



wwPDB EM Validation Summary Report ⓘ

Oct 21, 2025 – 06:41 PM EDT

PDB ID : 9D2L / pdb_00009d2l
EMDB ID : EMD-46499
Title : FoxP3 multimers bridge four T2G repeat DNAs
Authors : Leng, F.; Hur, S.
Deposited on : 2024-08-08
Resolution : 3.00 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.dev129
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDb archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.46

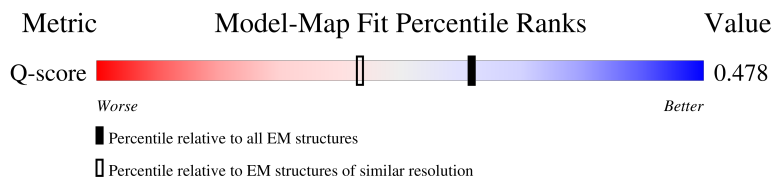
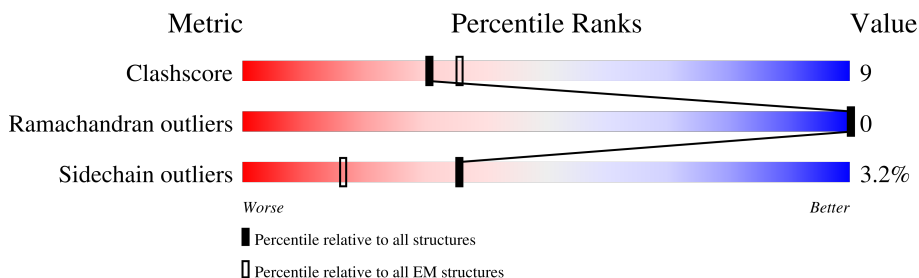
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.







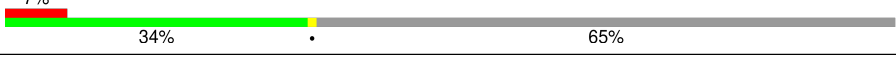

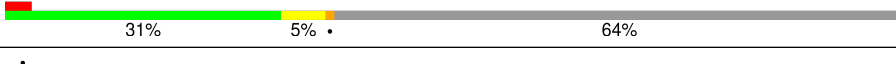







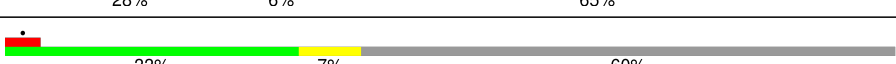


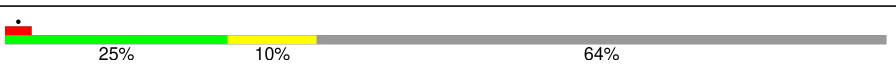





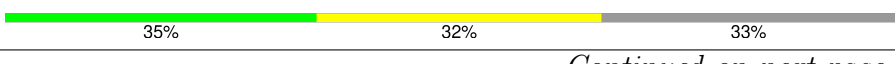

Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	14081 (2.50 - 3.50)

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	236	
1	B	236	
1	C	236	
1	D	236	


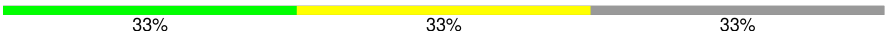
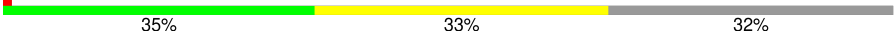
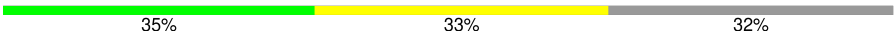
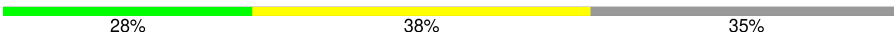
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Mol	Chain	Length	Quality of chain
1	E	236	
1	F	236	
1	G	236	
1	H	236	
1	I	236	
1	J	236	
1	K	236	
1	L	236	
1	M	236	
1	N	236	
1	O	236	
1	P	236	
1	Q	236	
1	R	236	
1	S	236	
1	T	236	
1	U	236	
1	V	236	
1	W	236	
1	X	236	
1	Y	236	
1	Z	236	
1	y	236	
1	z	236	
2	b	72	

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Mol	Chain	Length	Quality of chain
2	d	72	
2	f	72	
2	h	72	
3	a	72	
3	c	72	
3	e	72	
3	g	72	

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 24688 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 Forkhead box protein P3.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	I	83	Total	C	N	O		0	0
			414	248	83	83			
1	U	91	Total	C	N	O	S	0	0
			487	299	92	95	1		
1	V	80	Total	C	N	O		0	0
			399	239	80	80			
1	F	92	Total	C	N	O	S	0	0
			468	281	92	94	1		
1	E	80	Total	C	N	O		0	0
			399	239	80	80			
1	y	87	Total	C	N	O	S	0	0
			450	272	89	88	1		
1	Z	81	Total	C	N	O		0	0
			404	242	81	81			
1	z	86	Total	C	N	O	S	0	0
			619	403	114	99	3		
1	A	93	Total	C	N	O	S	0	0
			746	492	132	120	2		
1	X	87	Total	C	N	O		0	0
			441	264	89	88			
1	W	84	Total	C	N	O	S	0	0
			618	403	111	102	2		
1	R	94	Total	C	N	O	S	0	0
			722	477	126	116	3		
1	Y	81	Total	C	N	O		0	0
			404	242	81	81			
1	K	85	Total	C	N	O	S	0	0
			615	404	112	98	1		
1	J	86	Total	C	N	O	S	0	0
			661	433	118	107	3		
1	H	82	Total	C	N	O	S	0	0
			640	422	115	101	2		
1	D	96	Total	C	N	O	S	0	0
			734	483	128	120	3		

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	B	96	Total	C	N	O	S	0	0
			768	501	140	124	3		
1	M	86	Total	C	N	O	S	0	0
			657	430	119	106	2		
1	N	82	Total	C	N	O		0	0
			418	253	83	82			
1	S	82	Total	C	N	O	S	0	0
			638	420	115	101	2		
1	O	97	Total	C	N	O	S	0	0
			750	492	129	126	3		
1	Q	97	Total	C	N	O	S	0	0
			743	487	129	124	3		
1	C	97	Total	C	N	O	S	0	0
			753	496	132	123	2		
1	P	97	Total	C	N	O	S	0	0
			753	496	132	123	2		
1	T	95	Total	C	N	O	S	0	0
			730	480	130	118	2		
1	L	80	Total	C	N	O	S	0	0
			626	412	115	98	1		
1	G	94	Total	C	N	O	S	0	0
			718	472	129	115	2		

- Molecule 2 is a DNA chain called DNA (48-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
2	b	48	Total	C	N	O	P	0	0
			976	464	208	256	48		
2	d	49	Total	C	N	O	P	0	0
			997	474	213	261	49		
2	h	47	Total	C	N	O	P	0	0
			957	455	205	250	47		
2	f	49	Total	C	N	O	P	0	0
			997	474	213	261	49		

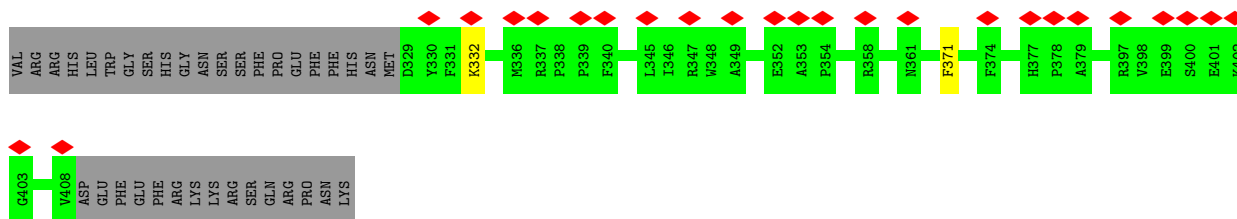
- Molecule 3 is a DNA chain called DNA (47-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
3	g	47	Total	C	N	O	P	0	0
			970	470	139	314	47		
3	c	49	Total	C	N	O	P	0	0
			1012	490	146	327	49		

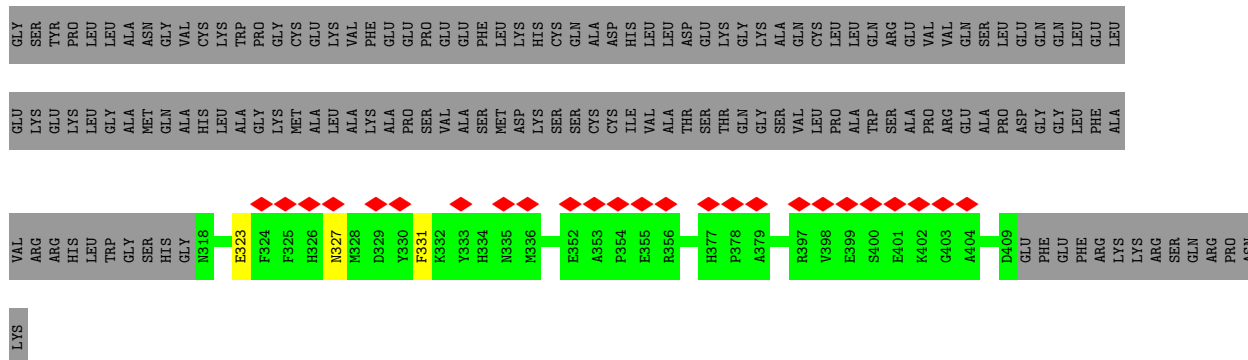
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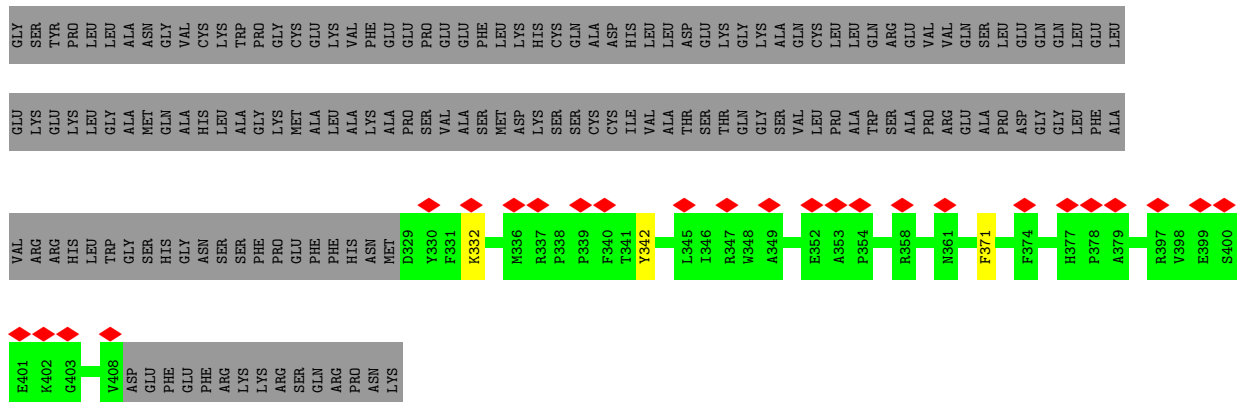
Mol	Chain	Residues	Atoms					AltConf	Trace
3	e	49	Total	C	N	O	P	0	0
			1012	490	146	327	49		
3	a	48	Total	C	N	O	P	0	0
			992	480	144	320	48		



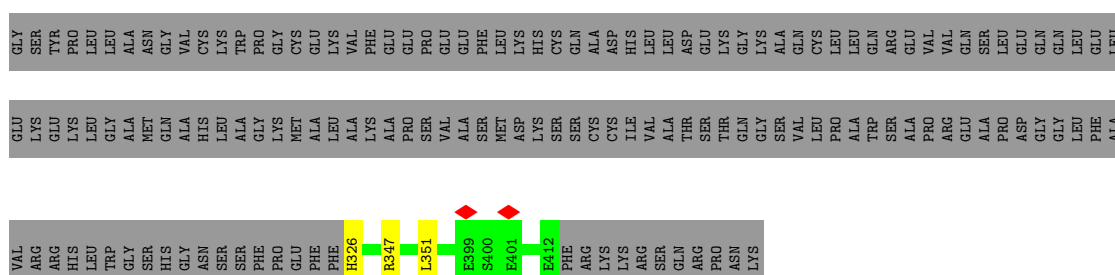
- Molecule 1: Forkhead box protein P3



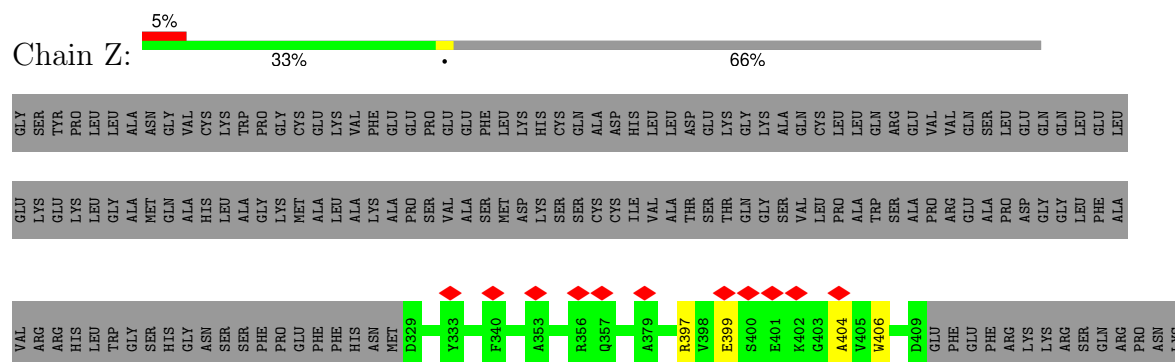
- Molecule 1: Forkhead box protein P3



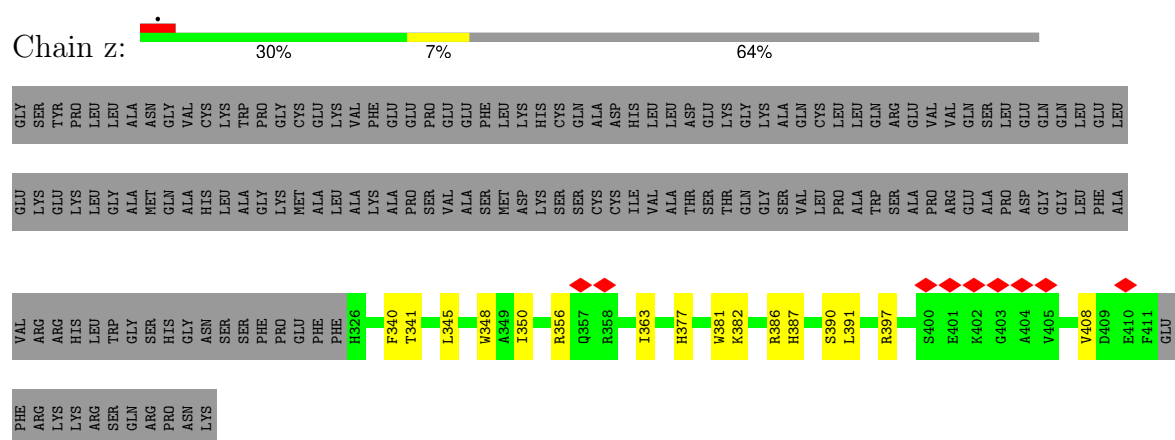
- Molecule 1: Forkhead box protein P3



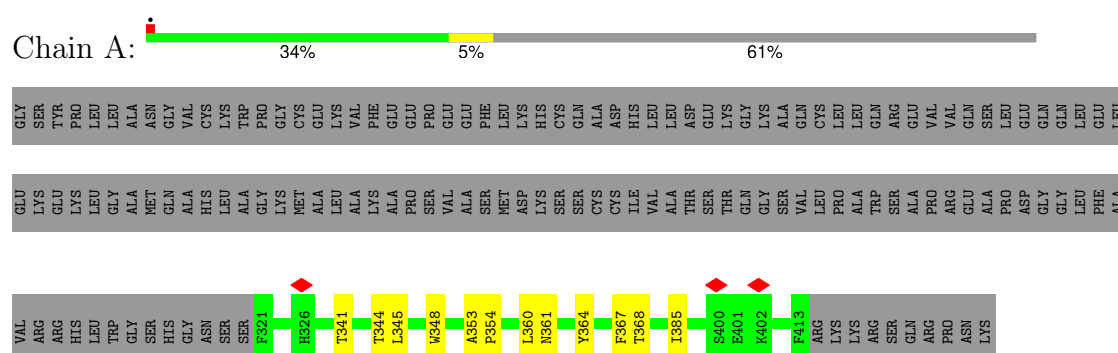
- Molecule 1: Forkhead box protein P3



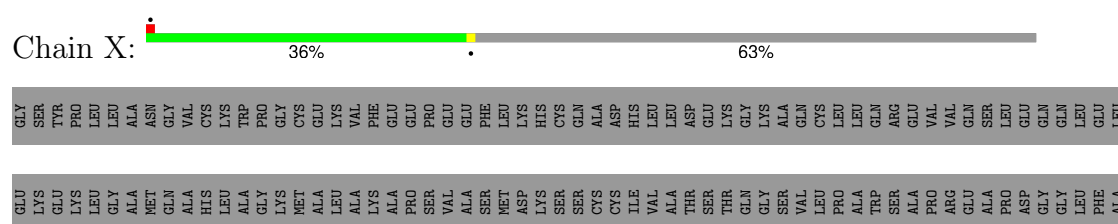
- Molecule 1: Forkhead box protein P3

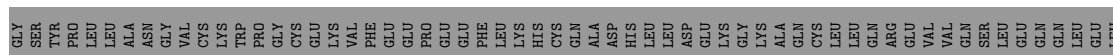


- Molecule 1: Forkhead box protein P3



- Molecule 1: Forkhead box protein P3





GLU	LYS	GLU	LYS	LEU	GLY	ALA	MET	HIS	GLN	ALA	LEU	GLY	ALA	LEU	GLY	LYS	ALA	LYS	ALA	LYS	PRO	SER	VAL	VAL	ALA	SER	MET	ASP	LYS	SER	SER	CYS	CYS	ILE	ALA	THR	SER	THR	GLN	GLY	SER	VAL	LEU	PRO	ALA	ALA	TRP	GLN	SER	ALA	ALA	PRO	ARG	GLU	ALA	PRO	ASP	GLY	GLY	PHE	GLU	ALA
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VAL	ARG	ARG	HIS	LEU	TRP	GLY	SER	HIS	GLN	ASN	SER	LEU	SER	PHE	PRO	GLY	LYS	PHE	ALA	LEU	HIS	ASN	R329	L345	L346	R347	E355	R356	F367	T368	R375	A384	I385	N388	L389	F395	V396	V398	E399	S400	E401	E402	H406	T407	V408	D409	E410	F411	E412	PHE	LYS	LYS
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ARG	SER	GLN	ARG	PRO	LYS
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• Molecule 1: Forkhead box protein P3



GLY	SER	TYR	PRO	LYS	LEU	ALA	ASN	GLY	VAL	CYS	TRP	PRO	GLY	LYS	GLU	VAL	PHE	GLU	PHE	LEU	HIS	CYS	GLN	ALA	ASP	HIS	LEU	LEU	ASP	GLU	LYS	LYS	GLY	ALA	GLN	CYS	LEU	LEU	GLN	GLN	GLY	LEU	GLU	LEU
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GLU	LYS	GLU	LYS	LEU	GLY	ALA	MET	HIS	GLN	ASN	SER	LEU	ALA	GLY	LYS	GLU	VAL	PHE	ALA	LEU	HIS	LYS	VAL	VAL	SER	MET	ASP	LYS	SER	SER	CYS	CYS	ILE	VAL	THR	SER	THR	GLY	SER	ALA	GLN	VAL	PRO	ALA	ALA	TRP	ASP	GLY	GLY	PHE	ALA
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VAL	ARG	HIS	TRP	GLY	SER	HIS	GLN	ASN	SER	PHE	PRO	GLY	LYS	PHE	ALA	LEU	HIS	R327	I350	L351	E352	R356	V366	A372	R375	A384	I385	N388	L389	V396	R397	V398	E399	S400	E401	R402	H406	T407	V408	D409	E410	F411	E412	PHE	ARG	LYS	LYS	ARG	SER
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GLN	ARG	PRO	ASN	LYS
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• Molecule 1: Forkhead box protein P3



GLY	SER	TYR	PRO	LYS	LEU	ALA	ASN	GLY	VAL	CYS	TRP	PRO	GLY	LYS	GLU	VAL	PHE	GLU	PHE	LEU	HIS	CYS	GLN	ALA	ASP	HIS	LEU	LEU	ASP	GLU	LYS	LYS	GLY	ALA	GLN	CYS	LEU	LEU	GLN	GLN	GLY	LEU	GLU	LEU
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GLU	LYS	GLU	LYS	LEU	GLY	ALA	MET	HIS	GLN	ASN	SER	LEU	ALA	GLY	LYS	GLU	VAL	PHE	ALA	LEU	HIS	LYS	VAL	VAL	SER	MET	ASP	LYS	SER	SER	CYS	CYS	ILE	VAL	THR	SER	THR	GLY	SER	ALA	GLN	VAL	PRO	ALA	ALA	TRP	SER	ALA	GLU	VAL	VAL	ARG	GLU	ALA	PRO	ASP	GLY	GLY	PHE	GLU	ALA
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VAL	ARG	HIS	TRP	GLY	SER	HIS	GLN	ASN	SER	PHE	PRO	GLY	LYS	PHE	ALA	LEU	HIS	R327	F331	M336	R337	R338	P339	F340	T341	Y342	A343	T344	L345	I346	E352	A353	P354	G357	F367	R375	R387	V398	E401	R402	V405	V408	ASP	GLU	PHE	GLU	PHE	GLU
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ARG	LYS	ARG	ARG	SER	GLN	ARG	PRO	ASN	LYS
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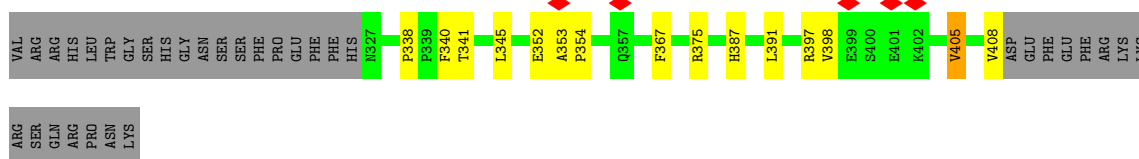
• Molecule 1: Forkhead box protein P3



GLY	SER	TYR	PRO	LYS	LEU	ALA	ASN	GLY	VAL	CYS	TRP	PRO	GLY	LYS	GLU	VAL	PHE	GLU	PHE	LEU	HIS	CYS	GLN	ALA	ASP	HIS	LEU	LEU	ASP	GLU	LYS	LYS	GLY	ALA	GLN	CYS	LEU	LEU	GLN	GLN	GLY	LEU	GLU	LEU
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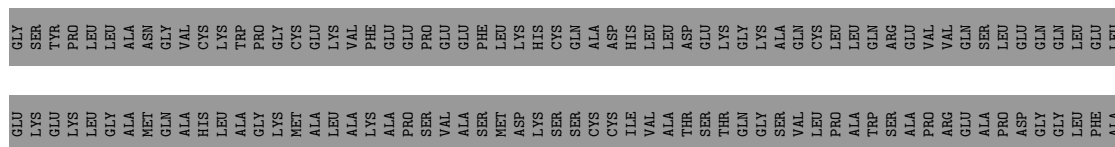
GLU	LYS	GLU	LYS	LEU	GLY	ALA	MET	HIS	GLN	ASN	SER	LEU	ALA	GLY	LYS	GLU	VAL	PHE	ALA	LEU	HIS	LYS	VAL	VAL	SER	MET	ASP	LYS	SER	SER	CYS	CYS	ILE	VAL	THR	SER	THR	GLY	SER	ALA	GLN	VAL	PRO	ALA	ALA	TRP	SER	ALA	GLU	VAL	VAL	ARG	GLU	ALA	PRO	ASP	GLY	GLY	PHE	GLU	ALA
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VAL	ARG	HIS	TRP	GLY	SER	HIS	GLN	ASN	SER	PHE	PRO	GLY	LYS	PHE	ALA	LEU	HIS	R318	F321	E322	F323	F324	F325	H326	F331	M336	R337	T341	A342	A343	T344	E352	A353	P354	Y373	T380	R397	V398	E413	ARG	LYS	LYS	ARG	SER	GLN	ARG	PRO	ASN	LYS
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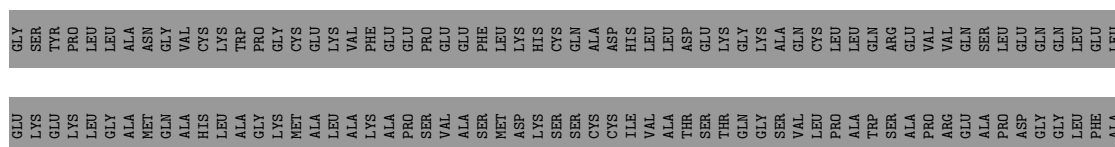
• Molecule 1: Forkhead box protein P3

Chain O: 33% 7% 59%



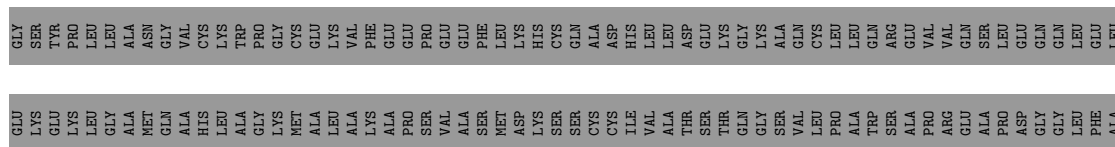
• Molecule 1: Forkhead box protein P3

Chain Q: 37% 59%



• Molecule 1: Forkhead box protein P3

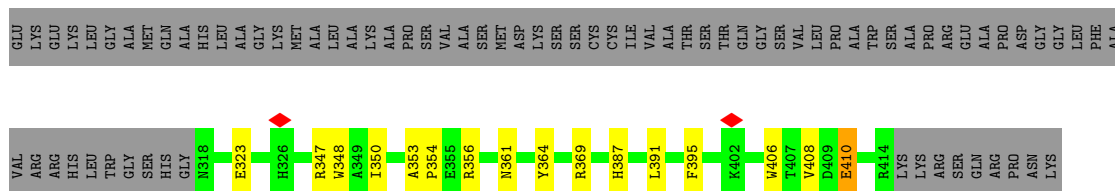
Chain C: 36% 5% 59%



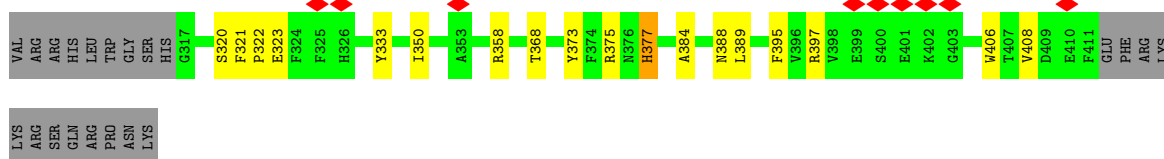
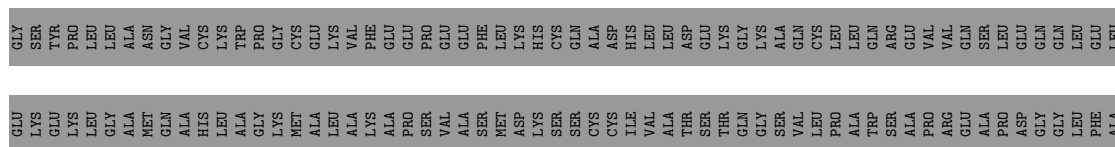
• Molecule 1: Forkhead box protein P3

Chain P: 34% 6% 59%

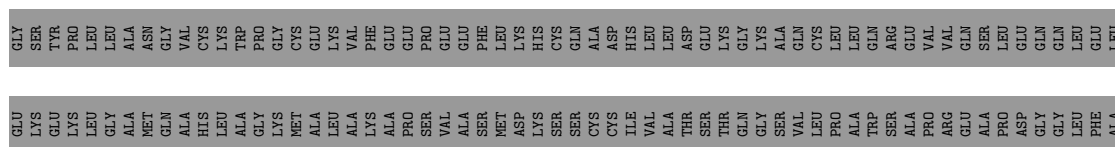




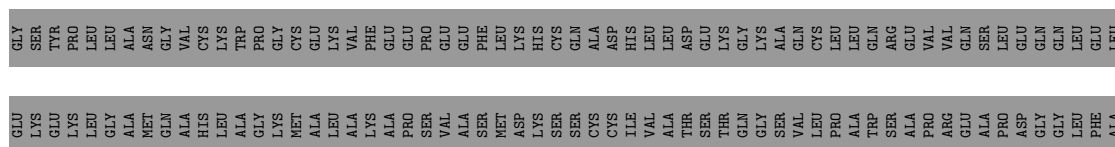
- Molecule 1: Forkhead box protein P3



- Molecule 1: Forkhead box protein P3




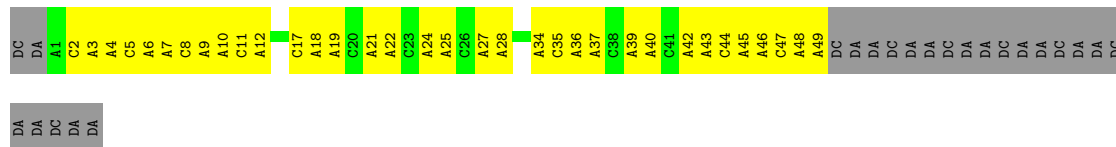
- Molecule 1: Forkhead box protein P3



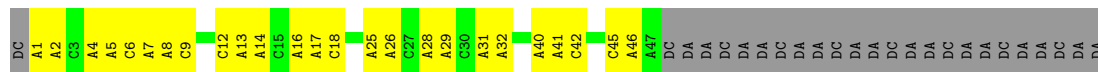
● Molecule 2: DNA (48-MER)

Chain b:  35% 32% 33%


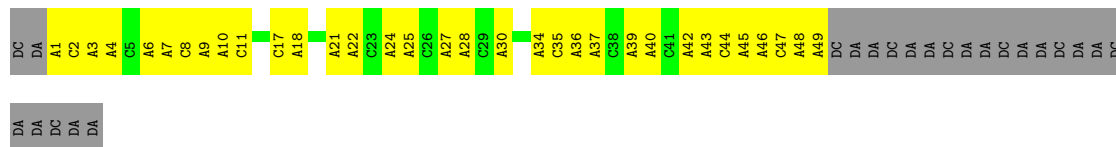
● Molecule 2: DNA (48-MER)

Chain d:  21% 47% 32%

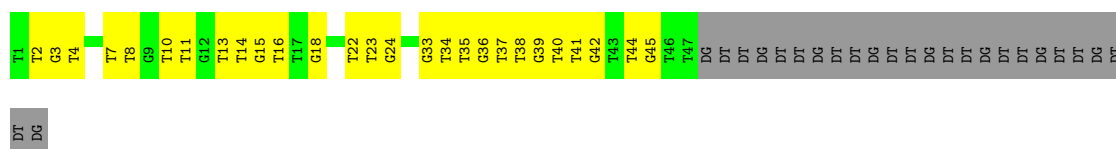
● Molecule 2: DNA (48-MER)

Chain h:  31% 35% 35%

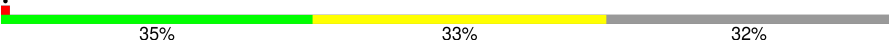
● Molecule 2: DNA (48-MER)

Chain f:  22% 46% 32%

● Molecule 3: DNA (47-MER)

Chain g:  28% 38% 35%

● Molecule 3: DNA (47-MER)

Chain c:  35% 33% 32%

[illegible]

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	1340131	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 ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	4.990	Depositor
Minimum map value	-3.213	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.059	Depositor
Recommended contour level	0.35	Depositor
Map size (Å)	423.424, 423.424, 423.424	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.827, 0.827, 0.827	Depositor

5 Model quality

5.1 Standard geometry

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	0.12	0/776	0.30	0/1063
1	B	0.13	0/796	0.31	0/1088
1	C	0.13	0/782	0.31	0/1072
1	D	0.11	0/761	0.31	0/1043
1	E	0.13	0/398	0.26	0/555
1	F	0.13	0/468	0.28	0/652
1	G	0.12	0/745	0.29	0/1023
1	H	0.10	0/665	0.27	0/913
1	I	0.06	0/413	0.23	0/576
1	J	0.08	0/685	0.24	0/939
1	K	0.11	0/636	0.32	0/876
1	L	0.12	0/650	0.32	0/892
1	M	0.09	0/681	0.26	0/935
1	N	0.09	0/419	0.28	0/585
1	O	0.13	0/778	0.36	0/1066
1	P	0.12	0/782	0.29	0/1072
1	Q	0.11	0/770	0.27	0/1055
1	R	0.12	0/750	0.30	0/1029
1	S	0.09	0/662	0.26	0/908
1	T	0.13	0/758	0.33	0/1039
1	U	0.12	0/490	0.29	0/680
1	V	0.12	0/398	0.26	0/555
1	W	0.12	0/638	0.34	0/877
1	X	0.09	0/440	0.25	0/612
1	Y	0.09	0/403	0.32	0/562
1	Z	0.10	0/403	0.32	0/562
1	y	0.07	0/450	0.26	0/624
1	z	0.13	0/638	0.37	0/878
2	b	0.24	0/1103	0.40	0/1692
2	d	0.22	0/1127	0.34	0/1729
2	f	0.21	0/1127	0.34	0/1729
2	h	0.23	0/1082	0.40	0/1660
3	a	0.26	0/1103	0.52	0/1708
3	c	0.24	0/1125	0.49	0/1742

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
3	e	0.24	0/1125	0.49	0/1742
3	g	0.27	0/1078	0.54	0/1669
All	All	0.17	0/26105	0.36	0/37402

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	746	0	645	7	0
1	B	768	0	678	8	0
1	C	753	0	634	7	0
1	D	734	0	613	9	0
1	E	399	0	177	2	0
1	F	468	0	217	1	0
1	G	718	0	605	9	0
1	H	640	0	557	14	0
1	I	414	0	183	1	0
1	J	661	0	569	7	0
1	K	615	0	511	9	0
1	L	626	0	547	8	0
1	M	657	0	562	8	0
1	N	418	0	189	0	0
1	O	750	0	632	14	0
1	P	753	0	634	10	0
1	Q	743	0	620	5	0
1	R	722	0	611	7	0
1	S	638	0	551	9	0
1	T	730	0	621	11	0
1	U	487	0	247	1	0
1	V	399	0	177	1	0
1	W	618	0	518	15	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	X	441	0	206	2	0
1	Y	404	0	179	2	0
1	Z	404	0	179	2	0
1	y	450	0	220	2	0
1	z	619	0	523	11	0
2	b	976	0	529	26	0
2	d	997	0	540	35	0
2	f	997	0	540	31	0
2	h	957	0	518	27	0
3	a	992	0	561	20	0
3	c	1012	0	573	23	0
3	e	1012	0	573	21	0
3	g	970	0	550	22	0
All	All	24688	0	16989	361	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 361 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)
2:f:43:DA:H2''	2:f:44:DC:H5''	1.66	0.78
1:O:352:GLU:HG3	1:O:354:PRO:HD3	1.67	0.76
2:d:43:DA:H2''	2:d:44:DC:H5''	1.67	0.76
2:h:31:DA:H2'	2:h:32:DA:C8	2.21	0.75
1:D:341:THR:HG22	1:D:343:ALA:H	1.52	0.73

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	91/236 (39%)	83 (91%)	8 (9%)	0	100	100
1	B	94/236 (40%)	89 (95%)	5 (5%)	0	100	100
1	C	95/236 (40%)	86 (90%)	9 (10%)	0	100	100
1	D	94/236 (40%)	85 (90%)	9 (10%)	0	100	100
1	E	78/236 (33%)	75 (96%)	3 (4%)	0	100	100
1	F	90/236 (38%)	86 (96%)	4 (4%)	0	100	100
1	G	92/236 (39%)	83 (90%)	9 (10%)	0	100	100
1	H	80/236 (34%)	72 (90%)	8 (10%)	0	100	100
1	I	81/236 (34%)	75 (93%)	6 (7%)	0	100	100
1	J	84/236 (36%)	81 (96%)	3 (4%)	0	100	100
1	K	83/236 (35%)	80 (96%)	3 (4%)	0	100	100
1	L	78/236 (33%)	70 (90%)	8 (10%)	0	100	100
1	M	84/236 (36%)	82 (98%)	2 (2%)	0	100	100
1	N	80/236 (34%)	75 (94%)	5 (6%)	0	100	100
1	O	95/236 (40%)	88 (93%)	7 (7%)	0	100	100
1	P	95/236 (40%)	86 (90%)	9 (10%)	0	100	100
1	Q	95/236 (40%)	89 (94%)	6 (6%)	0	100	100
1	R	92/236 (39%)	85 (92%)	7 (8%)	0	100	100
1	S	80/236 (34%)	73 (91%)	7 (9%)	0	100	100
1	T	93/236 (39%)	85 (91%)	8 (9%)	0	100	100
1	U	89/236 (38%)	84 (94%)	5 (6%)	0	100	100
1	V	78/236 (33%)	75 (96%)	3 (4%)	0	100	100
1	W	82/236 (35%)	73 (89%)	9 (11%)	0	100	100
1	X	85/236 (36%)	81 (95%)	4 (5%)	0	100	100
1	Y	79/236 (34%)	74 (94%)	5 (6%)	0	100	100
1	Z	79/236 (34%)	74 (94%)	5 (6%)	0	100	100
1	y	85/236 (36%)	81 (95%)	4 (5%)	0	100	100
1	z	84/236 (36%)	74 (88%)	10 (12%)	0	100	100
All	All	2415/6608 (36%)	2244 (93%)	171 (7%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	65/202 (32%)	64 (98%)	1 (2%)	60	83
1	B	69/202 (34%)	68 (99%)	1 (1%)	62	83
1	C	63/202 (31%)	63 (100%)	0	100	100
1	D	60/202 (30%)	58 (97%)	2 (3%)	33	67
1	F	3/202 (2%)	2 (67%)	1 (33%)	0	1
1	G	58/202 (29%)	57 (98%)	1 (2%)	56	81
1	H	55/202 (27%)	52 (94%)	3 (6%)	18	50
1	J	56/202 (28%)	54 (96%)	2 (4%)	30	64
1	K	46/202 (23%)	44 (96%)	2 (4%)	25	58
1	L	53/202 (26%)	52 (98%)	1 (2%)	52	79
1	M	55/202 (27%)	53 (96%)	2 (4%)	30	64
1	N	1/202 (0%)	1 (100%)	0	100	100
1	O	64/202 (32%)	61 (95%)	3 (5%)	22	56
1	P	63/202 (31%)	61 (97%)	2 (3%)	34	67
1	Q	62/202 (31%)	61 (98%)	1 (2%)	58	82
1	R	60/202 (30%)	60 (100%)	0	100	100
1	S	54/202 (27%)	51 (94%)	3 (6%)	17	49
1	T	61/202 (30%)	59 (97%)	2 (3%)	33	67
1	U	7/202 (4%)	6 (86%)	1 (14%)	2	13
1	W	49/202 (24%)	45 (92%)	4 (8%)	9	34
1	X	2/202 (1%)	2 (100%)	0	100	100
1	y	4/202 (2%)	4 (100%)	0	100	100
1	z	47/202 (23%)	45 (96%)	2 (4%)	25	58
All	All	1057/4646 (23%)	1023 (97%)	34 (3%)	36	67

5 of 34 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	P	369	ARG
1	P	410	GLU
1	L	345	LEU
1	J	398	VAL
1	J	396	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
1	H	377	HIS
1	B	334	HIS
1	C	335	ASN
1	S	387	HIS
1	W	388	ASN

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](#)

There are no ligands in this entry.

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.

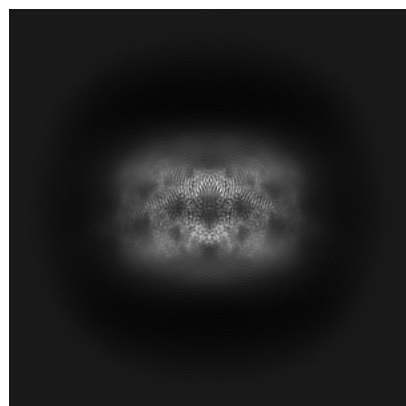
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-46499. These allow visual inspection of the internal detail of the map and identification of artifacts.

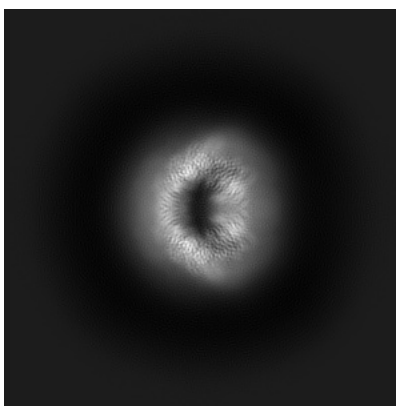
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

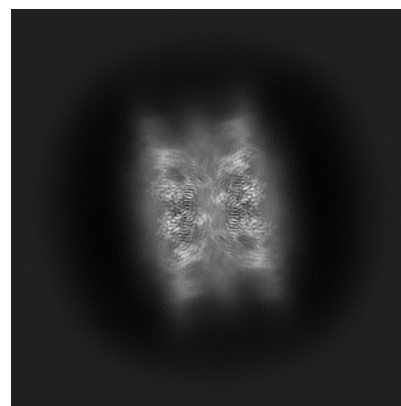
6.1.1 Primary map



X

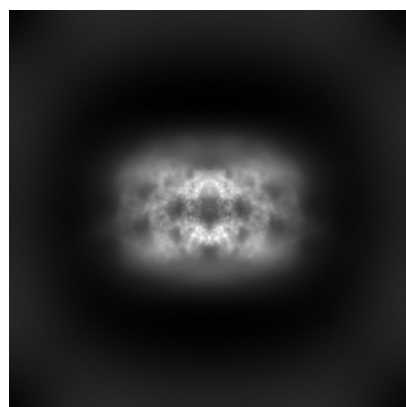


Y

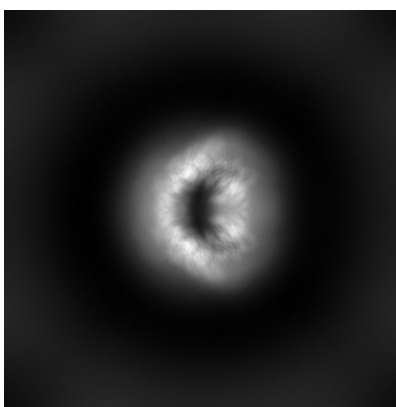


Z

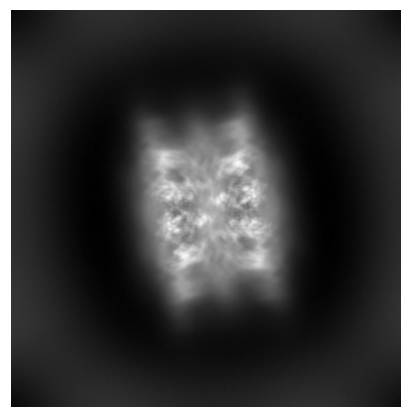
6.1.2 Raw map



X



Y

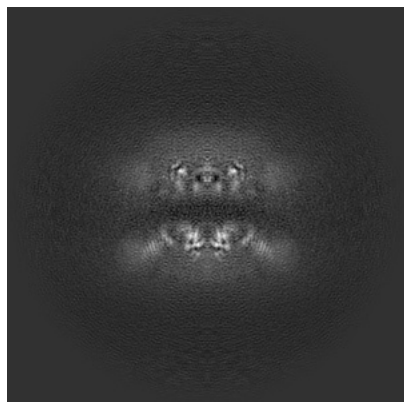


Z

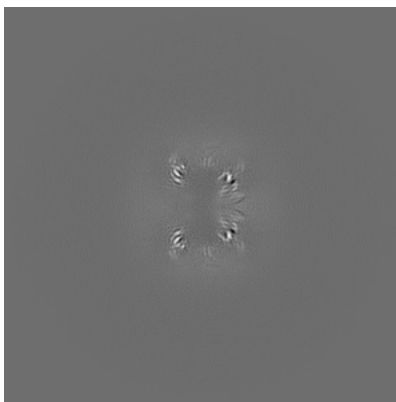
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

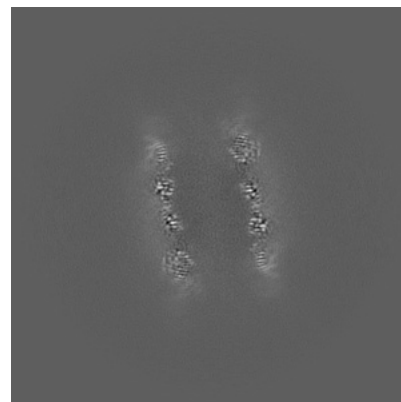
6.2.1 Primary map



X Index: 256

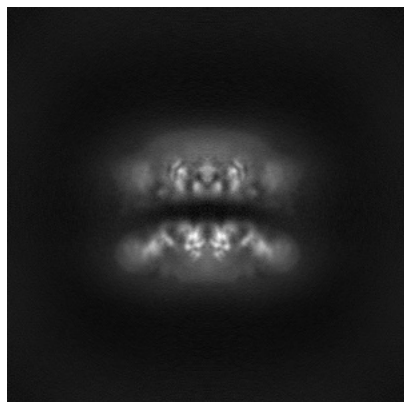


Y Index: 256

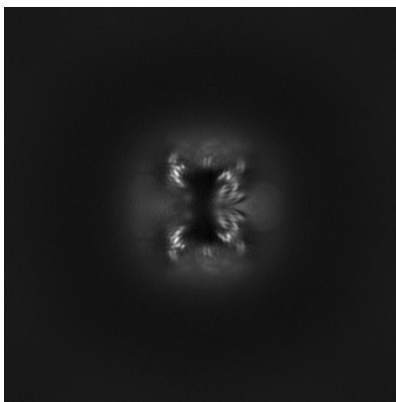


Z Index: 256

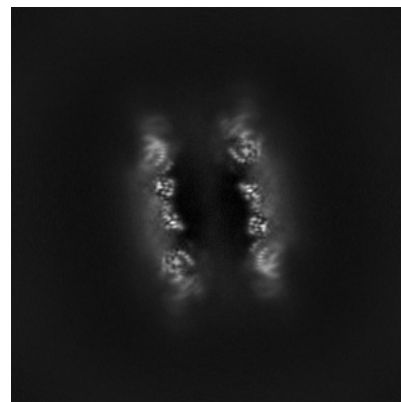
6.2.2 Raw map



X Index: 256



Y Index: 256

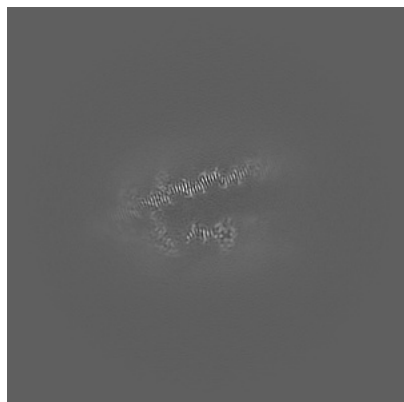


Z Index: 256

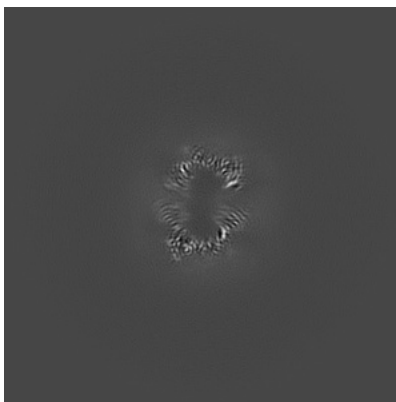
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

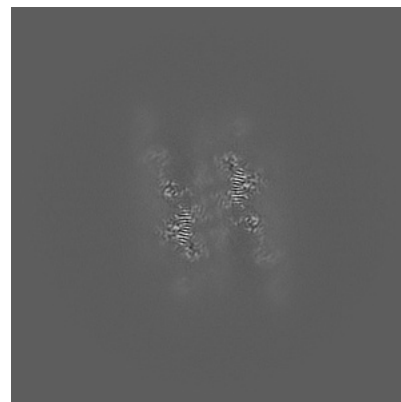
6.3.1 Primary map



X Index: 223

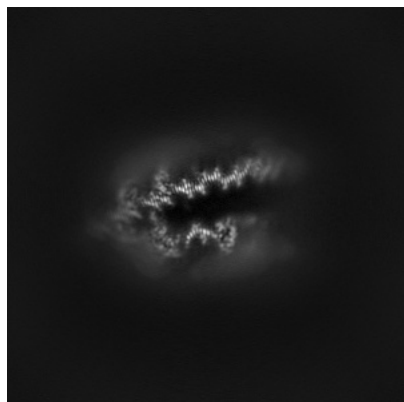


Y Index: 241

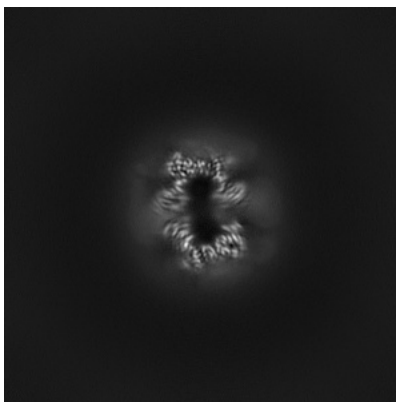


Z Index: 279

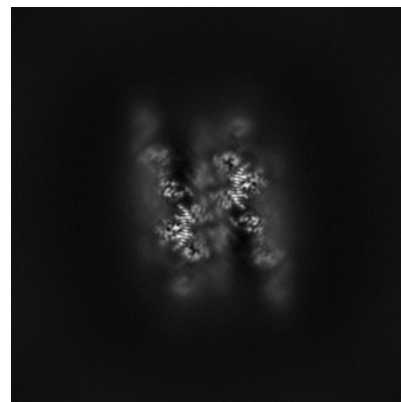
6.3.2 Raw map



X Index: 224



Y Index: 273

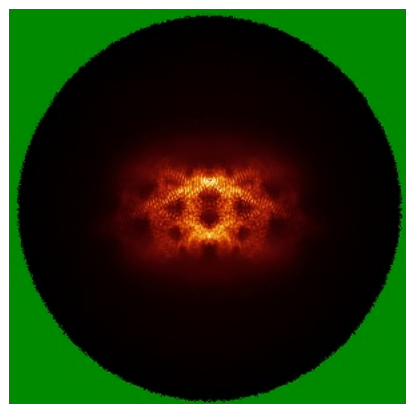


Z Index: 279

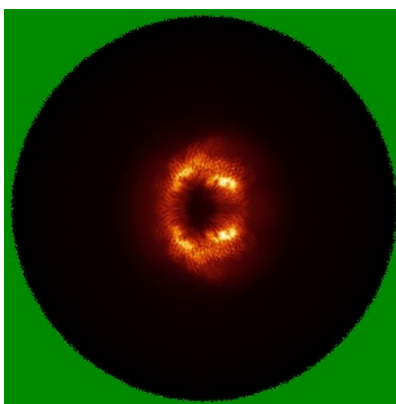
The images above show the largest variance slices of the map in three orthogonal directions.

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

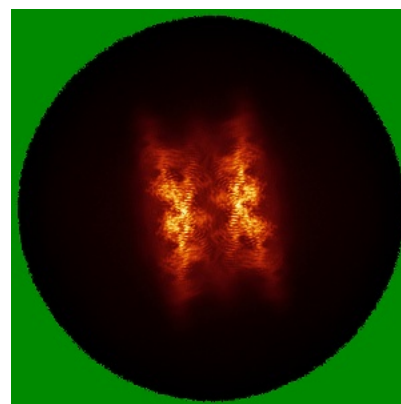
6.4.1 Primary map



X

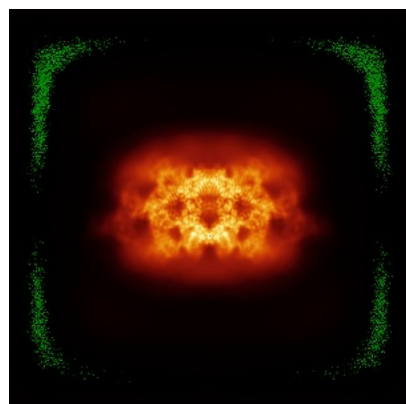


Y

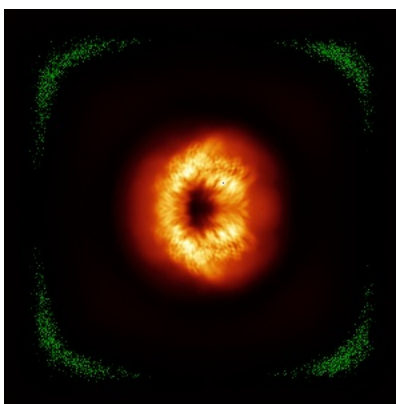


Z

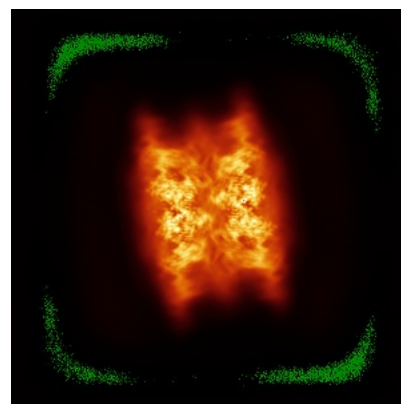
6.4.2 Raw map



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.

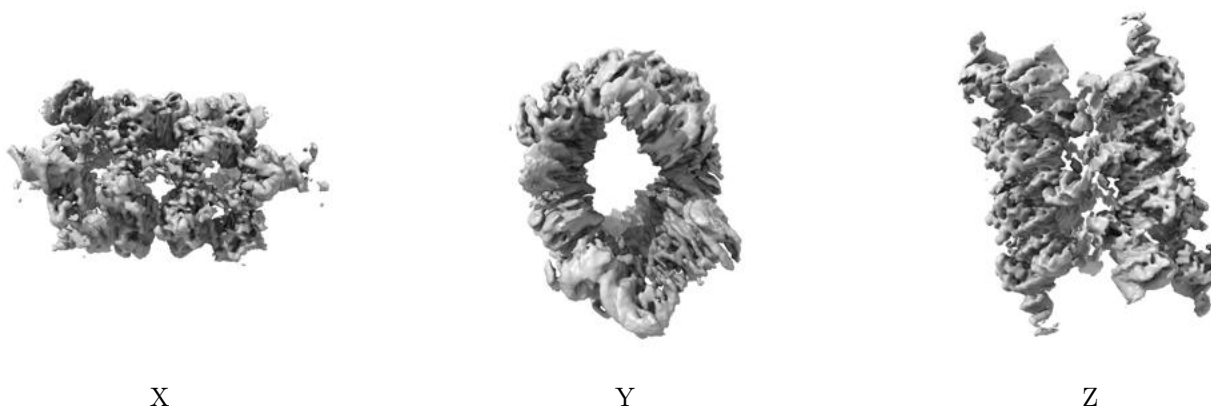
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.35. 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.

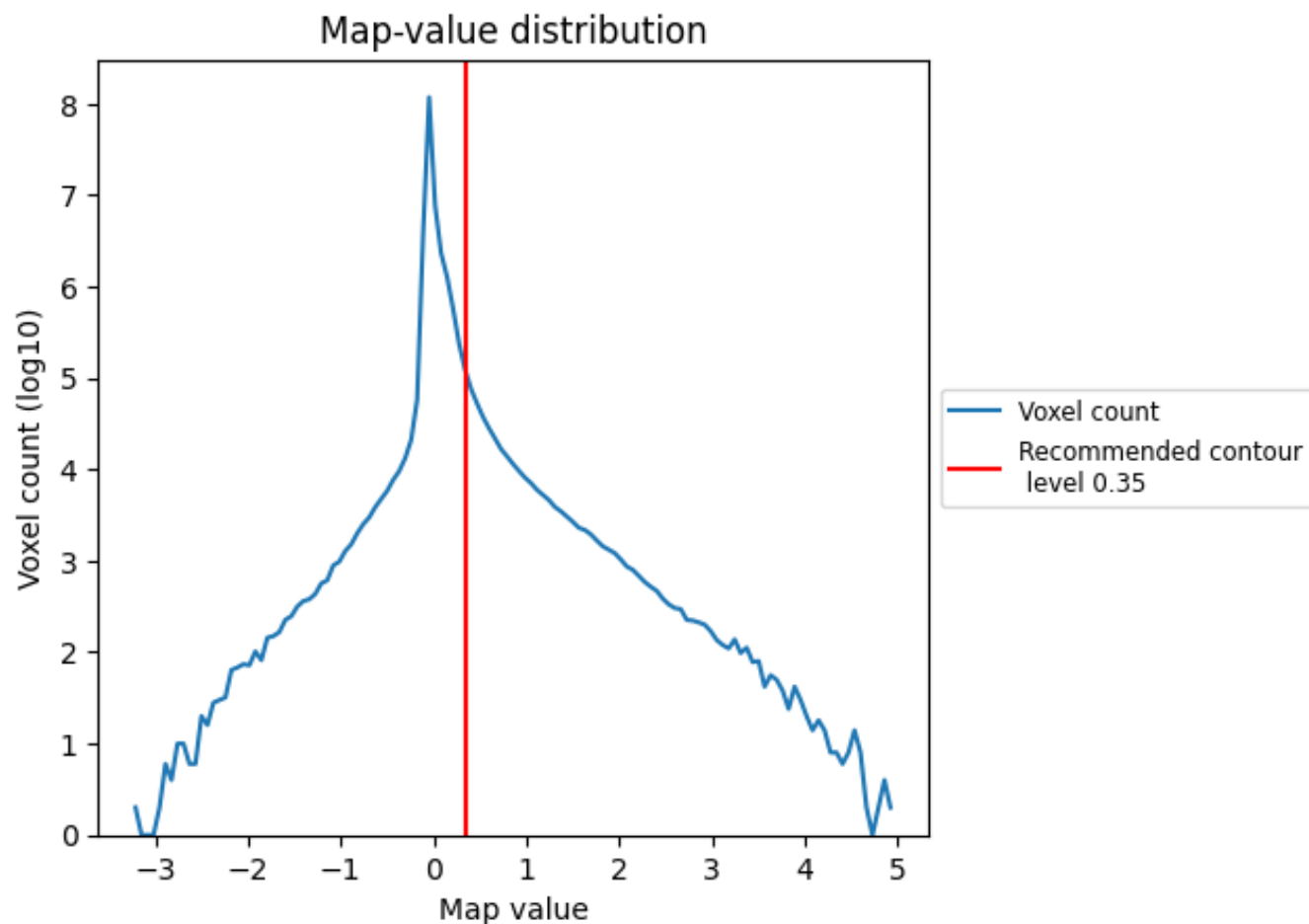
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

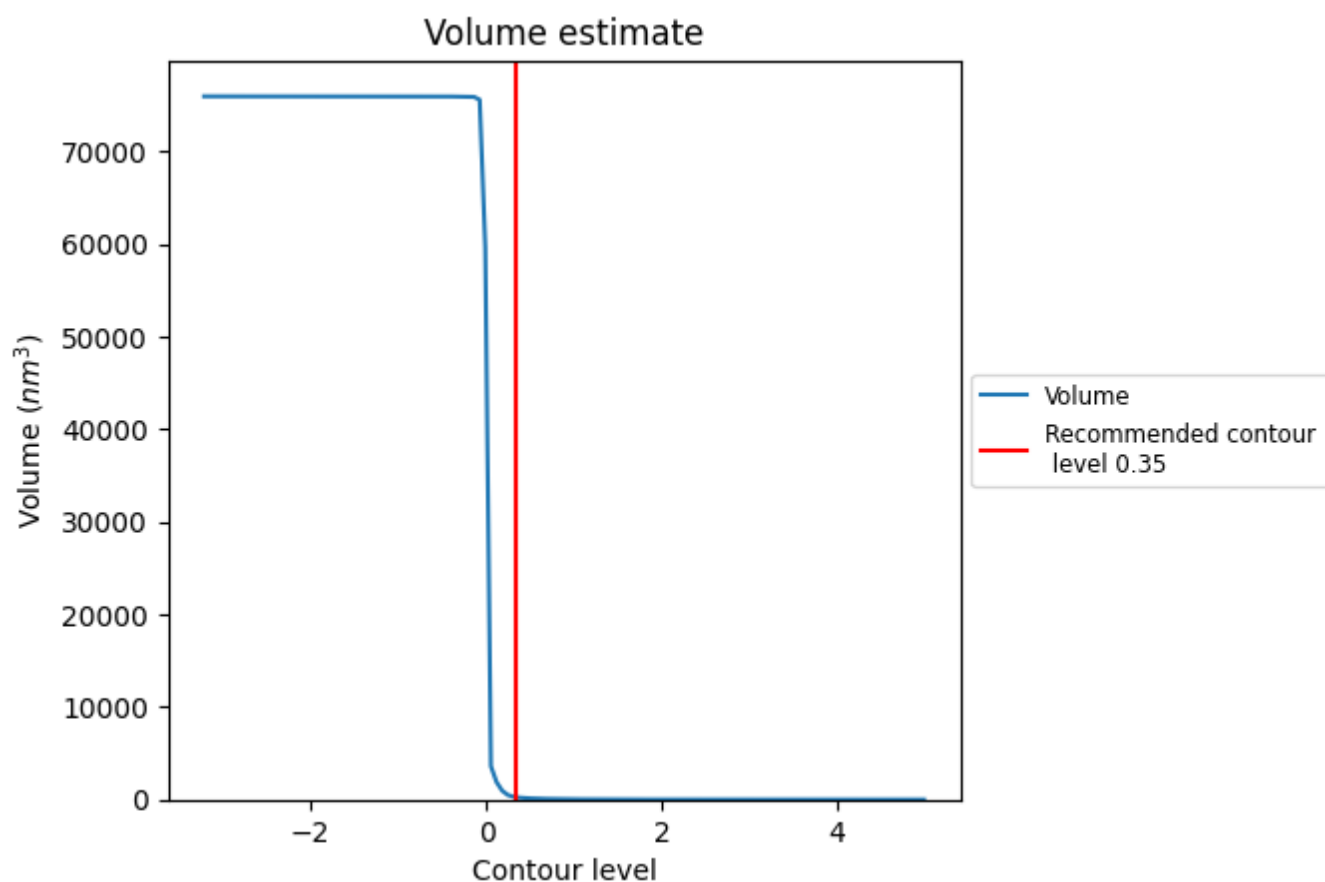
This section contains the results of statistical analysis of the map.

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.

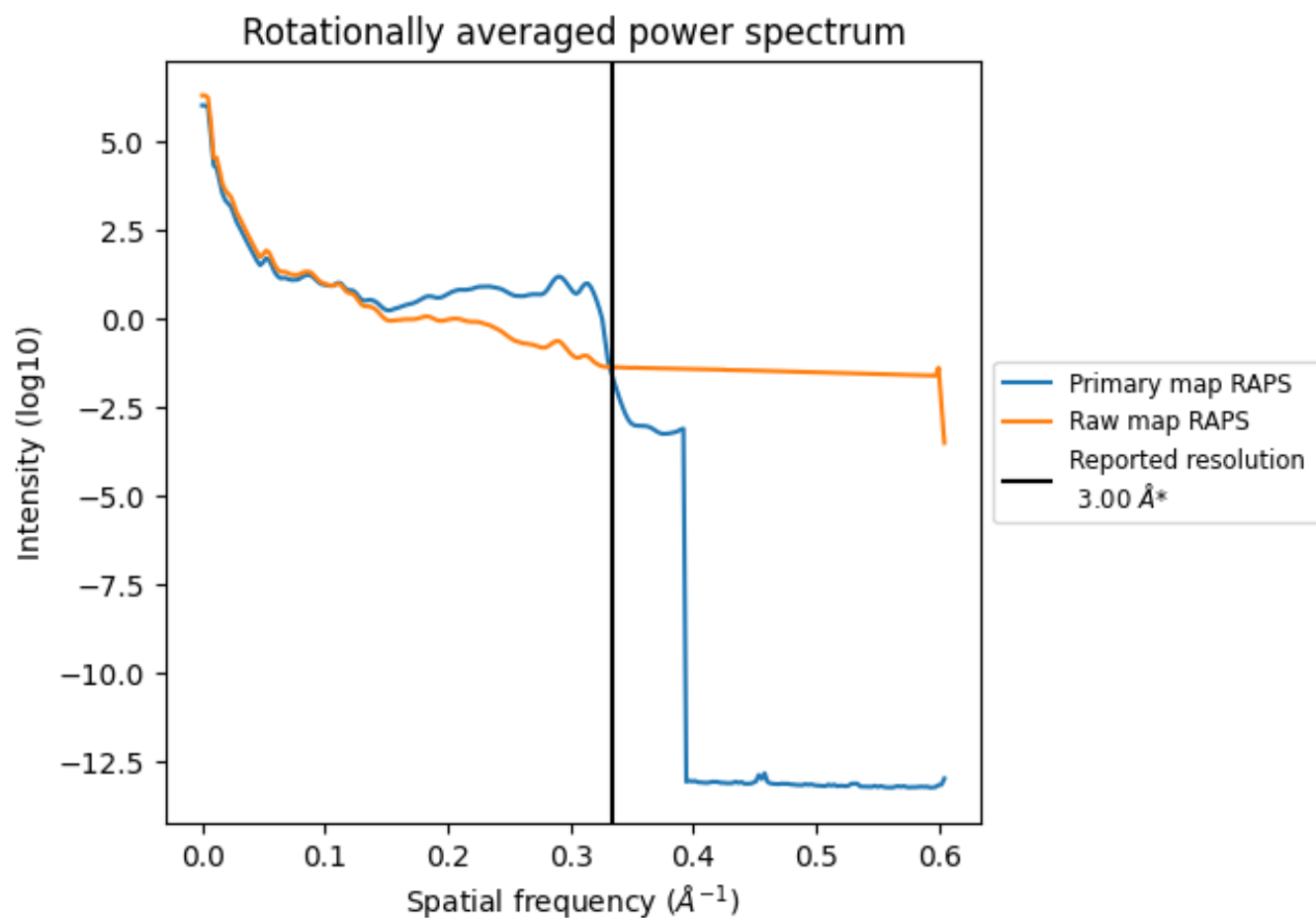
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 250 nm³; this corresponds to an approximate mass of 226 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 ⓘ

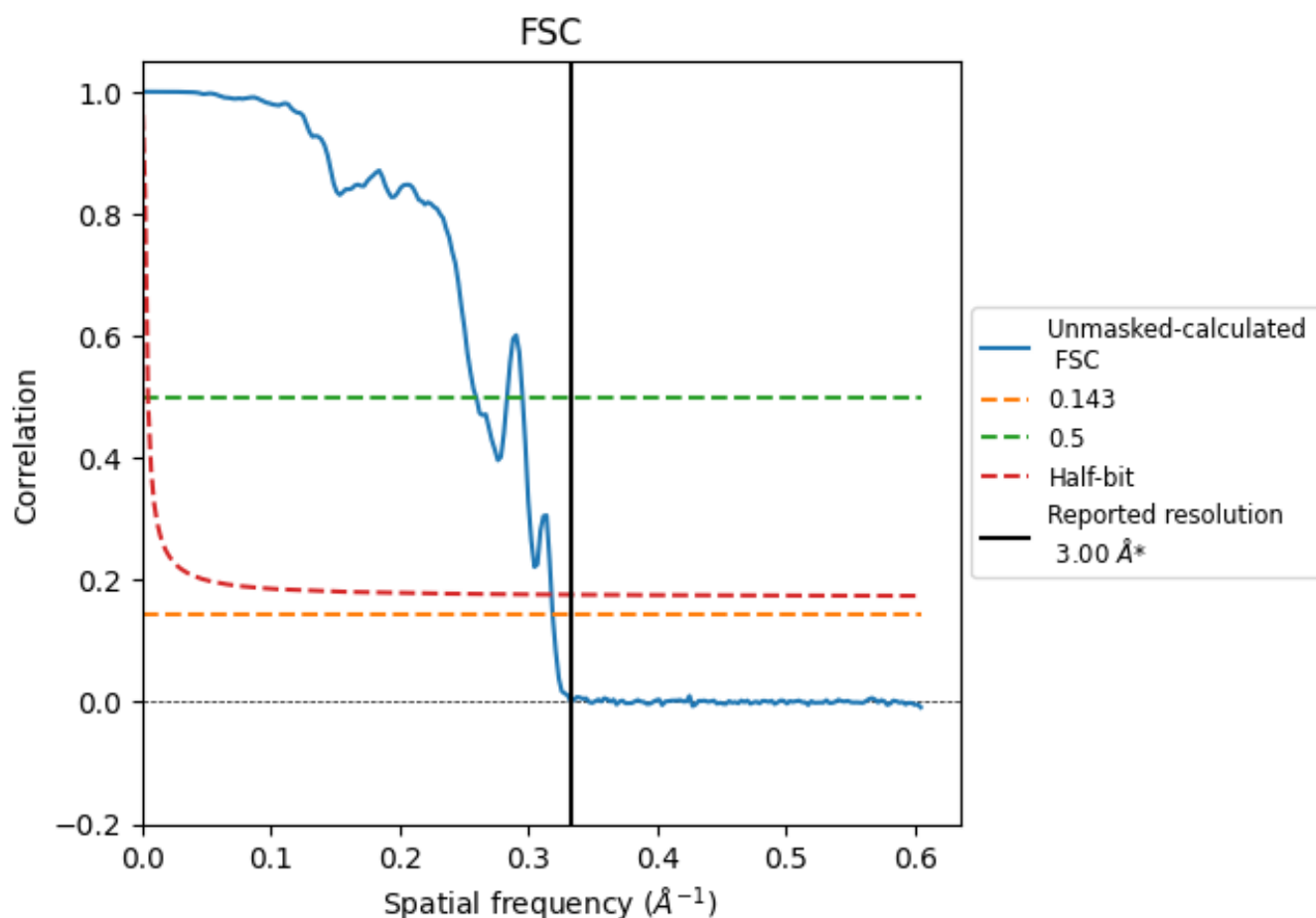


*Reported resolution corresponds to spatial frequency of 0.333 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.333 Å⁻¹

8.2 Resolution estimates [i](#)

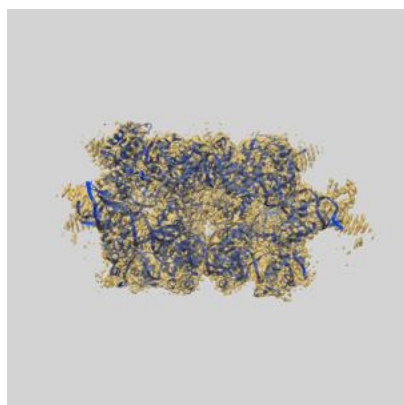
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.00	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.14	3.86	3.15

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

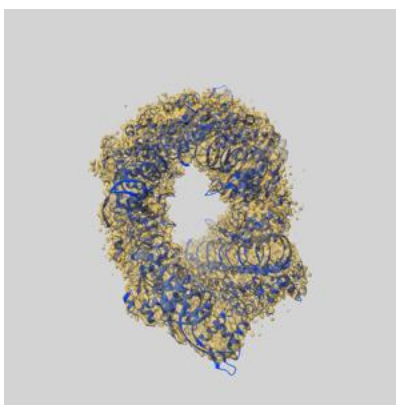
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-46499 and PDB model 9D2L. Per-residue inclusion information can be found in section [3](#) on page [8](#).

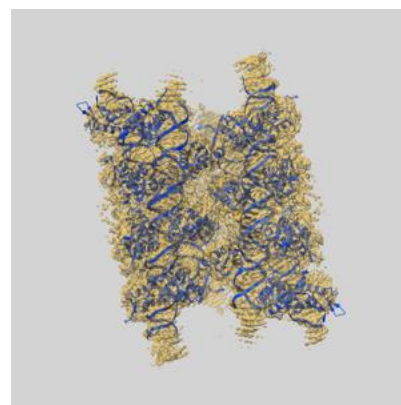
9.1 Map-model overlay [i](#)



X



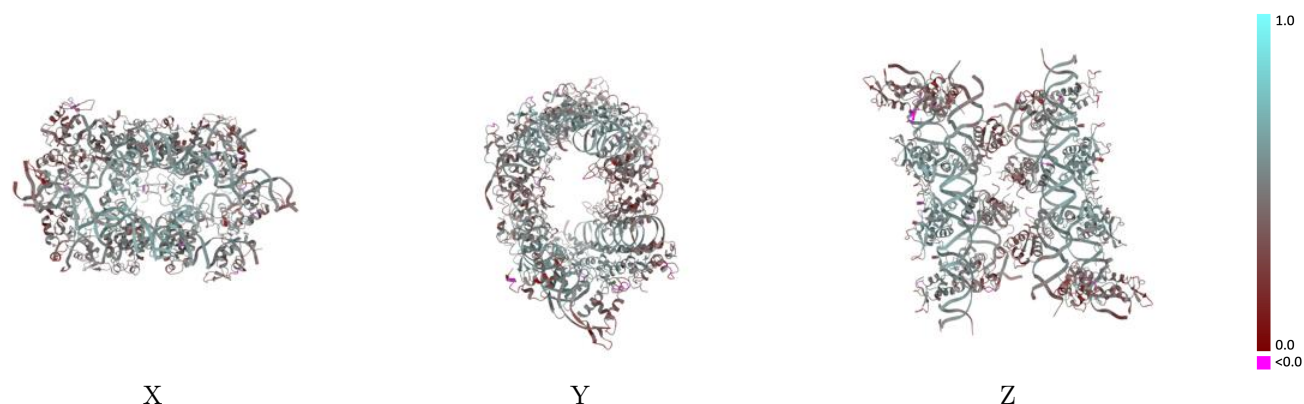
Y



Z

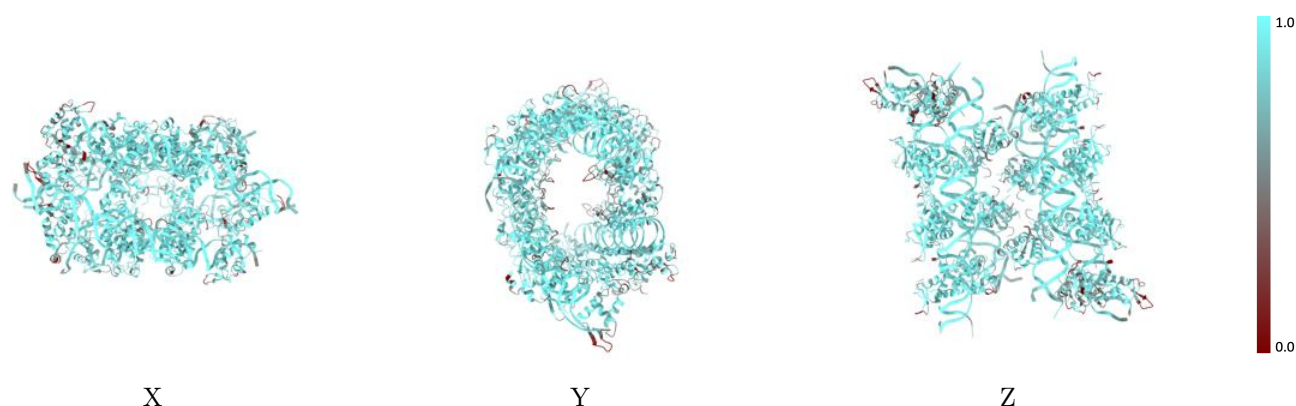
The images above show the 3D surface view of the map at the recommended contour level 0.35 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



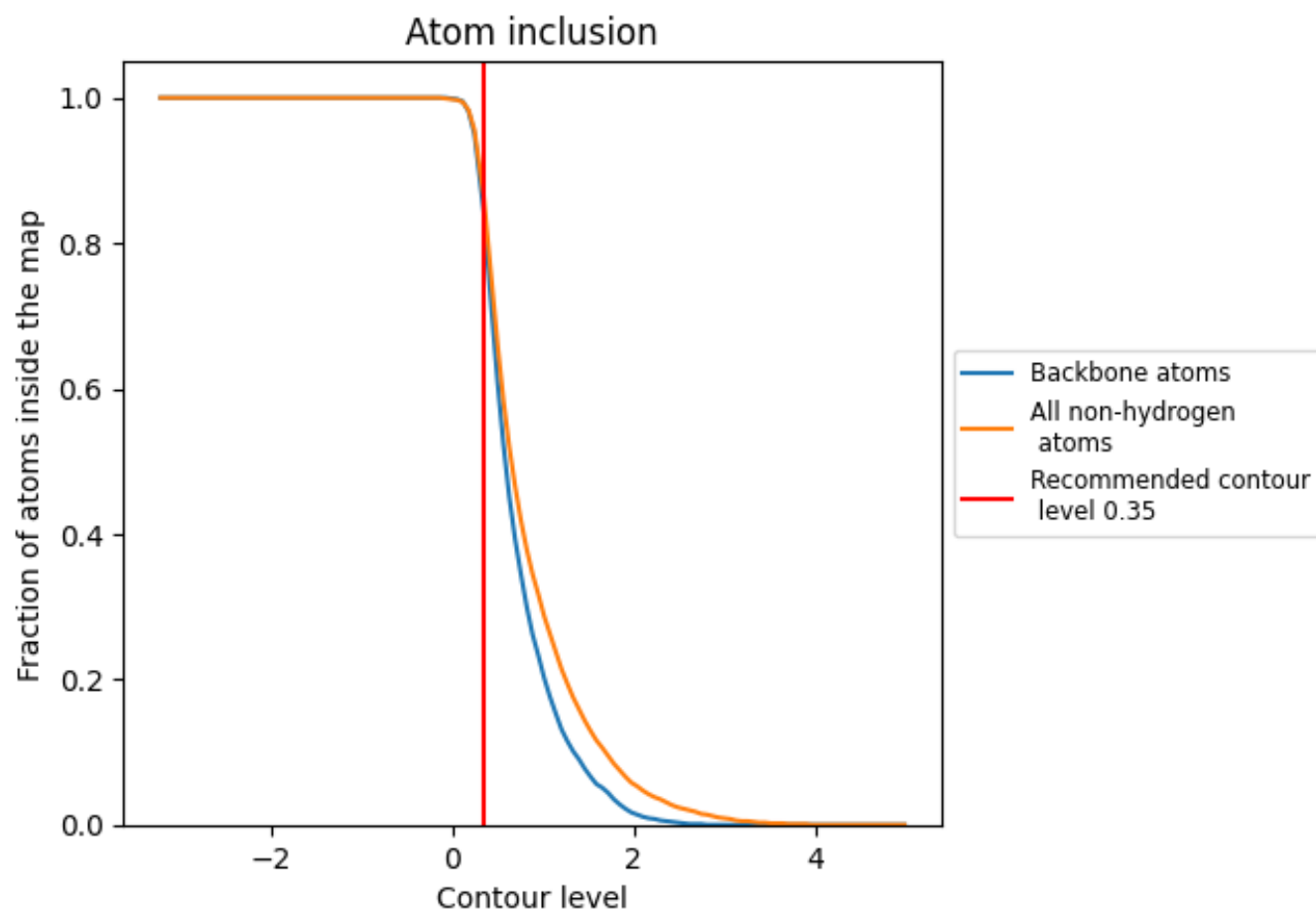
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.35).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 86% 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 (0.35) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8650	 0.4780
A	 0.9140	 0.5210
B	 0.9290	 0.5460
C	 0.9370	 0.5310
D	 0.9400	 0.5530
E	 0.6020	 0.3550
F	 0.6990	 0.3620
G	 0.8730	 0.4690
H	 0.8220	 0.4560
I	 0.7300	 0.3660
J	 0.8530	 0.4510
K	 0.7950	 0.4000
L	 0.7780	 0.3750
M	 0.8580	 0.4460
N	 0.7410	 0.3830
O	 0.9280	 0.5490
P	 0.9340	 0.5290
Q	 0.9240	 0.5410
R	 0.9050	 0.5130
S	 0.8190	 0.4540
T	 0.8550	 0.4660
U	 0.7180	 0.4090
V	 0.6040	 0.3490
W	 0.8150	 0.3920
X	 0.8840	 0.4270
Y	 0.7650	 0.3670
Z	 0.7650	 0.3700
a	 0.9100	 0.5270
b	 0.9010	 0.5220
c	 0.9150	 0.5220
d	 0.9210	 0.5230
e	 0.9200	 0.5260
f	 0.9240	 0.5260
g	 0.9080	 0.5220
h	 0.9090	 0.5200



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Chain	Atom inclusion	Q-score
y	 0.8800	 0.4360
z	 0.8230	 0.4110