



Full wwPDB EM Validation Report ⓘ

Mar 8, 2026 – 12:38 PM UTC

PDB ID : 6Q0J / pdb_00006q0j
EMDB ID : EMD-20550
Title : Structure of a MAPK pathway complex
Authors : Park, E.; Rawson, S.; Jeon, H.; Eck, M.J.
Deposited on : 2019-08-01
Resolution : 4.90 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:

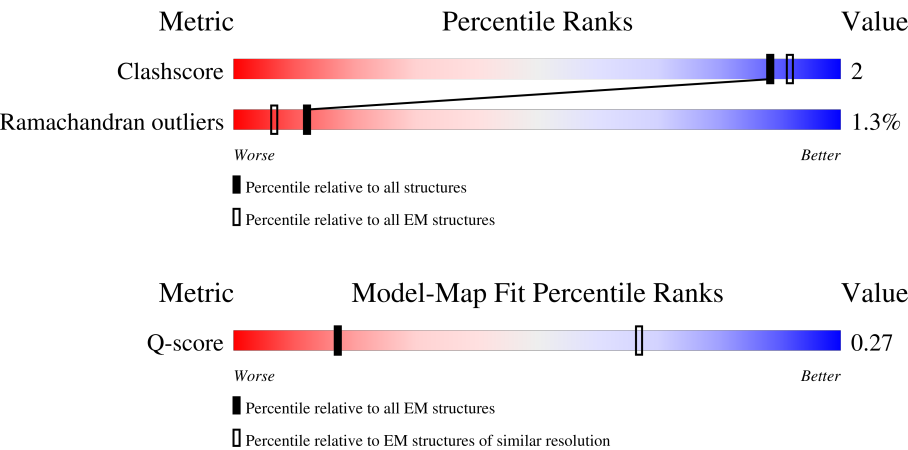
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

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 4.90 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Q-score	-	25397	1274 (4.40 - 5.40)

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	805	6% 34% 65%
1	B	805	33% 65%
2	C	415	27% 71% 26%
2	D	415	28% 71% 26%
3	X	247	19% 87% 5% 7%

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Mol	Chain	Length	Quality of chain
3	Y	247	26% 87% 5% 7%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 8213 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 Serine/threonine-protein kinase B-raf.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	281	Total	C	N	O	P	1	0
			1394	827	281	285	1		
1	B	282	Total	C	N	O	P	1	0
			1399	830	282	286	1		

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-26	MET	-	expression tag	UNP P15056
A	-25	SER	-	expression tag	UNP P15056
A	-24	TYR	-	expression tag	UNP P15056
A	-23	TYR	-	expression tag	UNP P15056
A	-22	HIS	-	expression tag	UNP P15056
A	-21	HIS	-	expression tag	UNP P15056
A	-20	HIS	-	expression tag	UNP P15056
A	-19	HIS	-	expression tag	UNP P15056
A	-18	HIS	-	expression tag	UNP P15056
A	-17	HIS	-	expression tag	UNP P15056
A	-16	HIS	-	expression tag	UNP P15056
A	-15	HIS	-	expression tag	UNP P15056
A	-14	ASP	-	expression tag	UNP P15056
A	-13	ILE	-	expression tag	UNP P15056
A	-12	PRO	-	expression tag	UNP P15056
A	-11	THR	-	expression tag	UNP P15056
A	-10	THR	-	expression tag	UNP P15056
A	-9	GLU	-	expression tag	UNP P15056
A	-8	ASN	-	expression tag	UNP P15056
A	-7	LEU	-	expression tag	UNP P15056
A	-6	TYR	-	expression tag	UNP P15056
A	-5	PHE	-	expression tag	UNP P15056
A	-4	GLN	-	expression tag	UNP P15056
A	-3	GLY	-	expression tag	UNP P15056
A	-2	ALA	-	expression tag	UNP P15056
A	-1	MET	-	expression tag	UNP P15056

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Chain	Residue	Modelled	Actual	Comment	Reference
A	0	ASP	-	expression tag	UNP P15056
A	365	ALA	SER	engineered mutation	UNP P15056
A	767	GLY	-	expression tag	UNP P15056
A	768	THR	-	expression tag	UNP P15056
A	769	SER	-	expression tag	UNP P15056
A	770	ALA	-	expression tag	UNP P15056
A	771	TRP	-	expression tag	UNP P15056
A	772	SER	-	expression tag	UNP P15056
A	773	HIS	-	expression tag	UNP P15056
A	774	PRO	-	expression tag	UNP P15056
A	775	GLN	-	expression tag	UNP P15056
A	776	PHE	-	expression tag	UNP P15056
A	777	GLU	-	expression tag	UNP P15056
A	778	LYS	-	expression tag	UNP P15056
B	-26	MET	-	expression tag	UNP P15056
B	-25	SER	-	expression tag	UNP P15056
B	-24	TYR	-	expression tag	UNP P15056
B	-23	TYR	-	expression tag	UNP P15056
B	-22	HIS	-	expression tag	UNP P15056
B	-21	HIS	-	expression tag	UNP P15056
B	-20	HIS	-	expression tag	UNP P15056
B	-19	HIS	-	expression tag	UNP P15056
B	-18	HIS	-	expression tag	UNP P15056
B	-17	HIS	-	expression tag	UNP P15056
B	-16	HIS	-	expression tag	UNP P15056
B	-15	HIS	-	expression tag	UNP P15056
B	-14	ASP	-	expression tag	UNP P15056
B	-13	ILE	-	expression tag	UNP P15056
B	-12	PRO	-	expression tag	UNP P15056
B	-11	THR	-	expression tag	UNP P15056
B	-10	THR	-	expression tag	UNP P15056
B	-9	GLU	-	expression tag	UNP P15056
B	-8	ASN	-	expression tag	UNP P15056
B	-7	LEU	-	expression tag	UNP P15056
B	-6	TYR	-	expression tag	UNP P15056
B	-5	PHE	-	expression tag	UNP P15056
B	-4	GLN	-	expression tag	UNP P15056
B	-3	GLY	-	expression tag	UNP P15056
B	-2	ALA	-	expression tag	UNP P15056
B	-1	MET	-	expression tag	UNP P15056
B	0	ASP	-	expression tag	UNP P15056
B	365	ALA	SER	engineered mutation	UNP P15056

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Chain	Residue	Modelled	Actual	Comment	Reference
B	767	GLY	-	expression tag	UNP P15056
B	768	THR	-	expression tag	UNP P15056
B	769	SER	-	expression tag	UNP P15056
B	770	ALA	-	expression tag	UNP P15056
B	771	TRP	-	expression tag	UNP P15056
B	772	SER	-	expression tag	UNP P15056
B	773	HIS	-	expression tag	UNP P15056
B	774	PRO	-	expression tag	UNP P15056
B	775	GLN	-	expression tag	UNP P15056
B	776	PHE	-	expression tag	UNP P15056
B	777	GLU	-	expression tag	UNP P15056
B	778	LYS	-	expression tag	UNP P15056

- Molecule 2 is a protein called Dual specificity mitogen-activated protein kinase kinase 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	C	306	Total	C	N	O	2	0
			1514	900	307	307		
2	D	306	Total	C	N	O	3	0
			1516	902	307	307		

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-21	MET	-	expression tag	UNP Q02750
C	-20	GLY	-	expression tag	UNP Q02750
C	-19	SER	-	expression tag	UNP Q02750
C	-18	SER	-	expression tag	UNP Q02750
C	-17	HIS	-	expression tag	UNP Q02750
C	-16	HIS	-	expression tag	UNP Q02750
C	-15	HIS	-	expression tag	UNP Q02750
C	-14	HIS	-	expression tag	UNP Q02750
C	-13	HIS	-	expression tag	UNP Q02750
C	-12	HIS	-	expression tag	UNP Q02750
C	-11	SER	-	expression tag	UNP Q02750
C	-10	ALA	-	expression tag	UNP Q02750
C	-9	VAL	-	expression tag	UNP Q02750
C	-8	ASP	-	expression tag	UNP Q02750
C	-7	GLU	-	expression tag	UNP Q02750
C	-6	ASN	-	expression tag	UNP Q02750
C	-5	LEU	-	expression tag	UNP Q02750
C	-4	TYR	-	expression tag	UNP Q02750

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-3	PHE	-	expression tag	UNP Q02750
C	-2	GLN	-	expression tag	UNP Q02750
C	-1	GLY	-	expression tag	UNP Q02750
C	0	GLY	-	expression tag	UNP Q02750
C	218	ALA	SER	engineered mutation	UNP Q02750
C	222	ALA	SER	engineered mutation	UNP Q02750
D	-21	MET	-	expression tag	UNP Q02750
D	-20	GLY	-	expression tag	UNP Q02750
D	-19	SER	-	expression tag	UNP Q02750
D	-18	SER	-	expression tag	UNP Q02750
D	-17	HIS	-	expression tag	UNP Q02750
D	-16	HIS	-	expression tag	UNP Q02750
D	-15	HIS	-	expression tag	UNP Q02750
D	-14	HIS	-	expression tag	UNP Q02750
D	-13	HIS	-	expression tag	UNP Q02750
D	-12	HIS	-	expression tag	UNP Q02750
D	-11	SER	-	expression tag	UNP Q02750
D	-10	ALA	-	expression tag	UNP Q02750
D	-9	VAL	-	expression tag	UNP Q02750
D	-8	ASP	-	expression tag	UNP Q02750
D	-7	GLU	-	expression tag	UNP Q02750
D	-6	ASN	-	expression tag	UNP Q02750
D	-5	LEU	-	expression tag	UNP Q02750
D	-4	TYR	-	expression tag	UNP Q02750
D	-3	PHE	-	expression tag	UNP Q02750
D	-2	GLN	-	expression tag	UNP Q02750
D	-1	GLY	-	expression tag	UNP Q02750
D	0	GLY	-	expression tag	UNP Q02750
D	218	ALA	SER	engineered mutation	UNP Q02750
D	222	ALA	SER	engineered mutation	UNP Q02750

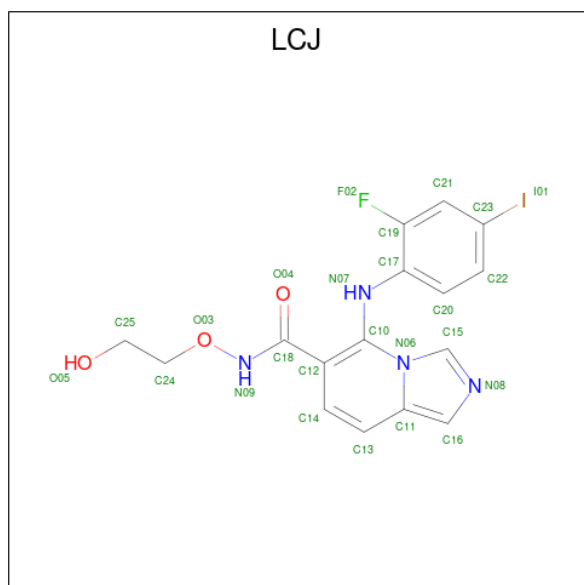
- Molecule 3 is a protein called 14-3-3 protein zeta.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	X	229	Total	C	N	O	0	0
			1138	680	229	229		
3	Y	229	Total	C	N	O	0	0
			1138	680	229	229		

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
4	C	1	Total	Mg	0
			1	1	
4	D	1	Total	Mg	0
			1	1	

- Molecule 5 is 5-[(2-fluoro-4-iodophenyl)amino]-N-(2-hydroxyethoxy)imidazo[1,5-a]pyridine-6-carboxamide (CCD ID: LCJ) (formula: $C_{16}H_{14}FIN_4O_3$).



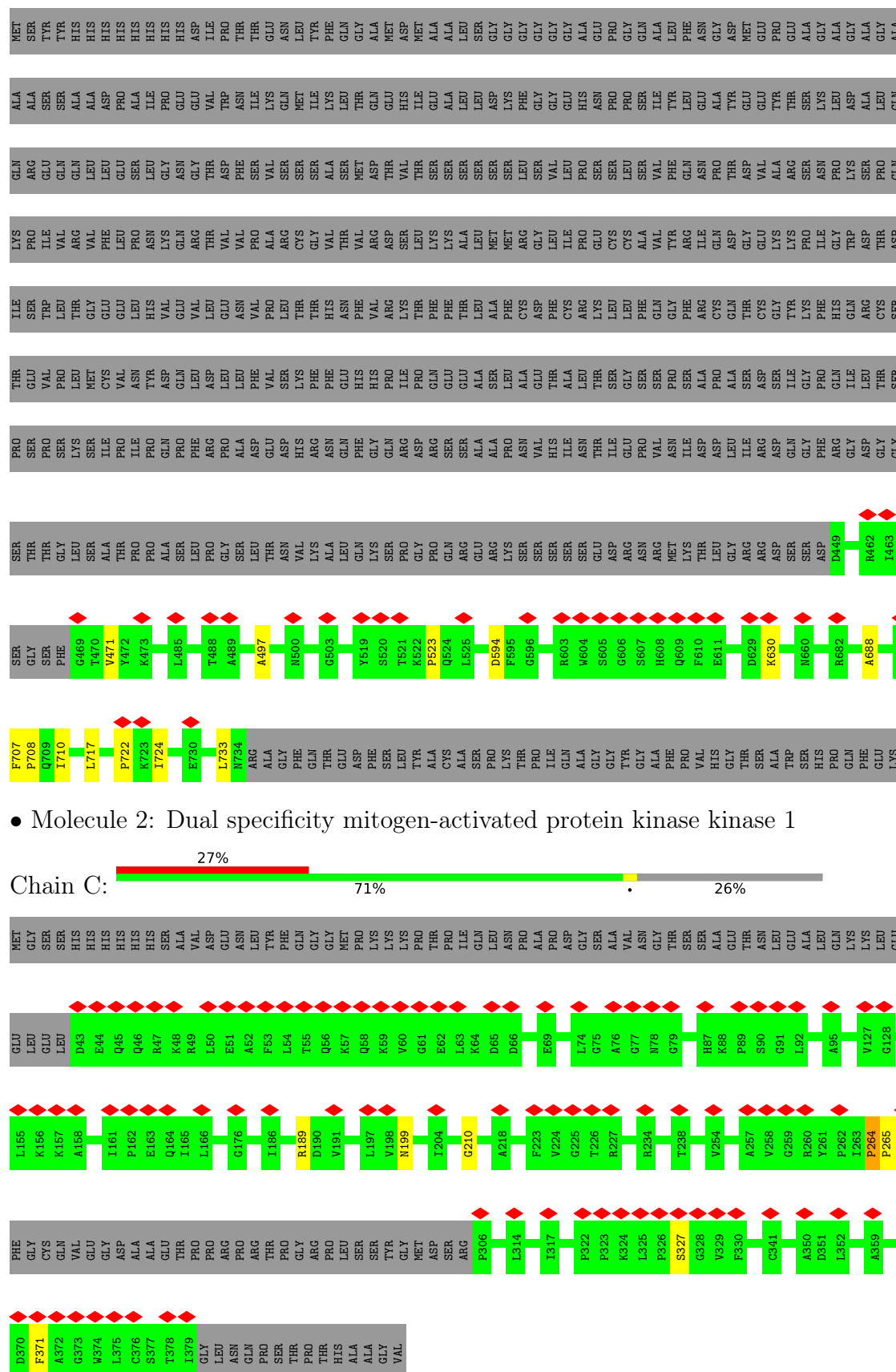
Mol	Chain	Residues	Atoms						AltConf
5	C	1	Total	C	F	I	N	O	0
			25	16	1	1	4	3	
5	D	1	Total	C	F	I	N	O	0
			25	16	1	1	4	3	

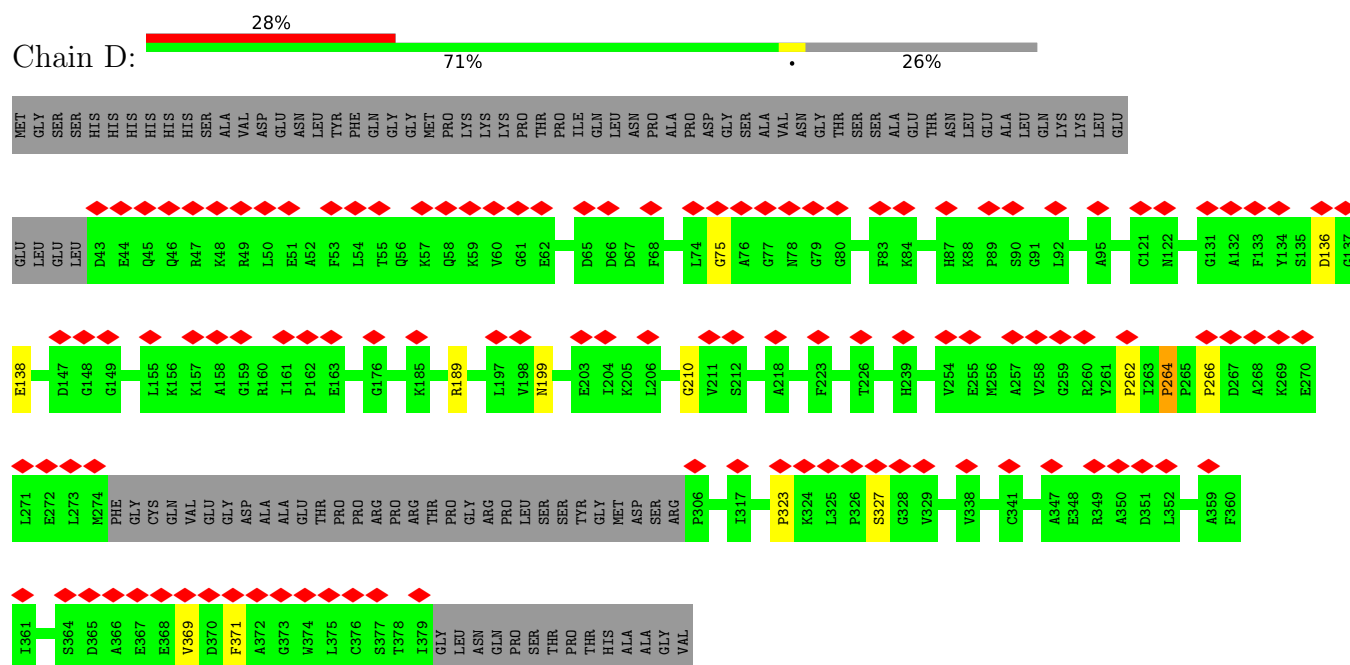
- Molecule 6 is PHOSPHOTHIOPHOSPHORIC ACID-ADENYLATE ESTER (CCD ID: AGS) (formula: $C_{10}H_{16}N_5O_{12}P_3S$).



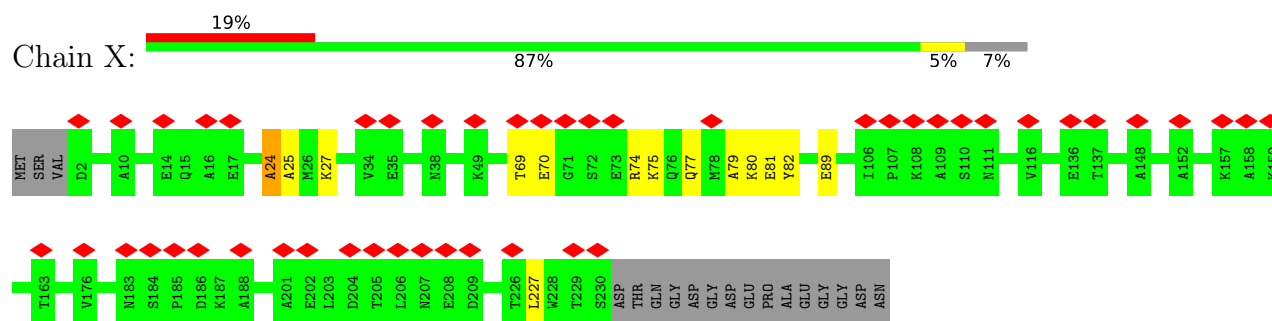
Mol	Chain	Residues	Atoms						AltConf
6	C	1	Total 31	C 10	N 5	O 12	P 3	S 1	0
6	D	1	Total 31	C 10	N 5	O 12	P 3	S 1	0



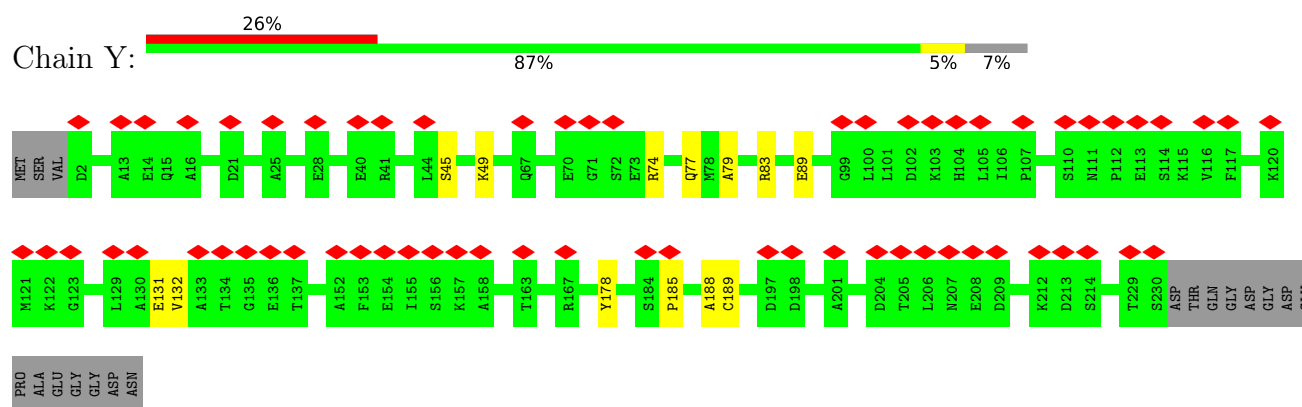




• Molecule 3: 14-3-3 protein zeta



• Molecule 3: 14-3-3 protein zeta



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	425135	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	53	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.125	Depositor
Minimum map value	-0.059	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.0285	Depositor
Map size ($\text{\AA}$)	284.16, 284.16, 284.16	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.11, 1.11, 1.11	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: AGS, LCJ, SEP, MG

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	0.73	0/1384	1.12	3/1922 (0.2%)
1	B	0.75	0/1389	1.14	5/1929 (0.3%)
2	C	0.69	0/1515	1.16	4/2104 (0.2%)
2	D	0.72	0/1520	1.16	5/2111 (0.2%)
3	X	0.79	0/1137	1.14	6/1586 (0.4%)
3	Y	0.72	0/1137	1.05	2/1586 (0.1%)
All	All	0.73	0/8082	1.13	25/11238 (0.2%)

There are no bond length outliers.

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	264	PRO	N-CA-CB	6.81	109.69	103.08
3	X	89	GLU	CA-C-N	6.20	128.59	120.28
3	X	89	GLU	C-N-CA	6.20	128.59	120.28
3	Y	89	GLU	CA-C-N	6.18	128.56	120.28
3	Y	89	GLU	C-N-CA	6.18	128.56	120.28
3	X	81	GLU	CA-C-N	5.93	128.22	120.28
3	X	81	GLU	C-N-CA	5.93	128.22	120.28
1	B	708	PRO	N-CA-C	-5.91	105.01	113.47
2	C	138	GLU	N-CA-C	5.90	118.28	108.13
2	D	138	GLU	N-CA-C	5.90	118.28	108.13
2	D	266	PRO	N-CA-C	5.88	119.75	111.33
3	X	69	THR	CA-C-N	5.65	132.33	121.54
3	X	69	THR	C-N-CA	5.65	132.33	121.54
1	A	471	VAL	N-CA-C	5.54	115.87	108.11
1	B	471	VAL	N-CA-C	5.50	115.81	108.11
1	A	630	LYS	N-CA-C	-5.37	105.34	111.14
2	D	264	PRO	N-CA-CB	5.34	108.26	103.08
2	D	327	SER	N-CA-C	5.33	116.77	110.97

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	327	SER	N-CA-C	5.30	116.74	110.97
1	B	630	LYS	N-CA-C	-5.28	105.44	111.14
1	B	705	PRO	N-CA-CB	-5.27	97.72	103.25
1	A	497	ALA	N-CA-C	-5.20	105.31	110.97
1	B	497	ALA	N-CA-C	-5.16	105.34	110.97
2	D	199	ASN	N-CA-C	5.09	116.04	108.86
2	C	199	ASN	N-CA-C	5.09	116.03	108.86

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	1394	0	614	2	0
1	B	1399	0	616	3	0
2	C	1514	0	674	2	0
2	D	1516	0	676	4	0
3	X	1138	0	522	6	0
3	Y	1138	0	522	5	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	C	25	0	0	1	0
5	D	25	0	0	3	0
6	C	31	0	12	0	0
6	D	31	0	12	3	0
All	All	8213	0	3648	23	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 (23) 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:Y:178:TYR:CB	3:Y:188:ALA:HB2	2.01	0.91

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:X:75:LYS:O	3:X:79:ALA:HB3	1.71	0.90
5:D:402:LCJ:C25	6:D:403:AGS:S1G	2.64	0.85
2:C:210:GLY:HA2	5:C:402:LCJ:C16	2.30	0.62
2:D:210:GLY:HA2	5:D:402:LCJ:C16	2.30	0.62
1:A:722:PRO:CB	3:X:227:LEU:HA	2.31	0.60
3:Y:74:ARG:HA	3:Y:77:GLN:CB	2.34	0.57
3:Y:45:SER:O	3:Y:49:LYS:CB	2.54	0.56
1:B:702:ASP:C	1:B:704:ARG:H	2.14	0.56
3:X:24:ALA:O	3:X:27:LYS:N	2.42	0.53
1:A:708:PRO:O	1:A:712:ALA:N	2.39	0.52
2:D:262:PRO:O	2:D:323:PRO:CB	2.57	0.52
3:X:80:LYS:C	3:X:82:TYR:N	2.70	0.49
3:X:80:LYS:C	3:X:82:TYR:H	2.20	0.48
3:Y:79:ALA:O	3:Y:83:ARG:N	2.44	0.47
2:D:75:GLY:HA3	6:D:403:AGS:H4'	2.00	0.44
2:D:369:VAL:O	2:D:371:PHE:N	2.51	0.43
5:D:402:LCJ:O05	6:D:403:AGS:S1G	2.77	0.42
3:X:74:ARG:HA	3:X:77:GLN:CB	2.49	0.42
1:B:688:ALA:HB3	1:B:717:LEU:CB	2.50	0.42
3:Y:185:PRO:O	3:Y:189:CYS:CB	2.67	0.42
1:B:707:PHE:HA	1:B:710:ILE:CB	2.50	0.42
2:C:369:VAL:O	2:C:371:PHE:N	2.51	0.41

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	277/805 (34%)	255 (92%)	19 (7%)	3 (1%)	11	45
1	B	278/805 (34%)	255 (92%)	18 (6%)	5 (2%)	6	33
2	C	304/415 (73%)	282 (93%)	17 (6%)	5 (2%)	7	37

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	D	305/415 (74%)	284 (93%)	18 (6%)	3 (1%)	12	47
3	X	227/247 (92%)	213 (94%)	11 (5%)	3 (1%)	9	41
3	Y	227/247 (92%)	220 (97%)	5 (2%)	2 (1%)	14	49
All	All	1618/2934 (55%)	1509 (93%)	88 (5%)	21 (1%)	12	41

All (21) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	722	PRO
1	B	724	ILE
2	C	264	PRO
2	C	265	PRO
2	C	266	PRO
2	D	264	PRO
3	X	25	ALA
1	B	733	LEU
2	C	136	ASP
2	D	136	ASP
3	X	70	GLU
1	A	594	ASP
1	A	725	HIS
1	B	594	ASP
2	C	189	ARG
2	D	189	ARG
3	Y	131	GLU
3	X	24	ALA
1	A	523	PRO
1	B	523	PRO
3	Y	132	VAL

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 ⓘ

2 non-standard protein/DNA/RNA residues are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
1	SEP	B	729	1	8,9,10	0.67	0	7,12,14	0.65	0
1	SEP	A	729	1	8,9,10	0.67	0	7,12,14	0.61	0

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
1	SEP	B	729	1	-	3/6/8/10	-
1	SEP	A	729	1	-	4/6/8/10	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	729	SEP	CB-OG-P-O1P
1	A	729	SEP	CB-OG-P-O2P
1	A	729	SEP	CB-OG-P-O3P
1	B	729	SEP	N-CA-CB-OG
1	B	729	SEP	C-CA-CB-OG
1	B	729	SEP	CA-CB-OG-P
1	A	729	SEP	N-CA-CB-OG

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 2 are monoatomic - leaving 4 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
6	AGS	D	403	4	32,33,33	2.04	6 (18%)	45,52,52	1.88	10 (22%)
5	LCJ	C	402	4	26,27,27	2.42	7 (26%)	26,37,37	1.48	5 (19%)
6	AGS	C	403	4	32,33,33	3.54	15 (46%)	45,52,52	1.99	12 (26%)
5	LCJ	D	402	-	26,27,27	2.41	7 (26%)	26,37,37	1.48	5 (19%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	AGS	D	403	4	-	3/21/38/38	0/3/3/3
5	LCJ	C	402	4	-	6/13/13/13	0/3/3/3
6	AGS	C	403	4	-	0/21/38/38	0/3/3/3
5	LCJ	D	402	-	-	6/13/13/13	0/3/3/3

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	C	403	AGS	C3'-C4'	-9.77	1.28	1.53
6	C	403	AGS	C2'-C1'	-8.71	1.26	1.53
6	D	403	AGS	PG-S1G	7.96	2.07	1.90
5	C	402	LCJ	C18-N09	7.61	1.45	1.34
5	D	402	LCJ	C18-N09	7.60	1.45	1.34
5	C	402	LCJ	C11-N06	-6.72	1.31	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	D	402	LCJ	C11-N06	-6.70	1.32	1.40
6	C	403	AGS	O4'-C1'	6.61	1.57	1.42
6	C	403	AGS	PB-O3B	5.38	1.65	1.59
6	C	403	AGS	C2'-C3'	4.95	1.66	1.53
6	D	403	AGS	C5-C4	4.73	1.47	1.39
6	C	403	AGS	O4'-C4'	4.56	1.55	1.45
6	C	403	AGS	C6-N6	4.39	1.45	1.34
5	C	402	LCJ	C10-N07	3.98	1.46	1.37
5	D	402	LCJ	C10-N07	3.98	1.46	1.37
6	C	403	AGS	PG-O2G	3.86	1.67	1.54
6	C	403	AGS	PG-O3G	3.43	1.65	1.54
6	C	403	AGS	C5-C4	-2.92	1.33	1.39
6	C	403	AGS	O2'-C2'	2.82	1.49	1.43
6	C	403	AGS	C5-N7	-2.81	1.34	1.39
6	C	403	AGS	C5'-C4'	2.79	1.60	1.51
6	D	403	AGS	C5-C6	2.79	1.48	1.41
6	C	403	AGS	C8-N9	-2.76	1.32	1.37
5	C	402	LCJ	C12-C10	-2.69	1.39	1.43
5	D	402	LCJ	C12-C10	-2.62	1.39	1.43
6	C	403	AGS	PA-O3A	2.59	1.62	1.59
5	D	402	LCJ	O04-C18	-2.42	1.19	1.23
5	C	402	LCJ	O04-C18	-2.41	1.19	1.23
5	C	402	LCJ	C17-N07	2.39	1.46	1.41
6	D	403	AGS	C8-N7	2.38	1.36	1.31
5	D	402	LCJ	C17-N07	2.37	1.46	1.41
5	C	402	LCJ	C16-N08	-2.25	1.33	1.37
6	D	403	AGS	C5-N7	-2.22	1.35	1.39
5	D	402	LCJ	C16-N08	-2.22	1.33	1.37
6	D	403	AGS	PG-O2G	2.05	1.61	1.54

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	D	403	AGS	C5-C4-N3	-5.82	118.70	126.72
6	C	403	AGS	N3-C2-N1	-5.64	120.04	128.58
6	C	403	AGS	C5-C4-N3	-4.80	120.11	126.72
6	D	403	AGS	N3-C4-N9	4.59	134.98	127.17
6	C	403	AGS	N9-C8-N7	-4.46	107.60	113.94
6	D	403	AGS	C2-N3-C4	3.70	120.86	111.83
6	C	403	AGS	C1'-N9-C8	-3.61	119.08	127.09
6	D	403	AGS	C4-C5-N7	-3.46	106.63	110.58
6	D	403	AGS	PB-O3B-PG	-3.45	120.54	133.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	402	LCJ	C16-C11-N06	3.42	107.99	104.58
5	D	402	LCJ	C16-C11-N06	3.40	107.97	104.58
6	C	403	AGS	C2-N3-C4	3.31	119.90	111.83
6	D	403	AGS	N3-C2-N1	-3.19	123.75	128.58
6	C	403	AGS	N3-C4-N9	2.99	132.26	127.17
6	C	403	AGS	C5-N7-C8	2.94	108.08	103.45
5	C	402	LCJ	C21-C19-C17	-2.83	120.54	123.43
5	D	402	LCJ	C21-C19-C17	-2.80	120.56	123.43
6	C	403	AGS	C4-N9-C8	2.70	108.58	105.74
6	D	403	AGS	C4-N9-C8	2.57	108.44	105.74
6	D	403	AGS	C5-N7-C8	2.52	107.41	103.45
5	C	402	LCJ	C13-C11-C16	-2.50	131.88	137.90
5	D	402	LCJ	C13-C11-C16	-2.49	131.92	137.90
6	D	403	AGS	C3'-C2'-C1'	2.44	106.09	101.46
6	C	403	AGS	C4-N9-C1'	2.44	132.34	126.63
6	C	403	AGS	PB-O3B-PG	-2.36	124.52	133.17
5	D	402	LCJ	C15-N06-C11	2.31	108.27	106.56
5	C	402	LCJ	C15-N06-C11	2.25	108.22	106.56
5	D	402	LCJ	C16-N08-C15	2.21	108.13	105.24
5	C	402	LCJ	C16-N08-C15	2.20	108.12	105.24
6	C	403	AGS	C4-C5-N7	-2.16	108.11	110.58
6	C	403	AGS	C2'-C3'-C4'	2.09	106.65	102.61
6	D	403	AGS	C6-C5-N7	2.09	136.12	132.09

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	C	402	LCJ	C14-C12-C18-O04
5	D	402	LCJ	C14-C12-C18-O04
6	D	403	AGS	C3'-C4'-C5'-O5'
6	D	403	AGS	O4'-C4'-C5'-O5'
5	C	402	LCJ	C14-C12-C18-N09
5	D	402	LCJ	C14-C12-C18-N09
5	C	402	LCJ	C25-C24-O03-N09
5	D	402	LCJ	C25-C24-O03-N09
5	C	402	LCJ	C10-C12-C18-N09
5	C	402	LCJ	C10-C12-C18-O04
5	D	402	LCJ	C10-C12-C18-N09
5	D	402	LCJ	C10-C12-C18-O04
5	C	402	LCJ	O03-C24-C25-O05
5	D	402	LCJ	O03-C24-C25-O05

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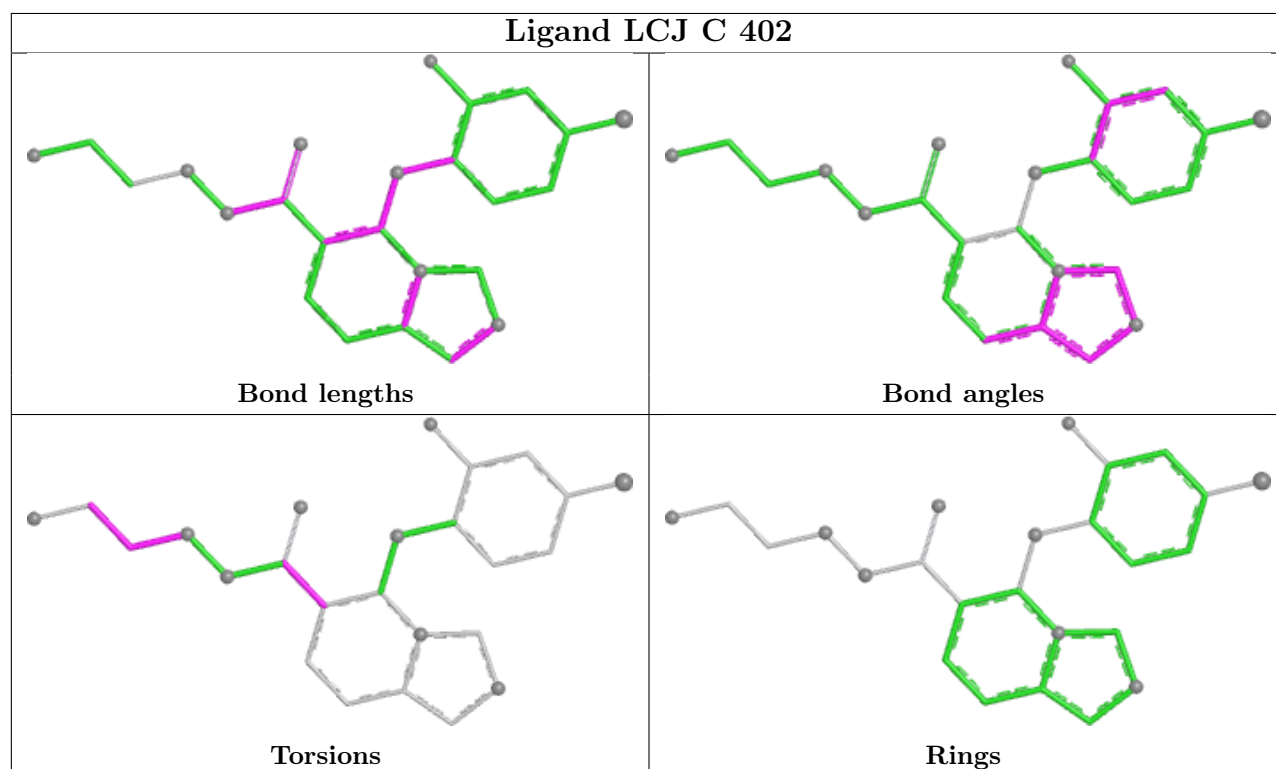
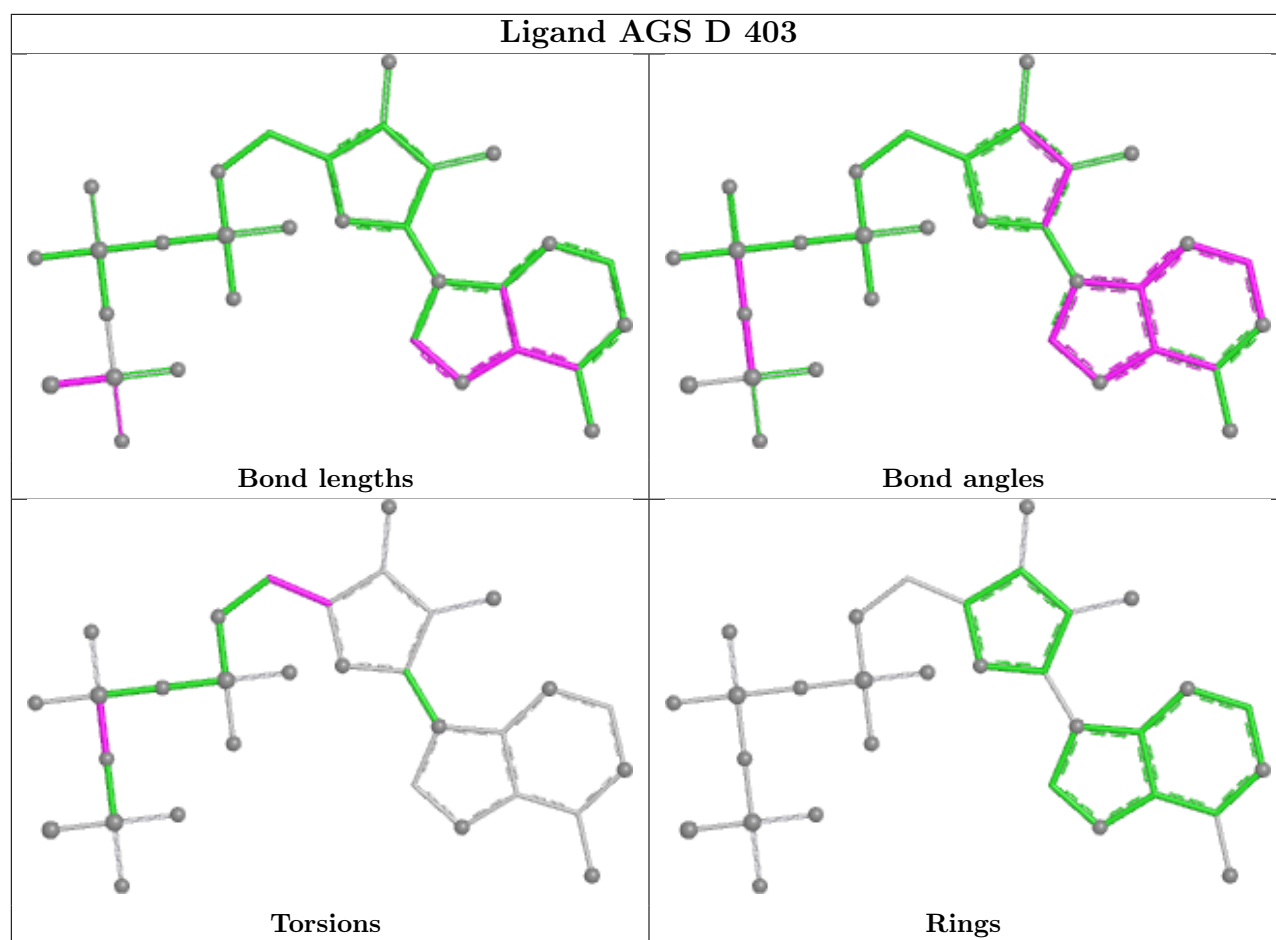
Mol	Chain	Res	Type	Atoms
6	D	403	AGS	PG-O3B-PB-O2B

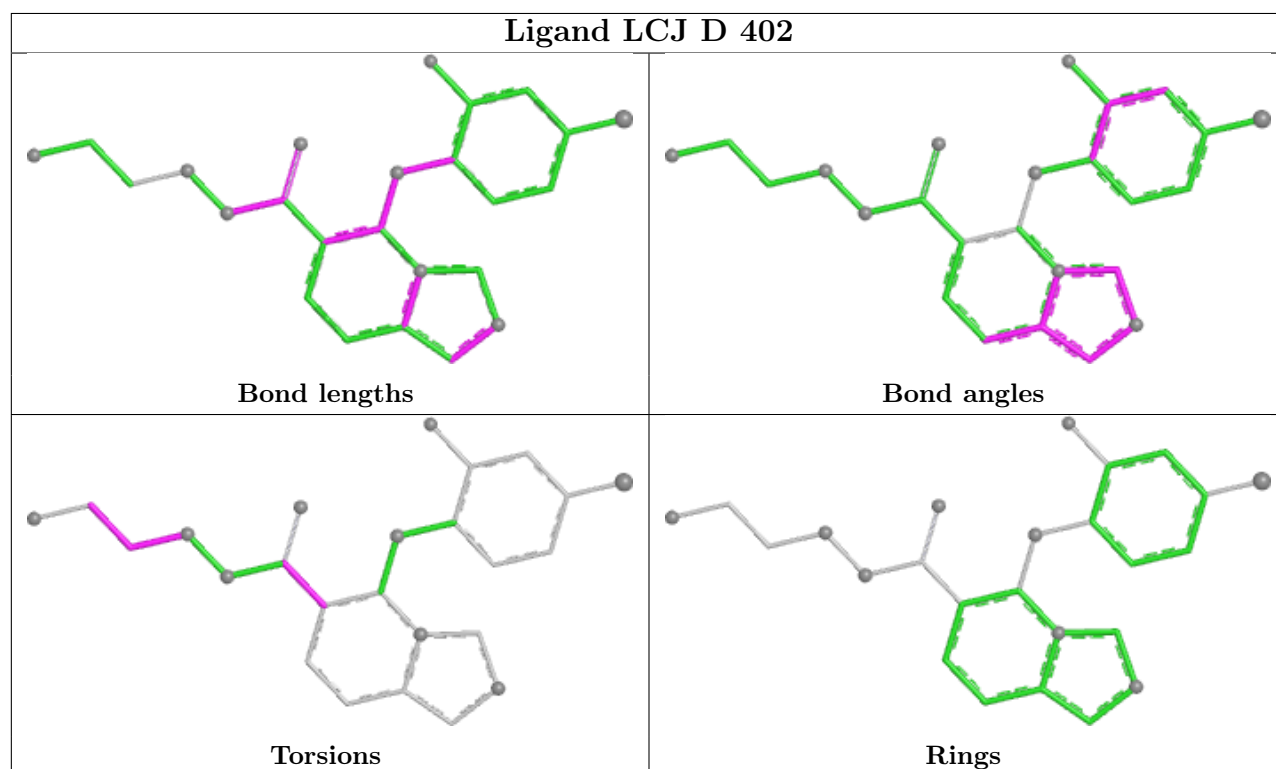
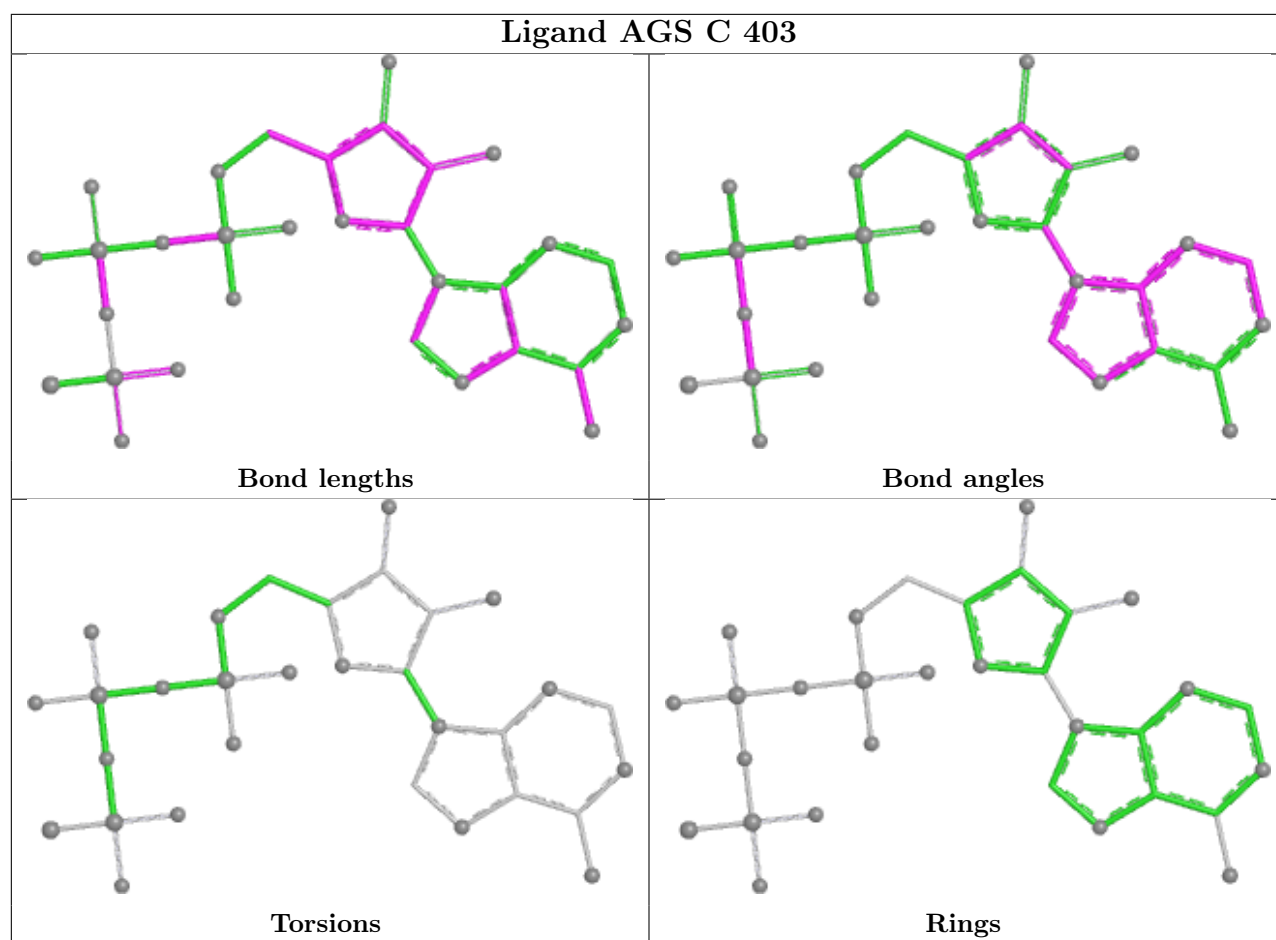
There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	403	AGS	3	0
5	C	402	LCJ	1	0
5	D	402	LCJ	3	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-20550. These allow visual inspection of the internal detail of the map and identification of artifacts.

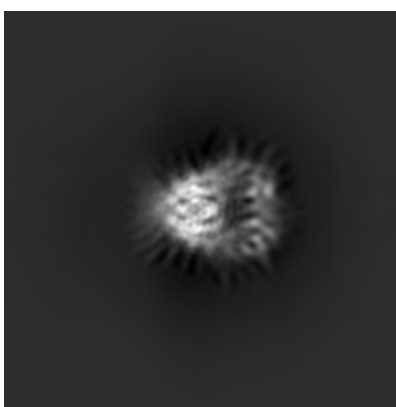
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

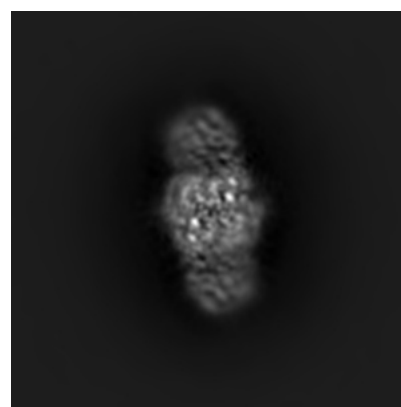
6.1.1 Primary map



X



Y

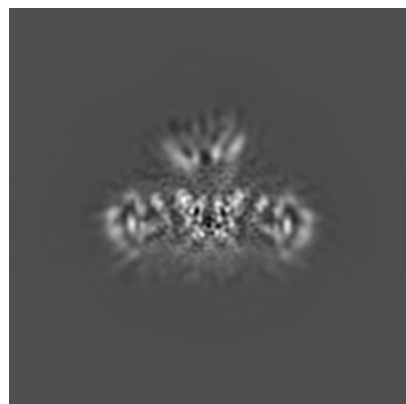


Z

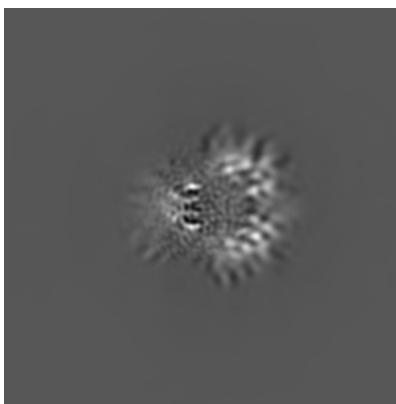
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

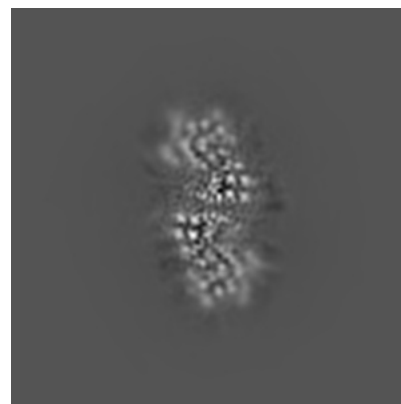
6.2.1 Primary map



X Index: 128



Y Index: 128



Z Index: 128

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

6.3 Largest variance slices [i](#)

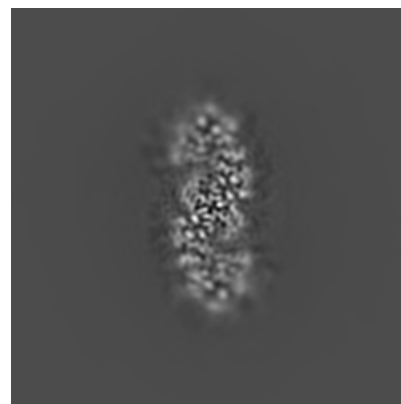
6.3.1 Primary map



X Index: 140



Y Index: 121



Z Index: 121

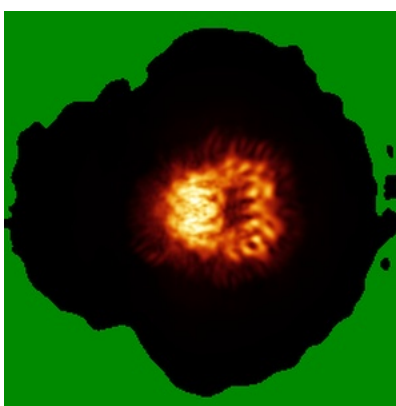
The images above show the largest variance slices of the map in three orthogonal directions.

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

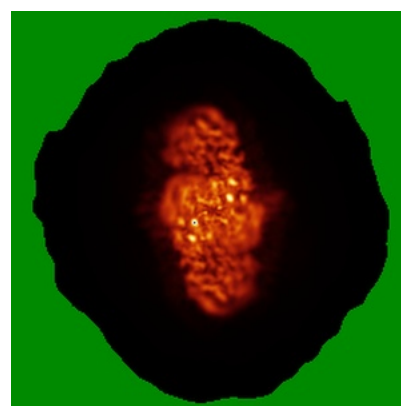
6.4.1 Primary map



X



Y

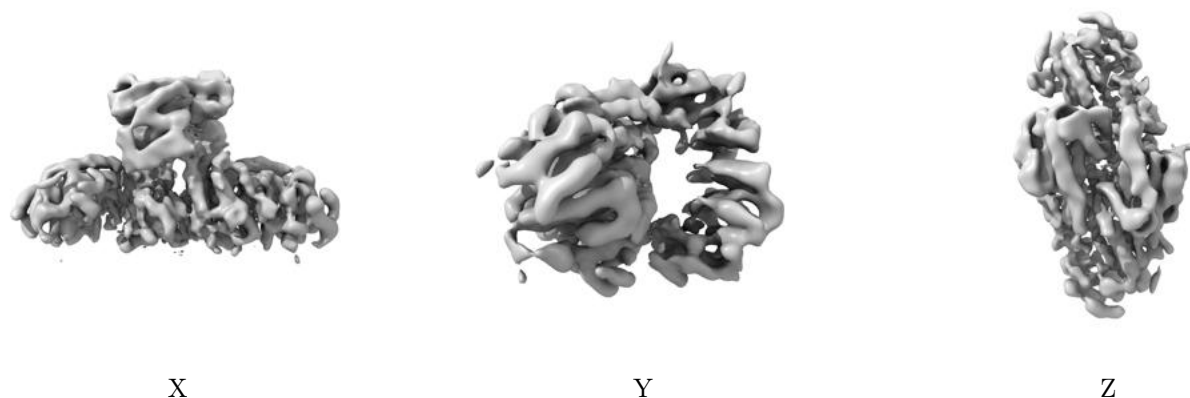


Z

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 0.0285. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

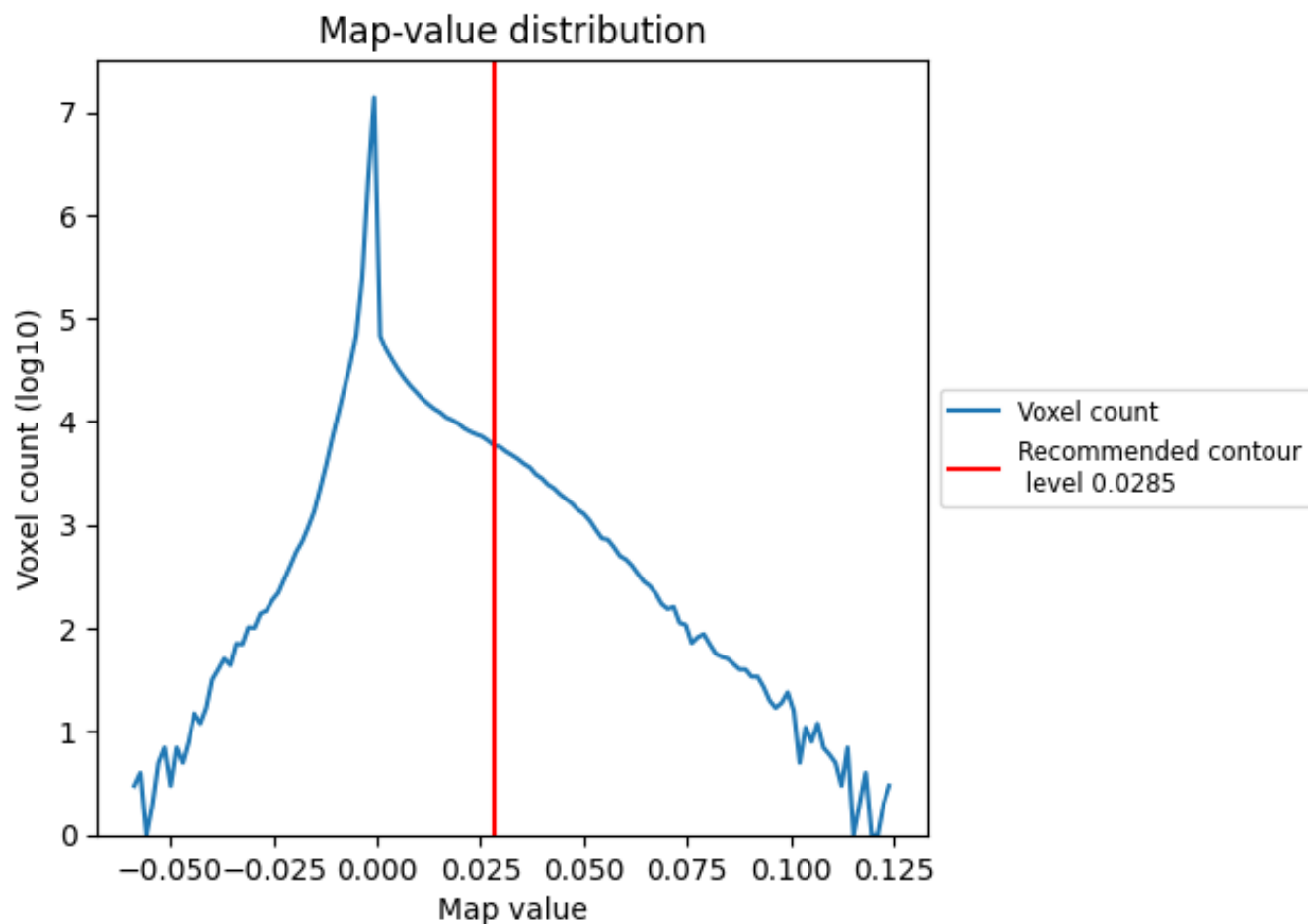
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

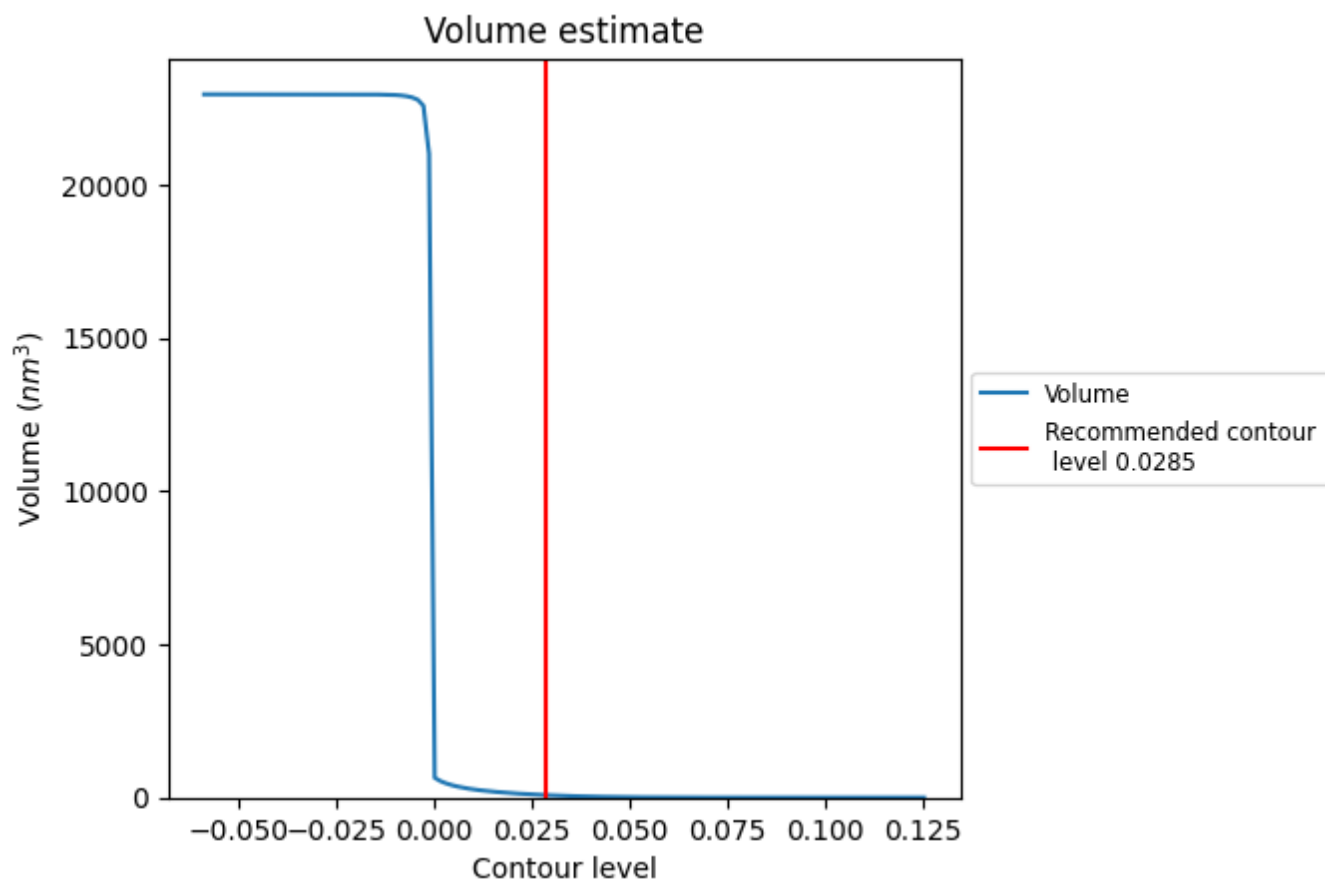
This section contains the results of statistical analysis of the map.

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.

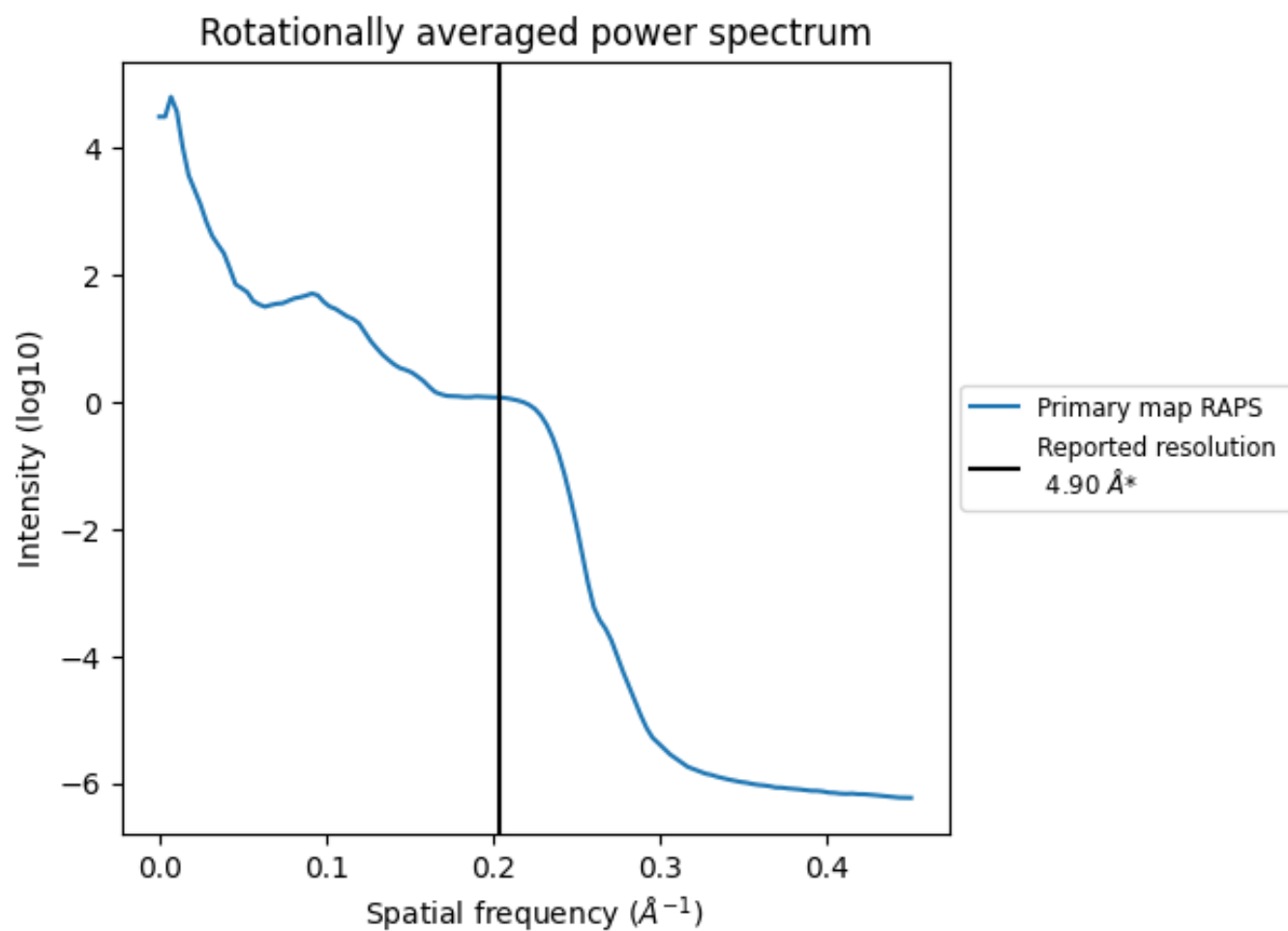
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 81 nm³; this corresponds to an approximate mass of 74 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 0.204 Å⁻¹

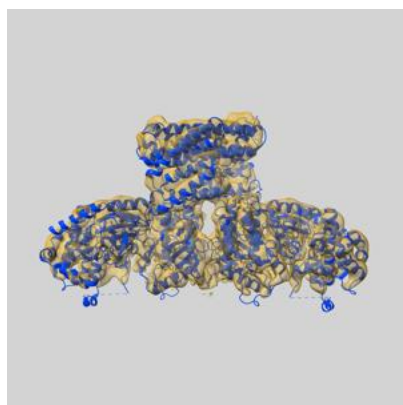
8 Fourier-Shell correlation ⓘ

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

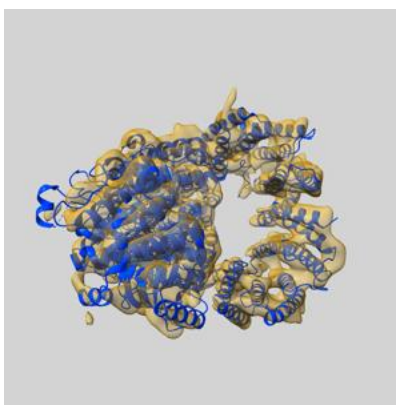
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-20550 and PDB model 6Q0J. Per-residue inclusion information can be found in section 3 on page 10.

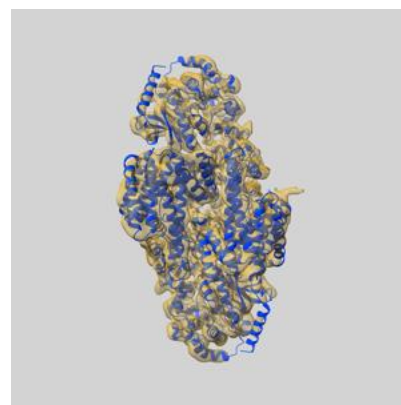
9.1 Map-model overlay [i](#)



X



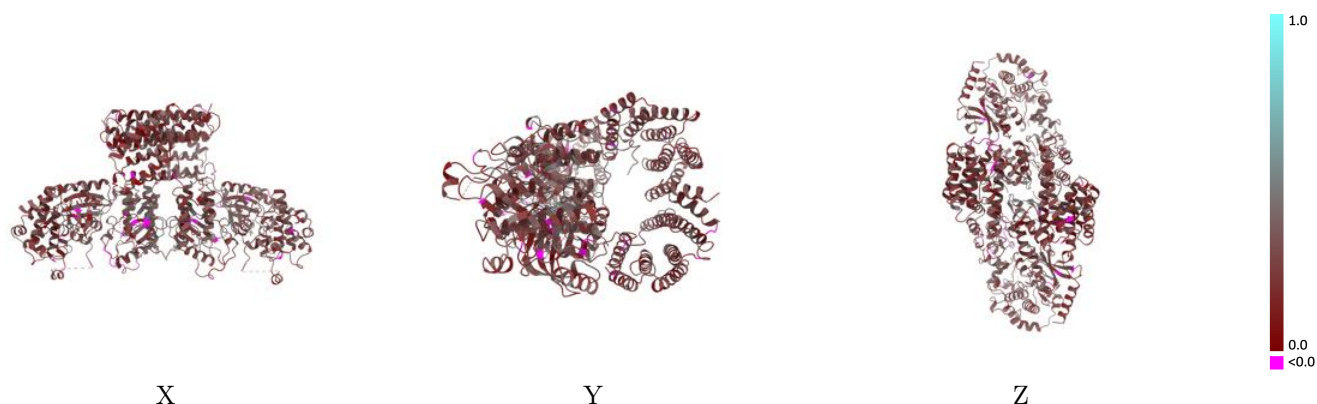
Y



Z

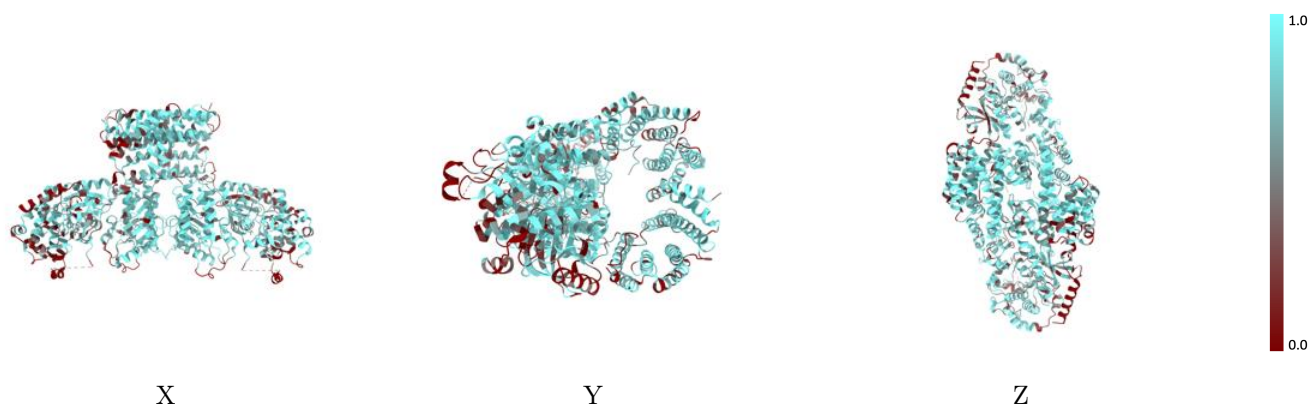
The images above show the 3D surface view of the map at the recommended contour level 0.0285 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



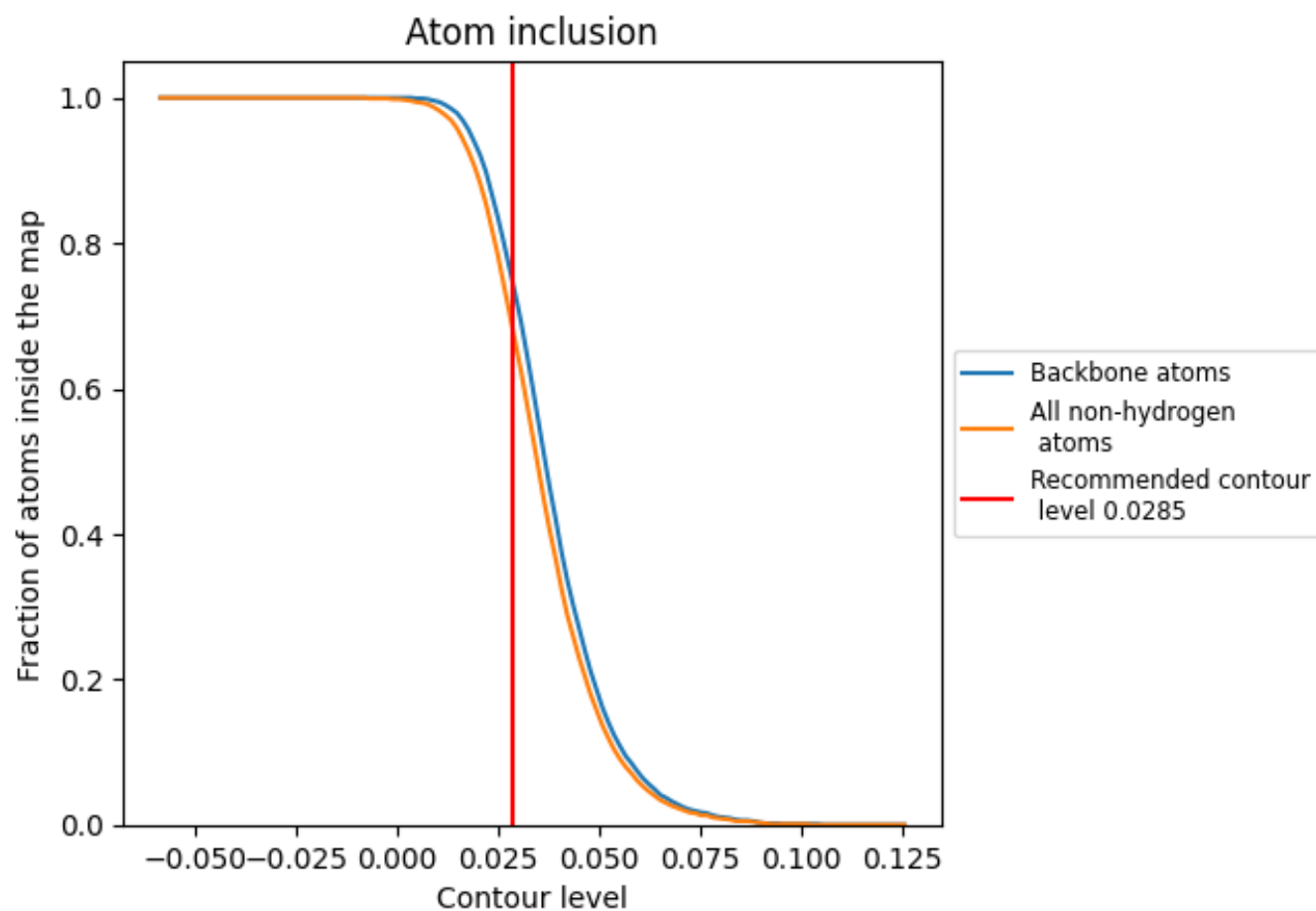
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0285).

9.4 Atom inclusion [i](#)



At the recommended contour level, 75% of all backbone atoms, 68% 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 (0.0285) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6810	0.2700
A	0.7520	0.2920
B	0.7800	0.3060
C	0.5930	0.2660
D	0.5870	0.2720
X	0.7290	0.2430
Y	0.6710	0.2300

