



Full wwPDB EM Validation Report ⓘ

Sep 29, 2024 – 05:06 AM EDT

PDB ID : 8HAO
EMDB ID : EMD-34598
Title : Human parathyroid hormone receptor-1 dimer
Authors : Zhao, L.; Xu, H.E.; Yuan, Q.
Deposited on : 2022-10-26
Resolution : 3.76 Å (reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

EMDB validation analysis : 0.0.1.dev113
MolProbity : 4.02b-467
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

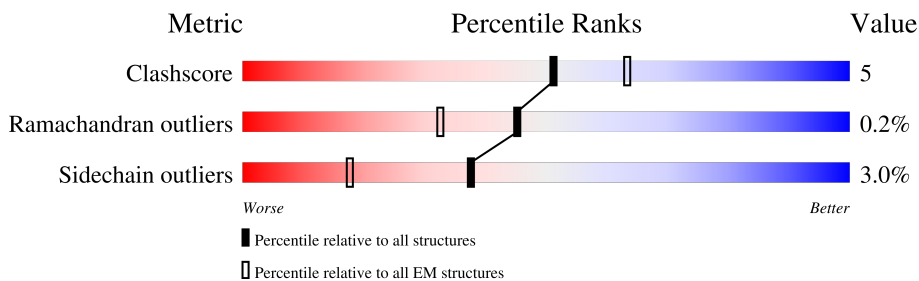
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.76 Å.

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




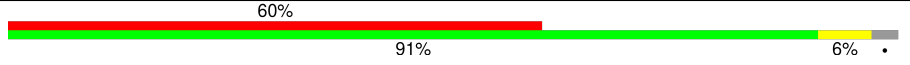
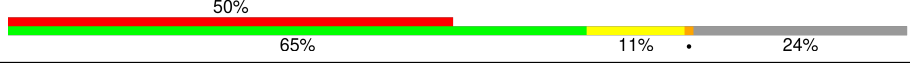
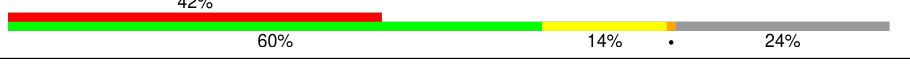
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	361	
1	C	361	
2	B	400	
2	D	400	
3	E	71	
3	G	71	
4	F	140	
4	N	140	

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Mol	Chain	Length	Quality of chain
5	H	35	
5	P	35	
6	I	476	
6	R	476	

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 18479 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 Guanine nucleotide-binding protein G(s) subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	235	Total	C	N	O	S	0	0
			1950	1232	350	360	8		
1	C	235	Total	C	N	O	S	0	0
			1950	1232	350	360	8		

- Molecule 2 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	341	Total	C	N	O	S	0	0
			2614	1612	470	511	21		
2	D	341	Total	C	N	O	S	0	0
			2614	1612	470	511	21		

- Molecule 3 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	E	57	Total	C	N	O	S	0	0
			436	273	77	83	3		
3	G	57	Total	C	N	O	S	0	0
			436	273	77	83	3		

- Molecule 4 is a protein called Nanobody 35.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	F	129	Total	C	N	O	S	0	0
			983	611	173	193	6		
4	N	129	Total	C	N	O	S	0	0
			983	611	173	193	6		

- Molecule 5 is a protein called Parathyroid hormone.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	H	34	Total	C	N	O	S	0	0
			288	181	55	50	2		
5	P	34	Total	C	N	O	S	0	0
			288	181	55	50	2		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	35	NH2	-	amidation	UNP P01270
P	35	NH2	-	amidation	UNP P01270

- Molecule 6 is a protein called Parathyroid hormone/parathyroid hormone-related peptide receptor.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	I	362	Total	C	N	O	S	0	0
			2977	1969	497	491	20		
6	R	360	Total	C	N	O	S	0	0
			2960	1958	495	487	20		

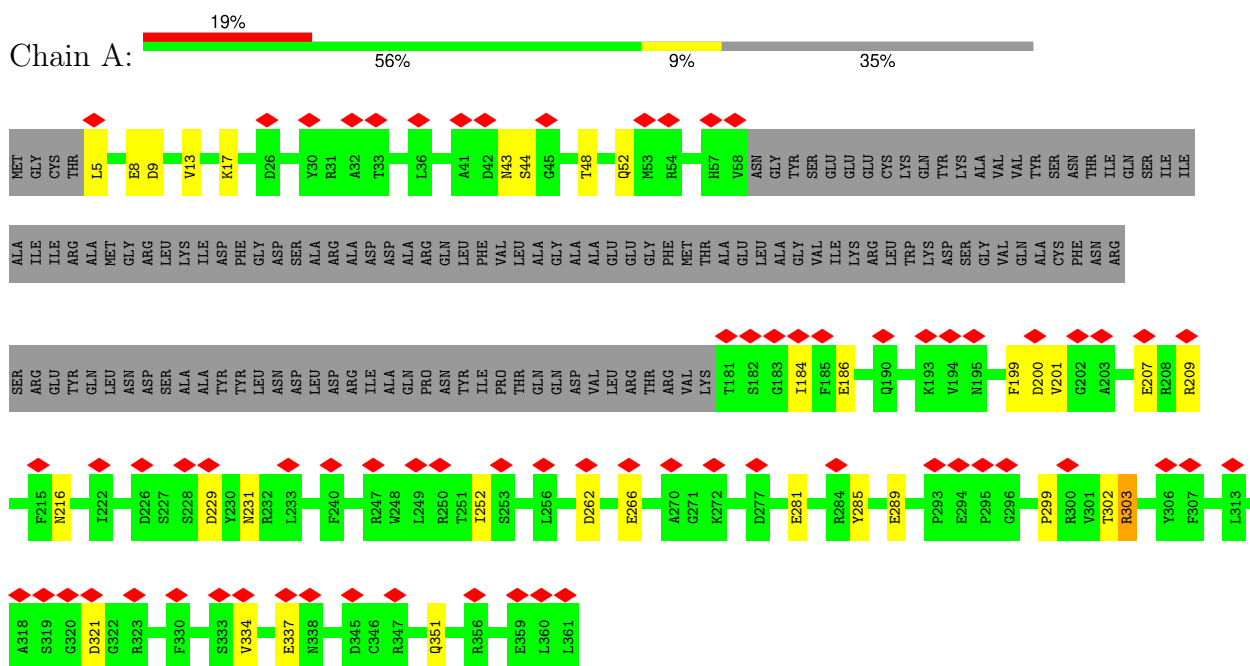
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	188	ALA	GLY	conflict	UNP Q03431
I	484	ARG	LYS	conflict	UNP Q03431
R	188	ALA	GLY	conflict	UNP Q03431
R	484	ARG	LYS	conflict	UNP Q03431

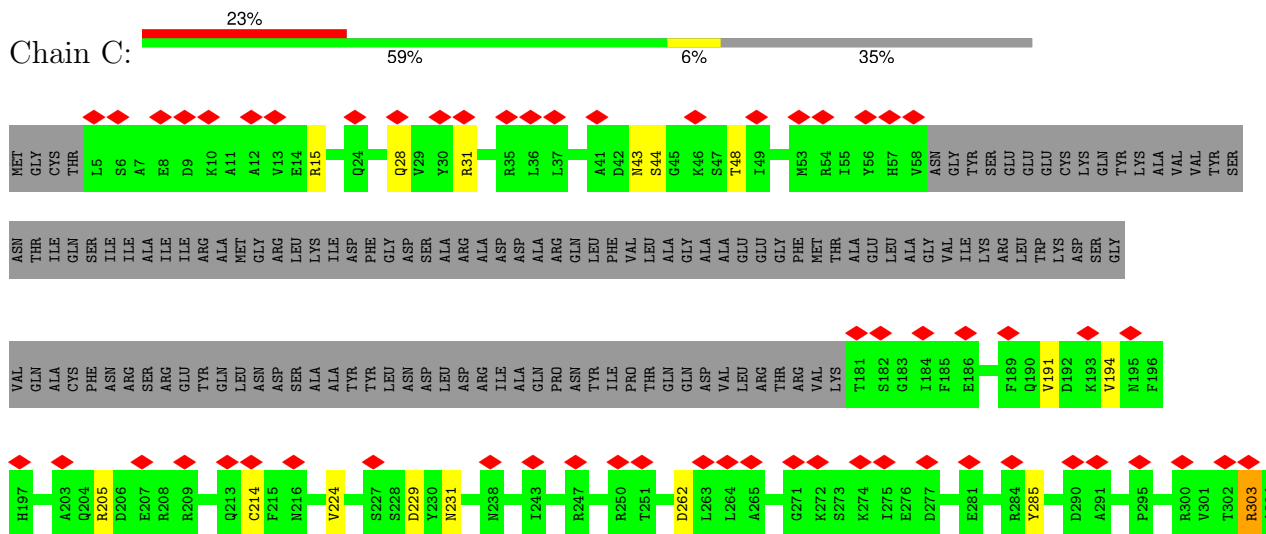
3 Residue-property plots [i](#)

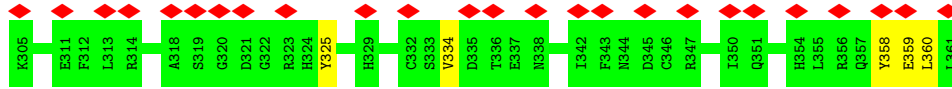
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Guanine nucleotide-binding protein G(s) subunit alpha

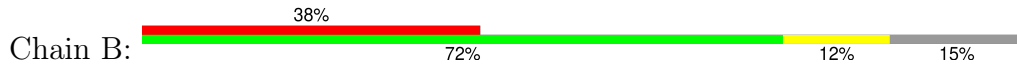


- Molecule 1: Guanine nucleotide-binding protein G(s) subunit alpha

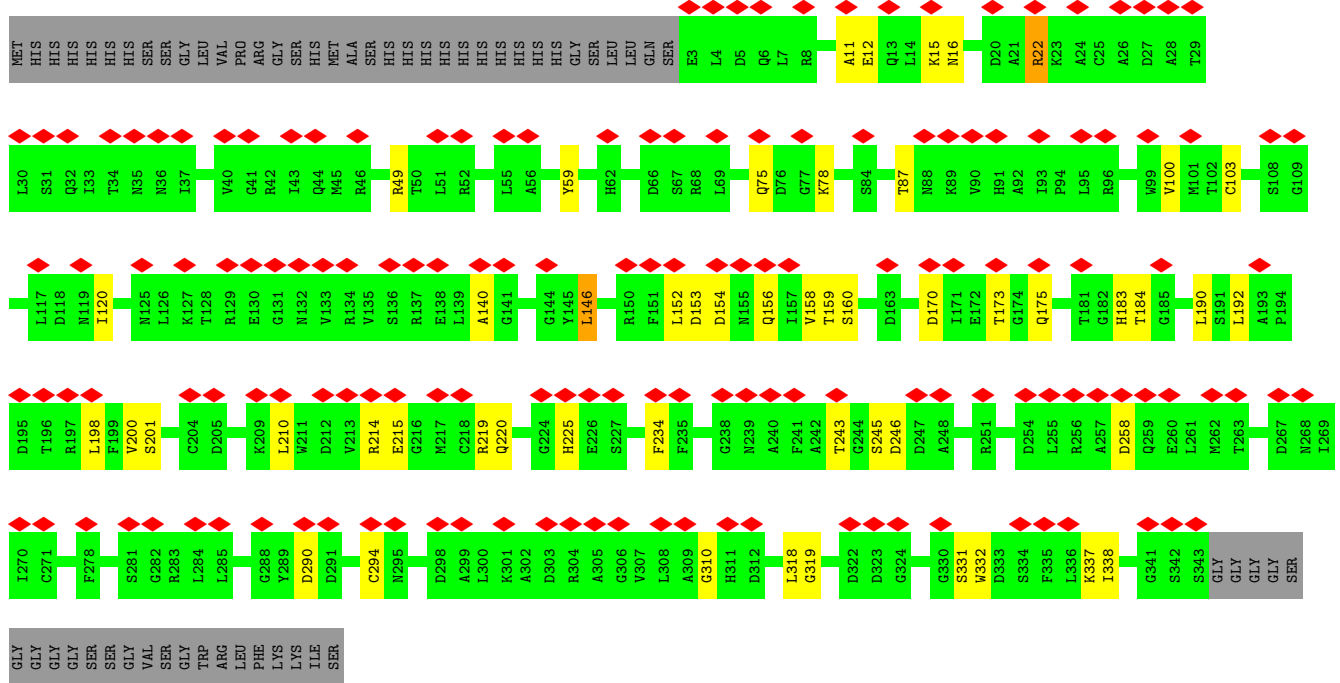




• Molecule 2: Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1



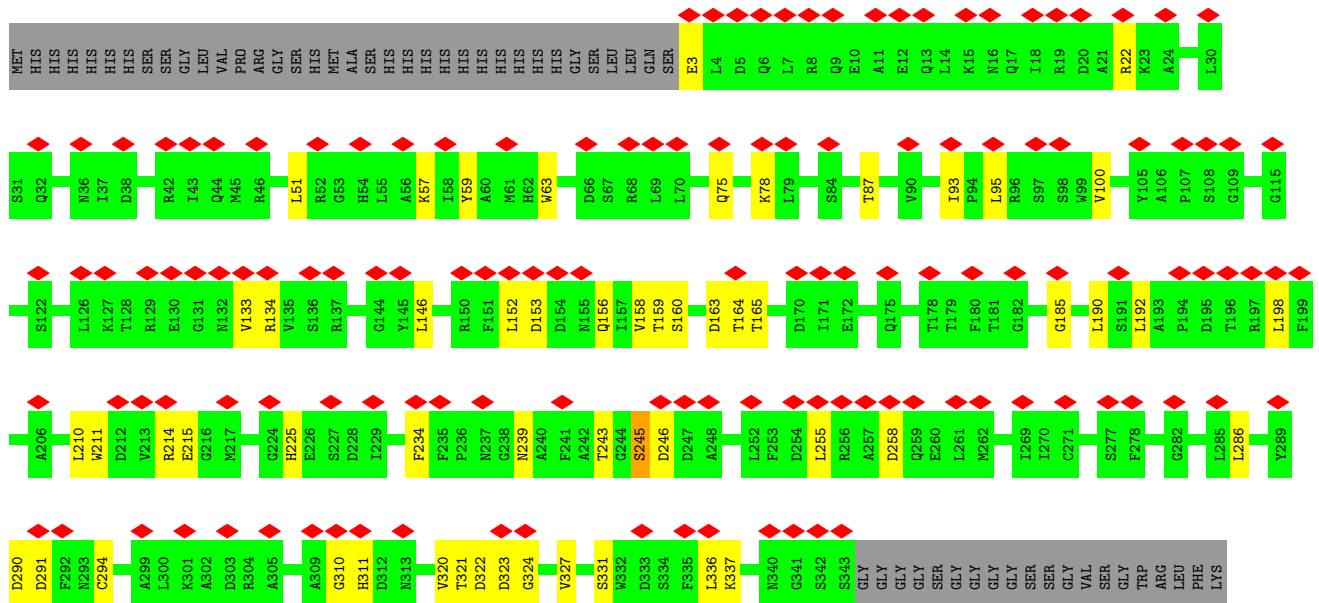
Chain B:



• Molecule 2: Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1

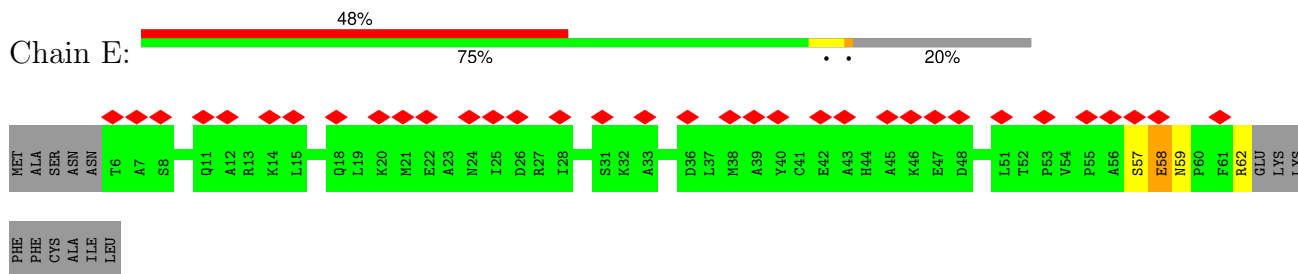


Chain D:

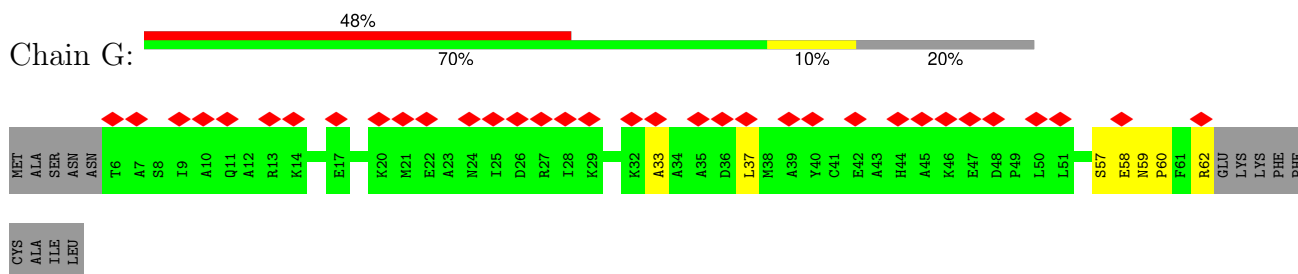


LYS
ILE
SER

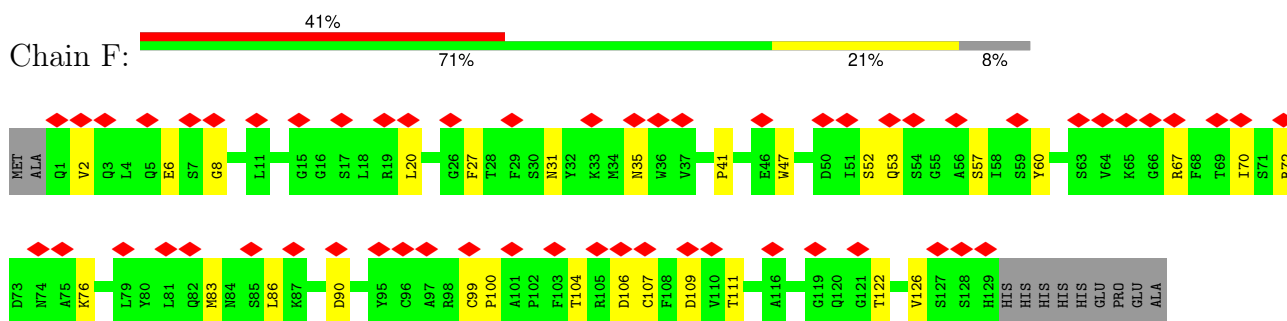
- Molecule 3: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2



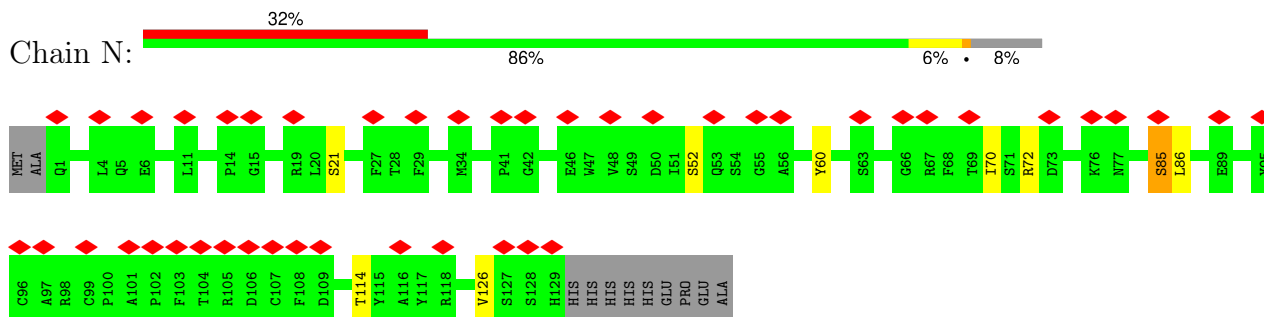
- Molecule 3: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2



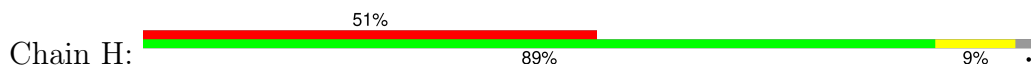
- Molecule 4: Nanobody 35

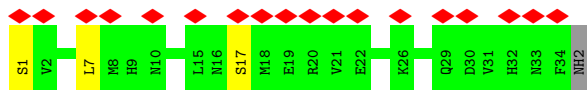


- Molecule 4: Nanobody 35

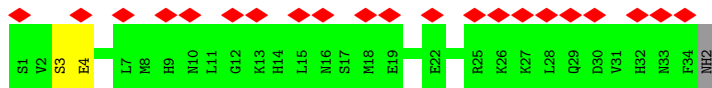
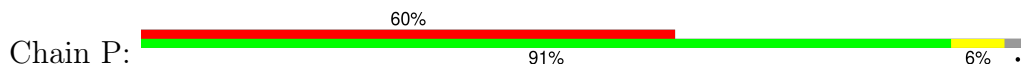


- Molecule 5: Parathyroid hormone

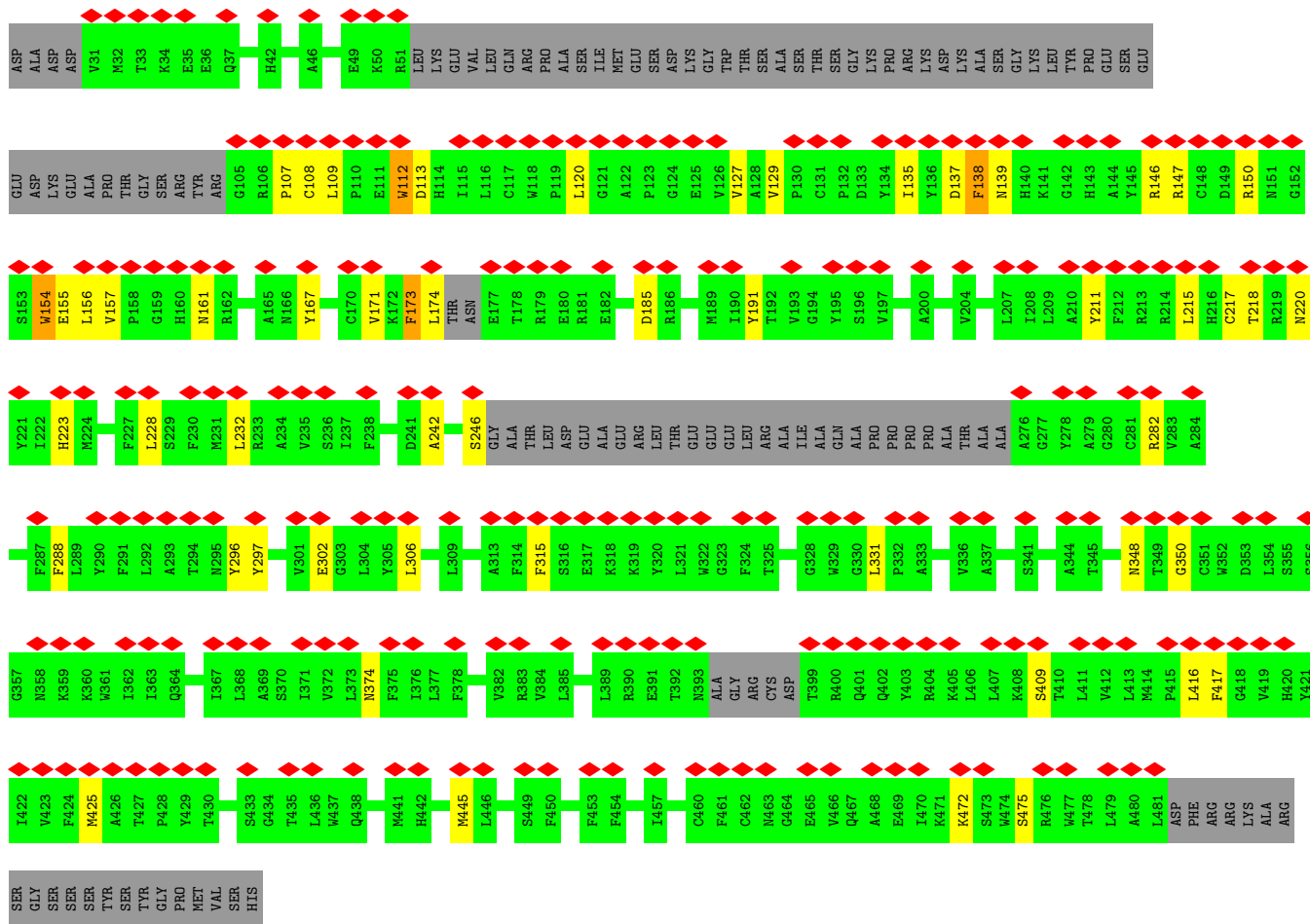




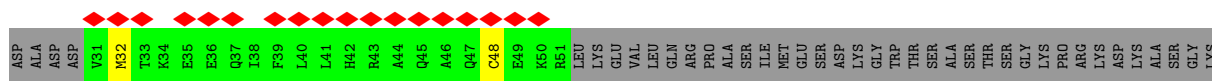
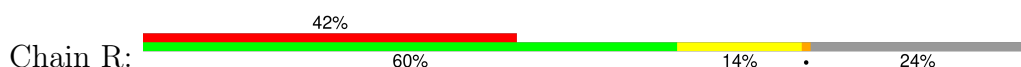
• Molecule 5: Parathyroid hormone



• Molecule 6: Parathyroid hormone/parathyroid hormone-related peptide receptor



• Molecule 6: Parathyroid hormone/parathyroid hormone-related peptide receptor



LEU	LEU	D149	I222	V285	N358	M425	PRO	LEU	D149	I222	V285	N358	M425	PRO
TYR	TYR	R150	H223	T286	K359	A426	MEI	TYR	R150	H223	T286	K359	A426	MEI
GLU	GLU	S153	M224	F287	I362	T427	VAL	GLU	S153	M224	F287	I362	T427	VAL
SER	SER	W154	F227	L289	I363	P428	SER	SER	W154	F227	L289	I363	P428	SER
GLU	GLU	E155	L228	Y290	Q364	Y429	HIS	GLU	E155	L228	Y290	Q364	Y429	HIS
ASP	ASP	L156	S229	F291	L367	T430		ASP	L156	S229	F291	L367	T430	
LYS	LYS	V157	L289	L292	L368	T435		LYS	V157	L289	L292	L368	T435	
GLU	GLU	P158	M231	A293	A369	L436		GLU	P158	M231	A293	A369	L436	
ALA	ALA	G159	L232	T294	S370	W437		ALA	G159	L232	T294	S370	W437	
PRO	PRO	H160	R233	Y297	I371	Q438		PRO	H160	R233	Y297	I371	Q438	
THR	THR	N161	S236	W298	V372	Q440		THR	N161	S236	W298	V372	Q440	
GLY	GLY	R162	I237	L299	L373	M441		GLY	R162	I237	L299	L373	M441	
SER	SER	T163	F238	L300	N374	H442		SER	T163	F238	L300	N374	H442	
ARG	ARG	W164	V239	V301	F375	E443		ARG	W164	V239	V301	F375	E443	
TYR	TYR	A165	K240	E302	I376	M445		TYR	A165	K240	E302	I376	M445	
ARG	ARG	N166	D241	G303	L377	F446		ARG	N166	D241	G303	L377	F446	
G105	G105	Y167	A242	L304	F378	F447		G105	Y167	A242	L304	F378	F447	
L109	L109	S168	V243	Y305	I379	F450		L109	S168	V243	Y305	I379	F450	
P110	P110	E169	L244	L306	N380	Q451		P110	E169	L244	L306	N380	Q451	
E111	E111	C170	Y245	T310	I381	F454		E111	C170	Y245	T310	I381	F454	
W112	W112	V171	S246	F311	V382	W455		W112	V171	S246	F311	V382	W455	
D113	D113	K172	GLY	M312	R383	A456		D113	K172	GLY	M312	R383	A456	
H114	H114	F173	ALA	A313	V384	I457		H114	F173	ALA	A313	V384	I457	
I115	I115	LEU	THR	F314	L385	F461		I115	LEU	THR	F314	L385	F461	
L116	L116	LEU	LEU	S315	R390	C462		L116	LEU	LEU	S315	R390	C462	
C117	C117	ASN	ASP	E317	E391	A468		C117	ASN	ASP	E317	E391	A468	
W118	W118	GLU	GLU	K318	T392	E469		W118	GLU	GLU	K318	T392	E469	
P119	P119	GLU	ALA	Y320	N393	I470		P119	GLU	ALA	Y320	N393	I470	
L120	L120	ARG	ARG	L321	ALA	K471		L120	ARG	ARG	L321	ALA	K471	
G121	G121	LEU	LEU	F327	GLY	K472		G121	LEU	LEU	F327	GLY	K472	
A122	A122	GLU	GLU	G330	ARG	S475		A122	GLU	GLU	G330	ARG	S475	
P123	P123	LEU	LEU	L331	CYS	R476		P123	LEU	LEU	L331	CYS	R476	
G124	G124	GLU	GLU	P332	ASP	L479		G124	GLU	GLU	P332	ASP	L479	
E125	E125	GLU	GLU	A333	GLY	A480		E125	GLU	GLU	A333	GLY	A480	
V126	V126	ARG	ARG	V334	ASP	L481		V126	ARG	ARG	V334	ASP	L481	
V127	V127	LEU	LEU	V338	T399	PHE		V127	LEU	LEU	V338	T399	PHE	
A128	A128	ILE	ILE	S341	R400	ARG		A128	ILE	ILE	S341	R400	ARG	
V129	V129	GLN	GLN	V342	Q402	ARG		V129	GLN	GLN	V342	Q402	ARG	
P130	P130	ALA	ALA	R343	Q403	ARG		P130	ALA	ALA	R343	Q403	ARG	
C131	C131	PRO	PRO	A344	Y403	ARG		C131	PRO	PRO	A344	Y403	ARG	
D133	D133	PRO	PRO	T345	R404	ARG		D133	PRO	PRO	T345	R404	ARG	
Y134	Y134	PRO	PRO	L346	L407	ARG		Y134	PRO	PRO	L346	L407	ARG	
I135	I135	ALA	ALA	R347	K408	ARG		I135	ALA	ALA	R347	K408	ARG	
Y136	Y136	THR	THR	A347	S409	ARG		Y136	THR	THR	A347	S409	ARG	
D137	D137	ALA	ALA	T349	T410	ARG		D137	ALA	ALA	T349	T410	ARG	
F138	F138	ALA	ALA	G350	L413	ARG		F138	ALA	ALA	G350	L413	ARG	
M139	M139	A276	G277	C351	L416	ARG		M139	A276	G277	C351	L416	ARG	
H140	H140	G277	Y278	W352	F417	ARG		H140	G277	Y278	W352	F417	ARG	
K141	K141	Y278	A279	D353	G418	ARG		K141	Y278	A279	D353	G418	ARG	
G142	G142	R213	G280	I422	V419	ARG		G142	R213	G280	I422	V419	ARG	
H143	H143	R213	C281	Y423	H420	ARG		H143	R213	C281	Y423	H420	ARG	
A144	A144	R214	R282	L354	Y421	ARG		A144	R214	R282	L354	Y421	ARG	
Y145	Y145	H215		S355	I422	ARG		Y145	H215		S355	I422	ARG	
R146	R146	C217			Y423	ARG		R146	C217			Y423	ARG	
R147	R147	T218			V423	ARG		R147	T218			V423	ARG	
C148	C148	R219			F424	ARG		C148	R219			F424	ARG	
		N220				ARG				N220			ARG	
		Y221				ARG				Y221			ARG	

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	55858	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.745	Depositor
Minimum map value	-0.003	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.027	Depositor
Recommended contour level	0.386	Depositor
Map size (Å)	421.888, 421.888, 421.888	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.824, 0.824, 0.824	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.25	0/1989	0.50	0/2677
1	C	0.25	0/1989	0.50	0/2677
2	B	0.24	0/2661	0.51	0/3607
2	D	0.24	0/2661	0.52	0/3607
3	E	0.25	0/442	0.49	0/597
3	G	0.26	0/442	0.46	0/597
4	F	0.28	0/1004	0.58	1/1360 (0.1%)
4	N	0.26	0/1004	0.51	0/1360
5	H	0.25	0/293	0.44	0/391
5	P	0.25	0/293	0.44	0/391
6	I	0.24	0/3066	0.46	0/4164
6	R	0.25	0/3049	0.47	0/4141
All	All	0.25	0/18893	0.49	1/25569 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	F	41	PRO	CA-N-CD	-7.35	101.21	111.50

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	1950	0	1925	21	0
1	C	1950	0	1925	16	0
2	B	2614	0	2518	29	0
2	D	2614	0	2518	35	0
3	E	436	0	448	3	0
3	G	436	0	448	4	0
4	F	983	0	945	20	0
4	N	983	0	945	6	0
5	H	288	0	292	2	0
5	P	288	0	292	2	0
6	I	2977	0	2961	29	0
6	R	2960	0	2944	40	0
All	All	18479	0	18161	195	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 5.

All (195) 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:E:57:SER:OG	3:E:58:GLU:OE2	1.79	0.99
1:A:266:GLU:OE2	1:C:48:THR:OG1	1.90	0.90
6:I:242:ALA:O	6:I:246:SER:OG	1.97	0.81
4:N:114:THR:HG22	4:N:114:THR:O	1.85	0.75
2:D:93:ILE:HD12	2:D:133:VAL:HG21	1.68	0.75
2:D:75:GLN:NE2	2:D:100:VAL:O	2.19	0.75
6:R:215:LEU:O	6:R:220:ASN:ND2	2.24	0.70
6:I:215:LEU:O	6:I:220:ASN:ND2	2.25	0.69
1:A:216:ASN:O	1:A:252:ILE:HD11	1.93	0.68
1:A:334:VAL:HG11	1:C:334:VAL:HG11	1.76	0.68
5:P:4:GLU:OE2	6:R:233:ARG:NH2	2.27	0.67
6:I:228:LEU:O	6:I:232:LEU:HD22	1.94	0.67
6:R:390:ARG:NH2	6:R:391:GLU:OE1	2.29	0.65
2:B:75:GLN:NE2	2:B:100:VAL:O	2.30	0.65
4:F:111:THR:HG23	4:F:111:THR:O	1.98	0.64
4:F:86:LEU:HD12	4:F:126:VAL:HG21	1.80	0.63
1:C:358:TYR:CE2	6:I:306:LEU:HD13	2.34	0.62
2:D:310:GLY:O	2:D:337:LYS:NZ	2.31	0.62
2:B:200:VAL:HG22	2:B:234:PHE:HE1	1.65	0.62
4:F:67:ARG:NH2	4:F:90:ASP:OD2	2.31	0.62
2:B:152:LEU:HD13	2:B:158:VAL:HG23	1.82	0.61
2:B:310:GLY:O	2:B:337:LYS:NZ	2.33	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:152:LEU:HD11	2:B:192:LEU:HD11	1.82	0.60
4:N:60:TYR:OH	4:N:70:ILE:N	2.33	0.60
2:D:163:ASP:OD2	2:D:165:THR:OG1	2.08	0.60
6:I:282:ARG:NH2	6:I:348:ASN:OD1	2.34	0.60
2:D:3:GLU:N	2:D:3:GLU:OE2	2.34	0.60
6:I:146:ARG:NH1	6:I:147:ARG:O	2.36	0.59
6:R:282:ARG:NH2	6:R:348:ASN:OD1	2.35	0.59
1:C:214:CYS:HA	2:D:57:LYS:HZ1	1.67	0.59
2:D:51:LEU:HD12	2:D:336:LEU:HD23	1.86	0.58
1:C:205:ARG:HH12	2:D:164:THR:HG23	1.70	0.57
6:R:198:SER:O	6:R:202:LEU:HD23	2.05	0.57
4:F:76:LYS:N	4:F:76:LYS:HD3	2.20	0.56
2:B:183:HIS:HE2	2:B:201:SER:HG	1.52	0.56
2:D:210:LEU:HD12	2:D:255:LEU:HD22	1.88	0.56
1:C:285:TYR:O	1:C:303:ARG:NH1	2.39	0.55
6:R:299:ILE:HD11	6:R:417:PHE:C	2.27	0.55
2:B:215:GLU:OE1	2:B:219:ARG:NH2	2.40	0.55
2:D:215:GLU:OE1	2:D:215:GLU:N	2.39	0.55
2:B:220:GLN:NE2	2:B:258:ASP:OD1	2.39	0.55
2:D:153:ASP:OD1	2:D:156:GLN:N	2.39	0.54
4:N:114:THR:O	4:N:114:THR:CG2	2.53	0.54
4:F:53:GLN:N	4:F:53:GLN:OE1	2.35	0.54
4:N:86:LEU:HD12	4:N:126:VAL:HG21	1.89	0.54
2:B:200:VAL:HG22	2:B:234:PHE:CE1	2.42	0.54
4:F:60:TYR:OH	4:F:70:ILE:N	2.41	0.54
3:G:57:SER:OG	3:G:58:GLU:OE2	2.21	0.54
1:A:13:VAL:HG13	1:A:17:LYS:NZ	2.22	0.54
6:R:372:VAL:O	6:R:376:ILE:HG13	2.07	0.54
2:D:87:THR:HG22	2:D:87:THR:O	2.09	0.53
6:R:146:ARG:NH1	6:R:164:TRP:O	2.41	0.53
4:F:52:SER:O	4:F:72:ARG:NH1	2.40	0.53
6:R:297:TYR:CE2	6:R:331:LEU:HD23	2.44	0.53
1:A:48:THR:O	1:A:52:GLN:NE2	2.38	0.53
2:D:290:ASP:O	2:D:290:ASP:OD1	2.27	0.53
2:D:323:ASP:OD1	2:D:323:ASP:N	2.40	0.53
3:E:59:ASN:O	3:E:62:ARG:NE	2.42	0.52
2:B:245:SER:OG	2:B:246:ASP:N	2.43	0.52
6:I:282:ARG:NH1	6:I:350:GLY:O	2.43	0.52
1:A:186:GLU:OE1	1:A:186:GLU:N	2.43	0.52
2:B:153:ASP:OD1	2:B:156:GLN:N	2.39	0.52
2:B:225:HIS:NE2	2:B:243:THR:OG1	2.39	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:87:THR:O	2:B:87:THR:HG22	2.11	0.51
6:R:115:ILE:HD12	6:R:115:ILE:H	1.74	0.51
6:R:112:TRP:NE1	6:R:116:LEU:O	2.42	0.51
1:C:229:ASP:O	1:C:231:ASN:N	2.44	0.51
6:I:127:VAL:HG12	6:I:129:VAL:HG23	1.93	0.51
5:P:3:SER:OG	6:R:444:GLU:OE1	2.23	0.51
2:D:164:THR:HG22	2:D:185:GLY:O	2.10	0.51
6:R:127:VAL:HG12	6:R:129:VAL:HG23	1.92	0.51
1:A:285:TYR:O	1:A:303:ARG:NH1	2.43	0.51
2:B:11:ALA:O	2:B:15:LYS:HG2	2.11	0.50
1:A:351:GLN:NE2	6:R:310:ILE:O	2.43	0.50
6:R:457:ILE:HD12	6:R:461:PHE:HB2	1.94	0.50
6:R:282:ARG:NH1	6:R:350:GLY:O	2.44	0.50
4:F:86:LEU:HD12	4:F:126:VAL:CG2	2.42	0.50
6:R:392:THR:HG22	6:R:392:THR:O	2.11	0.50
6:R:299:ILE:HD11	6:R:418:GLY:N	2.27	0.50
6:R:374:ASN:ND2	6:R:417:PHE:O	2.44	0.50
2:D:198:LEU:HB3	2:D:210:LEU:HD21	1.93	0.50
4:F:2:VAL:HG13	4:F:27:PHE:CD2	2.46	0.49
2:D:245:SER:OG	2:D:246:ASP:N	2.44	0.49
2:D:95:LEU:HD12	2:D:100:VAL:HG21	1.93	0.49
6:I:156:LEU:O	6:I:157:VAL:HG22	2.13	0.49
1:C:31:ARG:NH1	6:I:315:PHE:O	2.44	0.49
1:A:48:THR:O	1:A:52:GLN:HG2	2.13	0.49
2:B:146:LEU:HD21	2:B:159:THR:CG2	2.43	0.48
6:R:290:TYR:O	6:R:294:THR:HG23	2.13	0.48
3:E:58:GLU:OE2	3:E:58:GLU:N	2.46	0.48
1:A:184:ILE:HD11	1:A:199:PHE:HB3	1.94	0.48
1:A:281:GLU:OE1	1:A:281:GLU:N	2.43	0.48
1:A:229:ASP:O	1:A:231:ASN:N	2.43	0.48
4:F:31:ASN:OD1	4:F:31:ASN:O	2.32	0.48
2:B:184:THR:HG22	2:B:184:THR:O	2.14	0.47
6:I:112:TRP:CG	6:I:113:ASP:N	2.82	0.47
1:A:289:GLU:OE1	1:A:289:GLU:N	2.32	0.47
4:F:31:ASN:OD1	4:F:31:ASN:C	2.52	0.47
2:D:210:LEU:HD23	2:D:211:TRP:N	2.30	0.47
6:I:173:PHE:O	6:I:174:LEU:C	2.52	0.47
3:G:59:ASN:O	3:G:62:ARG:HD2	2.15	0.47
4:N:52:SER:O	4:N:72:ARG:NH1	2.48	0.47
6:R:138:PHE:O	6:R:139:ASN:OD1	2.33	0.47
2:D:63:TRP:CE3	2:D:321:THR:HG22	2.51	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:164:THR:HG22	2:D:185:GLY:C	2.36	0.46
2:D:311:HIS:ND1	2:D:331:SER:OG	2.45	0.46
6:I:297:TYR:CE2	6:I:331:LEU:HD23	2.50	0.46
6:R:217:CYS:SG	6:R:218:THR:N	2.89	0.46
2:B:198:LEU:HD13	2:B:210:LEU:HD21	1.97	0.46
2:D:152:LEU:HD11	2:D:192:LEU:HD11	1.98	0.46
1:A:337:GLU:N	1:A:337:GLU:OE2	2.45	0.46
2:D:160:SER:HB2	2:D:190:LEU:HD23	1.98	0.46
6:R:149:ASP:O	6:R:150:ARG:HB3	2.16	0.46
6:R:239:VAL:O	6:R:243:VAL:HG23	2.16	0.46
2:B:170:ASP:HB3	2:B:173:THR:HG22	1.97	0.45
2:D:225:HIS:NE2	2:D:243:THR:OG1	2.43	0.45
4:F:6:GLU:N	4:F:6:GLU:OE2	2.49	0.45
1:C:43:ASN:OD1	1:C:44:SER:N	2.50	0.45
2:D:22:ARG:NE	2:D:258:ASP:OD2	2.36	0.45
6:R:157:VAL:N	6:R:161:ASN:O	2.49	0.45
1:C:359:GLU:N	1:C:359:GLU:OE1	2.50	0.45
2:B:12:GLU:OE1	2:B:16:ASN:ND2	2.50	0.45
2:D:286:LEU:HD12	2:D:286:LEU:H	1.82	0.45
4:F:35:ASN:OD1	4:F:47:TRP:NE1	2.46	0.45
1:C:15:ARG:O	1:C:15:ARG:HD3	2.17	0.44
1:A:321:ASP:OD1	1:A:321:ASP:N	2.49	0.44
6:R:112:TRP:CG	6:R:113:ASP:N	2.86	0.44
1:C:262:ASP:N	1:C:262:ASP:OD1	2.51	0.44
2:B:246:ASP:OD1	2:B:246:ASP:O	2.35	0.44
6:I:223:HIS:ND1	6:I:302:GLU:OE1	2.49	0.44
1:A:200:ASP:OD1	1:A:201:VAL:N	2.50	0.44
1:A:262:ASP:OD1	1:A:262:ASP:N	2.51	0.44
2:B:22:ARG:NE	2:B:258:ASP:OD2	2.47	0.44
4:F:8:GLY:O	4:F:122:THR:HG21	2.18	0.44
6:R:202:LEU:HD22	6:R:456:ALA:HB2	1.99	0.44
2:D:320:VAL:HG22	2:D:327:VAL:HG22	1.99	0.43
6:R:156:LEU:H	6:R:156:LEU:HD23	1.83	0.43
2:D:146:LEU:HD21	2:D:159:THR:CG2	2.48	0.43
6:I:374:ASN:ND2	6:I:417:PHE:O	2.47	0.43
6:R:150:ARG:NH2	6:R:153:SER:OG	2.51	0.43
1:A:207:GLU:OE2	1:A:209:ARG:NH2	2.51	0.43
2:D:146:LEU:HD21	2:D:159:THR:HG23	1.99	0.43
5:H:1:SER:N	6:I:425:MET:O	2.45	0.43
6:I:217:CYS:SG	6:I:218:THR:N	2.91	0.43
6:I:137:ASP:O	6:I:139:ASN:N	2.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:109:ASP:OD1	4:F:109:ASP:N	2.45	0.43
2:B:49:ARG:HB2	2:B:338:ILE:HD12	1.99	0.43
6:I:302:GLU:HB3	6:I:416:LEU:HD21	2.01	0.43
6:R:223:HIS:ND1	6:R:302:GLU:OE2	2.51	0.43
2:D:63:TRP:CZ3	2:D:321:THR:HG22	2.53	0.42
6:I:135:ILE:HG21	6:I:138:PHE:CD1	2.54	0.42
2:B:331:SER:OG	2:B:332:TRP:N	2.52	0.42
1:C:360:LEU:O	6:I:409:SER:OG	2.28	0.42
6:I:155:GLU:N	6:I:155:GLU:OE1	2.52	0.42
6:I:154:TRP:CD1	6:I:156:LEU:HG	2.54	0.42
4:F:99:CYS:HB3	4:F:107:CYS:HB3	1.88	0.42
5:H:7:LEU:HD22	6:I:445:MET:CE	2.49	0.42
1:A:5:LEU:N	1:A:8:GLU:OE1	2.53	0.42
2:D:311:HIS:HD1	2:D:331:SER:HG	1.60	0.42
2:B:160:SER:HB2	2:B:190:LEU:HD23	2.00	0.42
2:B:173:THR:HG23	2:B:175:GLN:H	1.84	0.42
6:I:232:LEU:HD22	6:I:232:LEU:H	1.85	0.42
2:B:120:ILE:HD12	2:B:140:ALA:HB2	2.02	0.42
4:F:106:ASP:OD1	4:F:106:ASP:C	2.57	0.42
6:R:112:TRP:HE3	6:R:112:TRP:H	1.68	0.42
2:B:318:LEU:HD23	2:B:319:GLY:N	2.35	0.41
6:R:423:VAL:HG23	6:R:424:PHE:CD2	2.54	0.41
3:G:33:ALA:O	3:G:37:LEU:HD12	2.20	0.41
6:I:113:ASP:OD1	6:I:113:ASP:C	2.59	0.41
3:G:59:ASN:OD1	3:G:60:PRO:HD2	2.19	0.41
2:B:318:LEU:HD23	2:B:318:LEU:C	2.40	0.41
1:C:44:SER:HB2	1:C:224:VAL:HG12	2.03	0.41
4:F:20:LEU:HD12	4:F:83:MET:SD	2.61	0.41
4:N:85:SER:O	4:N:85:SER:OG	2.33	0.41
6:R:110:PRO:HB3	6:R:112:TRP:CZ3	2.56	0.41
1:A:299:PRO:HA	1:A:302:THR:HG22	2.03	0.41
6:R:425:MET:C	6:R:425:MET:SD	2.99	0.41
2:D:152:LEU:HD13	2:D:158:VAL:HG23	2.03	0.41
2:D:286:LEU:HD22	2:D:327:VAL:HG21	2.02	0.41
2:D:321:THR:OG1	2:D:324:GLY:N	2.54	0.41
4:F:100:PRO:HD2	4:F:107:CYS:CB	2.50	0.41
4:F:104:THR:HG22	4:F:106:ASP:H	1.85	0.41
6:I:107:PRO:O	6:I:108:CYS:HB2	2.21	0.41
6:R:138:PHE:O	6:R:139:ASN:C	2.59	0.41
2:B:290:ASP:O	2:B:290:ASP:OD1	2.38	0.41
6:I:157:VAL:N	6:I:161:ASN:O	2.54	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:R:441:MET:O	6:R:445:MET:HG2	2.21	0.41
6:R:188:ALA:HA	6:R:191:TYR:CE2	2.56	0.40
1:A:43:ASN:OD1	1:A:44:SER:N	2.54	0.40
6:R:290:TYR:HE2	6:R:333:ALA:HB2	1.86	0.40
6:R:115:ILE:HD12	6:R:115:ILE:N	2.37	0.40
1:C:191:VAL:O	1:C:194:VAL:HG22	2.21	0.40
1:C:31:ARG:HD2	1:C:31:ARG:C	2.42	0.40
6:I:171:VAL:HA	6:I:173:PHE:CE2	2.57	0.40
6:R:381:ILE:O	6:R:384:VAL:HG22	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	231/361 (64%)	226 (98%)	5 (2%)	0	100	100
1	C	231/361 (64%)	227 (98%)	4 (2%)	0	100	100
2	B	339/400 (85%)	333 (98%)	6 (2%)	0	100	100
2	D	339/400 (85%)	333 (98%)	6 (2%)	0	100	100
3	E	55/71 (78%)	55 (100%)	0	0	100	100
3	G	55/71 (78%)	54 (98%)	1 (2%)	0	100	100
4	F	127/140 (91%)	124 (98%)	3 (2%)	0	100	100
4	N	127/140 (91%)	124 (98%)	3 (2%)	0	100	100
5	H	32/35 (91%)	32 (100%)	0	0	100	100
5	P	32/35 (91%)	32 (100%)	0	0	100	100
6	I	352/476 (74%)	333 (95%)	17 (5%)	2 (1%)	22	55
6	R	350/476 (74%)	327 (93%)	21 (6%)	2 (1%)	22	55
All	All	2270/2966 (76%)	2200 (97%)	66 (3%)	4 (0%)	45	73

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	I	150	ARG
6	R	150	ARG
6	I	109	LEU
6	R	109	LEU

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	212/315 (67%)	210 (99%)	2 (1%)	75	84
1	C	212/315 (67%)	209 (99%)	3 (1%)	62	77
2	B	282/328 (86%)	274 (97%)	8 (3%)	38	60
2	D	282/328 (86%)	272 (96%)	10 (4%)	31	56
3	E	46/58 (79%)	45 (98%)	1 (2%)	47	66
3	G	46/58 (79%)	46 (100%)	0	100	100
4	F	107/116 (92%)	106 (99%)	1 (1%)	75	84
4	N	107/116 (92%)	105 (98%)	2 (2%)	52	70
5	H	33/33 (100%)	32 (97%)	1 (3%)	36	59
5	P	33/33 (100%)	33 (100%)	0	100	100
6	I	316/407 (78%)	303 (96%)	13 (4%)	26	52
6	R	314/407 (77%)	295 (94%)	19 (6%)	15	43
All	All	1990/2514 (79%)	1930 (97%)	60 (3%)	37	59

All (60) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	ASP
1	A	303	ARG
2	B	22	ARG
2	B	59	TYR
2	B	78	LYS

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Mol	Chain	Res	Type
2	B	103	CYS
2	B	146	LEU
2	B	154	ASP
2	B	214	ARG
2	B	294	CYS
1	C	28	GLN
1	C	303	ARG
1	C	325	TYR
2	D	59	TYR
2	D	78	LYS
2	D	134	ARG
2	D	214	ARG
2	D	234	PHE
2	D	239	ASN
2	D	245	SER
2	D	291	ASP
2	D	294	CYS
2	D	322	ASP
3	E	58	GLU
4	F	57	SER
5	H	17	SER
6	I	112	TRP
6	I	120	LEU
6	I	138	PHE
6	I	154	TRP
6	I	167	TYR
6	I	173	PHE
6	I	185	ASP
6	I	191	TYR
6	I	211	TYR
6	I	288	PHE
6	I	296	TYR
6	I	472	LYS
6	I	475	SER
4	N	21	SER
4	N	85	SER
6	R	32	MET
6	R	48	CYS
6	R	112	TRP
6	R	120	LEU
6	R	138	PHE
6	R	145	TYR

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Mol	Chain	Res	Type
6	R	154	TRP
6	R	173	PHE
6	R	179	ARG
6	R	191	TYR
6	R	214	ARG
6	R	236	SER
6	R	288	PHE
6	R	314	PHE
6	R	385	LEU
6	R	404	ARG
6	R	424	PHE
6	R	441	MET
6	R	475	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
5	P	9	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](#)

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

There are no chain breaks in this entry.

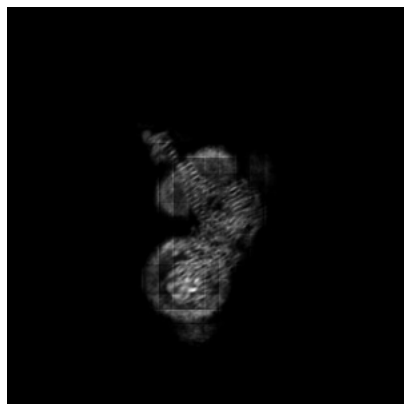
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-34598. These allow visual inspection of the internal detail of the map and identification of artifacts.

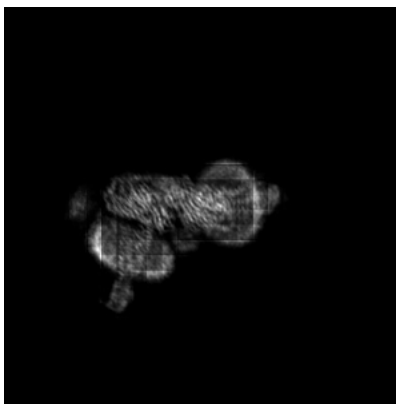
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

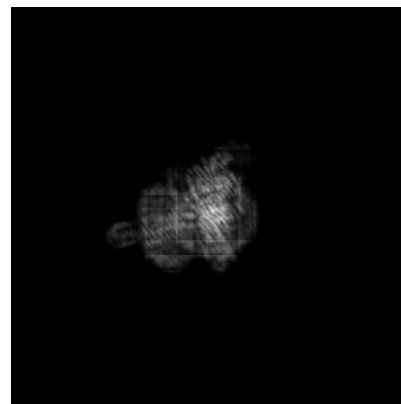
6.1.1 Primary map



X

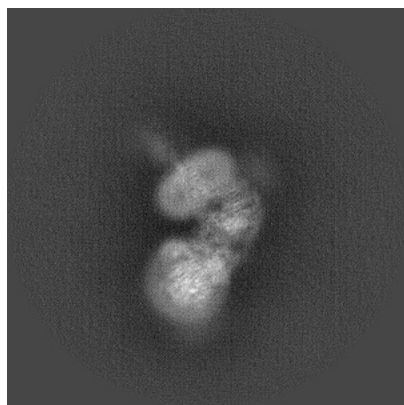


Y

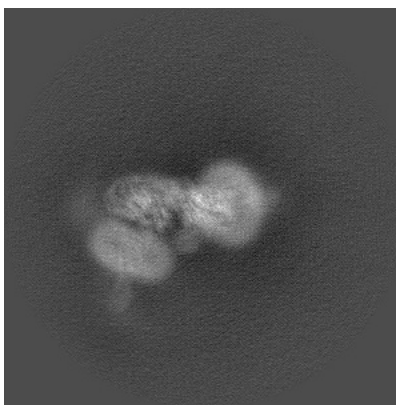


Z

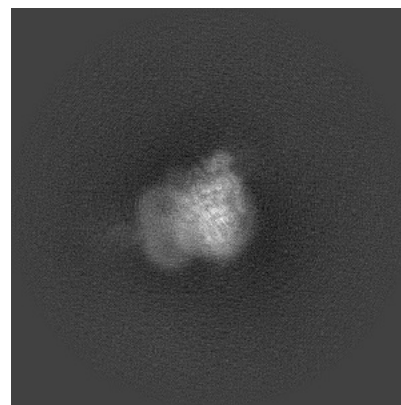
6.1.2 Raw map



X



Y



Z

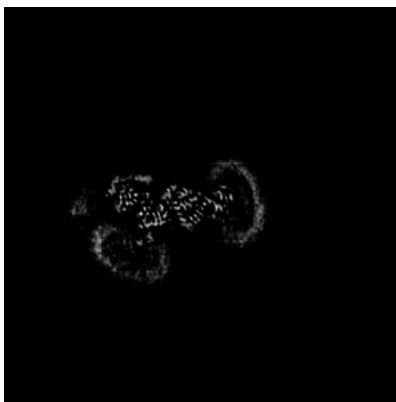
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 256

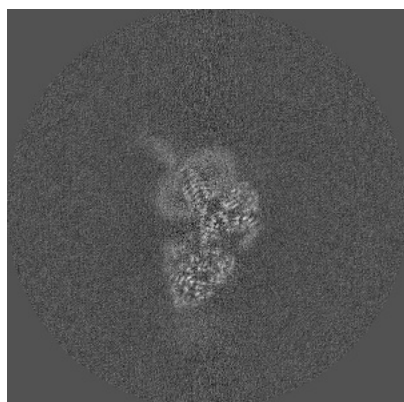


Y Index: 256

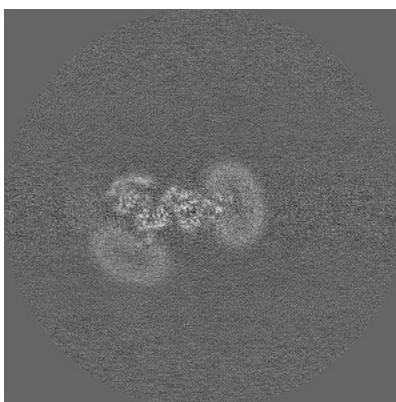


Z Index: 256

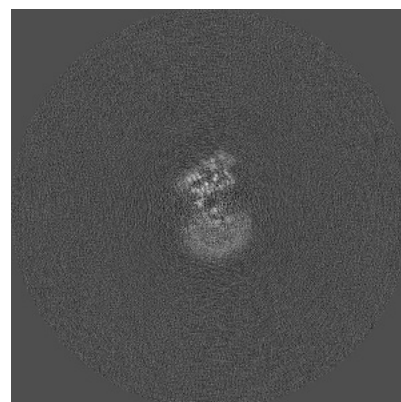
6.2.2 Raw map



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](#)

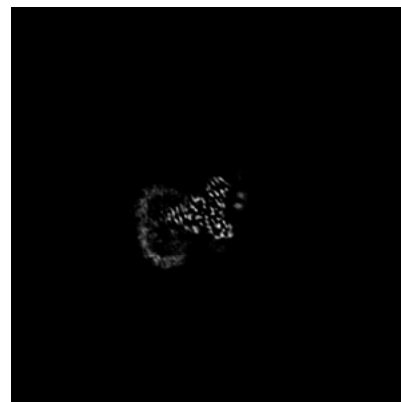
6.3.1 Primary map



X Index: 267

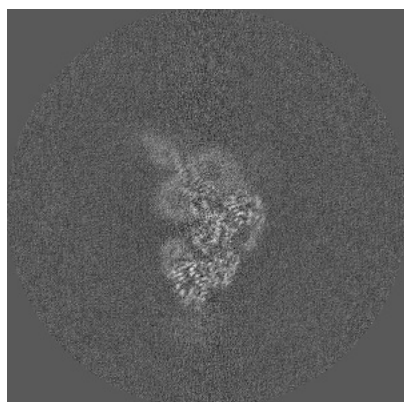


Y Index: 242

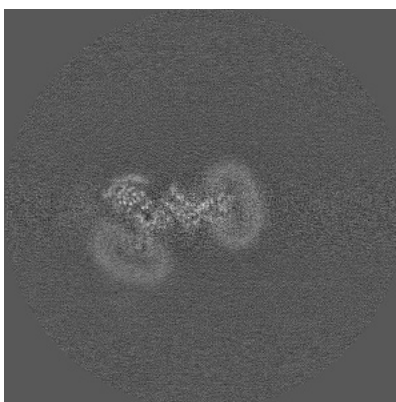


Z Index: 184

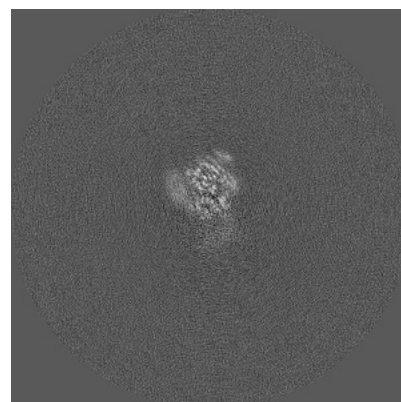
6.3.2 Raw map



X Index: 266



Y Index: 252

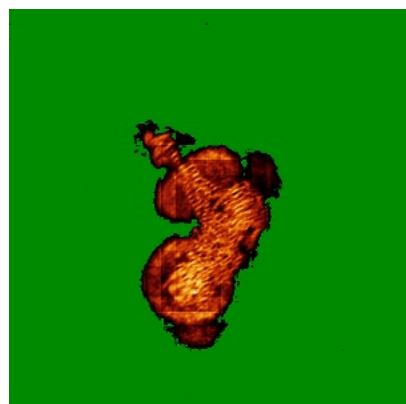


Z Index: 240

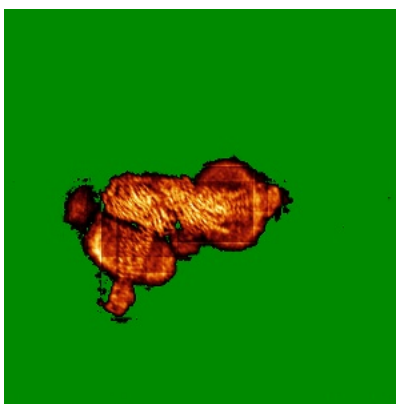
The images above show the largest variance slices of the map in three orthogonal directions.

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

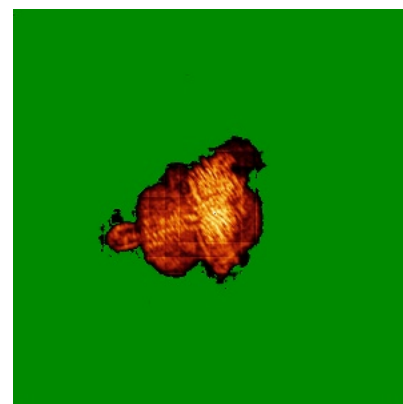
6.4.1 Primary map



X

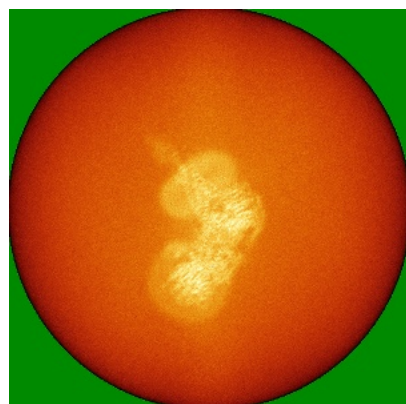


Y

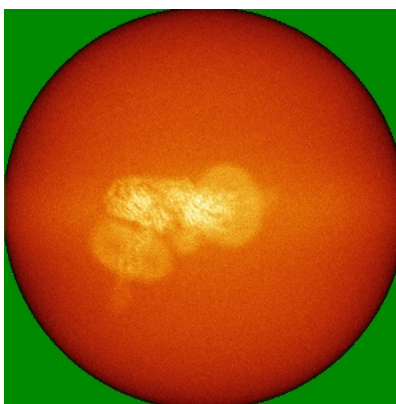


Z

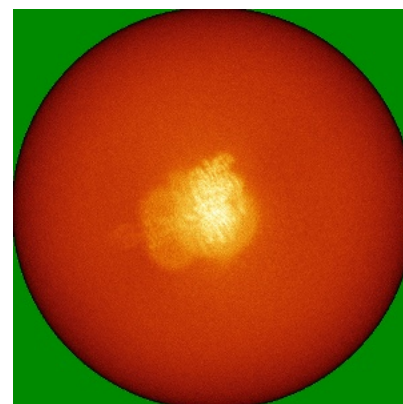
6.4.2 Raw map



X



Y

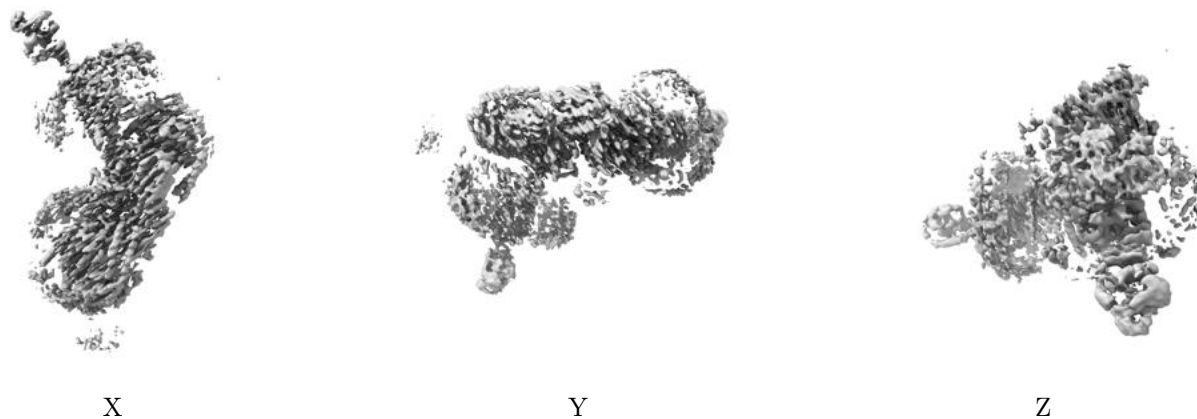


Z

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.

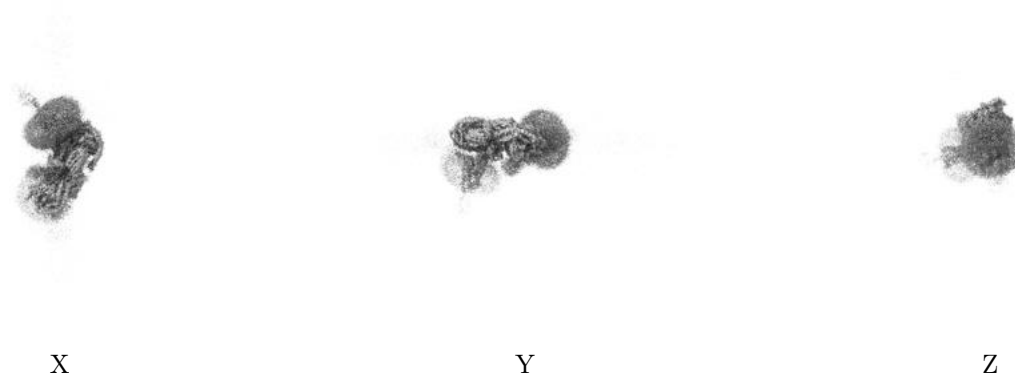
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.386. 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.

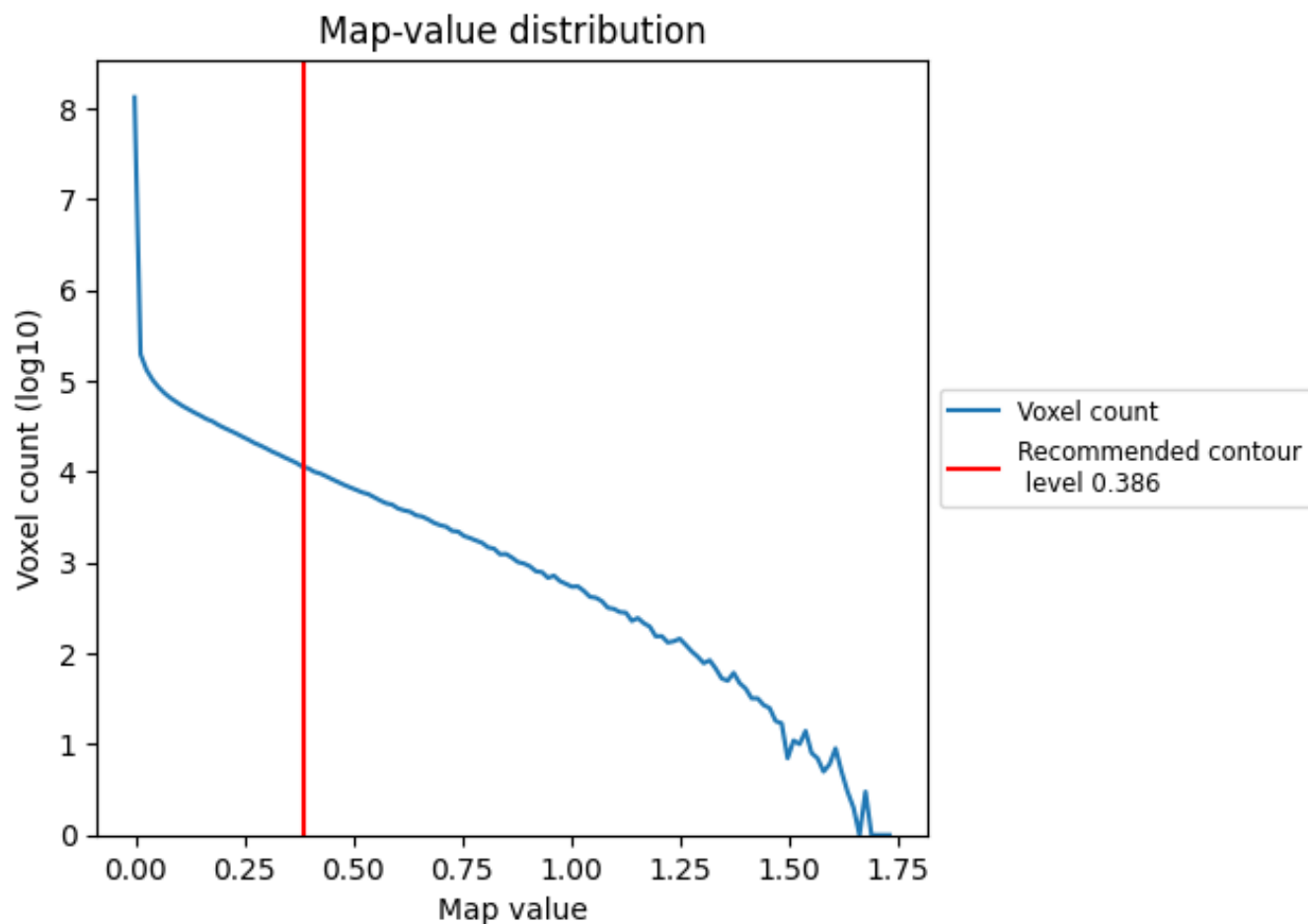
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

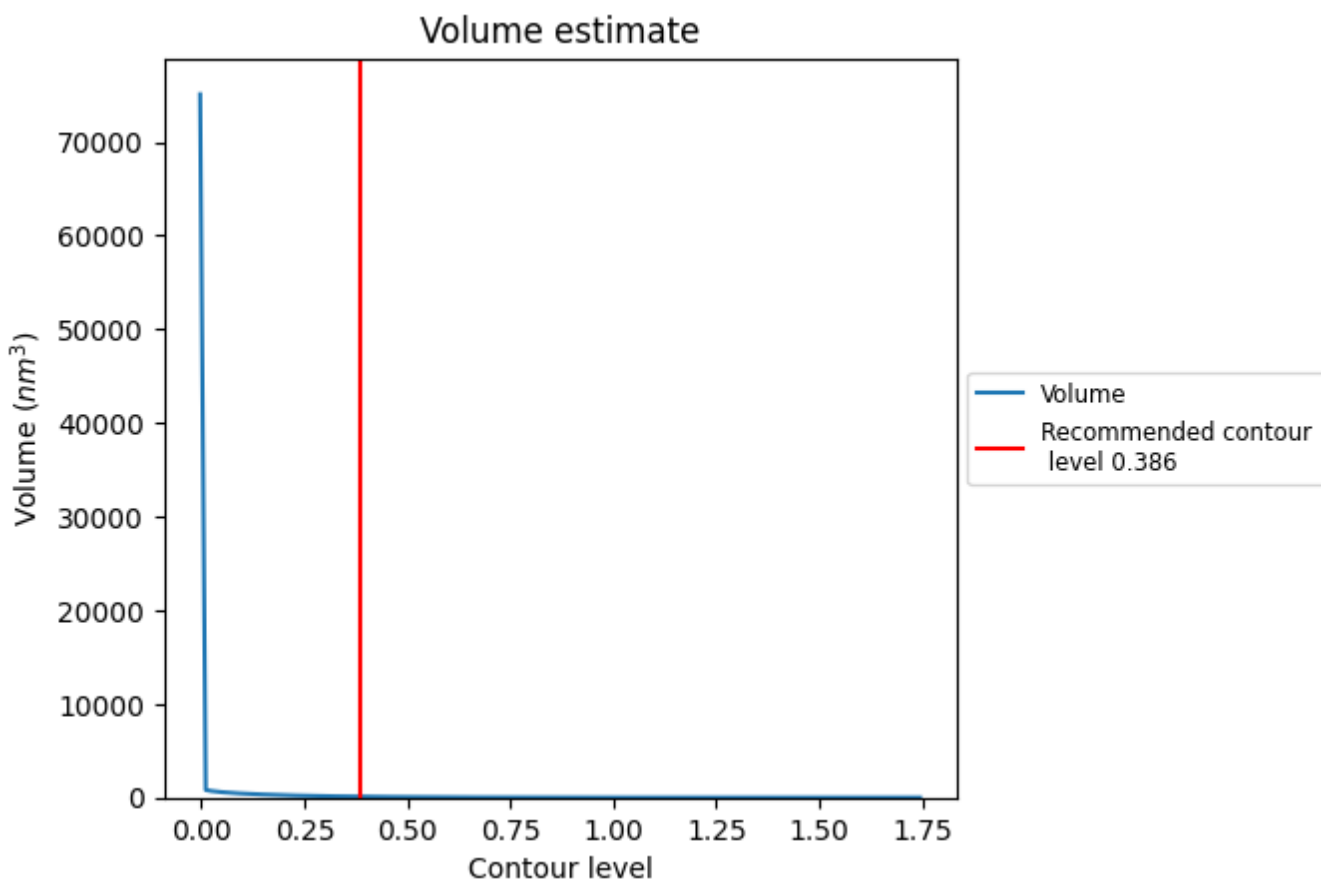
This section contains the results of statistical analysis of the map.

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.

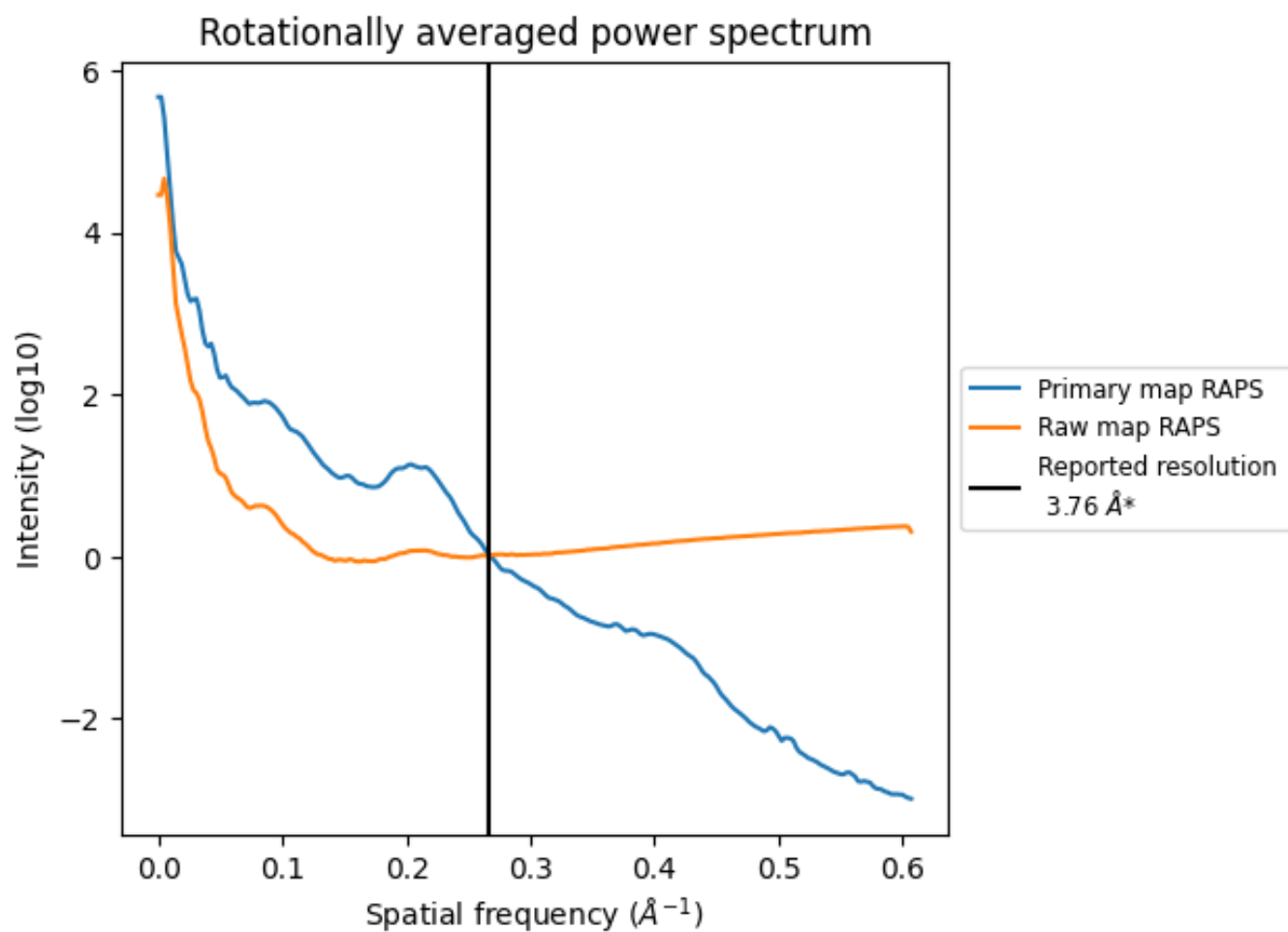
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 98 nm^3 ; this corresponds to an approximate mass of 89 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum i

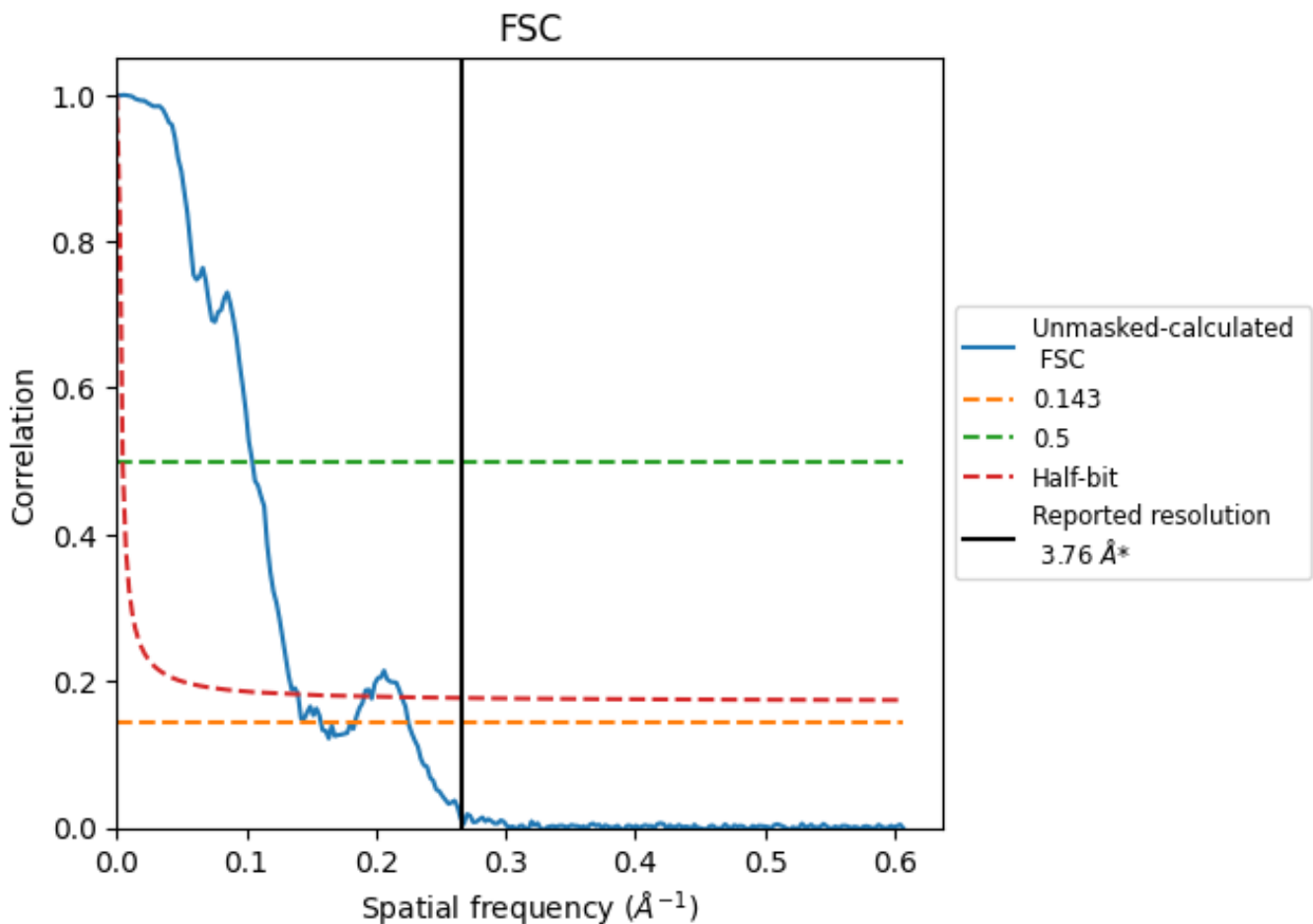


*Reported resolution corresponds to spatial frequency of 0.266 Å⁻¹

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 0.266 Å⁻¹

8.2 Resolution estimates [i](#)

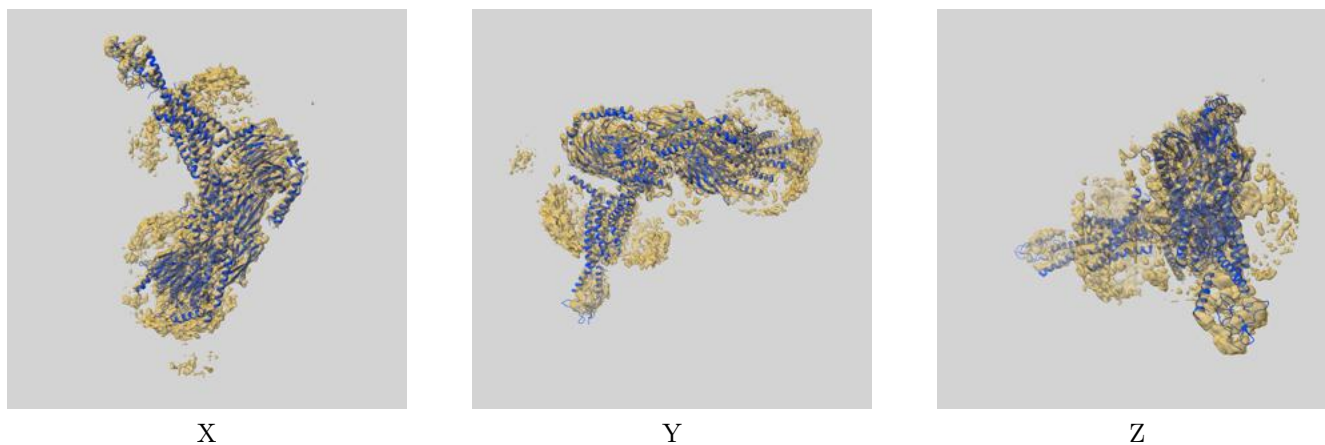
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.76	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	6.35	9.56	7.15

*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 6.35 differs from the reported value 3.76 by more than 10 %

9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-34598 and PDB model 8HAO. Per-residue inclusion information can be found in section [3](#) on page [6](#).

9.1 Map-model overlay [i](#)



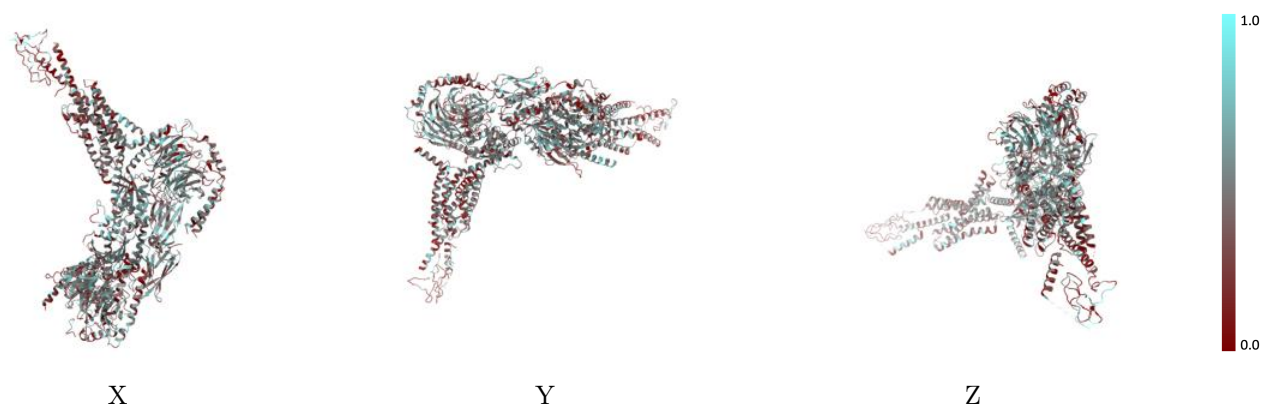
The images above show the 3D surface view of the map at the recommended contour level 0.386 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



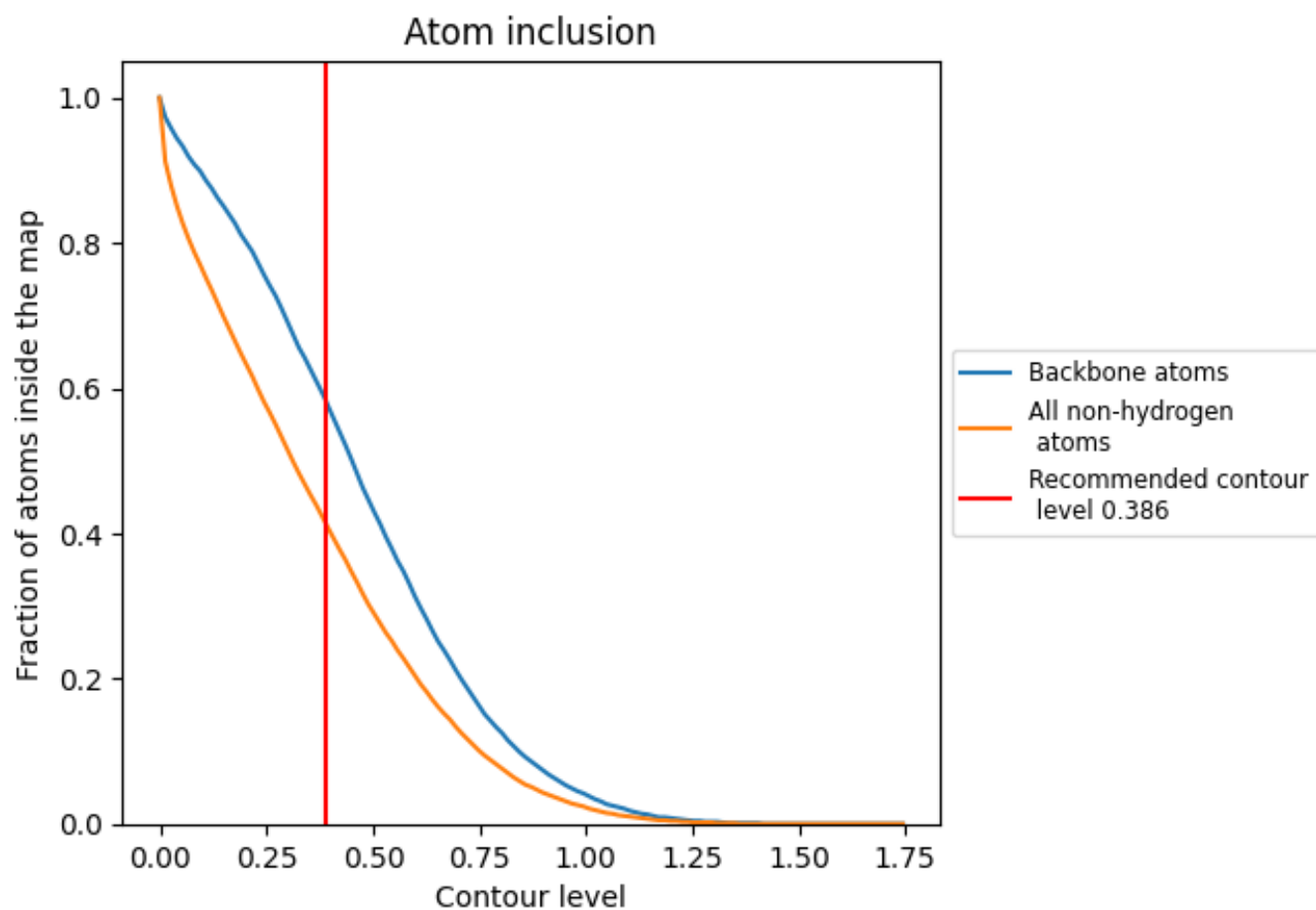
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.386).



























9.4 Atom inclusion [i](#)



At the recommended contour level, 59% of all backbone atoms, 42% 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 (0.386) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.4160	 0.2060
A	 0.4950	 0.2590
B	 0.4460	 0.2270
C	 0.4650	 0.2180
D	 0.4580	 0.2380
E	 0.3850	 0.1550
F	 0.4430	 0.2330
G	 0.3680	 0.2010
H	 0.3850	 0.1730
I	 0.3150	 0.1410
N	 0.4760	 0.2740
P	 0.3430	 0.1590
R	 0.3640	 0.1640

