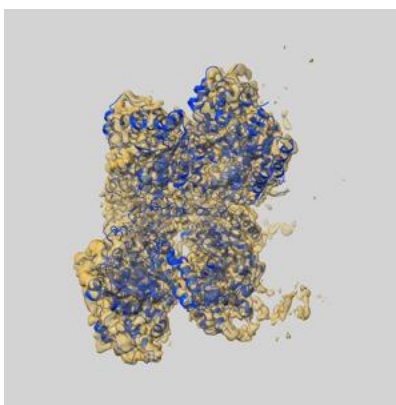
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-20000 and PDB model 6OAB. Per-residue inclusion information can be found in [section 3](#) on [page 7](#).

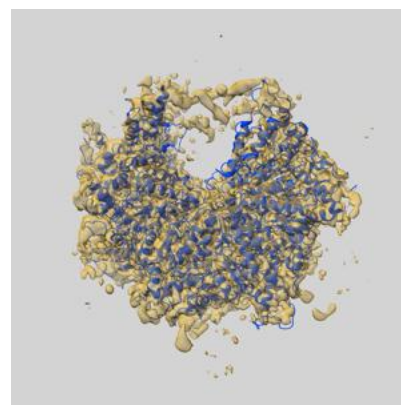
9.1 Map-model overlay [i](#)



X



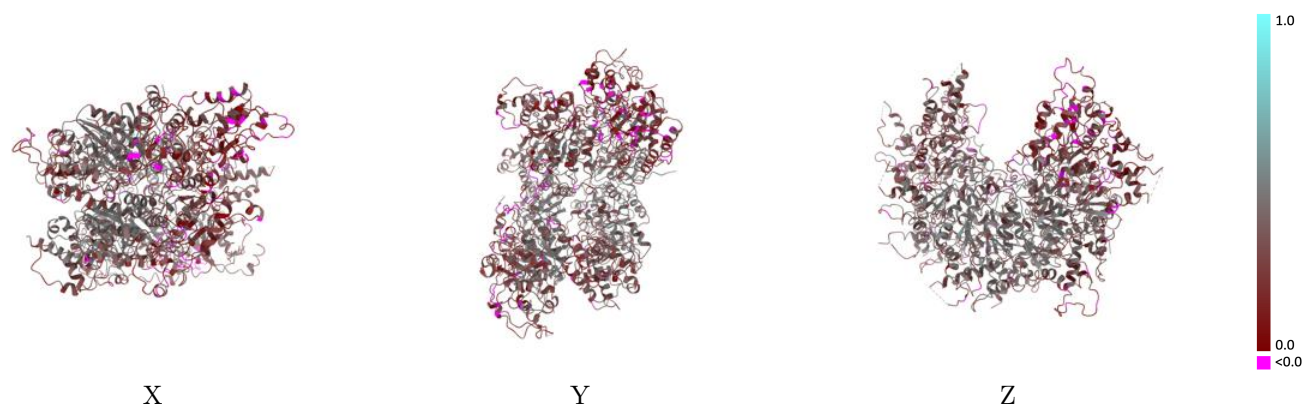
Y



Z

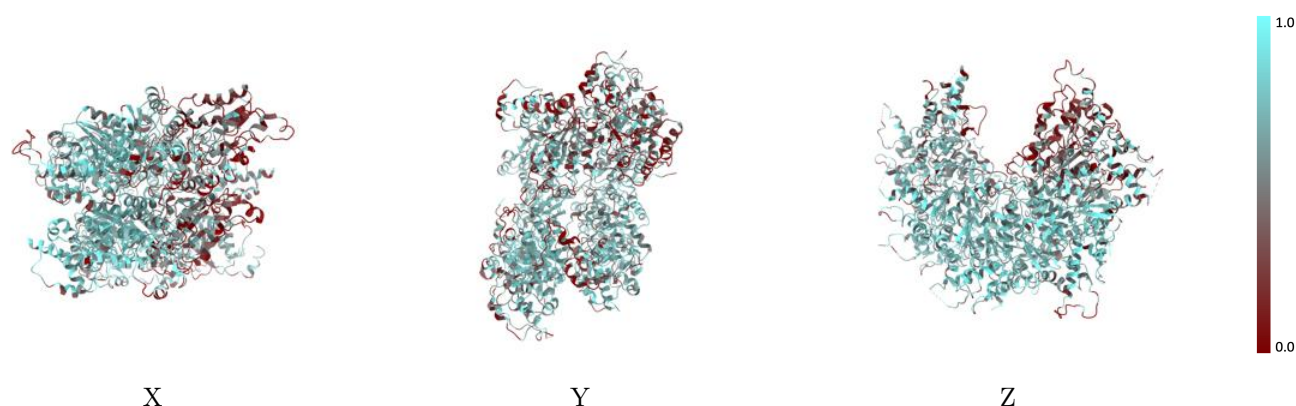
The images above show the 3D surface view of the map at the recommended contour level 0.5 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



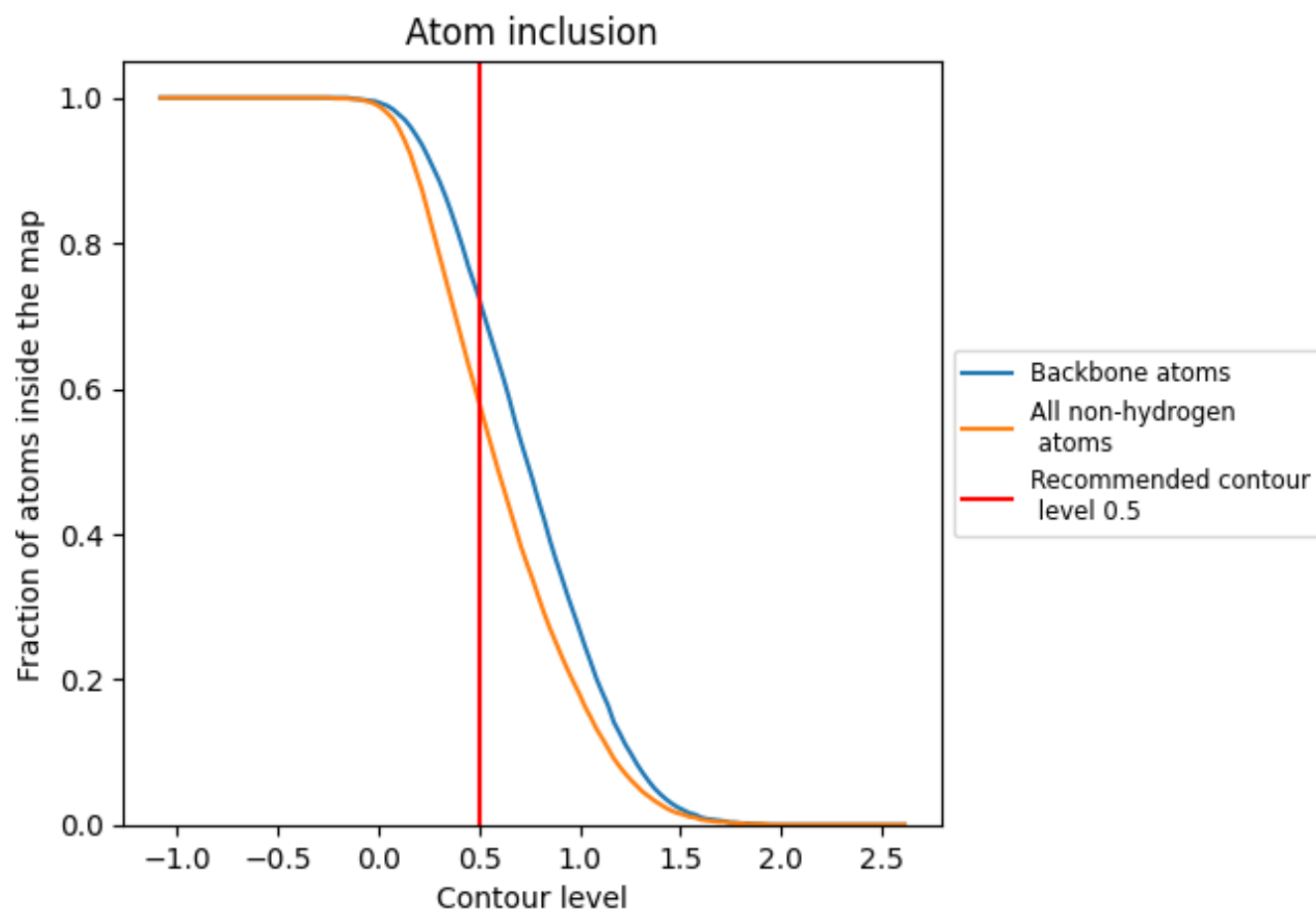
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.5).

9.4 Atom inclusion [i](#)



At the recommended contour level, 72% of all backbone atoms, 58% 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 (0.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5810	0.3060
A	0.3640	0.2060
B	0.6250	0.3040
C	0.7010	0.3630
D	0.6550	0.3460
E	0.5320	0.2990
H	0.7500	0.4390

