



Full wwPDB EM Validation Report ⓘ

Oct 20, 2025 – 04:24 PM EDT

PDB ID : 9DGT / pdb_00009dgt
EMDB ID : EMD-46847
Title : structure of dynactin, dynein tail with one BICDR from dynein-dynactin-BI
CDR on microtubules
Authors : Rao, Q.; Chai, P.; Zhang, K.
Deposited on : 2024-09-03
Resolution : 7.20 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:

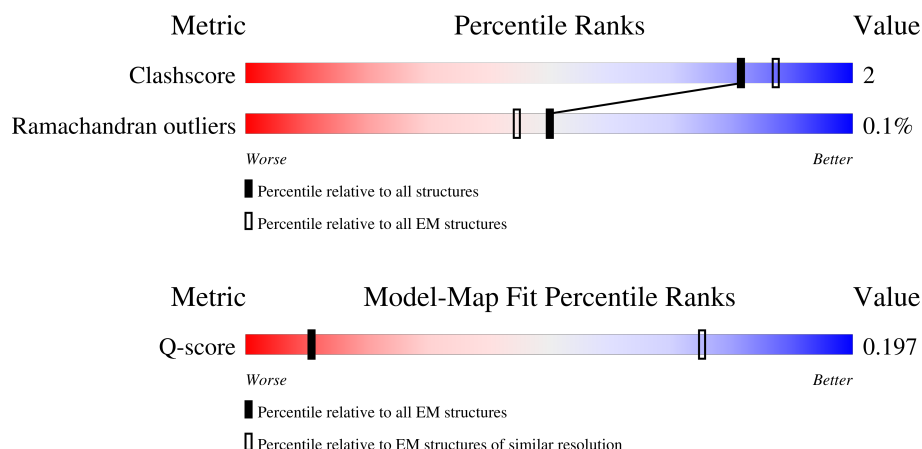
EMDB validation analysis : 0.0.1.dev129
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive 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

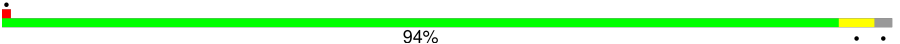
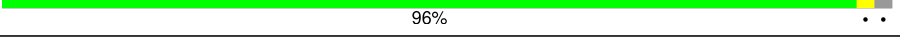
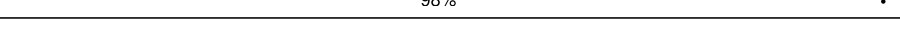
The reported resolution of this entry is 7.20 Å.

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.



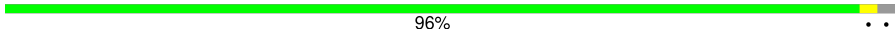
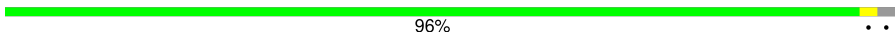
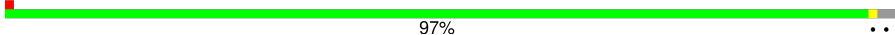
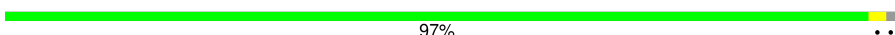
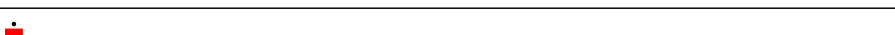
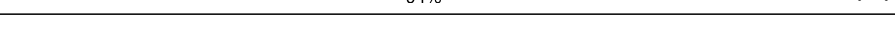
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Q-score	-	25397	444 (6.70 - 7.70)

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	376	 94%
1	B	376	 96%
1	C	376	 98%
1	D	376	 94%
1	E	376	 95%

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Mol	Chain	Length	Quality of chain
1	F	376	
1	G	376	
1	I	376	
2	H	375	
3	J	417	
4	K	286	
5	L	272	
6	M	405	
6	N	405	
6	P	405	
6	Q	405	
7	O	186	
7	R	186	
8	U	190	
9	V	182	
10	W	1281	
10	Z	1281	
11	Y	467	
12	c	577	
12	d	577	
13	e	4646	
13	f	4646	
13	m	4646	
13	n	4646	
14	g	612	

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Mol	Chain	Length	Quality of chain
14	h	612	55% 42%
14	o	612	56% 42%
14	p	612	56% 42%
15	j	492	97%
15	q	492	97%

2 Entry composition

There are 18 unique types of molecules in this entry. The entry contains 59534 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 Alpha-centractin.

Mol	Chain	Residues	Atoms				AltConf	Trace
1	A	370	Total	C	N	O	0	0
			1822	1082	370	370		
1	B	370	Total	C	N	O	0	0
			1822	1082	370	370		
1	C	375	Total	C	N	O	0	0
			1847	1097	375	375		
1	D	370	Total	C	N	O	0	0
			1822	1082	370	370		
1	E	370	Total	C	N	O	0	0
			1822	1082	370	370		
1	F	370	Total	C	N	O	0	0
			1822	1082	370	370		
1	G	370	Total	C	N	O	0	0
			1822	1082	370	370		
1	I	370	Total	C	N	O	0	0
			1822	1082	370	370		

- Molecule 2 is a protein called Actin, cytoplasmic 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	H	370	Total	C	N	O	0	0
			1822	1082	370	370		

- Molecule 3 is a protein called Actin-related protein 10.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	J	379	Total	C	N	O	0	0
			1868	1110	379	379		

- Molecule 4 is a protein called F-actin-capping protein subunit alpha-1.

Mol	Chain	Residues	Atoms				AltConf	Trace
4	K	278	Total	C	N	O	0	0
			1378	822	278	278		

- Molecule 5 is a protein called F-actin-capping protein subunit beta.

Mol	Chain	Residues	Atoms				AltConf	Trace
5	L	269	Total	C	N	O	0	0
			1327	789	269	269		

- Molecule 6 is a protein called Dynactin subunit 2.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	M	340	Total	C	N	O	0	0
			1689	1009	340	340		
6	N	280	Total	C	N	O	0	0
			1394	834	280	280		
6	P	325	Total	C	N	O	0	0
			1612	962	325	325		
6	Q	343	Total	C	N	O	0	0
			1707	1021	343	343		

- Molecule 7 is a protein called Dynactin subunit 3.

Mol	Chain	Residues	Atoms				AltConf	Trace
7	O	179	Total	C	N	O	0	0
			888	530	179	179		
7	R	170	Total	C	N	O	0	0
			844	504	170	170		

- Molecule 8 is a protein called Dynactin subunit 6.

Mol	Chain	Residues	Atoms				AltConf	Trace
8	U	167	Total	C	N	O	0	0
			822	488	167	167		

- Molecule 9 is a protein called Dynactin subunit 5.

Mol	Chain	Residues	Atoms				AltConf	Trace
9	V	179	Total	C	N	O	0	0
			881	523	179	179		

- Molecule 10 is a protein called Dynactin subunit 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
10	W	152	Total	C	N	O	0	0
			754	450	152	152		
10	Z	192	Total	C	N	O	0	0
			952	568	192	192		

- Molecule 11 is a protein called Dynactin subunit 4.

Mol	Chain	Residues	Atoms				AltConf	Trace
11	Y	410	Total	C	N	O	0	0
			2038	1218	410	410		

- Molecule 12 is a protein called BICD family-like cargo adapter 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
12	c	220	Total	C	N	O	0	0
			1095	655	220	220		
12	d	220	Total	C	N	O	0	0
			1095	655	220	220		

- Molecule 13 is a protein called Cytoplasmic dynein 1 heavy chain 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
13	e	798	Total	C	N	O	0	0
			3959	2363	798	798		
13	f	808	Total	C	N	O	0	0
			4009	2393	808	808		
13	m	792	Total	C	N	O	0	0
			3750	2166	792	792		
13	n	755	Total	C	N	O	0	0
			3566	2056	755	755		

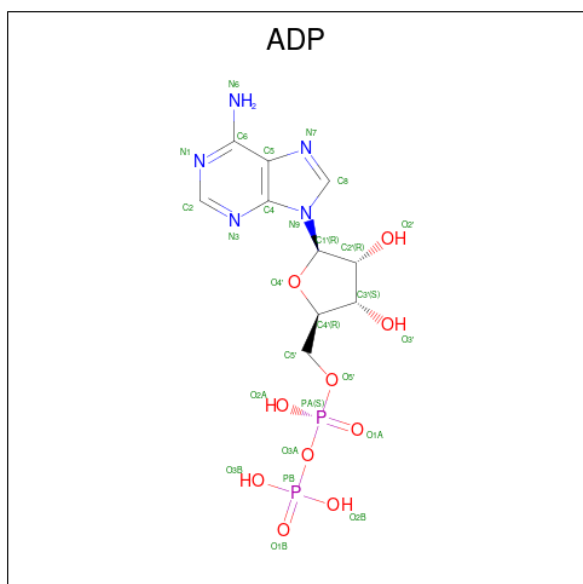
- Molecule 14 is a protein called Cytoplasmic dynein 1 intermediate chain 2.

Mol	Chain	Residues	Atoms				AltConf	Trace
14	g	358	Total	C	N	O	0	0
			1767	1051	358	358		
14	h	358	Total	C	N	O	0	0
			1767	1051	358	358		
14	o	358	Total	C	N	O	0	0
			1767	1051	358	358		
14	p	358	Total	C	N	O	0	0
			1767	1051	358	358		

- Molecule 15 is a protein called Dynein light intermediate chain.

Mol	Chain	Residues	Atoms				AltConf	Trace
15	j	14	Total	C	N	O	0	0
			69	41	14	14		
15	q	14	Total	C	N	O	0	0
			69	41	14	14		

- Molecule 16 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



- # ATP

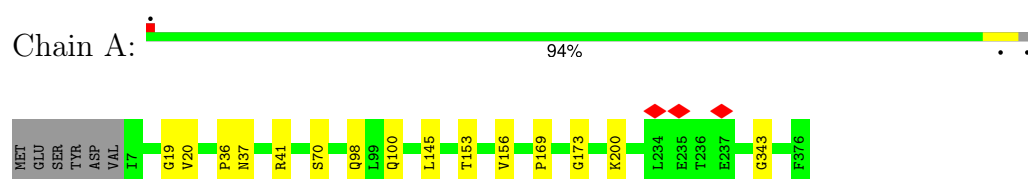
- Molecule 18 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	AltConf
18	Y	3	Total Zn 3 3	0

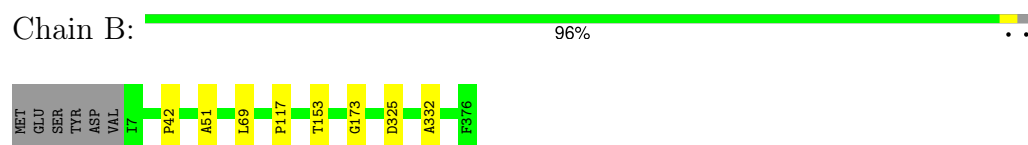
3 Residue-property plots [i](#)

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.

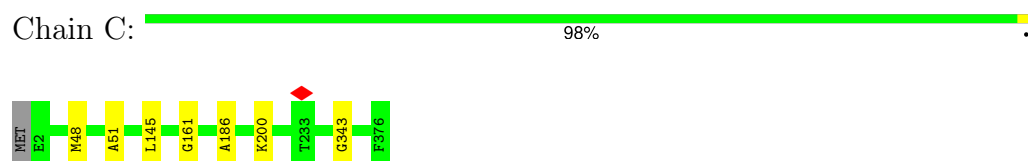
- Molecule 1: Alpha-centractin



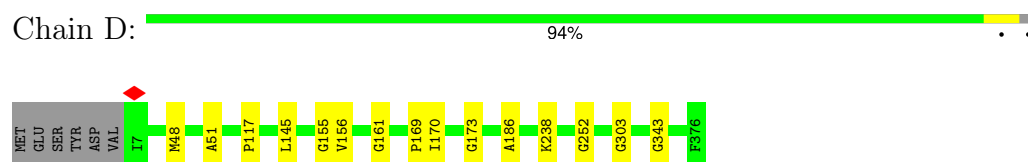
- Molecule 1: Alpha-centractin



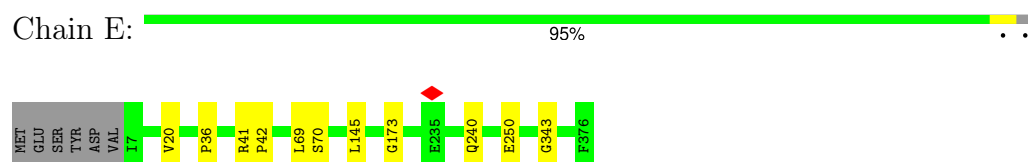
- Molecule 1: Alpha-centractin



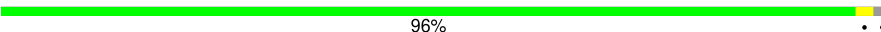
- Molecule 1: Alpha-centractin

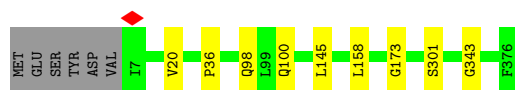


- Molecule 1: Alpha-centractin

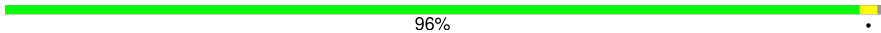


- Molecule 1: Alpha-centractin

Chain F:  96%

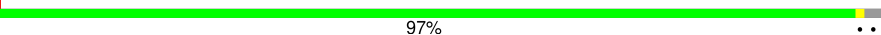


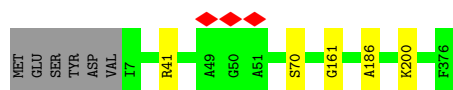
- Molecule 1: Alpha-centractin

Chain G:  96%

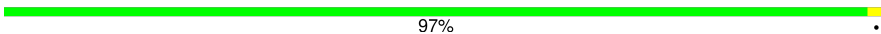


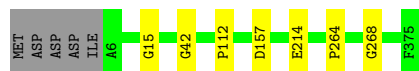
- Molecule 1: Alpha-centractin

Chain I:  97%



- Molecule 2: Actin, cytoplasmic 1

Chain H:  97%

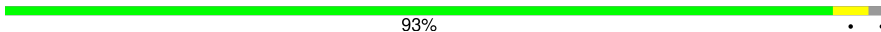


- Molecule 3: Actin-related protein 10

Chain J:  89% 9%

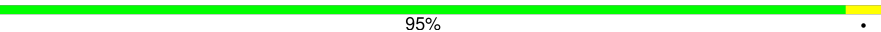


- Molecule 4: F-actin-capping protein subunit alpha-1

Chain K:  93%



- Molecule 5: F-actin-capping protein subunit beta

Chain L:  95%





VAL	
PRO	
GLY	
PRO	
GLY	
LEU	
VAL	
LYS	
D1094	
L1141	
E1145	
A1186	
K1187	
S1188	
I1285	
SER	

Chain Y: 85% 12%

The figure consists of two bar charts, labeled 'a' and 'b', showing the distribution of amino acid types in the protein sequences of the two groups. The x-axis represents the percentage of each amino acid type, and the y-axis lists the amino acids. The bars are color-coded: yellow for hydrophobic, green for polar, and grey for basic.

Chart a (Top): This chart shows a higher proportion of hydrophobic (yellow) and basic (grey) amino acids. The distribution is as follows:

Amino Acid	Percentage (%)	Type
MET	1	Hydrophobic
A2	1	Hydrophobic
E45	1	Basic
Y50	1	Polar
C51	1	Hydrophobic
E56	1	Basic
P77	1	Hydrophobic
T88	1	Hydrophobic
SER	1	Polar
ILE	1	Polar
THR	1	Polar
GLN	1	Polar
LEU	1	Polar
PRO	1	Basic
ASP	1	Basic
ASP	1	Basic
PRO	1	Basic
ALA	1	Hydrophobic
LYS	1	Basic
THR	1	Polar
THR	1	Polar
VAL	1	Hydrophobic
VAL	1	Hydrophobic
LYS	1	Basic
LYS	1	Basic
A106	1	Hydrophobic
C114	1	Hydrophobic
R115	1	Basic
W116	1	Hydrophobic
M172	1	Polar
Y173	1	Polar
M174	1	Polar
P175	1	Hydrophobic
L176	1	Hydrophobic
T182	1	Hydrophobic
ILE	1	Polar
HIS	1	Basic
VAL	1	Hydrophobic
VAL	1	Hydrophobic
ASP	1	Basic
LYS	1	Basic
TVR	1	Polar
GLY	1	Polar
LEU	1	Polar
GLY	1	Polar
THR	1	Polar
ARG	1	Basic
LEU	1	Polar
GLN	1	Polar
ARG	1	Basic
PRO	1	Basic

Chart b (Bottom): This chart shows a higher proportion of polar (green) and acidic (yellow) amino acids. The distribution is as follows:

Amino Acid	Percentage (%)	Type
ALA	1	Hydrophobic
GLY	1	Polar
THR	1	Polar
ILE	1	Polar
THR	1	Polar
ALA	1	Hydrophobic
LEU	1	Polar
ALA	1	Hydrophobic
GLY	1	Polar
LEU	1	Polar
SER	1	Polar
LYS	1	Basic
GLU	1	Polar
GLY	1	Polar
GLU	1	Polar
ASP	1	Basic
GLN	1	Polar
K219	1	Basic
S281	1	Hydrophobic
C351	1	Hydrophobic
E352	1	Hydrophobic
A381	1	Hydrophobic
E382	1	Hydrophobic
Y383	1	Hydrophobic
D397	1	Basic
K427	1	Basic
R440	1	Basic
P441	1	Hydrophobic
V442	1	Hydrophobic
E443	1	Hydrophobic
E444	1	Hydrophobic
A445	1	Hydrophobic
H457	1	Hydrophobic
P464	1	Hydrophobic
LEU	1	Polar
PRO	1	Basic

Chain c: 36% 2% 62%

MET	SER	ALA	ALA	PHE	CYS	LEU	GLY	LEU	ALA	ARG	ALA	SER	PRO	PRO	ASP	SER	CYS	CYS	MET	GLU	LEU	PRO	PRO	GLY	ALA	ALA	GLY	GLY	ASP	VAL	VAL	SER	SER	PRO	ALA	THR	ALA	ALA	ALA	ALA	LEU	VAL	SER	PHE	PRO	GLY	GLY	GLY	LEU	GLU	GLU	GLU
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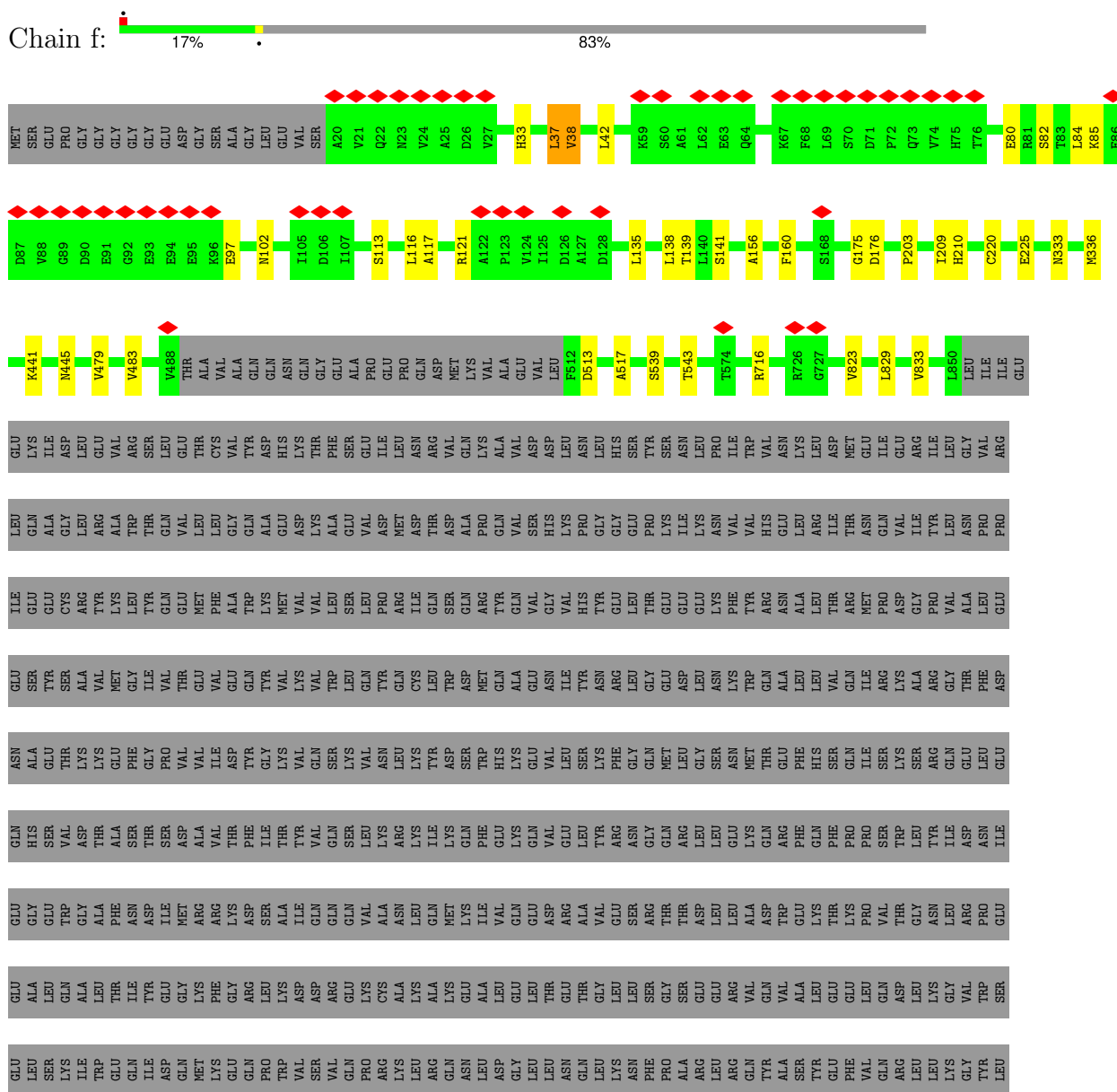






PHE	THR	ASP	LEU	SER	ASP	ARG
THR	ARG	ALA	ASP	GLN	VAL	PRO
ARG	ALA	ALA	ALA	ALA	VAL	ALA
ALA	ASP	CYS	CYS	ALA	GLN	TRP
LEU	LEU	PHE	PHE	SER	VAL	MET
ILE	ILE	GLY	GLY	GLY	CYS	ARG
PHE	THR	VAL	VAL	GLY	GLY	THR
THR	THR	THR	THR	ALA	ALA	HIS
VAL	VAL	GLY	GLY	LYS	LYS	THR
ASP	ASP	LEU	LEU	GLU	GLN	THR
PHE	PHE	LYS	LYS	LEU	LYS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

- Molecule 13: Cytoplasmic dynein 1 heavy chain 1







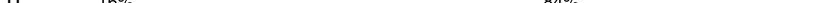






ASN	VAL	VAL	THR	LEU	PRO	VAL	TYR	LEU	ASN	PHE	THR	ARG	ALA	ASP	LEU	ILE	PHE	THR	VAL	ASP	PHE	GLU	ILE	ALA	THR	LYS	GLU	ASP	PRO	ARG	SER	PHE	THR	TYR	GLU	ARG	GLY	VAL	ALA	VAL	LEU	CYS	THR	GLU
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- Molecule 13: Cytoplasmic dynein 1 heavy chain 1

Chain n:  16% 84%

W673	E674	G679	R704	Q707	Q708	R709	W710	L711	G712	W713	S714	L720	GLU	SER	THR	ARG	VAL	ARG	GLY	ARG	SER	GLY	ASN	VAL	LEU	R734	L740	G757	F758	R759	L762	A763	P776	R799	L803	L804	S807	A817	E818	E825	S826	Y827	K828	E838
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ILE	LEU	GLY	VAL	ARG	LEU	GLN	ALA	GLY	LEU	LEU	ALA	TRP	THR	GLN	VAL	LEU	LEU	GLY	GLN	ALA	ASP	LYS	LEU	GLU	GLU	VAL	ASP	ASP	THR	ASP	ALA	ALA	PRO	PRO	VAL	SER	HIS	LYS	LYS	ILE	LYS	ASN	ASN	VAL	VAL	HIS	LEU	LEU	ARG	ILE	THR	ASN	GLN	VAL	ILE	VAL
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TYR	LEU	ASN	PRO	PRO	ILE	GLU	GLU	CYS	ARG	TYR	LYS	LEU	TYR	GLN	GLU	MET	PHE	ALA	TRP	LYS	MET	VAL	VAL	LEU	SER	LEU	PRO	ILE	GLN	SER	GLN	ARG	TYR	GLN	VAL	GLY	VAL	HIS	TYR	GLU	LEU	THR	GLU	GLU	LYS	PHE	TYR	ARG	ASN	ALA	LEU	THR	ARG	MET	PRO	ASP	GLY
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PRO	VAL	ALA	ALA	ALA	GLU	GLU	SER	TYR	SER	ALA	ALA	VAL	VAL	MET	GLY	ILE	VAL	VAL	THR	GLU	VAL	GLU	GLY	GLN	TYR	VAL	VAL	LYS	VAL	TRP	LEU	GLN	TYR	GLN	CYS	LEU	TRP	TRP	ASP	MET	MET	GLN	ALA	ALA	GLU	ASN	ILE	ILE	TYR	ASN	ASN	ARG	LEU	GLY	GLU	ASP	LEU	ASN	LYS	TRP	GLN	LEU	ALA	LEU	LEU	VAL	GLN	ILE	ARG	LYS	ALA
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ARG	GLY	THR	PHE	ASP	ASN	ALA	GLU	THR	LYS	LYS	PHE	GLY	PRO	VAL	VAL	ILE	ASP	Tyr	LYS	GLY	LYS	VAL	GLN	SER	LYS	VAL	VAL	LEU	LYS	TYP	ASP	SER	SER	TRP	TRP	HIS	LYS	LYS	GLU	VAL	VAL	LEU	LEU	SER	SER	PHE	GLY	GLN	MET	MET	THR	THR	GLU	PHE	HIS	SER	GLN	ILE	ILE	SER	SER	LYS	SER
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ARG GLN GLU GLU LEU LEU GLN HIS SER SER VAL ASP THR THR SER THR SER ASP VAL VAL THR PHE PHE THR THR TYR VAL GLN GLN SER LEU LEU LYS ARG LYS LYS LYS GLN PHE PHE GLU GLU LYS GLN VAL VAL GLU LEU LEU TYR ARG ASN GLY GLN ARG ARG ARG LEU LEU GLU GLU LYS GLN PHE PHE GLN PHE PRO PRO PRO SER SER TRP LEU

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

LEU LYS GLY TYR LEU LYS ILE ASN MET LEU VAL ILE GLU LEU LYS ASP ARG HIS TRP LYS GLN LEU MET LYS ARG LEU HIS ASN VAL VAL VAL SER GLU THR LEU LEU GLN ILE TRP TRP ASP VAL ASP LEU GLN LYS ASN GLU ALA VAL VAL LYS ASP

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

SER	PRO	TRP	TYR	LYS	VAL	PHE	GLU	GLU	ASP	ASP	ALA	LEU	SER	TRP	GLU	ASP	ASN	ARG	ILE	MET	LEU	ALA	LEU	PHE	ASP	VAL	TRP	TRP	ILE	ASP	VAL	GLN	ARG	ARG	TRP	VAL	TYR	LEU	GLU	GLY	ILE	PHE	THR	GLY	SER	ALA	ASP	LYS	HIS	LEU	LEU	PRO	VAL	GLU	THR	GLN	ARG	PHE	TYR
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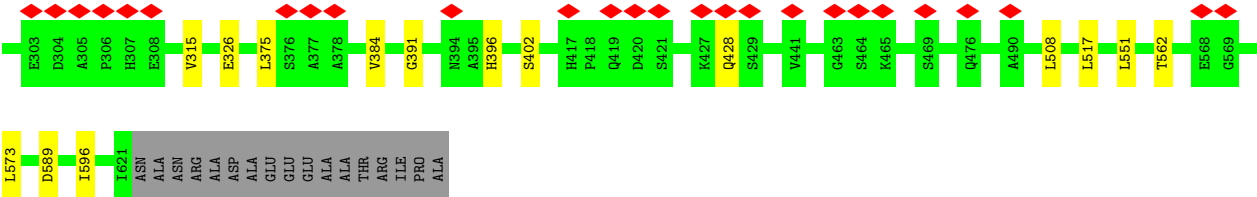
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- Molecule 14: Cytoplasmic dynein 1 intermediate chain 2



A	Q290	GLU	ASP	GLU	MET
	Y291	LEU	PHE	ALA	SER
	P292	THR	PRO	LEU	ASP
	E293	GLU	ARG	LEU	LYS
	V315	GLU	GLU	GLN	SER
	E326	LYS	ILE	MET	GLU
	L359	GLN	VAL	GLY	LEU
	V370	GLN	THR	THR	LYS
	Q371	ILE	TYR	LEU	ALA
	S409	THR	THR	PRO	GLU
B	D413	LEU	VAL	PRO	ARG
	M414	SER	MET	PRO	ALA
	Q419	PHE	GLN	SER	ILE
	V441	ASP	GLN	PRO	ARG
	T480	HIS	LYS	SER	GLU
	C484	THR	GLU	SER	GLU
	G489	ARG	ASP	LYS	LYS
	A490	ILE	GLU	SER	LYS
	V491	VAL	VAL	ALA	ARG
	D492	GLU	THR	GLY	LYS
C	F497	ILE	PRO	SER	LYS
	S500	ASN	LYS	GLN	GLU
	L551	ILE	PRO	ASP	THR
	T562	PHE	PRO	GLY	GLN
	E568	PHE	ILE	GLY	ASN
	G569	ASP	GLU	ASP	GLN
	H580	THR	PRO	GLY	LYS
	S581	SER	GLU	ALA	ALA
	G582	GLY	GLU	VAL	VAL
	R583	GLU	THR	ARG	GLN
D	E601	ASP	LEU	ARG	VAL
	Q602	LYS	LYS	PRO	GLN
	M608	THR	ILE	THR	GLN
	D609	GLY	ALA	LYS	GLU
		GLN	SER	GLY	LEU
		ILE	SER	MET	GLU
		GLN	ASP	ALA	LYS
		ALA	SER	LYS	LYS
		GLY	ALA	ILE	ARG
		THR	PRO	THR	ARG

ASP
ALA
GLU
GLU
GLU
ALA
ALA
THR
ARG
ILE
PRO
ALA



• Molecule 15: Dynein light intermediate chain

Chain j: . 97%

MET	ALA	PRO	GLY	VAL	GLY	VAL	GLU	LYS	LYS	LEU	LEU	THR	LEU	GLY	PRO	ASN	GLY	PRO	ALA	ALA	THR	ARG	THR	PRO	ALA
GLY	GLU	ASP	GLY	VAL	GLY	VAL	GLY	LYS	THR	THR	THR	THR	THR	GLN	GLN	GLN	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	LYS
PHE	ALA	VAL	SER	GLY	GLY	GLY	GLY	SER	LEU	PRO	GLY	VAL	ILE	PHE	VAL	VAL	ASP	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ASP
PHE	GLN	TYR	ILE	GLY	GLY	PRO	GLY	GLY	GLY	GLY	GLY	GLY	GLY	PRO	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY
GLY	LYS	HIS	ASP	TYR	ASP	ARG	ASP	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY
LEU	VAL	VAL	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY
VAL	PHE	LEU	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY
ASN	ASN	ALA	ALA	SER	E426	K439	LYS	GLY	THR	GLY	THR	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY
ALA																									

• Molecule 15: Dynein light intermediate chain

Chain q: . 97%

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



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	10750	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS GLACIOS	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.461	Depositor
Minimum map value	-0.198	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.022	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	666.62396, 666.62396, 666.62396	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.736, 1.736, 1.736	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, ATP, ADP

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	0.16	0/1821	0.40	0/2531
1	B	0.18	0/1821	0.48	0/2531
1	C	0.18	0/1846	0.46	0/2566
1	D	0.17	0/1821	0.42	0/2531
1	E	0.17	0/1821	0.46	0/2531
1	F	0.18	0/1821	0.46	0/2531
1	G	0.18	0/1821	0.44	0/2531
1	I	0.15	0/1821	0.43	0/2531
2	H	0.17	0/1821	0.40	0/2531
3	J	0.28	0/1867	0.50	0/2596
4	K	0.16	0/1377	0.40	0/1919
5	L	0.16	0/1326	0.37	0/1844
6	M	0.17	0/1684	0.45	0/2343
6	N	0.15	0/1389	0.40	0/1933
6	P	0.16	0/1609	0.41	0/2240
6	Q	0.16	0/1703	0.39	0/2373
7	O	0.15	0/887	0.44	0/1236
7	R	0.17	0/843	0.49	0/1175
8	U	0.21	0/821	0.54	0/1140
9	V	0.15	0/880	0.42	0/1222
10	W	0.16	0/750	0.45	0/1040
10	Z	0.17	0/951	0.48	0/1325
11	Y	0.40	0/2035	0.58	1/2837 (0.0%)
12	c	0.38	0/1094	0.67	0/1527
12	d	0.37	0/1094	0.66	0/1527
13	e	0.29	0/3956	0.48	0/5515
13	f	0.26	0/4007	0.51	2/5588 (0.0%)
13	m	0.19	0/3747	0.39	0/5115
13	n	0.32	0/3562	0.49	0/4855
14	g	0.11	0/1766	0.29	0/2457
14	h	0.14	0/1766	0.40	0/2457
14	o	0.13	0/1766	0.37	1/2457 (0.0%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
14	p	0.14	0/1766	0.37	1/2457 (0.0%)
15	j	0.24	0/68	0.50	0/93
15	q	0.27	0/68	0.44	0/93
All	All	0.22	0/59196	0.46	5/82178 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
14	o	428	GLN	CB-CA-C	-5.18	110.58	116.54
14	p	428	GLN	CB-CA-C	-5.15	110.61	116.54
11	Y	51	CYS	CB-CA-C	5.04	116.40	108.63
13	f	37	LEU	CA-C-N	5.04	131.45	122.13
13	f	37	LEU	C-N-CA	5.04	131.45	122.13

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1822	0	820	8	0
1	B	1822	0	820	7	0
1	C	1847	0	830	5	0
1	D	1822	0	820	10	0
1	E	1822	0	820	7	0
1	F	1822	0	820	6	0
1	G	1822	0	820	5	0
1	I	1822	0	820	3	0
2	H	1822	0	835	6	0
3	J	1868	0	823	5	0
4	K	1378	0	611	6	0
5	L	1327	0	585	13	0
6	M	1689	0	765	2	0
6	N	1394	0	632	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	P	1612	0	747	5	0
6	Q	1707	0	769	1	0
7	O	888	0	413	1	0
7	R	844	0	385	1	0
8	U	822	0	370	2	0
9	V	881	0	379	4	0
10	W	754	0	336	2	0
10	Z	952	0	434	2	0
11	Y	2038	0	886	4	0
12	c	1095	0	471	18	0
12	d	1095	0	471	10	0
13	e	3959	0	1773	26	0
13	f	4009	0	1794	24	0
13	m	3750	0	1534	19	0
13	n	3566	0	1454	10	0
14	g	1767	0	796	7	0
14	h	1767	0	796	11	0
14	o	1767	0	796	8	0
14	p	1767	0	796	10	0
15	j	69	0	31	0	0
15	q	69	0	31	0	0
16	A	27	0	12	0	0
16	B	27	0	12	0	0
16	C	27	0	12	0	0
16	D	27	0	12	1	0
16	E	27	0	12	0	0
16	F	27	0	12	0	0
16	G	27	0	12	0	0
16	I	27	0	12	0	0
16	J	27	0	12	1	0
17	H	31	0	12	3	0
18	Y	3	0	0	0	0
All	All	59534	0	26403	207	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 2.

All (207) 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)
13:n:776:PRO:CB	14:p:375:LEU:O	1.81	1.28

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:L:161:SER:CB	12:c:132:ARG:HA	1.75	1.15
5:L:161:SER:CB	12:c:131:SER:C	2.27	1.08
5:L:160:SER:CB	12:c:128:GLN:HA	1.86	1.05
5:L:161:SER:CB	12:c:132:ARG:CA	2.38	1.02
5:L:161:SER:H	12:c:131:SER:CB	1.78	0.96
5:L:161:SER:CB	12:c:131:SER:O	2.18	0.90
5:L:161:SER:CB	12:c:132:ARG:N	2.36	0.88
13:f:82:SER:HA	13:f:113:SER:HA	1.56	0.87
13:f:85:LYS:HA	13:f:97:GLU:HA	1.65	0.79
13:n:456:HIS:O	13:n:460:GLN:N	2.19	0.75
13:e:718:PHE:CB	13:e:819:GLY:O	2.35	0.75
9:V:58:GLY:HA3	9:V:89:ASP:HA	1.70	0.72
9:V:73:PHE:HA	9:V:82:PHE:HA	1.70	0.72
13:f:117:ALA:N	13:f:138:LEU:O	2.17	0.72
13:e:344:LEU:HA	13:e:356:ALA:HB1	1.71	0.71
12:c:307:LEU:HA	12:d:307:LEU:HA	1.75	0.69
13:e:718:PHE:CB	13:e:822:LEU:O	2.41	0.69
13:e:486:PRO:HA	13:e:512:PHE:HA	1.75	0.68
10:W:1130:ALA:O	10:W:1134:LEU:N	2.25	0.66
13:e:283:ARG:HA	13:f:175:GLY:HA3	1.78	0.65
13:f:829:LEU:O	13:f:833:VAL:N	2.30	0.65
2:H:42:GLY:HA3	3:J:387:TRP:HA	1.79	0.64
13:f:716:ARG:HA	13:f:823:VAL:HA	1.79	0.64
4:K:186:ALA:N	4:K:216:VAL:O	2.30	0.63
8:U:25:GLY:HA3	8:U:43:ALA:HB3	1.81	0.63
13:m:152:PHE:O	13:m:157:VAL:N	2.27	0.63
13:f:121:ARG:H	13:f:135:LEU:HA	1.64	0.62
5:L:161:SER:N	12:c:131:SER:CB	2.59	0.62
1:C:51:ALA:HB2	1:E:173:GLY:HA3	1.80	0.62
1:D:303:GLY:HA3	16:D:800:ADP:H5'2	1.81	0.62
14:p:551:LEU:O	14:p:562:THR:N	2.33	0.62
13:e:270:THR:O	13:e:274:GLU:N	2.24	0.61
9:V:38:GLY:HA3	9:V:59:ARG:HA	1.82	0.61
5:L:160:SER:CB	12:c:128:GLN:CA	2.73	0.61
14:o:508:LEU:O	14:o:517:LEU:N	2.35	0.60
14:p:508:LEU:O	14:p:517:LEU:N	2.35	0.60
14:o:551:LEU:O	14:o:562:THR:N	2.33	0.60
7:O:47:ILE:O	7:O:51:ARG:N	2.33	0.59
13:e:403:HIS:HA	13:e:532:GLU:HA	1.83	0.59
1:I:41:ARG:O	1:I:70:SER:N	2.34	0.59
5:L:181:LYS:O	5:L:185:GLY:N	2.32	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:m:153:ILE:O	13:m:158:ALA:N	2.34	0.59
1:B:325:ASP:HA	6:P:93:GLU:H	1.68	0.59
11:Y:45:GLU:N	11:Y:281:SER:O	2.35	0.58
12:c:120:GLY:HA2	12:d:120:GLY:HA2	1.87	0.57
13:e:80:GLU:HA	13:e:115:SER:HA	1.87	0.57
14:o:391:GLY:HA3	14:o:396:HIS:HA	1.86	0.57
14:h:409:SER:N	14:h:420:ASP:O	2.25	0.57
13:m:39:PRO:O	13:m:46:GLY:N	2.37	0.57
13:f:220:CYS:O	13:f:225:GLU:N	2.37	0.56
14:p:391:GLY:HA3	14:p:396:HIS:HA	1.86	0.56
5:L:167:TYR:N	5:L:199:LYS:O	2.31	0.56
12:c:117:ALA:N	12:d:116:ALA:HB1	2.20	0.56
13:e:165:ILE:O	13:e:171:ALA:N	2.37	0.56
5:L:145:LYS:O	5:L:178:GLN:N	2.37	0.56
14:h:394:ASN:O	13:m:599:GLY:HA3	2.06	0.56
13:e:152:PHE:O	13:e:157:VAL:N	2.35	0.55
13:e:283:ARG:HA	13:f:176:ASP:H	1.70	0.55
14:p:573:LEU:HA	14:p:589:ASP:HA	1.88	0.55
2:H:157:ASP:N	17:H:401:ATP:O2B	2.28	0.55
1:D:155:GLY:N	1:D:170:ILE:O	2.36	0.55
13:m:119:ILE:O	13:m:136:ARG:N	2.40	0.55
3:J:137:MET:O	3:J:304:VAL:N	2.39	0.55
13:e:483:VAL:O	13:e:512:PHE:N	2.40	0.55
14:o:573:LEU:HA	14:o:589:ASP:HA	1.88	0.55
1:B:42:PRO:HA	1:B:69:LEU:HA	1.89	0.54
14:g:409:SER:O	14:g:419:GLN:N	2.40	0.54
13:n:776:PRO:CA	14:p:375:LEU:O	2.53	0.54
13:f:539:SER:O	13:f:543:THR:N	2.37	0.54
14:h:551:LEU:O	14:h:562:THR:N	2.41	0.54
4:K:94:ILE:HA	4:K:110:PRO:HA	1.90	0.54
6:M:155:HIS:O	6:M:160:LEU:N	2.33	0.54
14:p:384:VAL:HA	14:p:402:SER:HA	1.90	0.53
12:c:237:PHE:HA	12:d:237:PHE:HA	1.91	0.53
13:e:753:LEU:O	13:e:757:GLY:N	2.40	0.53
14:o:384:VAL:HA	14:o:402:SER:HA	1.90	0.53
1:C:48:MET:CB	1:E:173:GLY:HA2	2.38	0.53
13:f:33:HIS:O	13:f:37:LEU:N	2.36	0.53
13:f:156:ALA:O	13:f:160:PHE:N	2.26	0.52
13:m:132:SER:H	13:n:41:LEU:C	2.17	0.52
1:E:41:ARG:O	1:E:70:SER:N	2.34	0.52
13:e:435:ARG:HA	13:e:447:LYS:HA	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:P:312:LYS:O	6:P:315:GLN:N	2.42	0.52
9:V:60:HIS:O	9:V:90:HIS:HA	2.10	0.52
13:f:80:GLU:N	13:f:102:ASN:O	2.27	0.52
1:B:325:ASP:HA	6:P:93:GLU:N	2.25	0.51
4:K:163:PHE:HA	4:K:170:ASN:HA	1.91	0.51
6:M:212:GLU:N	10:W:1255:LYS:O	2.35	0.51
13:e:717:ILE:CB	13:e:824:TRP:HA	2.40	0.51
10:Z:1141:LEU:O	10:Z:1145:GLU:N	2.45	0.50
14:o:315:VAL:O	14:o:326:GLU:N	2.45	0.50
1:E:20:VAL:HA	1:E:36:PRO:HA	1.94	0.50
14:h:435:THR:H	14:h:451:SER:HA	1.77	0.50
13:m:195:HIS:O	13:m:199:ASN:N	2.45	0.50
14:h:436:SER:O	14:h:450:GLY:N	2.40	0.49
13:n:86:GLU:O	13:n:96:LYS:N	2.42	0.49
12:d:155:LEU:O	12:d:159:PHE:CB	2.61	0.49
13:n:315:SER:O	13:n:319:ASP:N	2.45	0.49
14:p:315:VAL:O	14:p:326:GLU:N	2.45	0.49
13:m:715:GLY:O	13:m:824:TRP:N	2.46	0.49
13:m:747:SER:HA	13:m:768:ALA:HB1	1.95	0.49
13:n:776:PRO:C	14:p:375:LEU:O	2.56	0.49
1:G:98:GLN:O	1:G:100:GLN:N	2.45	0.49
13:e:539:SER:O	13:e:543:THR:N	2.43	0.48
1:E:42:PRO:HA	1:E:69:LEU:HA	1.95	0.48
13:f:209:ILE:O	13:f:210:HIS:C	2.57	0.48
13:m:539:SER:O	13:m:543:THR:N	2.40	0.48
13:e:37:LEU:O	13:e:41:LEU:N	2.39	0.48
14:g:551:LEU:O	14:g:562:THR:N	2.47	0.48
1:G:41:ARG:O	1:G:70:SER:N	2.38	0.48
1:A:98:GLN:O	1:A:100:GLN:N	2.47	0.47
13:e:120:LYS:HA	13:e:135:LEU:HA	1.96	0.47
8:U:82:MET:HA	8:U:99:MET:O	2.14	0.47
14:g:359:LEU:N	14:g:371:GLN:O	2.42	0.47
1:C:145:LEU:O	1:C:343:GLY:HA3	2.15	0.47
1:D:156:VAL:HA	1:D:169:PRO:HA	1.97	0.47
11:Y:427:LYS:HA	11:Y:457:HIS:HA	1.96	0.47
13:m:437:ILE:O	13:m:441:LYS:N	2.41	0.47
13:m:585:PHE:O	13:m:589:ASN:N	2.47	0.47
1:A:20:VAL:HA	1:A:36:PRO:HA	1.96	0.47
14:h:266:SER:O	14:h:598:ASP:N	2.41	0.47
1:A:41:ARG:O	1:A:70:SER:N	2.38	0.47
13:e:435:ARG:O	13:e:447:LYS:N	2.48	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:f:513:ASP:O	13:f:517:ALA:N	2.37	0.47
1:A:200:LYS:O	1:B:117:PRO:HA	2.15	0.46
1:F:145:LEU:O	1:F:343:GLY:HA3	2.14	0.46
1:I:161:GLY:O	1:I:186:ALA:HB1	2.15	0.46
14:g:315:VAL:O	14:g:326:GLU:N	2.48	0.46
13:m:716:ARG:HA	13:m:823:VAL:HA	1.96	0.46
13:e:119:ILE:O	13:e:136:ARG:N	2.49	0.46
13:f:38:VAL:O	13:f:42:LEU:N	2.35	0.46
1:G:161:GLY:O	1:G:186:ALA:HB1	2.16	0.46
3:J:22:GLU:N	16:J:800:ADP:O1B	2.49	0.46
1:E:145:LEU:O	1:E:343:GLY:HA3	2.15	0.45
1:G:200:LYS:O	2:H:112:PRO:HA	2.16	0.45
4:K:160:SER:O	4:K:173:TRP:N	2.35	0.45
13:e:535:GLY:HA2	13:e:546:TRP:HA	1.97	0.45
14:p:268:ASN:N	14:p:596:ILE:O	2.49	0.45
13:f:113:SER:O	13:f:141:SER:HA	2.17	0.45
13:f:116:LEU:HA	13:f:139:THR:HA	1.98	0.45
11:Y:50:TYR:HA	11:Y:56:GLU:O	2.16	0.45
13:f:82:SER:O	13:f:84:LEU:N	2.50	0.45
1:D:51:ALA:HB2	1:F:173:GLY:HA3	1.98	0.45
2:H:214:GLU:HA	17:H:401:ATP:C2	2.52	0.45
14:o:268:ASN:N	14:o:596:ILE:O	2.49	0.45
6:P:258:GLY:O	6:P:260:CYS:N	2.48	0.45
4:K:62:PHE:HA	4:K:76:ILE:O	2.17	0.45
1:D:161:GLY:O	1:D:186:ALA:HB1	2.17	0.45
13:f:479:VAL:O	13:f:483:VAL:N	2.42	0.45
12:c:300:GLY:HA2	12:d:300:GLY:HA2	1.98	0.45
1:A:145:LEU:O	1:A:343:GLY:HA3	2.17	0.44
14:h:527:VAL:HA	14:h:544:ASP:HA	1.99	0.44
13:m:802:SER:O	13:m:806:ALA:HB2	2.17	0.44
13:e:286:TYR:CB	13:f:175:GLY:HA2	2.48	0.44
3:J:248:TYR:O	3:J:256:LEU:N	2.40	0.44
13:f:333:ASN:O	13:f:336:MET:N	2.49	0.44
14:h:480:THR:H	14:h:501:SER:HA	1.82	0.43
1:F:158:LEU:O	1:F:301:SER:N	2.51	0.43
10:Z:1186:ALA:O	10:Z:1188:SER:N	2.51	0.43
1:D:145:LEU:O	1:D:343:GLY:HA3	2.18	0.43
6:Q:26:PRO:O	6:Q:28:ASP:N	2.51	0.43
13:e:283:ARG:CA	13:f:176:ASP:H	2.29	0.43
13:m:25:ALA:N	13:m:125:ILE:O	2.52	0.43
1:B:332:ALA:H	6:P:86:GLY:HA3	1.82	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:161:GLY:O	1:C:186:ALA:HB1	2.18	0.43
1:B:51:ALA:HB2	1:D:173:GLY:HA3	2.01	0.43
14:g:359:LEU:O	14:g:370:VAL:N	2.51	0.43
13:f:441:LYS:O	13:f:445:ASN:N	2.33	0.43
14:g:480:THR:N	14:g:500:SER:O	2.52	0.43
1:I:200:LYS:O	3:J:98:PRO:HA	2.19	0.42
1:A:19:GLY:O	1:A:37:ASN:N	2.41	0.42
14:h:455:SER:HA	14:h:472:PHE:O	2.19	0.42
1:D:238:LYS:HA	1:D:252:GLY:HA2	2.00	0.42
7:R:18:GLU:O	7:R:22:TYR:N	2.52	0.42
1:B:153:THR:O	1:B:173:GLY:N	2.46	0.42
1:F:98:GLN:O	1:F:100:GLN:N	2.53	0.42
1:A:156:VAL:HA	1:A:169:PRO:HA	2.02	0.41
1:F:20:VAL:HA	1:F:36:PRO:HA	2.03	0.41
12:d:199:THR:O	12:d:200:ARG:C	2.63	0.41
13:m:137:VAL:O	13:n:139:THR:N	2.53	0.41
13:n:666:GLU:HA	13:n:673:TRP:CB	2.50	0.41
13:m:112:LYS:H	13:m:142:GLU:C	2.29	0.41
1:A:153:THR:O	1:A:173:GLY:N	2.53	0.41
1:C:200:LYS:O	1:D:117:PRO:HA	2.21	0.41
11:Y:114:CYS:O	11:Y:116:TRP:N	2.45	0.41
14:h:436:SER:N	14:h:450:GLY:O	2.39	0.41
12:c:100:PRO:C	12:c:102:LEU:H	2.29	0.41
13:m:165:ILE:CA	13:m:171:ALA:H	2.34	0.41
14:h:406:LYS:HA	14:h:423:GLU:HA	2.02	0.41
1:E:240:GLN:HA	1:E:250:GLU:HA	2.02	0.41
5:L:123:ASP:HA	5:L:128:PHE:HA	2.03	0.41
13:e:21:VAL:HA	13:e:122:ALA:HB1	2.03	0.41
4:K:154:ILE:N	4:K:179:PHE:O	2.42	0.41
13:n:674:GLU:HA	13:n:679:GLY:HA3	2.03	0.41
2:H:264:PRO:O	2:H:268:GLY:N	2.53	0.40
12:c:244:THR:HA	12:d:244:THR:HA	2.03	0.40
14:g:484:CYS:HA	14:g:497:PHE:HA	2.03	0.40
13:m:673:TRP:O	13:m:679:GLY:HA3	2.21	0.40
1:G:145:LEU:O	1:G:343:GLY:HA3	2.22	0.40
12:c:113:LEU:HA	12:d:113:LEU:HA	2.03	0.40
12:c:219:ALA:HB1	12:d:220:SER:HA	2.03	0.40
14:o:337:SER:O	14:o:351:GLY:N	2.46	0.40
2:H:15:GLY:N	17:H:401:ATP:O1B	2.55	0.40
13:e:435:ARG:HA	13:e:447:LYS:CA	2.51	0.40
1:D:48:MET:CB	1:F:173:GLY:HA2	2.52	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:e:349:GLU:O	13:e:353:ILE:N	2.49	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	368/376 (98%)	359 (98%)	9 (2%)	0	100	100
1	B	368/376 (98%)	355 (96%)	13 (4%)	0	100	100
1	C	373/376 (99%)	361 (97%)	12 (3%)	0	100	100
1	D	368/376 (98%)	356 (97%)	12 (3%)	0	100	100
1	E	368/376 (98%)	356 (97%)	12 (3%)	0	100	100
1	F	368/376 (98%)	357 (97%)	11 (3%)	0	100	100
1	G	368/376 (98%)	357 (97%)	11 (3%)	0	100	100
1	I	368/376 (98%)	354 (96%)	14 (4%)	0	100	100
2	H	368/375 (98%)	357 (97%)	11 (3%)	0	100	100
3	J	377/417 (90%)	365 (97%)	12 (3%)	0	100	100
4	K	276/286 (96%)	268 (97%)	8 (3%)	0	100	100
5	L	267/272 (98%)	261 (98%)	6 (2%)	0	100	100
6	M	330/405 (82%)	311 (94%)	18 (6%)	1 (0%)	37	73
6	N	270/405 (67%)	262 (97%)	7 (3%)	1 (0%)	30	68
6	P	319/405 (79%)	312 (98%)	7 (2%)	0	100	100
6	Q	335/405 (83%)	318 (95%)	17 (5%)	0	100	100
7	O	177/186 (95%)	165 (93%)	12 (7%)	0	100	100
7	R	168/186 (90%)	160 (95%)	8 (5%)	0	100	100
8	U	165/190 (87%)	157 (95%)	8 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
9	V	177/182 (97%)	172 (97%)	5 (3%)	0	100	100
10	W	144/1281 (11%)	138 (96%)	5 (4%)	1 (1%)	19	57
10	Z	190/1281 (15%)	185 (97%)	5 (3%)	0	100	100
11	Y	404/467 (86%)	377 (93%)	24 (6%)	3 (1%)	19	57
12	c	218/577 (38%)	206 (94%)	12 (6%)	0	100	100
12	d	218/577 (38%)	207 (95%)	11 (5%)	0	100	100
13	e	792/4646 (17%)	745 (94%)	45 (6%)	2 (0%)	37	73
13	f	804/4646 (17%)	763 (95%)	39 (5%)	2 (0%)	44	78
13	m	786/4646 (17%)	758 (96%)	27 (3%)	1 (0%)	48	83
13	n	747/4646 (16%)	721 (96%)	25 (3%)	1 (0%)	48	83
14	g	356/612 (58%)	353 (99%)	3 (1%)	0	100	100
14	h	356/612 (58%)	346 (97%)	10 (3%)	0	100	100
14	o	356/612 (58%)	350 (98%)	6 (2%)	0	100	100
14	p	356/612 (58%)	350 (98%)	6 (2%)	0	100	100
15	j	12/492 (2%)	11 (92%)	1 (8%)	0	100	100
15	q	12/492 (2%)	12 (100%)	0	0	100	100
All	All	11929/32921 (36%)	11485 (96%)	432 (4%)	12 (0%)	50	83

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	M	217	PRO
10	W	1142	PRO
11	Y	175	PRO
11	Y	441	PRO
13	f	38	VAL
13	f	203	PRO
13	n	21	VAL
13	e	726	ARG
13	m	210	HIS
6	N	163	ASP
13	e	732	VAL
11	Y	77	PRO

5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

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](#)

Of 13 ligands modelled in this entry, 3 are monoatomic - leaving 10 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	$\# Z > 2$
16	ADP	A	800	-	24,29,29	0.89	0	29,45,45	1.11	2 (6%)
16	ADP	I	800	-	24,29,29	0.88	0	29,45,45	1.18	2 (6%)
16	ADP	J	800	-	24,29,29	0.95	1 (4%)	29,45,45	1.24	3 (10%)
17	ATP	H	401	-	28,33,33	0.70	0	34,52,52	0.60	1 (2%)
16	ADP	C	800	-	24,29,29	0.86	0	29,45,45	1.09	2 (6%)
16	ADP	B	800	-	24,29,29	0.87	0	29,45,45	1.13	2 (6%)
16	ADP	G	800	-	24,29,29	0.88	0	29,45,45	1.17	2 (6%)
16	ADP	D	800	-	24,29,29	0.89	0	29,45,45	1.18	2 (6%)
16	ADP	E	800	-	24,29,29	0.87	0	29,45,45	1.13	2 (6%)
16	ADP	F	800	-	24,29,29	0.87	0	29,45,45	1.11	2 (6%)

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
16	ADP	A	800	-	-	1/12/32/32	0/3/3/3
16	ADP	I	800	-	-	3/12/32/32	0/3/3/3
16	ADP	J	800	-	-	7/12/32/32	0/3/3/3
17	ATP	H	401	-	-	10/18/38/38	0/3/3/3
16	ADP	C	800	-	-	3/12/32/32	0/3/3/3
16	ADP	B	800	-	-	0/12/32/32	0/3/3/3
16	ADP	G	800	-	-	0/12/32/32	0/3/3/3
16	ADP	D	800	-	-	5/12/32/32	0/3/3/3
16	ADP	E	800	-	-	2/12/32/32	0/3/3/3
16	ADP	F	800	-	-	8/12/32/32	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	J	800	ADP	PA-O3A	2.24	1.61	1.59

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	J	800	ADP	N3-C2-N1	-3.62	123.75	128.67
16	G	800	ADP	N3-C2-N1	-3.58	123.82	128.67
16	I	800	ADP	N3-C2-N1	-3.49	123.93	128.67
16	A	800	ADP	N3-C2-N1	-3.49	123.94	128.67
16	F	800	ADP	N3-C2-N1	-3.49	123.94	128.67
16	E	800	ADP	N3-C2-N1	-3.46	123.98	128.67
16	C	800	ADP	N3-C2-N1	-3.45	123.99	128.67
16	B	800	ADP	N3-C2-N1	-3.38	124.08	128.67
16	D	800	ADP	N3-C2-N1	-3.31	124.17	128.67
16	D	800	ADP	C4-C5-N7	-2.52	106.67	109.34
16	B	800	ADP	C4-C5-N7	-2.50	106.70	109.34
16	E	800	ADP	C4-C5-N7	-2.49	106.70	109.34
16	I	800	ADP	C4-C5-N7	-2.47	106.73	109.34
16	A	800	ADP	C4-C5-N7	-2.44	106.75	109.34
16	J	800	ADP	C4-C5-N7	-2.44	106.76	109.34
16	G	800	ADP	C4-C5-N7	-2.40	106.80	109.34
16	F	800	ADP	C4-C5-N7	-2.40	106.80	109.34
16	C	800	ADP	C4-C5-N7	-2.40	106.80	109.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
17	H	401	ATP	C5-C6-N6	2.25	123.73	120.31
16	J	800	ADP	C2'-C3'-C4'	2.09	106.64	102.61

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
16	C	800	ADP	C5'-O5'-PA-O3A
16	D	800	ADP	C5'-O5'-PA-O2A
16	D	800	ADP	C5'-O5'-PA-O3A
16	D	800	ADP	C3'-C4'-C5'-O5'
16	F	800	ADP	C5'-O5'-PA-O1A
16	F	800	ADP	C5'-O5'-PA-O2A
16	F	800	ADP	C5'-O5'-PA-O3A
16	I	800	ADP	C5'-O5'-PA-O1A
16	I	800	ADP	C5'-O5'-PA-O3A
16	J	800	ADP	PA-O3A-PB-O3B
16	J	800	ADP	C5'-O5'-PA-O1A
16	J	800	ADP	C5'-O5'-PA-O2A
16	J	800	ADP	C5'-O5'-PA-O3A
17	H	401	ATP	C5'-O5'-PA-O1A
17	H	401	ATP	C5'-O5'-PA-O2A
17	H	401	ATP	C5'-O5'-PA-O3A
16	J	800	ADP	C3'-C4'-C5'-O5'
17	H	401	ATP	O4'-C4'-C5'-O5'
16	D	800	ADP	O4'-C4'-C5'-O5'
16	J	800	ADP	O4'-C4'-C5'-O5'
17	H	401	ATP	C3'-C4'-C5'-O5'
16	F	800	ADP	O4'-C4'-C5'-O5'
16	F	800	ADP	C3'-C4'-C5'-O5'
16	D	800	ADP	PA-O3A-PB-O1B
17	H	401	ATP	PB-O3A-PA-O1A
17	H	401	ATP	PB-O3A-PA-O5'
16	C	800	ADP	C3'-C4'-C5'-O5'
16	C	800	ADP	C5'-O5'-PA-O1A
16	I	800	ADP	C5'-O5'-PA-O2A
16	J	800	ADP	PA-O3A-PB-O1B
17	H	401	ATP	PB-O3B-PG-O1G
16	F	800	ADP	PA-O3A-PB-O1B
16	E	800	ADP	PA-O3A-PB-O2B
16	F	800	ADP	PA-O3A-PB-O2B
16	F	800	ADP	PA-O3A-PB-O3B

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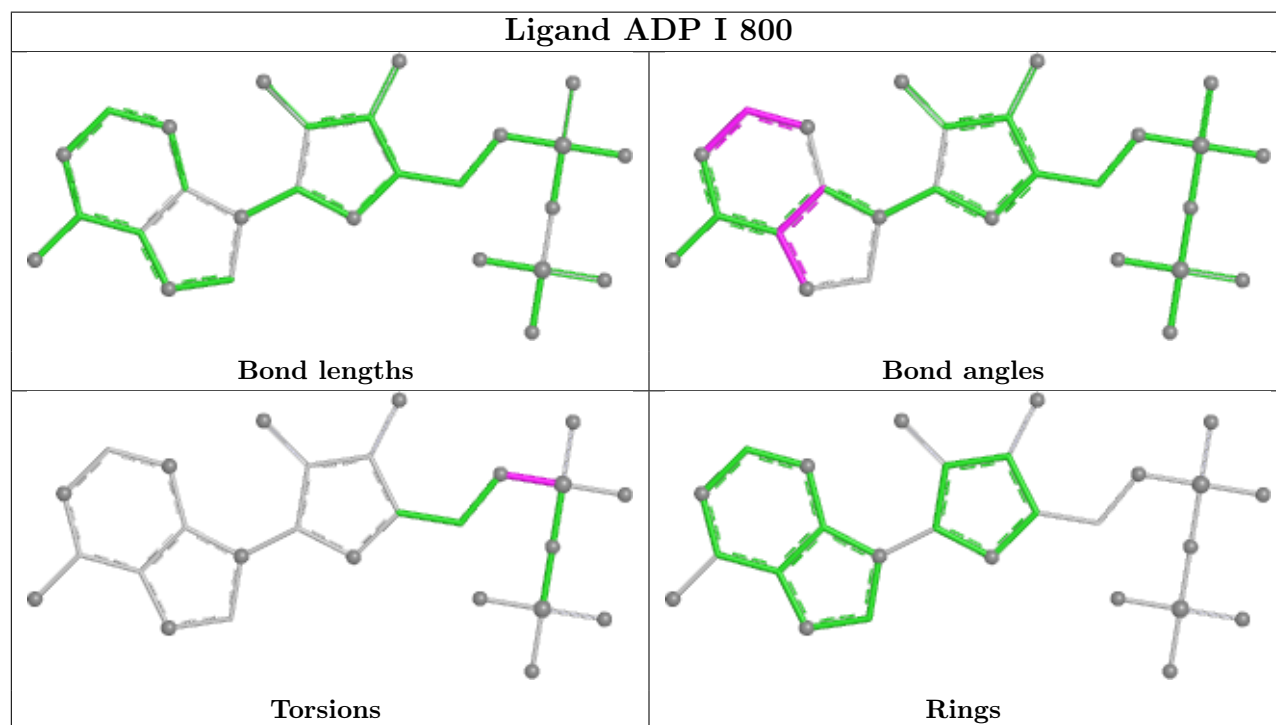
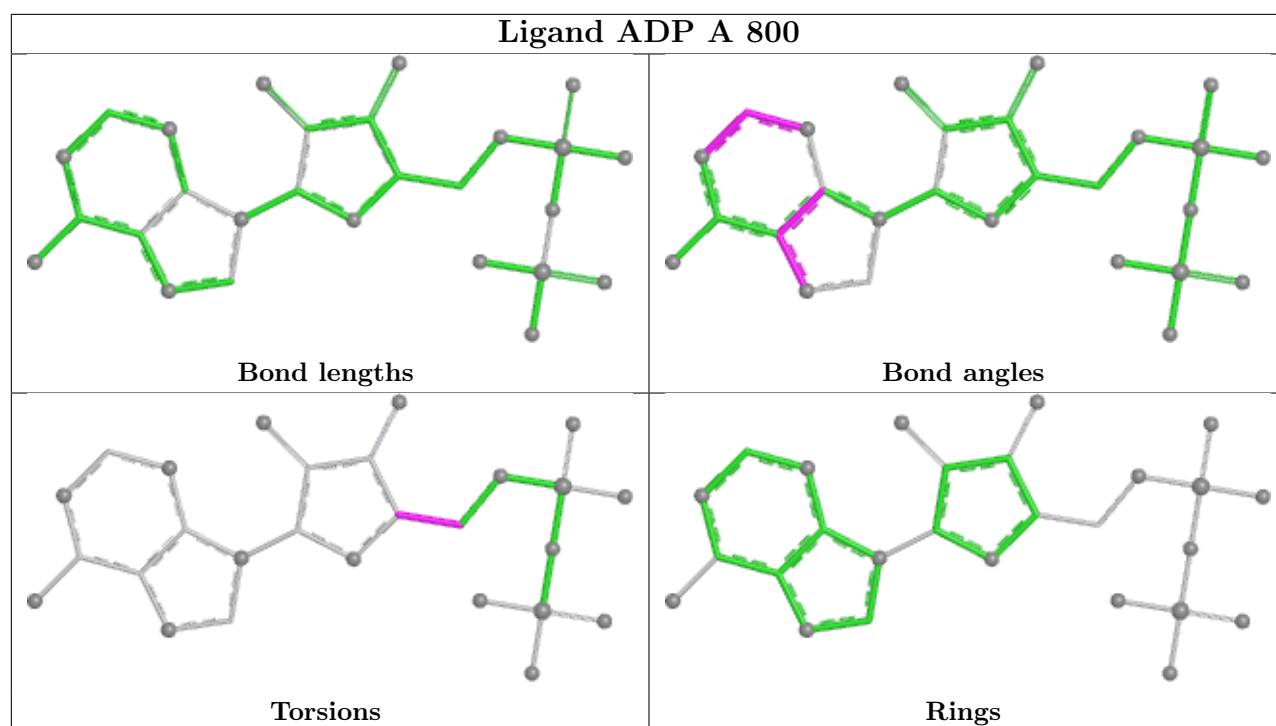
Mol	Chain	Res	Type	Atoms
17	H	401	ATP	PA-O3A-PB-O1B
16	A	800	ADP	O4'-C4'-C5'-O5'
16	E	800	ADP	O4'-C4'-C5'-O5'
17	H	401	ATP	PA-O3A-PB-O2B

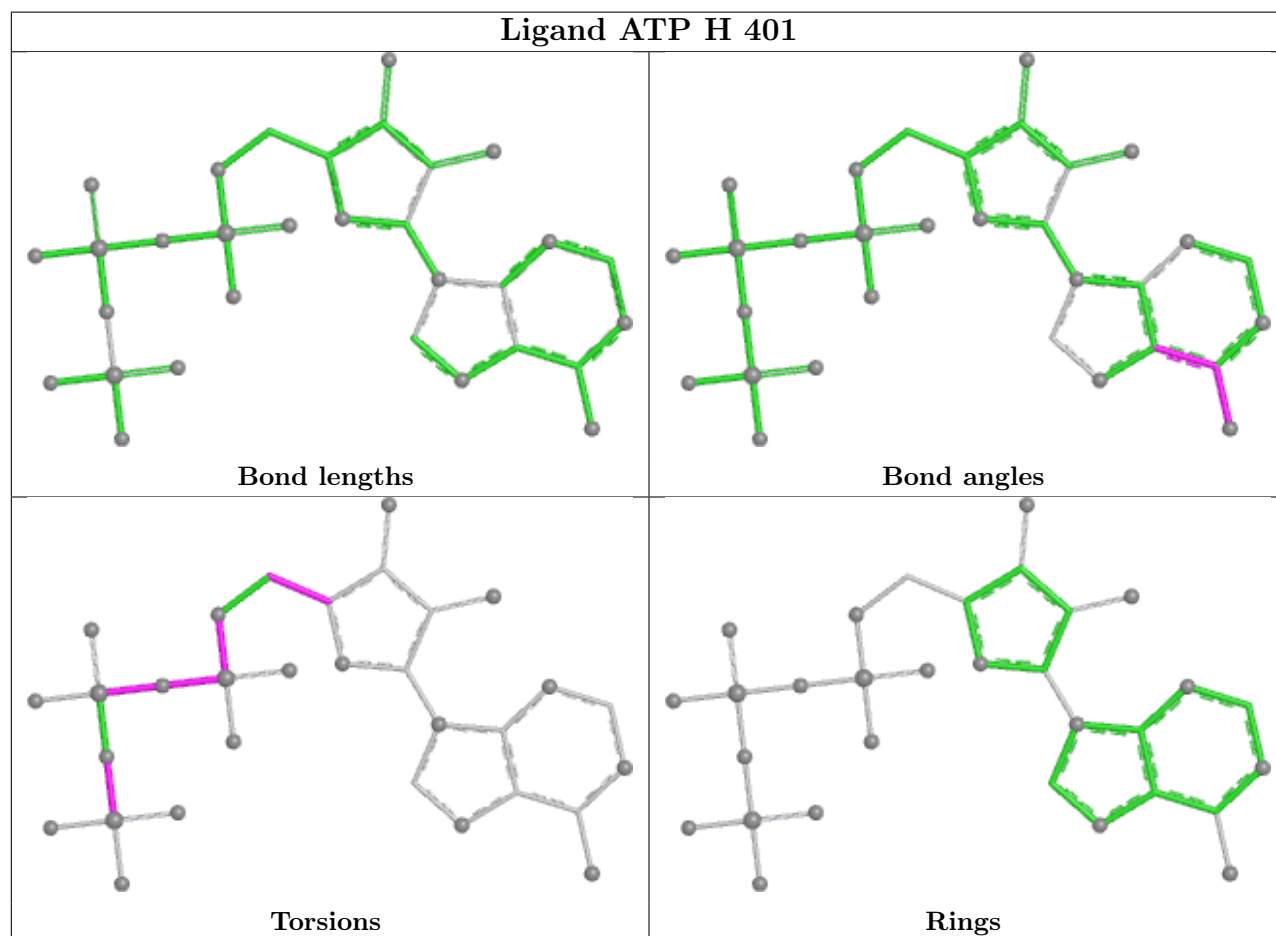
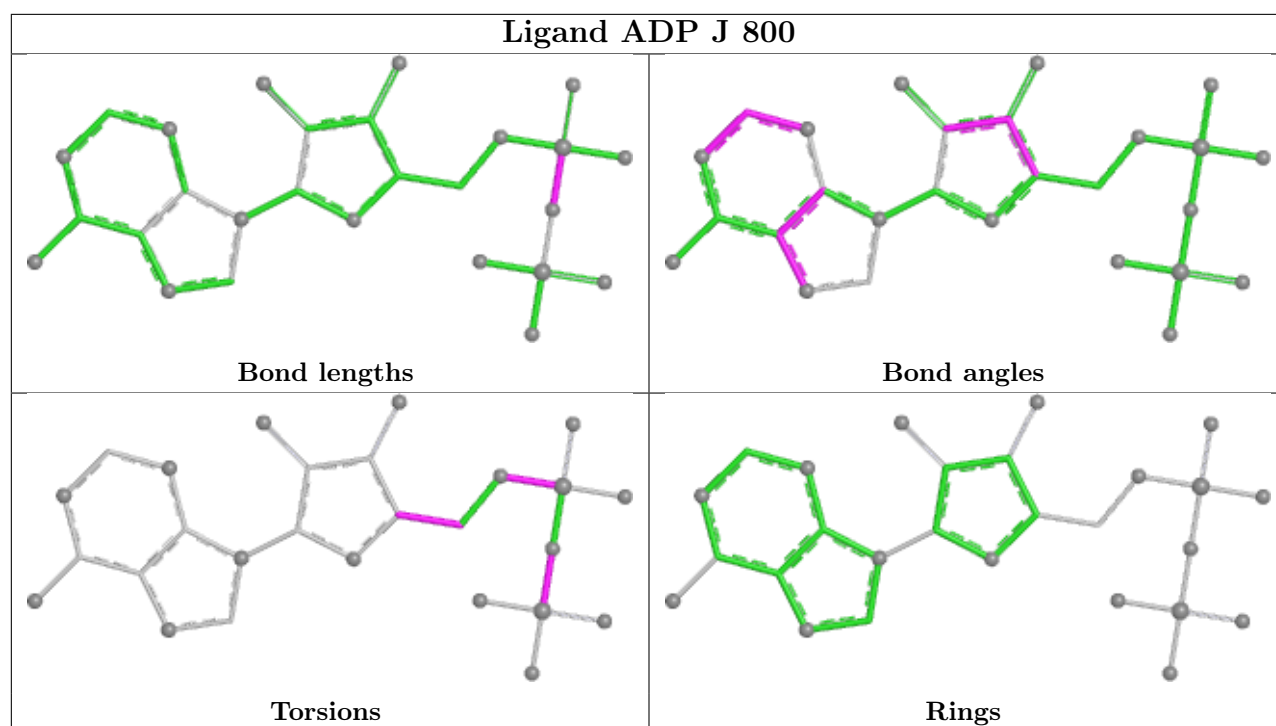
There are no ring outliers.

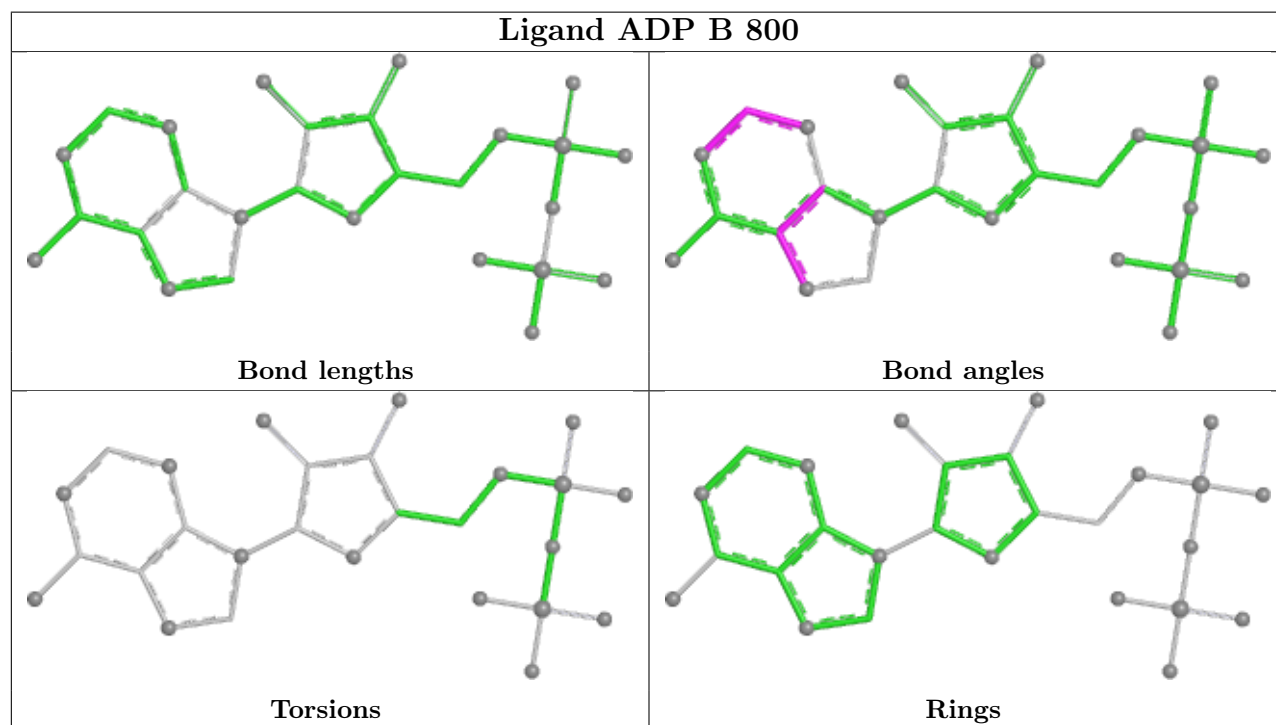
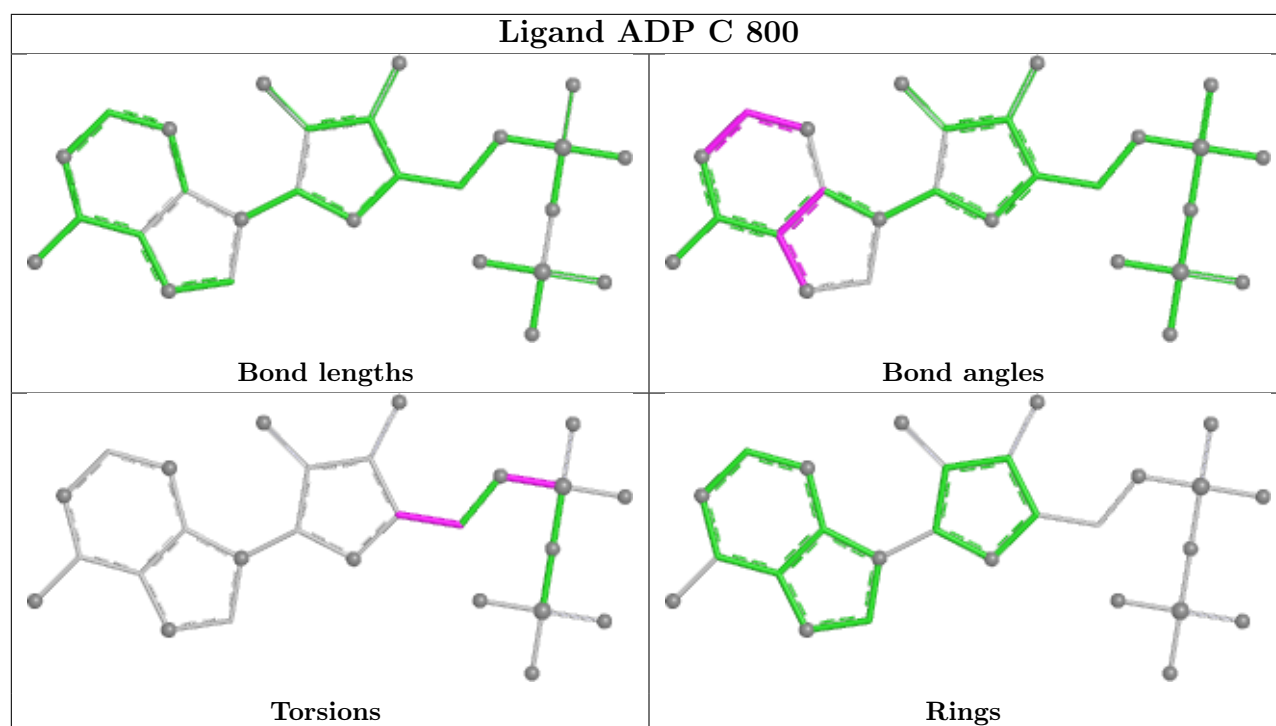
3 monomers are involved in 5 short contacts:

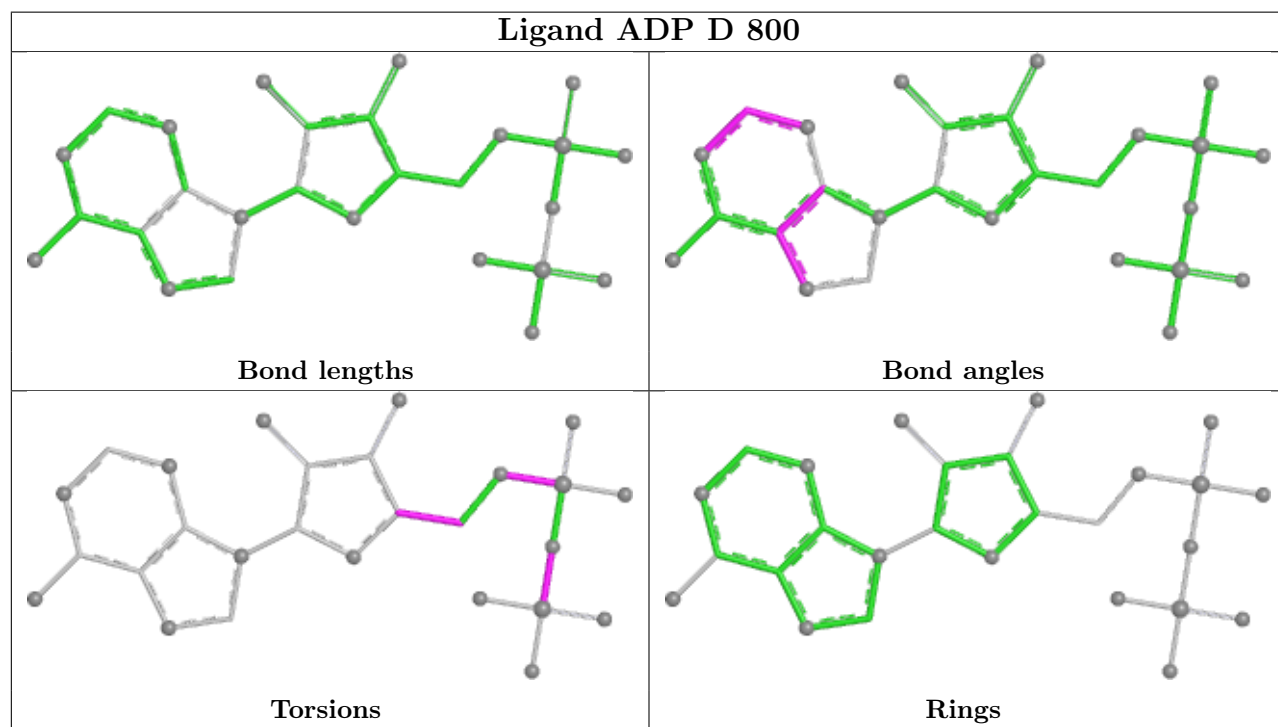
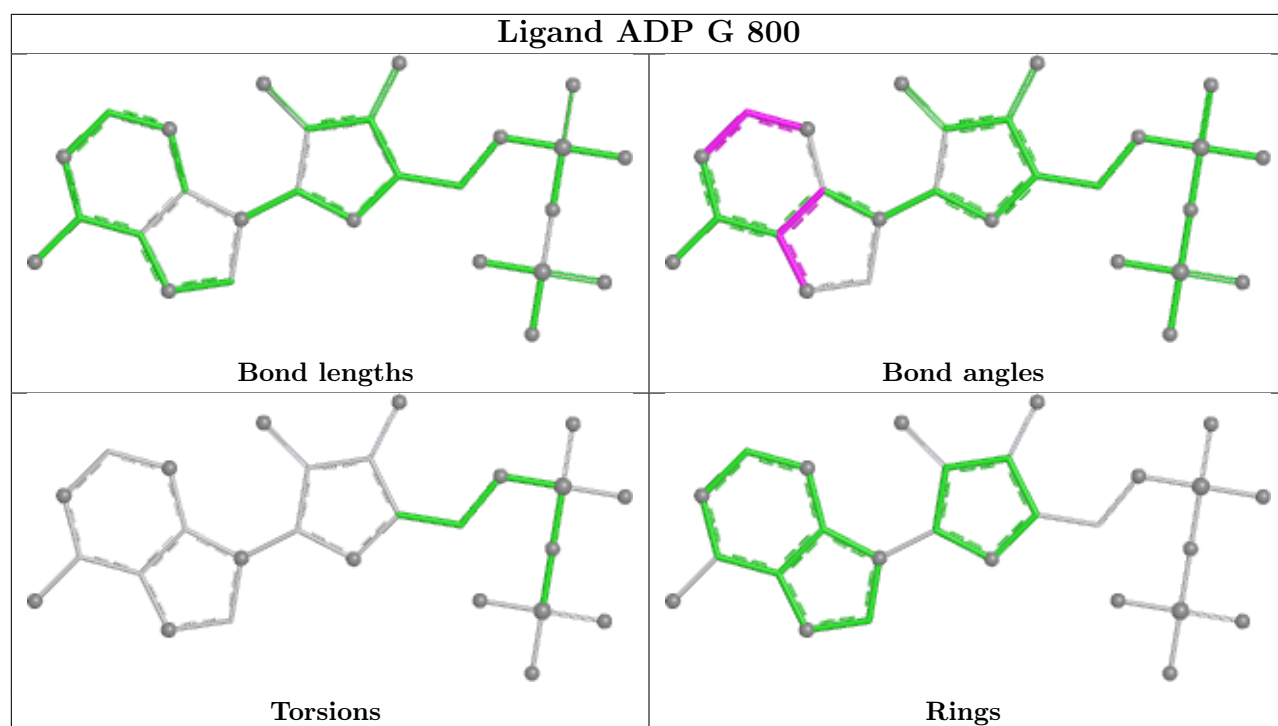
Mol	Chain	Res	Type	Clashes	Symm-Clashes
16	J	800	ADP	1	0
17	H	401	ATP	3	0
16	D	800	ADP	1	0

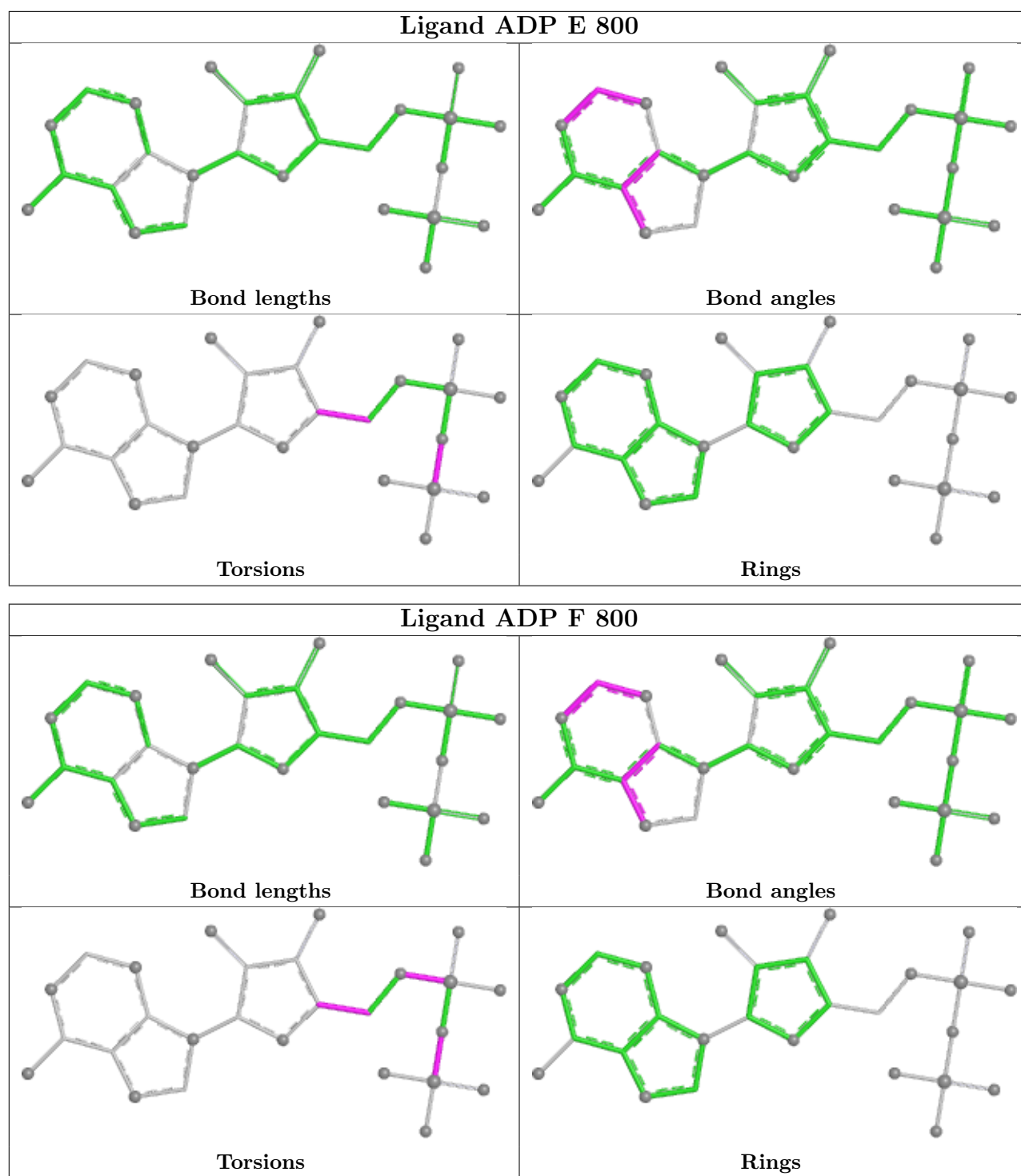
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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











5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

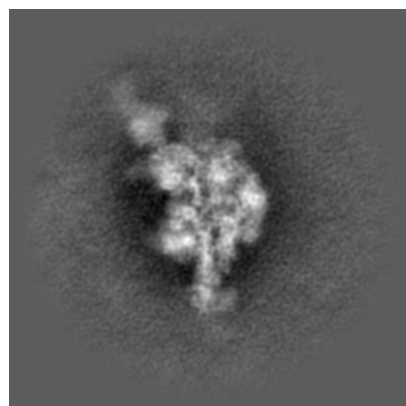
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-46847. These allow visual inspection of the internal detail of the map and identification of artifacts.

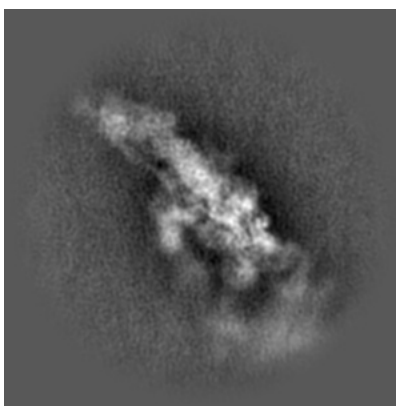
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

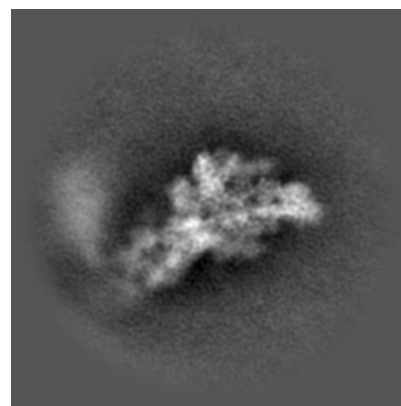
6.1.1 Primary map



X

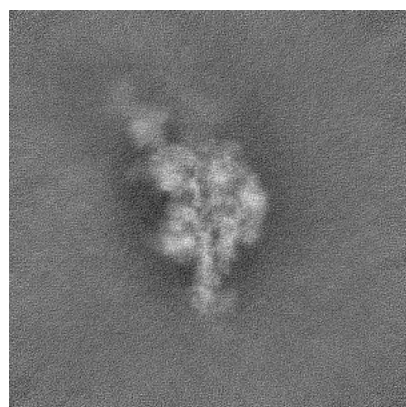


Y

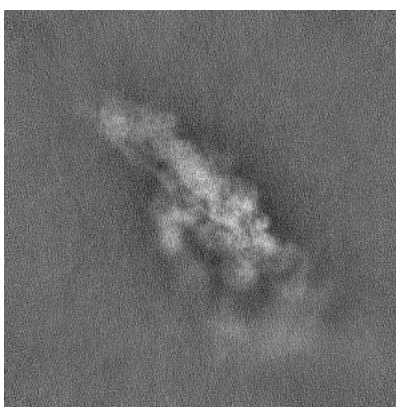


Z

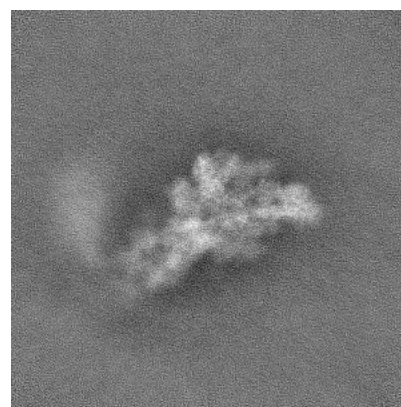
6.1.2 Raw map



X



Y

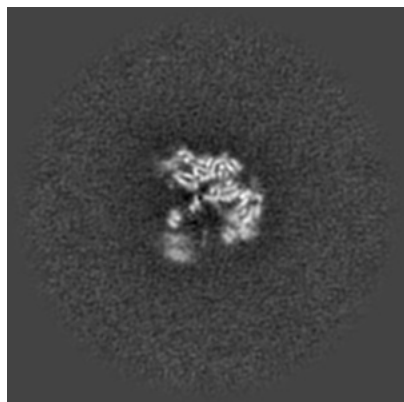


Z

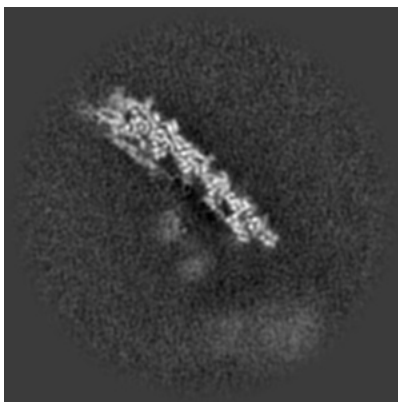
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

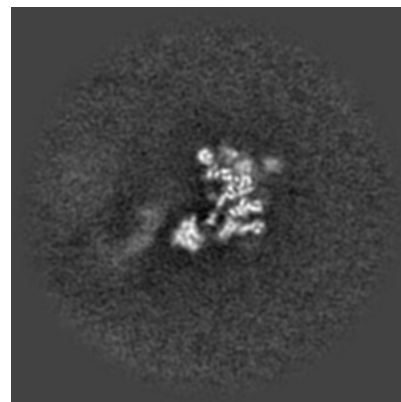
6.2.1 Primary map



X Index: 192

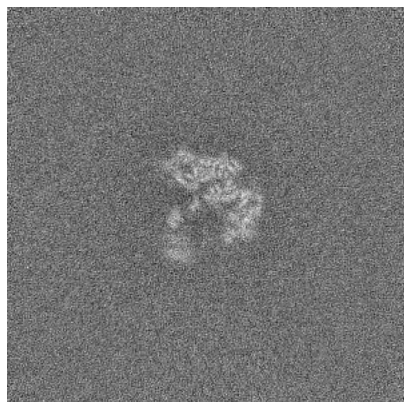


Y Index: 192

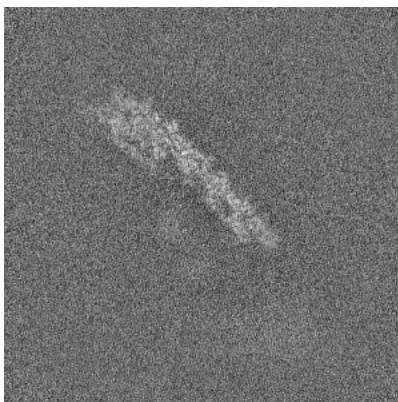


Z Index: 192

6.2.2 Raw map



X Index: 192



Y Index: 192

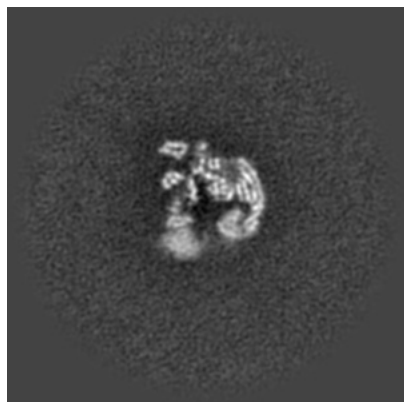


Z Index: 192

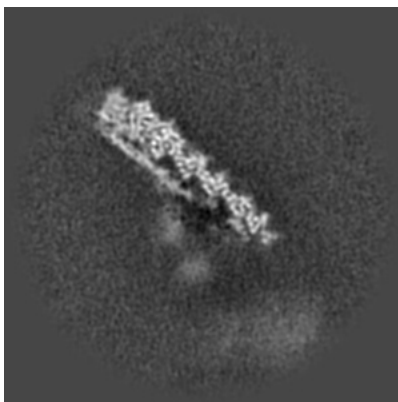
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

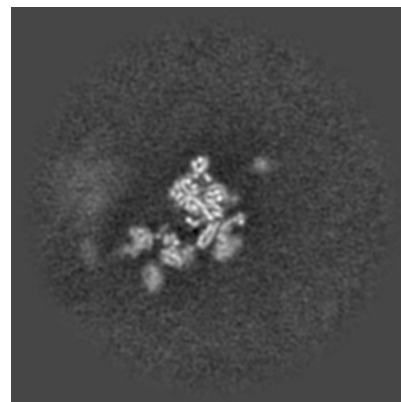
6.3.1 Primary map



X Index: 183

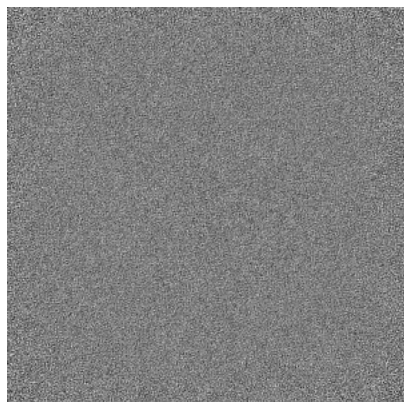


Y Index: 188

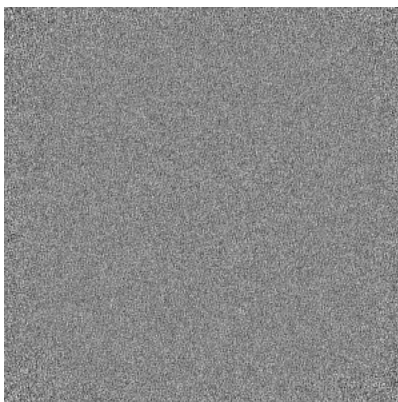


Z Index: 223

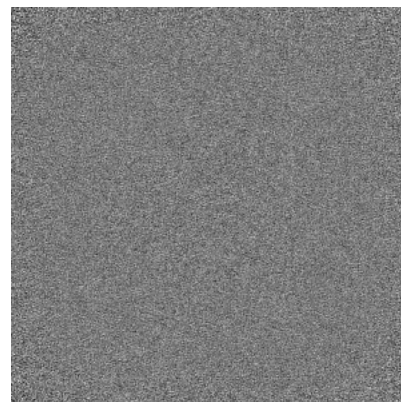
6.3.2 Raw map



X Index: 0



Y Index: 0

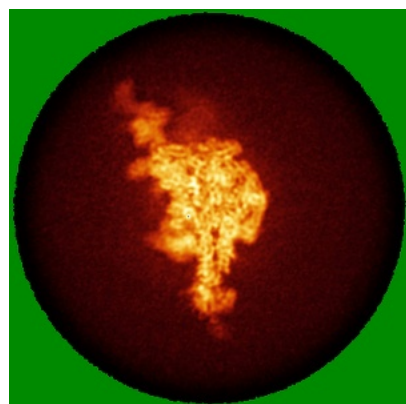


Z Index: 0

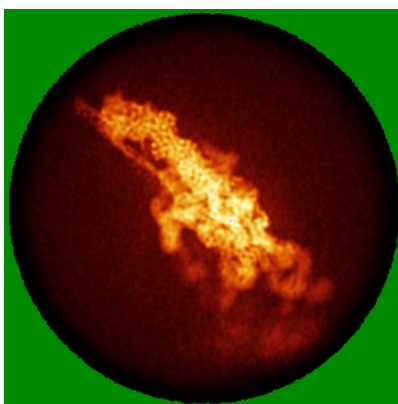
The images above show the largest variance slices of the map in three orthogonal directions.

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

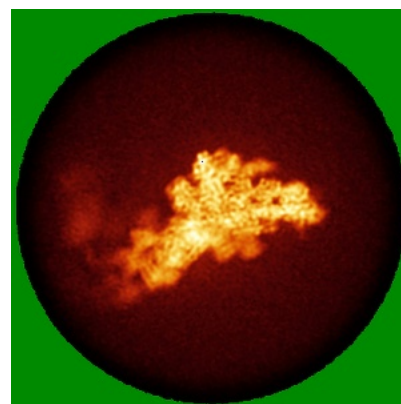
6.4.1 Primary map



X

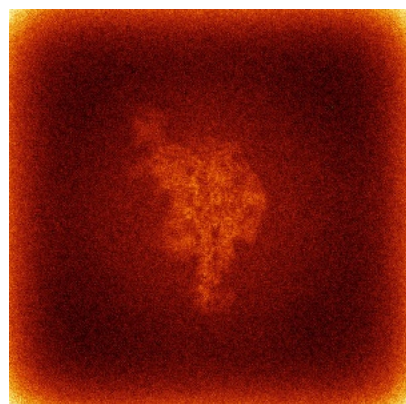


Y

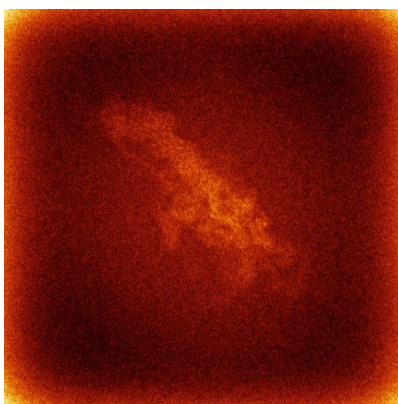


Z

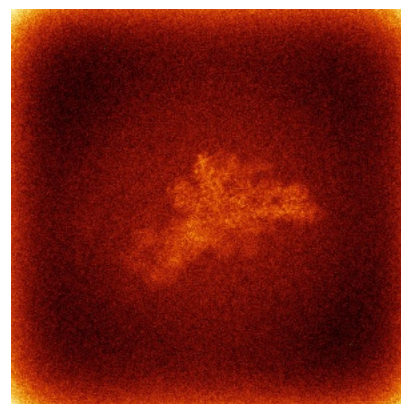
6.4.2 Raw map



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.

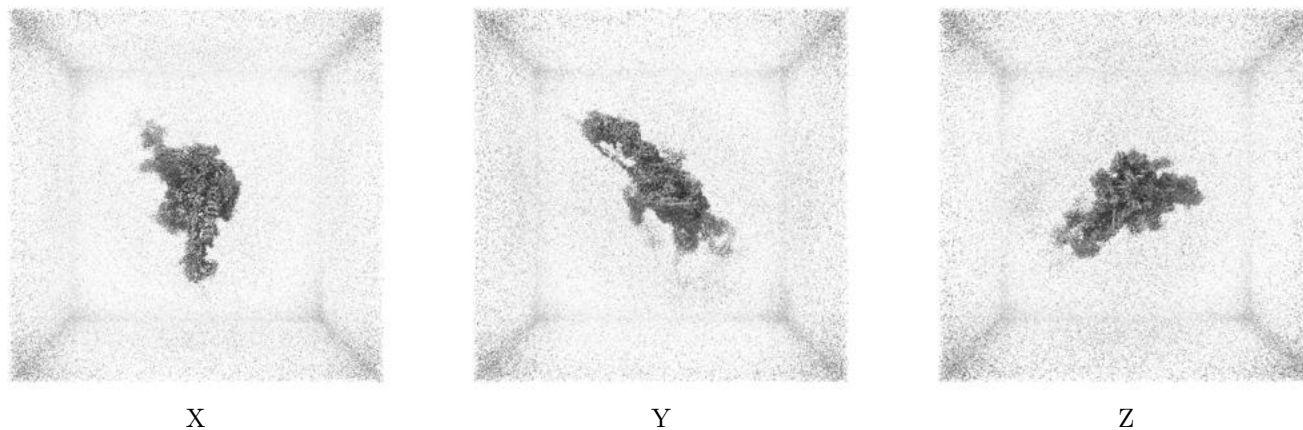
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.1. 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.

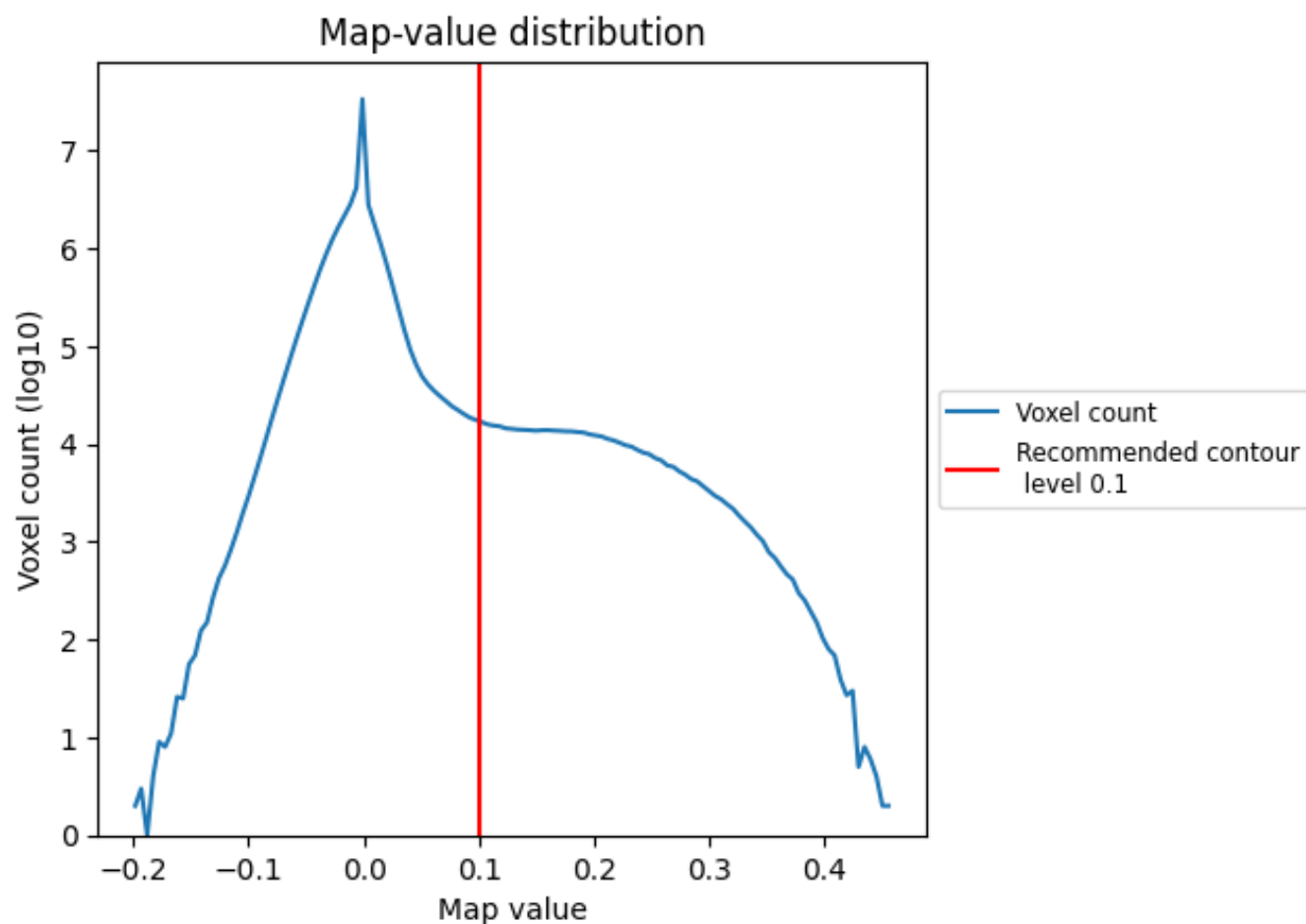
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

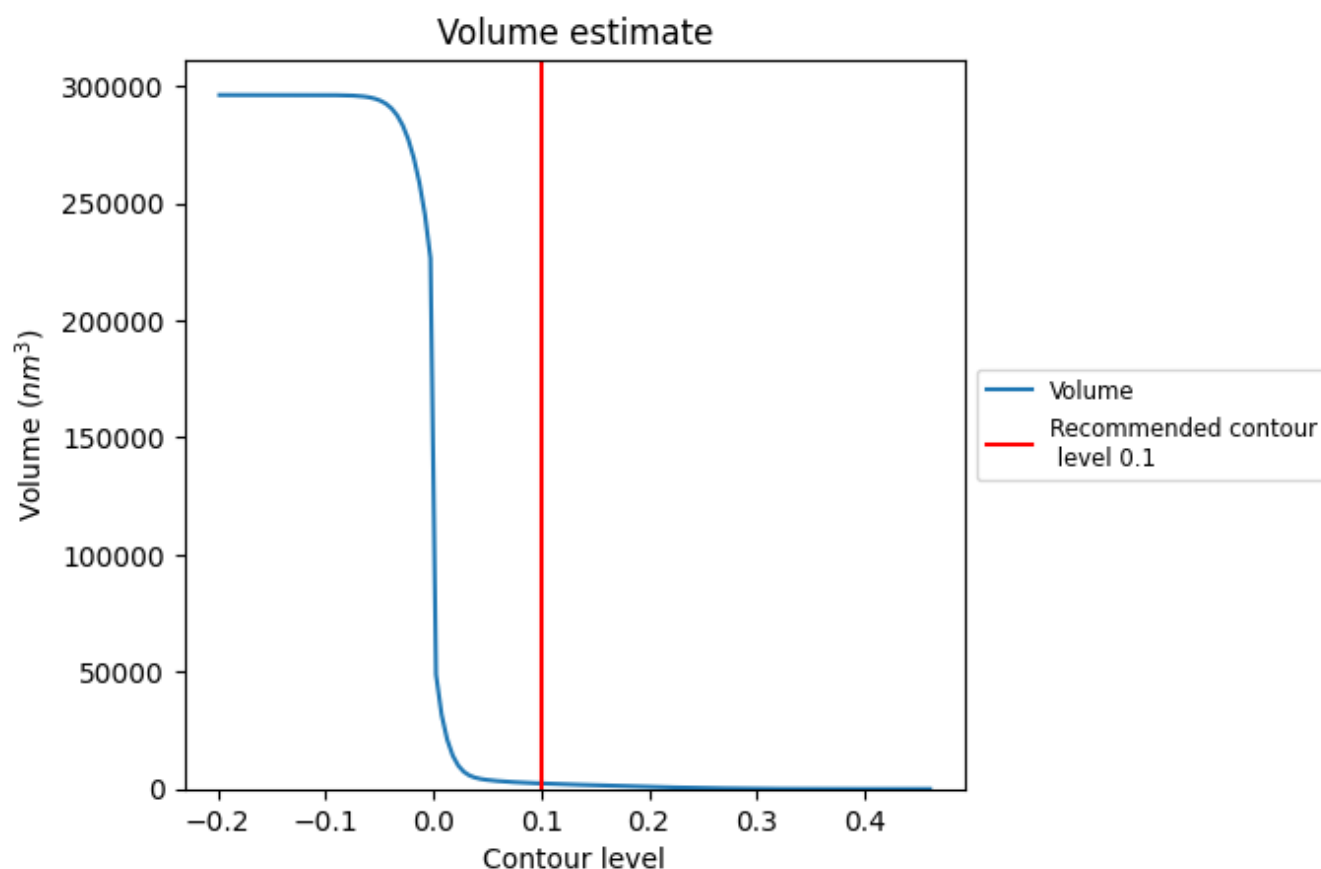
This section contains the results of statistical analysis of the map.

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.

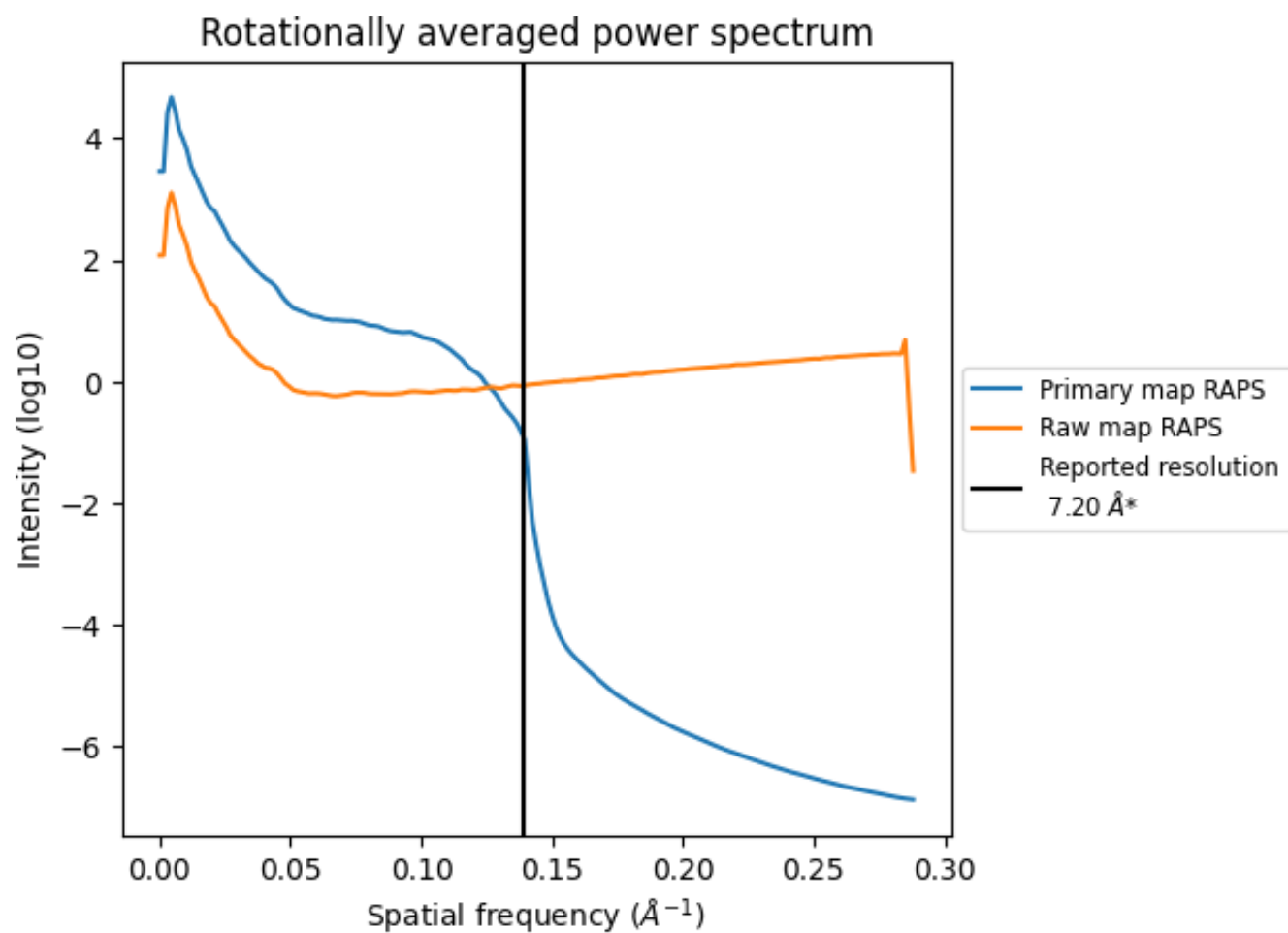
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2360 nm³; this corresponds to an approximate mass of 2132 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 ⓘ

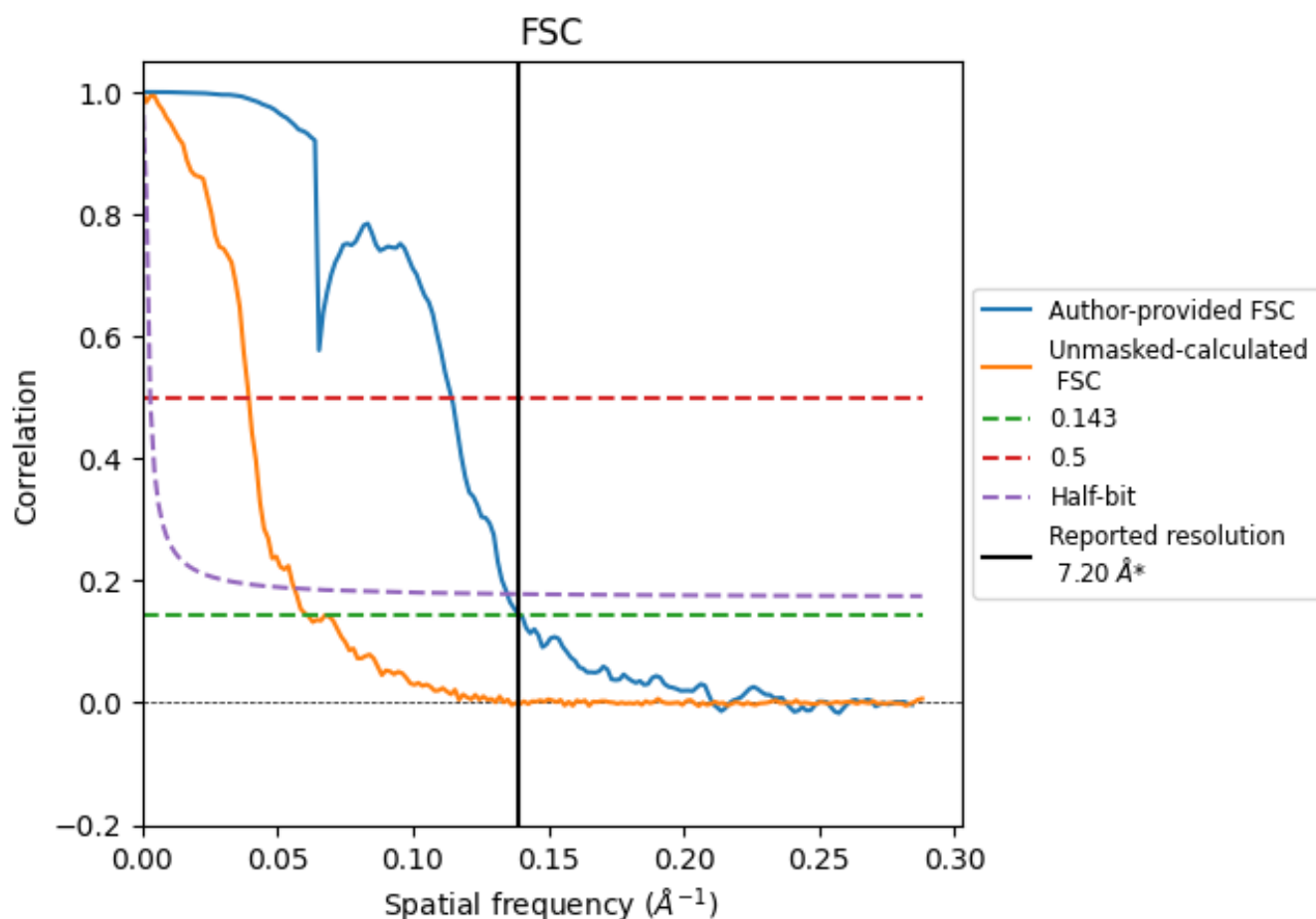


*Reported resolution corresponds to spatial frequency of $0.139 \text{ \AA}^{-1}$

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.139 Å⁻¹

8.2 Resolution estimates [i](#)

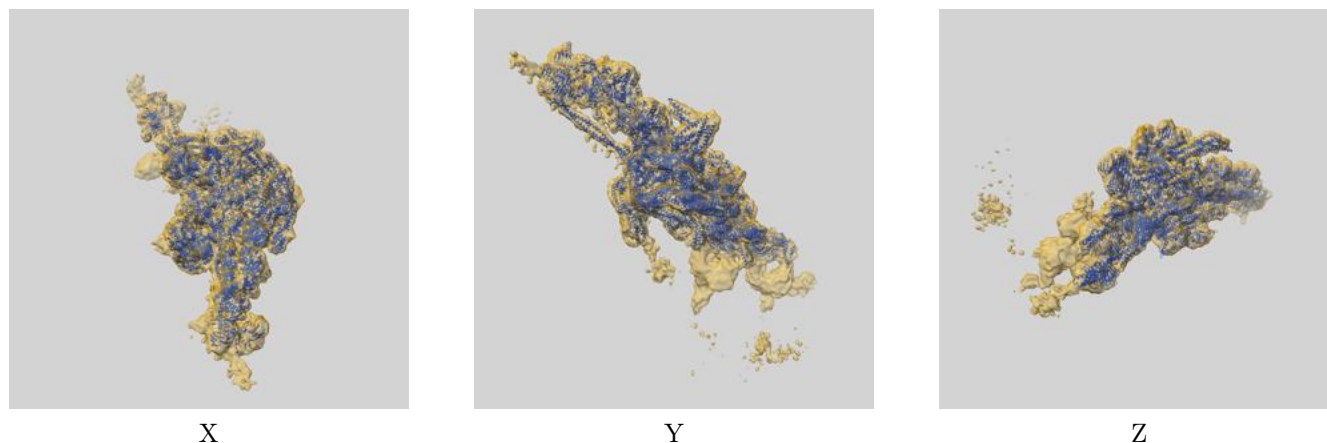
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	7.20	-	-
Author-provided FSC curve	7.16	8.76	7.42
Unmasked-calculated*	16.39	25.45	17.79

*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 16.39 differs from the reported value 7.2 by more than 10 %

9 Map-model fit [i](#)

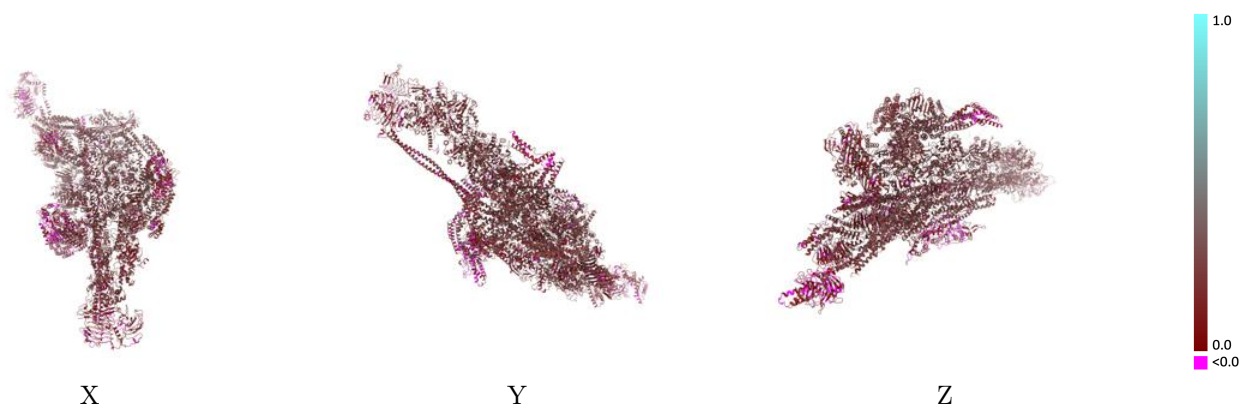
This section contains information regarding the fit between EMDB map EMD-46847 and PDB model 9DGT. Per-residue inclusion information can be found in [section 3](#) on [page 10](#).

9.1 Map-model overlay [i](#)



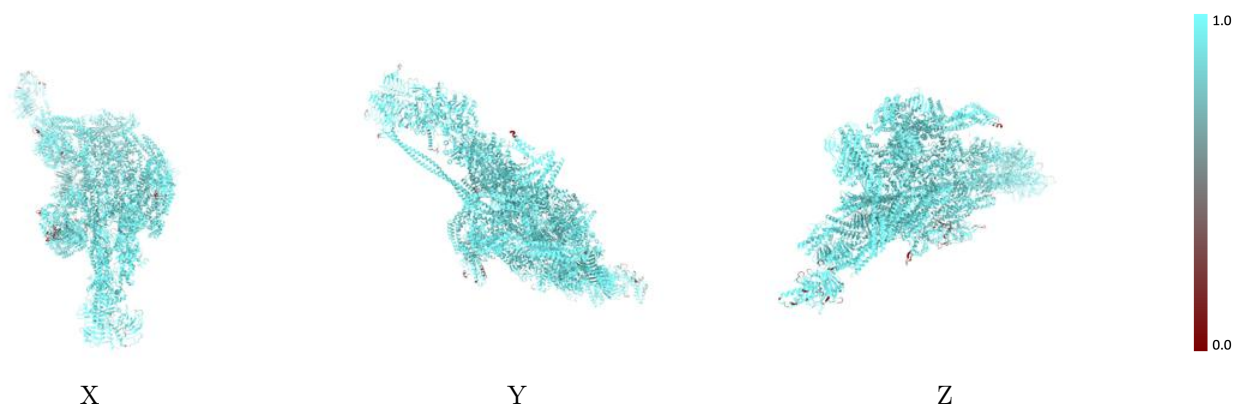
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



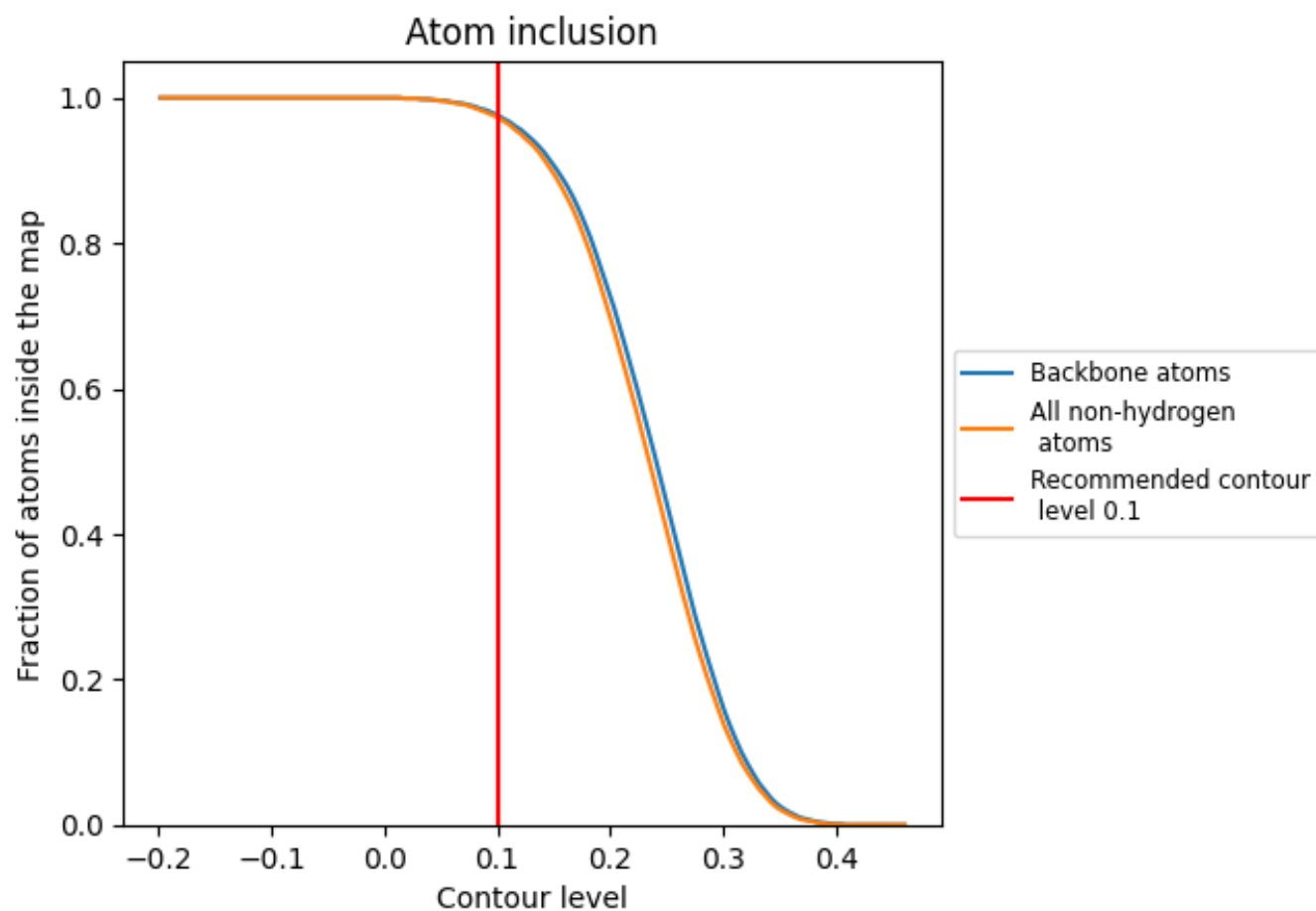
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.1).

9.4 Atom inclusion [i](#)



At the recommended contour level, 98% of all backbone atoms, 97% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9730	 0.1970
A	 0.9920	 0.2270
B	 0.9970	 0.2240
C	 0.9960	 0.2360
D	 0.9950	 0.2330
E	 0.9970	 0.2390
F	 0.9960	 0.2340
G	 0.9980	 0.2420
H	 0.9970	 0.2410
I	 0.9890	 0.2170
J	 0.9910	 0.2180
K	 0.9980	 0.2190
L	 0.9920	 0.2050
M	 0.9860	 0.2060
N	 0.9510	 0.2000
O	 0.9990	 0.2240
P	 0.9940	 0.2360
Q	 0.9400	 0.2300
R	 0.9920	 0.2040
U	 0.9720	 0.1450
V	 0.9640	 0.1120
W	 0.9680	 0.1930
Y	 0.9470	 0.1620
Z	 0.9970	 0.2230
c	 0.9970	 0.2380
d	 0.9910	 0.2050
e	 0.9290	 0.1320
f	 0.9360	 0.1830
g	 0.9330	 0.0820
h	 0.9880	 0.1620
j	 0.9710	 0.2030
m	 0.9790	 0.2220
n	 0.9490	 0.2020
o	 0.9860	 0.1740
p	 0.9290	 0.0870
q	 0.9860	 0.2010

