W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB EM Validation Summary Report (i)

Dec 10, 2022 – 10:07 pm GMT

PDB ID	:	6R25
EMDB ID	:	EMD-4710
Title	:	Structure of LSD2/NPAC-linker/nucleosome core particle complex: Class 3
Authors	:	Marabelli, C.; Pilotto, S.; Chittori, S.; Subramaniam, S.; Mattevi, A.
Deposited on	:	2019-03-15
Resolution	:	4.61 Å(reported)
Based on initial models	:	4HSU, 6ESF

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

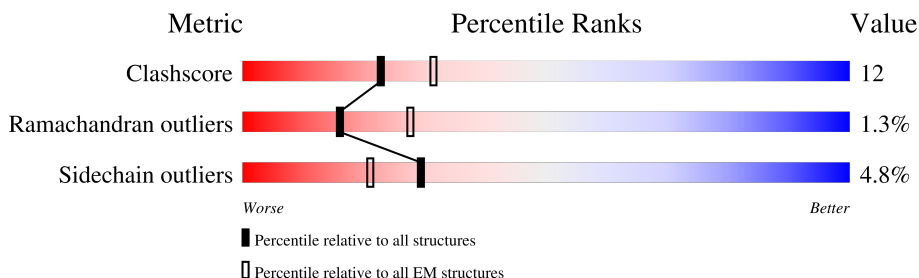|		
EMDB validation analysis	:	0.0.1.dev43
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.3

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 4.61 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	Percentile Ranks	Value
Clashscore		12
Ramachandran outliers		1.3%
Sidechain outliers		4.8%

Worse ... *Better*

■ Percentile relative to all structures
▯ Percentile relative to all EM structures

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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 <=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	K	776	48% / 79% 15% · 5%
2	L	12	67% / 75% 25%
3	M	135	12% / 14% · · 81%
4	A	135	52% 17% · · 27%
4	E	135	51% 19% · · 27%
5	B	102	57% 13% 6% · 23%
5	F	102	57% 19% · 22%
6	C	129	64% 13% · 19%

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Mol	Chain	Length	Quality of chain
6	G	129	70% 16% · · 12%
7	D	126	63% 11% · · 23%
7	H	126	59% 16% · · 22%
8	I	147	76% 24%
9	J	147	84% 15% ·

2 Entry composition ⓘ

There are 12 unique types of molecules in this entry. The entry contains 18654 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 Lysine-specific histone demethylase 1B.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	K	737	Total 5837	C 3727	N 994	O 1075	S 41	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	47	PRO	-	expression tag	UNP Q8NB78
K	48	LEU	-	expression tag	UNP Q8NB78
K	49	GLY	-	expression tag	UNP Q8NB78
K	50	SER	-	expression tag	UNP Q8NB78

- Molecule 2 is a protein called NPAC.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	L	12	Total 105	C 69	N 19	O 17	0	0

- Molecule 3 is a protein called Histone H3.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	M	26	Total 193	C 115	N 44	O 33	S 1	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	4	MET	LYS	conflict	UNP A0A310TTQ1

- Molecule 4 is a protein called Histone H3.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	A	99	Total 816	C 515	N 158	O 140	S 3	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	99	Total	C	N	O	S	0	0
			820	518	159	140	3		

- Molecule 5 is a protein called H4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	B	79	Total	C	N	O	S	0	0
			633	399	124	109	1		
5	F	80	Total	C	N	O	S	0	0
			638	401	125	111	1		

- Molecule 6 is a protein called Histone H2A.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	C	104	Total	C	N	O	0	0
			804	507	157	140		
6	G	113	Total	C	N	O	0	0
			870	547	172	151		

- Molecule 7 is a protein called H2B.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	D	97	Total	C	N	O	S	0	0
			766	481	142	141	2		
7	H	98	Total	C	N	O	S	0	0
			775	487	144	142	2		

- Molecule 8 is a DNA chain called DNA (147-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
8	I	147	Total	C	N	O	P	0	0
			3031	1435	566	883	147		

- Molecule 9 is a DNA chain called DNA (147-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
9	J	147	Total	C	N	O	P	0	0
			2996	1423	545	881	147		

- Molecule 10 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).

Mol	Chain	Residues	Atoms					AltConf
10	K	1	Total	C	N	O	P	0
			53	27	9	15	2	

- Molecule 11 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
11	K	3	Total	Zn	0
			3	3	

- Molecule 12 is water.

Mol	Chain	Residues	Atoms		AltConf
12	K	300	Total	O	0
			300	300	
12	L	2	Total	O	0
			2	2	
12	M	12	Total	O	0
			12	12	

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: Lysine-specific histone demethylase 1B

Chain K:

- Molecule 2: NPAC

Chain L:

67%

75%　25%

D214 P215 H216 F217 H218 H219 L222 S223 Q224 T225

• Molecule 3: Histone H3

Chain M:

12%

14%　81%

A1 R8 T11 G12 G13 K14 A15 P16 R17 K18 Q19 L20 A21 T22 K23 A24 A25 R26 LYS SER ALA PRO ALA THR GLY GLY VAL LYS LYS PRO HIS ARG TYR ARG PRO GLY THR VAL ALA LEU ARG GLU ILE ARG ARG TYR GLN LYS SER THR GLU LEU LEU ILE ARG LYS LEU PRO

PHE GLN ARG LEU VAL ARG GLU ILE ALA GLN ASP PHE LYS THR ASP LEU ARG PHE GLN SER SER ALA VAL MET ALA LEU GLN GLU ALA SER GLU ALA TYR LEU VAL ALA LEU PHE GLU ASP THR ASN LEU CYS ALA ILE HIS ALA LYS ARG VAL THR ILE MET PRO LYS ASP ILE GLN LEU

ALA ARG ARG ILE ARG GLY GLU ARG ALA

• Molecule 4: Histone H3

Chain A:

52%　17%　27%

ALA ARG THR LYS GLN THR ALA ARG LYS SER THR GLY GLY LYS ALA PRO ARG LYS GLN LEU ALA THR LYS ALA ALA ARG LYS SER ALA PRO ALA THR GLY GLY VAL LYS K37 P38 H39 R40 Y41 R42 T45 V46 E50 I51 R52 K56 E59 L60 L61 I62 Q68 R72

A75 K79 L82 F104 T107 N108 H113 I119 D123 R128 R129 I130 R131 G132 E133 R134 A135

• Molecule 4: Histone H3

Chain E:

51%　19%　27%

ALA ARG THR LYS GLN THR ALA ARG LYS SER THR GLY GLY LYS ALA PRO ARG LYS GLN LEU ALA THR LYS ALA ALA ARG LYS SER ALA PRO ALA THR GLY GLY VAL K36 K37 P38 H39 R40 Y41 R42 V46 A47 L48 R49 E50 I51 R52 K56 L61 I62 R63 Q68 R69 L70

V71 R72 E73 R83 E97 V101 A102 L103 D106 T107 N108 H113 D123 I124 I130 R134 ALA

• Molecule 5: H4

Chain B:

57%　13%　6%　23%

SER GLY ARG GLY LYS GLY GLY LYS GLY LEU GLY LYS GLY GLY ALA LYS ARG HIS ARG LYS VAL LEU R23 D24 N25 I26 Q27 G28 I29 T30 A33 R36 R39 R40 G41 G42 S47 G48 R55 D68 K79 V87 Q93 F100 G101 GLY

• Molecule 5: H4

Chain F:

57%　19%　22%

SER GLY ARG GLY LYS GLY LYS GLY LEU GLY LYS GLY GLY ALA LYS ARG HIS ARG LYS VAL LEU **R23** D24 N25 **I26** Q27 G28 K31 R36 L37 G42 S47 G48 Y51 R55 K59 E63 I66 **R67** D68 V87 R92 Q93 F100 **G101 G102**

- Molecule 6: Histone H2A

Chain C:

64%   13%   •   19%

SER GLY ARG GLY LYS GLN GLY GLY LYS THR ARG ALA LYS ALA LYS THR **R17** R20 **L23 Q24 F25** G28 R29 Y39 E56 L63 A66 A70 R77 I78 I79 **P80** R81 H82 A86 **L116** P117 **K118 K119 T120** GLU SER SER SER ALA LYS SER LYS

- Molecule 6: Histone H2A

Chain G:

70%   16%   • •   12%

SER GLY ARG GLY LYS GLN GLY GLY **G8 K9 T10 R11** A12 K13 A14 K15 T16 R17 **S18** S19 R20 **F25 P26** V27 **G28** R29 **V30** H31 Y39 L55 L58 A66 A70 N73 R77 H82 A86 **T120** GLU SER SER LYS SER ALA LYS SER LYS

- Molecule 7: H2B

Chain D:

63%   11%   • •   23%

MET PRO ASP PRO ALA LYS SER ALA PRO ALA ALA LYS LYS GLY SER LYS LYS ALA VAL THR LYS GLN LYS LYS ASP GLY LYS **K25 R26 R27 K28 T29 R30 K31 E32 S33** V38 E68 N81 **K82 R83** V95 R96 L99 L103 A107 V108 K113 K117

A121 LYS

- Molecule 7: H2B

Chain H:

59%   16%   • •   22%

MET PRO ASP PRO ALA LYS SER ALA PRO ALA ALA LYS LYS GLY SER LYS LYS ALA VAL THR LYS GLN LYS LYS ASP GLY K24 K25 **R26 R27 K28** T29 R30 K31 E32 **S33** Y34 V63 I70 E73 **A74** S75 R76 L77 L97 L98 L99 L103 K113 **A114** V115 T116 K117

Y118 T119 **S120 A121** LYS

- Molecule 8: DNA (147-MER)

Chain I:

76%   24%

A-73 T-72 C-71 G-70 G-69 A-68 T-67 A-62 T-61 T-57 C-54 A-53 **G-44** A-43 **G-42 A-41** C-40 T-39 A-38 G-37 T-16 G21 T22 G27 A42 G50 G51 C55 G56 G57 **C58** A59 C60 A65 T66 C70 G71 A72 T73

- Molecule 9: DNA (147-MER)

Chain J:

84%   15%   •

A-73 A-69 G-68 A-67 C-57 C-56 T-43 C-27 T-26 C-21 C-20 G-19 G28 A29 T30 T31 C36 C49 A50 G58 A61 T62 **G71** A72 T73

4   Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	34607	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 $(e^-/\text{Å}^2)$	1.25	Depositor
Minimum defocus (nm)	0.7	Depositor
Maximum defocus (nm)	3.05	Depositor
Magnification	130000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.061	Depositor
Minimum map value	-0.014	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.0112	Depositor
Map size (Å)	317.99997, 317.99997, 317.99997	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

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	K	0.32	0/5981	0.46	1/8100 (0.0%)
2	L	0.27	0/110	0.42	0/149
3	M	0.34	0/193	0.45	0/254
4	A	0.43	0/828	0.60	0/1111
4	E	0.41	0/832	0.61	0/1115
5	B	0.45	0/640	0.61	0/857
5	F	0.45	0/645	0.56	0/862
6	C	0.43	0/814	0.60	0/1099
6	G	0.41	0/880	0.62	0/1185
7	D	0.45	0/777	0.56	0/1043
7	H	0.44	0/786	0.56	0/1054
8	I	0.88	1/3403 (0.0%)	1.05	2/5255 (0.0%)
9	J	0.87	1/3357 (0.0%)	1.03	0/5174
All	All	0.60	2/19246 (0.0%)	0.77	3/27258 (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
4	A	0	3
5	F	0	1
6	C	0	1
6	G	0	1
7	D	0	1
7	H	0	3
All	All	0	10

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	J	71	DG	C1'-N9	-8.25	1.35	1.47
8	I	71	DG	C1'-N9	-7.42	1.36	1.47

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	K	151	ARG	NE-CZ-NH1	-5.21	117.70	120.30
8	I	42	DA	O4'-C1'-N9	5.17	111.62	108.00
8	I	-57	DT	O4'-C1'-N1	5.00	111.50	108.00

There are no chirality outliers.

5 of 10 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	A	129	ARG	Sidechain
4	A	131	ARG	Sidechain
4	A	40	ARG	Sidechain
6	C	17	ARG	Sidechain
7	D	27	ARG	Sidechain

5.2   Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	K	5837	0	5750	90	0
2	L	105	0	91	2	0
3	M	193	0	218	33	0
4	A	816	0	858	49	0
4	E	820	0	866	53	0
5	B	633	0	673	59	0
5	F	638	0	676	29	0
6	C	804	0	859	39	0
6	G	870	0	938	21	0
7	D	766	0	799	26	0
7	H	775	0	812	23	0
8	I	3031	0	1651	57	0
9	J	2996	0	1650	59	0
10	K	53	0	30	2	0

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WORLDWIDE
PDB
PROTEIN DATA BANK

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
11	K	3	0	0	0	0
12	K	300	0	0	3	0
12	L	2	0	0	0	0
12	M	12	0	0	1	0
All	All	18654	0	15871	420	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 12.

The worst 5 of 420 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)
3:M:17:ARG:HG3	9:J:-19:DG:C5'	1.41	1.47
7:D:30:ARG:O	7:D:31:LYS:HG3	1.19	1.31
5:B:24:ASP:HB2	5:B:27:GLN:CB	1.61	1.28
6:C:118:LYS:O	6:C:119:LYS:HG3	1.27	1.25
4:A:41:TYR:O	4:A:42:ARG:CG	1.82	1.25

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	K	731/776 (94%)	704 (96%)	27 (4%)	0	100	100
2	L	10/12 (83%)	10 (100%)	0	0	100	100
3	M	24/135 (18%)	22 (92%)	2 (8%)	0	100	100
4	A	97/135 (72%)	90 (93%)	5 (5%)	2 (2%)	7	38
4	E	97/135 (72%)	90 (93%)	3 (3%)	4 (4%)	3	25
5	B	77/102 (76%)	69 (90%)	3 (4%)	5 (6%)	1	18

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	F	78/102 (76%)	74 (95%)	4 (5%)	0	100	100
6	C	102/129 (79%)	91 (89%)	10 (10%)	1 (1%)	15	54
6	G	111/129 (86%)	100 (90%)	8 (7%)	3 (3%)	5	34
7	D	95/126 (75%)	89 (94%)	3 (3%)	3 (3%)	4	30
7	H	96/126 (76%)	85 (88%)	9 (9%)	2 (2%)	7	38
All	All	1518/1907 (80%)	1424 (94%)	74 (5%)	20 (1%)	16	48

5 of 20 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	B	25	ASN
5	B	28	GLY
5	B	29	ILE
5	B	30	THR
7	D	29	THR

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	K	632/662 (96%)	601 (95%)	31 (5%)	25	51
2	L	12/12 (100%)	11 (92%)	1 (8%)	11	36
3	M	18/110 (16%)	14 (78%)	4 (22%)	1	6
4	A	86/110 (78%)	81 (94%)	5 (6%)	20	47
4	E	87/110 (79%)	85 (98%)	2 (2%)	50	70
5	B	65/78 (83%)	60 (92%)	5 (8%)	13	39
5	F	65/78 (83%)	62 (95%)	3 (5%)	27	53
6	C	83/101 (82%)	79 (95%)	4 (5%)	25	52
6	G	89/101 (88%)	87 (98%)	2 (2%)	52	71
7	D	83/105 (79%)	81 (98%)	2 (2%)	49	69
7	H	84/105 (80%)	81 (96%)	3 (4%)	35	59

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	1304/1572 (83%)	1242 (95%)	62 (5%)	29	52

5 of 62 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	K	727	LYS
5	F	26	ILE
3	M	23	LYS
5	F	23	ARG
7	H	25	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
7	H	46	HIS
4	E	68	GLN
1	K	731	GLN
7	D	81	ASN
1	K	527	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 4 ligands modelled in this entry, 3 are 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	$\#|Z| > 2$
10	FAD	K	901	-	53,58,58	2.32	29 (54%)	68,89,89	1.44	13 (19%)

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
10	FAD	K	901	-	-	2/30/50/50	0/6/6/6

The worst 5 of 29 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	K	901	FAD	PA-O5B	-5.00	1.39	1.59
10	K	901	FAD	PA-O1A	-3.93	1.37	1.50
10	K	901	FAD	P-O2P	-3.80	1.37	1.55
10	K	901	FAD	O4B-C1B	-3.71	1.35	1.41
10	K	901	FAD	PA-O2A	-3.58	1.38	1.55

The worst 5 of 13 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
10	K	901	FAD	N3A-C2A-N1A	-3.80	122.73	128.68
10	K	901	FAD	C4X-C10-N10	3.40	121.46	116.48
10	K	901	FAD	C4-N3-C2	-2.91	120.26	125.64
10	K	901	FAD	C9A-N10-C10	-2.84	116.34	120.77
10	K	901	FAD	C4X-C4-N3	2.69	120.03	113.19

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	K	901	FAD	C5'-O5'-P-O3P
10	K	901	FAD	O4B-C4B-C5B-O5B

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	K	901	FAD	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 then 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.

Ligand FAD K 901

Bond lengths   Bond angles

Torsions   Rings
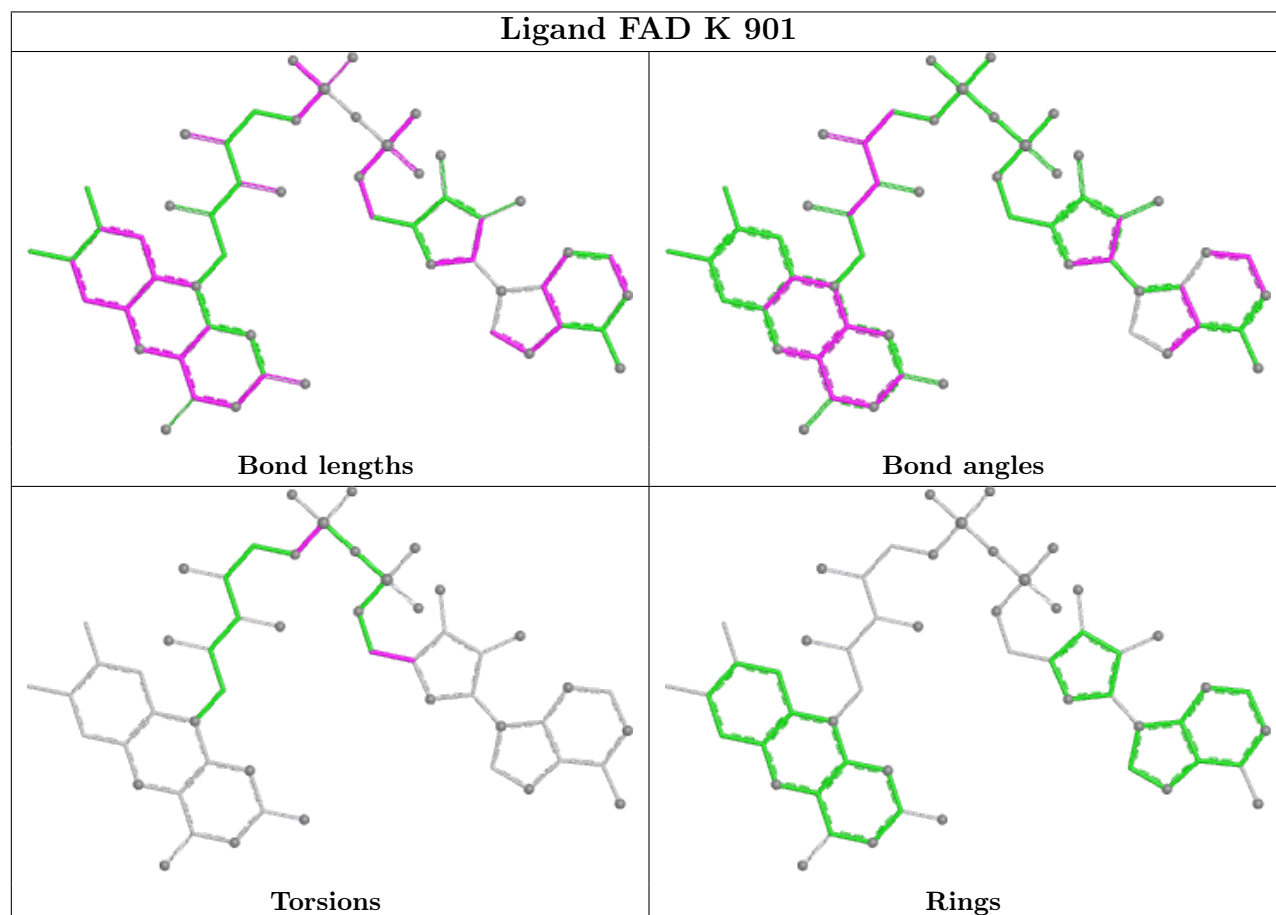
5.7 Other polymers ⓘ

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-4710. 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 |
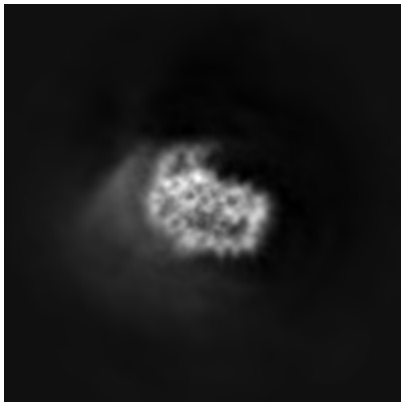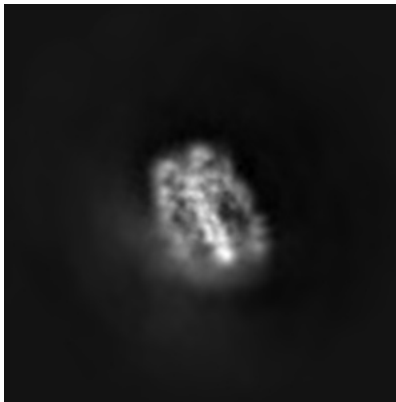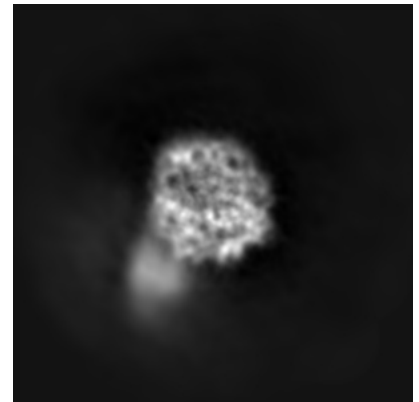
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map
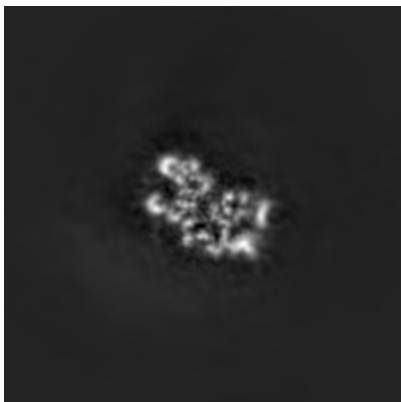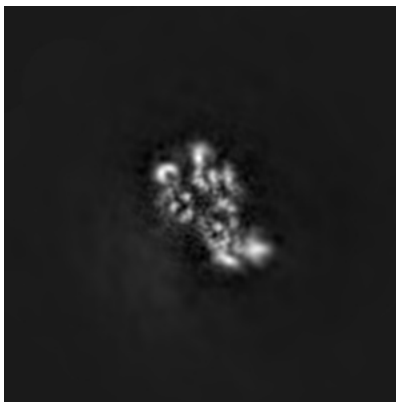
| X Index: 150 | Y Index: 150 | Z Index: 150 |
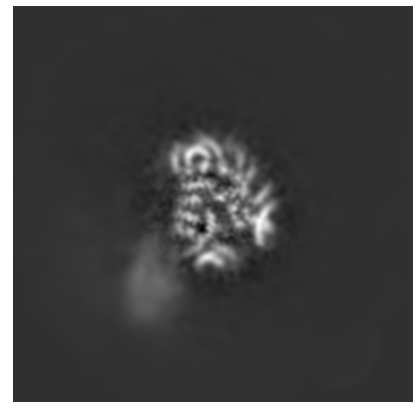
The images above show central slices of the map in three orthogonal directions.

6.3   Largest variance slices (i)

6.3.1   Primary map
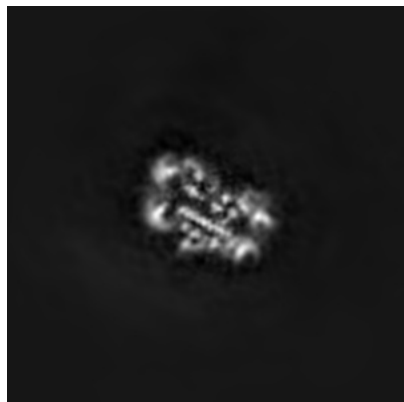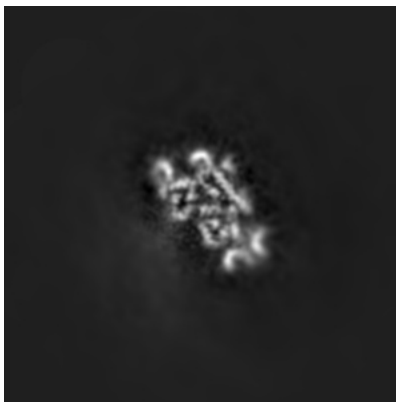
| X Index: 157 | Y Index: 143 | Z Index: 146 |
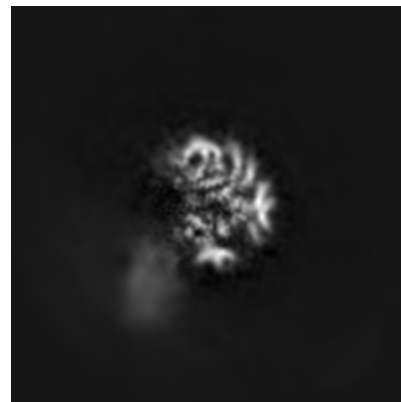
The images above show the largest variance slices of the map in three orthogonal directions.

6.4   Orthogonal surface views (i)

6.4.1   Primary map
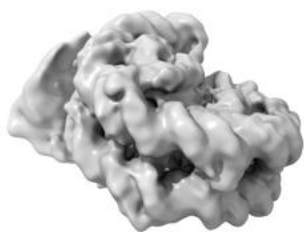
| X | Y | Z |
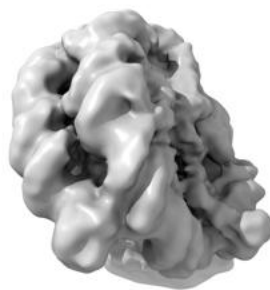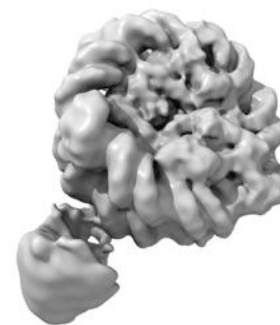
The images above show the 3D surface view of the map at the recommended contour level 0.0112. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5   Mask visualisation (i)

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

7 Map analysis ⓘ

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

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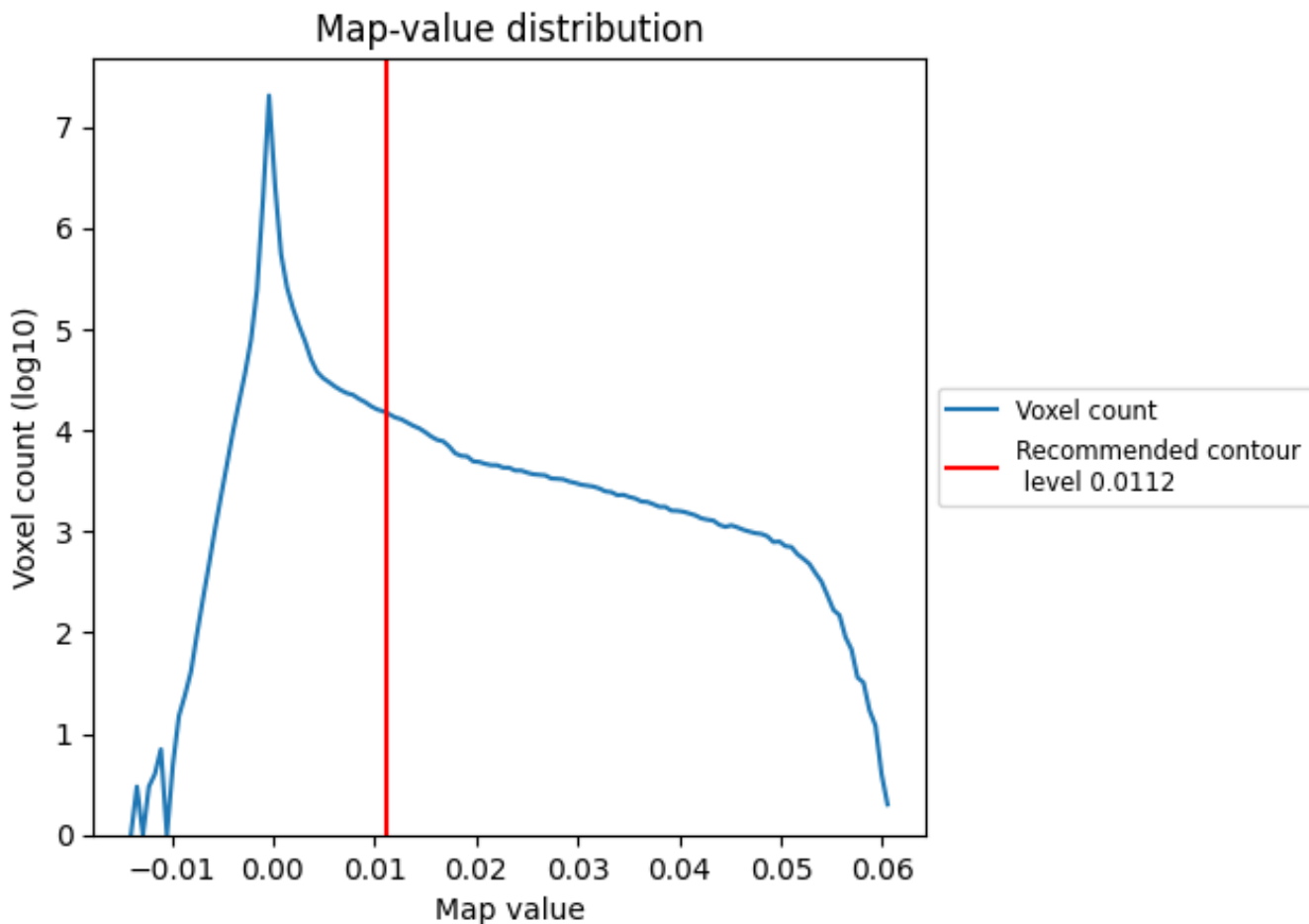
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate ⓘ
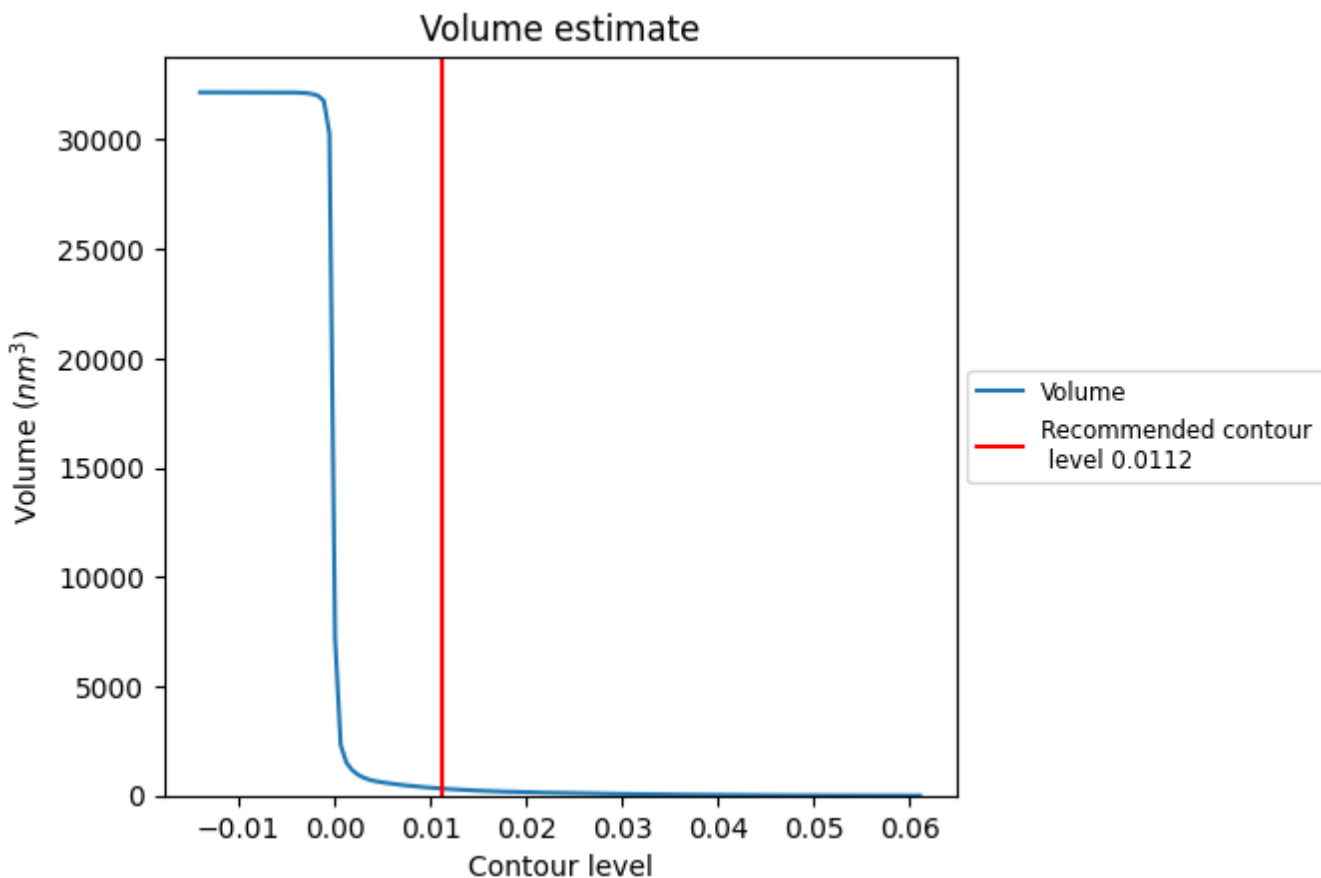
The volume at the recommended contour level is 321 nm^3; this corresponds to an approximate mass of 290 kDa.

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   ⓘ
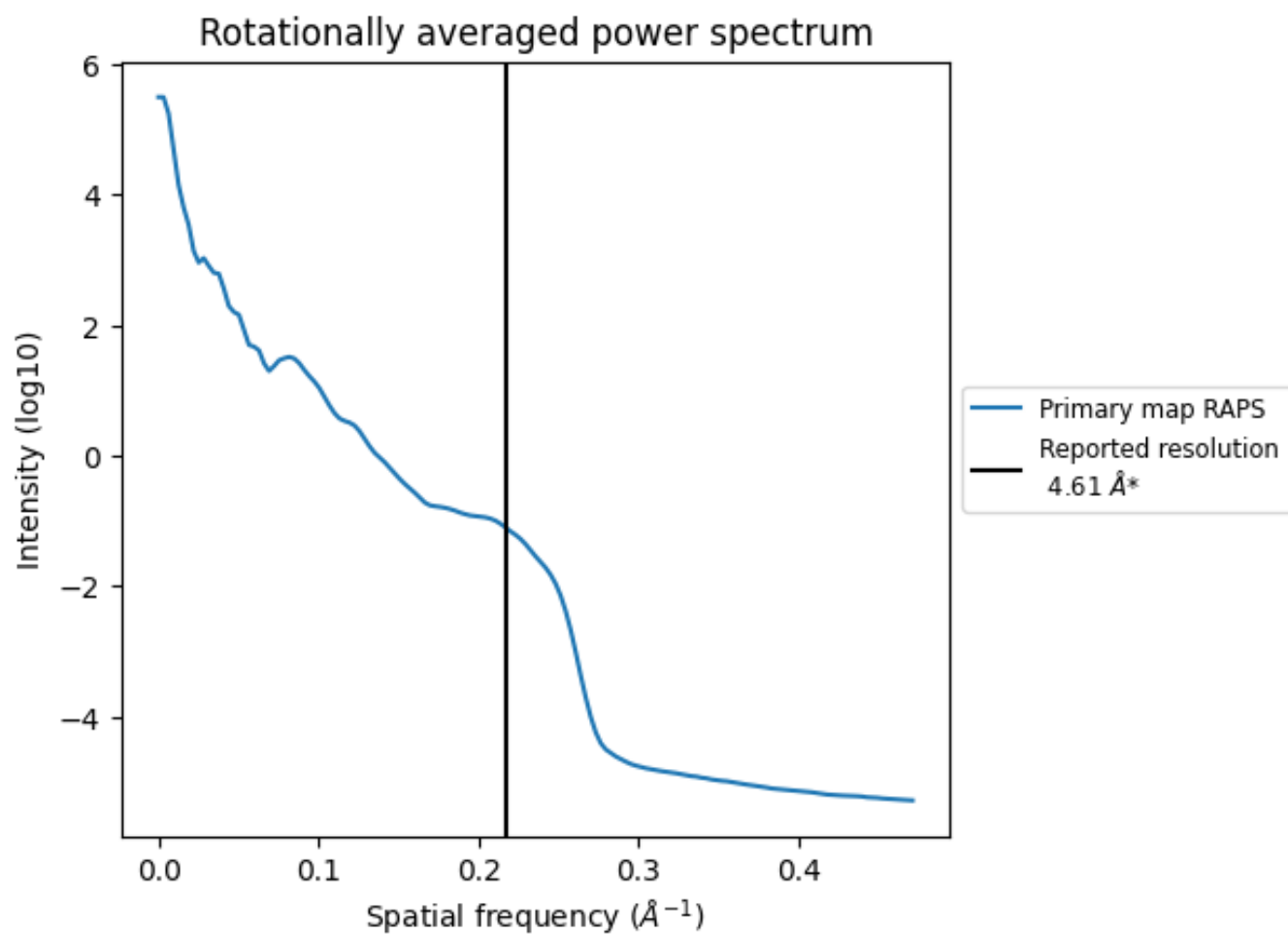
*Reported resolution corresponds to spatial frequency of 0.217 Å^{-1}

8 Fourier-Shell correlation (i)

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

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-4710 and PDB model 6R25. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlay ⓘ
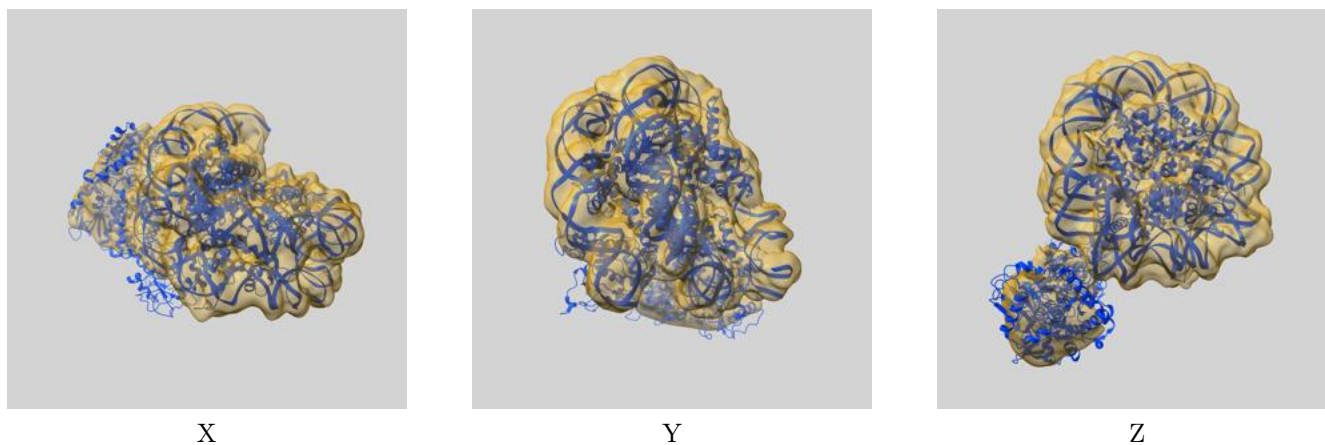
| X | Y | Z |

The images above show the 3D surface view of the map at the recommended contour level 0.0112 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)

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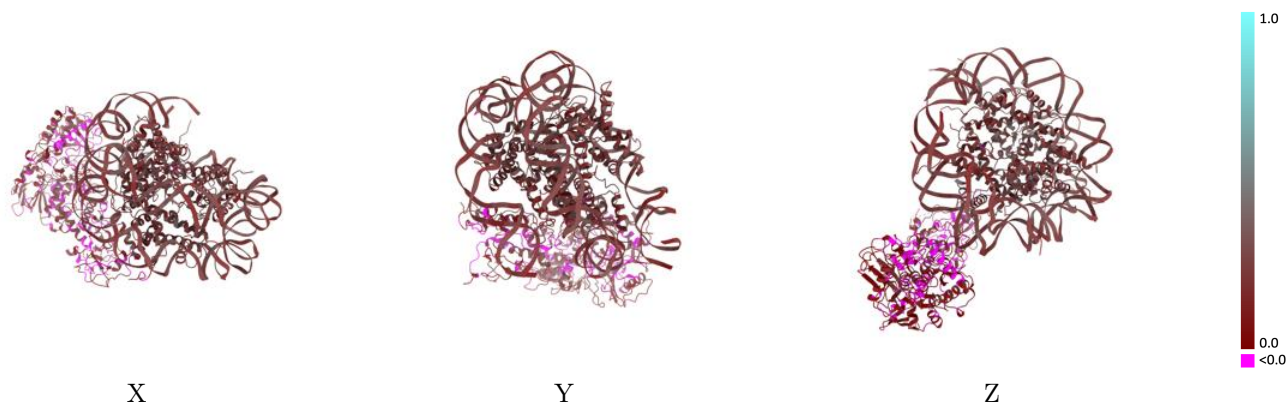
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

X   Y   Z
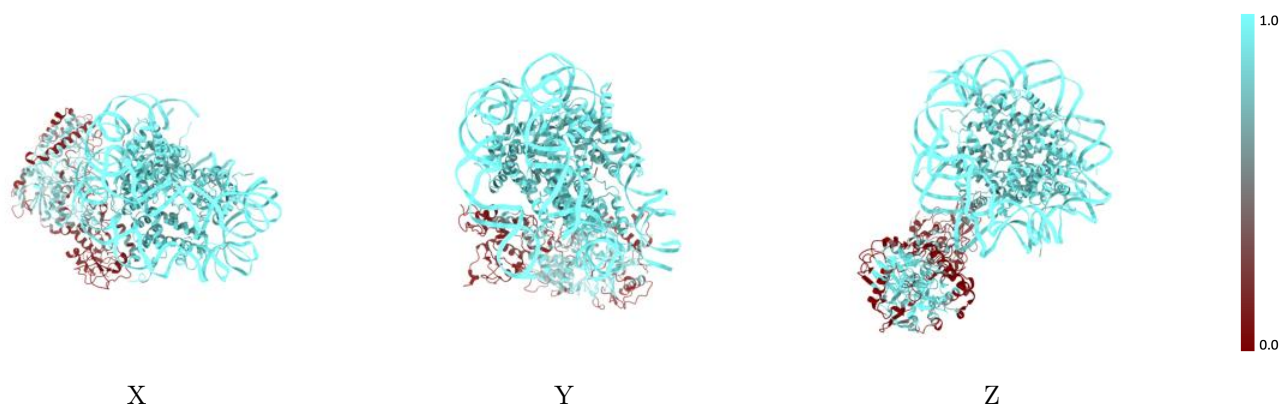
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.0112).

9.4 Atom inclusion (i)
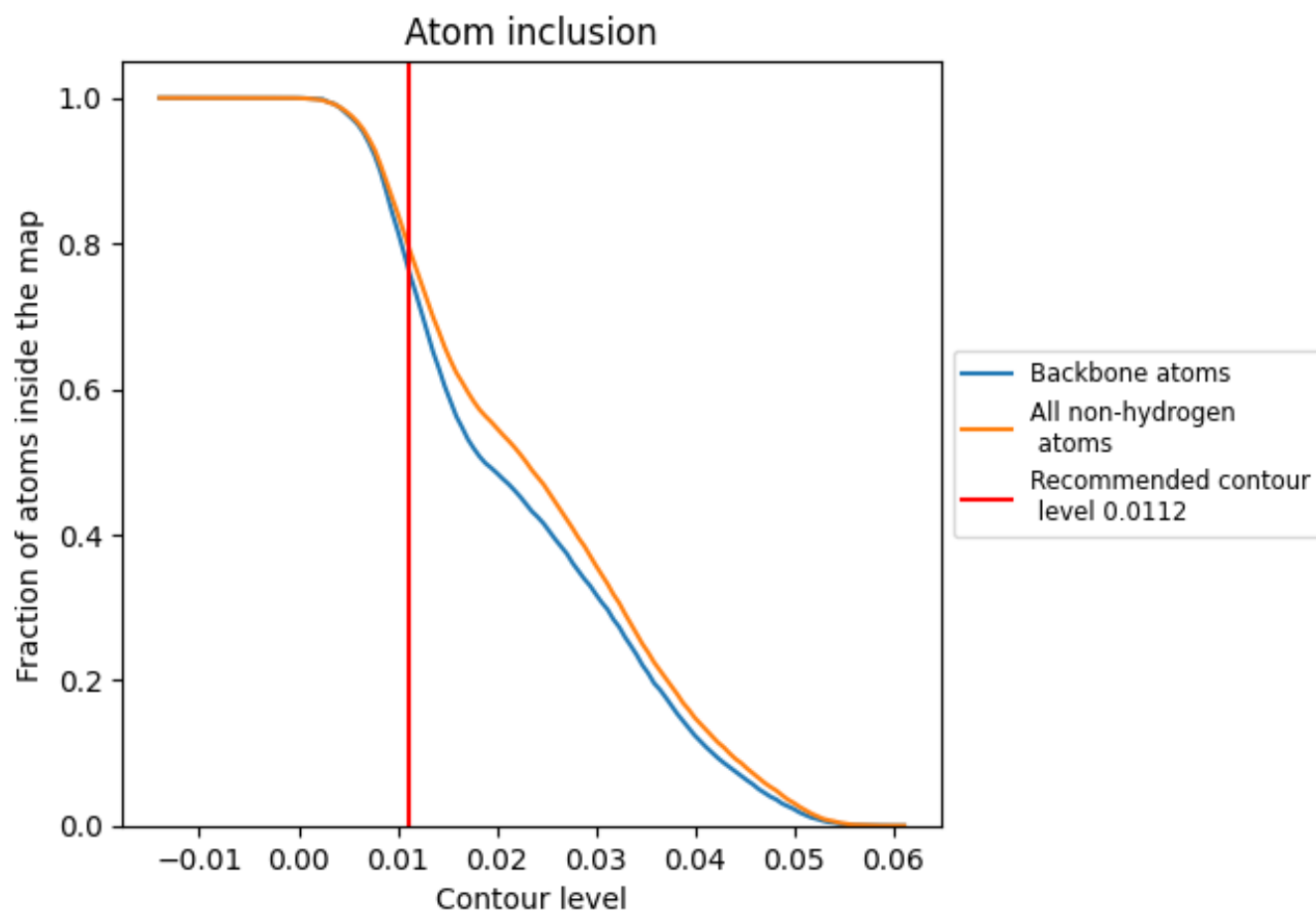
At the recommended contour level, 76% of all backbone atoms, 79% of all non-hydrogen atoms, are inside the map.

9.5   Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.0112) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7918	0.1860
A	0.9452	0.2380
B	0.9473	0.2610
C	0.9397	0.2610
D	0.9409	0.2600
E	0.9163	0.2390
F	0.9265	0.2750
G	0.9205	0.2550
H	0.9324	0.2520
I	0.9984	0.2580
J	0.9963	0.2540
K	0.4625	0.0530
L	0.3143	0.0020
M	0.3622	-0.0050

1.0

0.0
<0.0