W O R L D W I D E

wwPDB

PROTEIN DATA BANK

Full wwPDB EM Validation Report (i)

Oct 3, 2023 – 12:45 PM JST

PDB ID	:	8KD3
EMDB ID	:	EMD-37123
Title	:	Rpd3S in complex with nucleosome with H3K36MLA modification, H3K9Q mutation and 187bp DNA
Authors	:	Dong, S.; Li, H.; Wang, M.; Rasheed, N.; Zou, B.; Gao, X.; Guan, J.; Li, W.; Zhang, J.; Wang, C.; Zhou, N.; Shi, X.; Li, M.; Zhou, M.; Huang, J.; Li, H.; Zhang, Y.; Wong, K.H.; Zhang, X.; Chao, W.C.H.; He, J.
Deposited on	:	2023-08-09
Resolution	:	2.90 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:
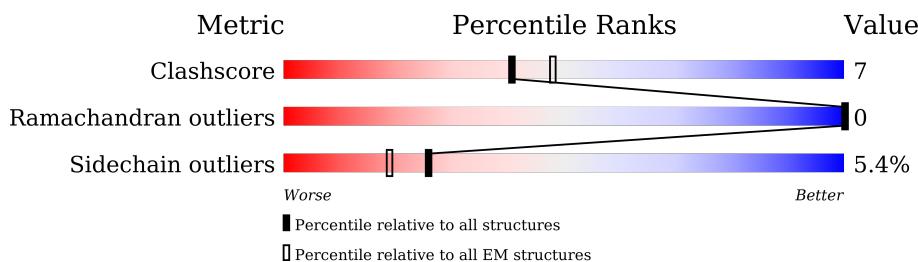
|		
EMDB validation analysis	:	0.0.1.dev50
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY
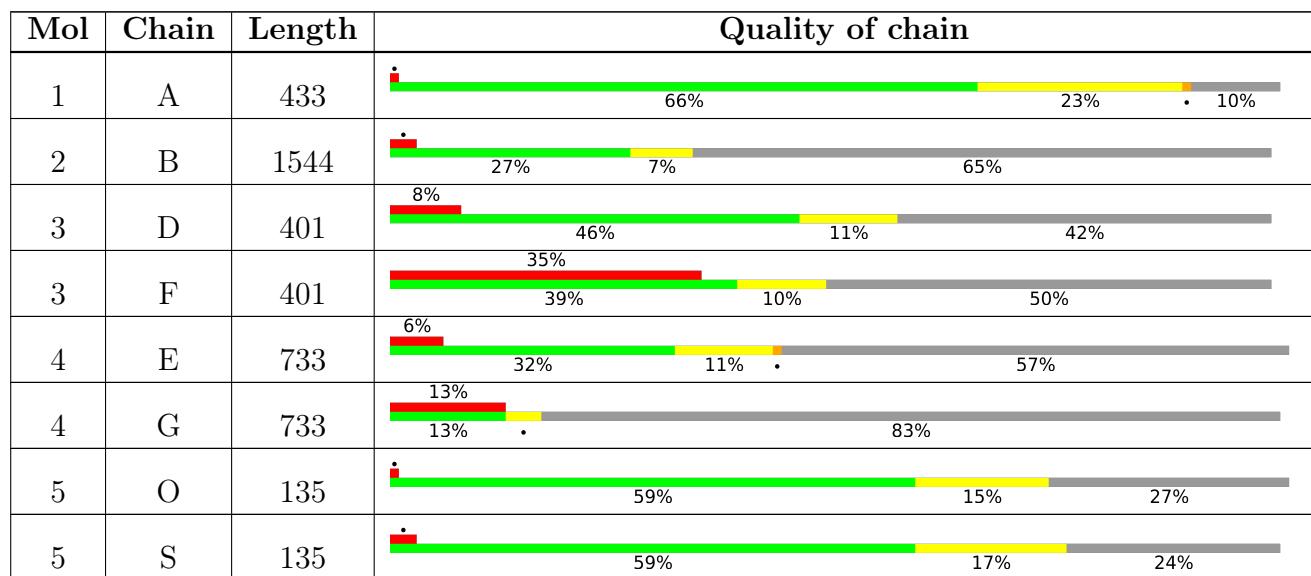
The reported resolution of this entry is 2.90 Å.

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	Percentile Ranks	Value
Clashscore		7
Ramachandran outliers		0
Sidechain outliers		5.4%

Worse ... *Better*

∎ Percentile relative to all structures
⧠ Percentile relative to all EM structures

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

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

Mol	Chain	Length	Quality of chain
1	A	433	66% 23% 10%
2	B	1544	27% 7% 65%
3	D	401	8% 46% 11% 42%
3	F	401	35% 39% 10% 50%
4	E	733	6% 32% 11% 57%
4	G	733	13% 13% 83%
5	O	135	59% 15% 27%
5	S	135	59% 17% 24%

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Mol	Chain	Length	Quality of chain
6	P	102	62% · 15% · 23%
6	T	102	58% · 19% · 23%
7	Q	129	62% · 19% · 17%
7	U	129	72% · 10% · 17%
8	R	122	70% · 6% · 24%
8	V	122	62% · 11% · 25%
9	X	187	7% · 65% · 22% · 12%
10	Y	187	6% · 71% · 17% · 12%

2 Entry composition ⓘ

There are 11 unique types of molecules in this entry. The entry contains 27576 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 Histone deacetylase RPD3.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	388	Total 3073	C 1945	N 521	O 582	S 25	0	0

- Molecule 2 is a protein called Transcriptional regulatory protein SIN3.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	542	Total 4545	C 2926	N 761	O 843	S 15	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-7	MET	-	initiating methionine	UNP P22579
B	-6	HIS	-	expression tag	UNP P22579
B	-5	HIS	-	expression tag	UNP P22579
B	-4	HIS	-	expression tag	UNP P22579
B	-3	HIS	-	expression tag	UNP P22579
B	-2	HIS	-	expression tag	UNP P22579
B	-1	HIS	-	expression tag	UNP P22579
B	0	HIS	-	expression tag	UNP P22579
B	1	HIS	-	expression tag	UNP P22579

- Molecule 3 is a protein called Chromatin modification-related protein EAF3.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	231	Total 1884	C 1205	N 312	O 355	S 12	0	0
3	F	200	Total 1647	C 1061	N 273	O 302	S 11	0	0

- Molecule 4 is a protein called Transcriptional regulatory protein RCO1.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	318	Total 2620	C 1666	N 456	O 481	S 17	0	0
4	G	126	Total 1043	C 673	N 174	O 186	S 10	0	0

There are 98 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	685	MET	-	expression tag	UNP Q04779
E	686	HIS	-	expression tag	UNP Q04779
E	687	HIS	-	expression tag	UNP Q04779
E	688	HIS	-	expression tag	UNP Q04779
E	689	HIS	-	expression tag	UNP Q04779
E	690	HIS	-	expression tag	UNP Q04779
E	691	HIS	-	expression tag	UNP Q04779
E	692	HIS	-	expression tag	UNP Q04779
E	693	HIS	-	expression tag	UNP Q04779
E	694	PRO	-	expression tag	UNP Q04779
E	695	GLN	-	expression tag	UNP Q04779
E	696	LEU	-	expression tag	UNP Q04779
E	697	ALA	-	expression tag	UNP Q04779
E	698	MET	-	expression tag	UNP Q04779
E	699	TRP	-	expression tag	UNP Q04779
E	700	SER	-	expression tag	UNP Q04779
E	701	HIS	-	expression tag	UNP Q04779
E	702	PRO	-	expression tag	UNP Q04779
E	703	GLN	-	expression tag	UNP Q04779
E	704	PHE	-	expression tag	UNP Q04779
E	705	GLU	-	expression tag	UNP Q04779
E	706	LYS	-	expression tag	UNP Q04779
E	707	GLY	-	expression tag	UNP Q04779
E	708	GLY	-	expression tag	UNP Q04779
E	709	GLY	-	expression tag	UNP Q04779
E	710	SER	-	expression tag	UNP Q04779
E	711	GLY	-	expression tag	UNP Q04779
E	712	GLY	-	expression tag	UNP Q04779
E	713	GLY	-	expression tag	UNP Q04779
E	714	SER	-	expression tag	UNP Q04779
E	715	GLY	-	expression tag	UNP Q04779
E	716	GLY	-	expression tag	UNP Q04779
E	717	GLY	-	expression tag	UNP Q04779
E	718	SER	-	expression tag	UNP Q04779
E	719	TRP	-	expression tag	UNP Q04779

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Chain	Residue	Modelled	Actual	Comment	Reference
E	720	SER	-	expression tag	UNP Q04779
E	721	HIS	-	expression tag	UNP Q04779
E	722	PRO	-	expression tag	UNP Q04779
E	723	GLN	-	expression tag	UNP Q04779
E	724	PHE	-	expression tag	UNP Q04779
E	725	GLU	-	expression tag	UNP Q04779
E	726	LYS	-	expression tag	UNP Q04779
E	727	GLU	-	expression tag	UNP Q04779
E	728	ASN	-	expression tag	UNP Q04779
E	729	LEU	-	expression tag	UNP Q04779
E	730	TYR	-	expression tag	UNP Q04779
E	731	PHE	-	expression tag	UNP Q04779
E	732	GLN	-	expression tag	UNP Q04779
E	733	SER	-	expression tag	UNP Q04779
G	685	MET	-	expression tag	UNP Q04779
G	686	HIS	-	expression tag	UNP Q04779
G	687	HIS	-	expression tag	UNP Q04779
G	688	HIS	-	expression tag	UNP Q04779
G	689	HIS	-	expression tag	UNP Q04779
G	690	HIS	-	expression tag	UNP Q04779
G	691	HIS	-	expression tag	UNP Q04779
G	692	HIS	-	expression tag	UNP Q04779
G	693	HIS	-	expression tag	UNP Q04779
G	694	PRO	-	expression tag	UNP Q04779
G	695	GLN	-	expression tag	UNP Q04779
G	696	LEU	-	expression tag	UNP Q04779
G	697	ALA	-	expression tag	UNP Q04779
G	698	MET	-	expression tag	UNP Q04779
G	699	TRP	-	expression tag	UNP Q04779
G	700	SER	-	expression tag	UNP Q04779
G	701	HIS	-	expression tag	UNP Q04779
G	702	PRO	-	expression tag	UNP Q04779
G	703	GLN	-	expression tag	UNP Q04779
G	704	PHE	-	expression tag	UNP Q04779
G	705	GLU	-	expression tag	UNP Q04779
G	706	LYS	-	expression tag	UNP Q04779
G	707	GLY	-	expression tag	UNP Q04779
G	708	GLY	-	expression tag	UNP Q04779
G	709	GLY	-	expression tag	UNP Q04779
G	710	SER	-	expression tag	UNP Q04779
G	711	GLY	-	expression tag	UNP Q04779
G	712	GLY	-	expression tag	UNP Q04779

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Chain	Residue	Modelled	Actual	Comment	Reference
G	713	GLY	-	expression tag	UNP Q04779
G	714	SER	-	expression tag	UNP Q04779
G	715	GLY	-	expression tag	UNP Q04779
G	716	GLY	-	expression tag	UNP Q04779
G	717	GLY	-	expression tag	UNP Q04779
G	718	SER	-	expression tag	UNP Q04779
G	719	TRP	-	expression tag	UNP Q04779
G	720	SER	-	expression tag	UNP Q04779
G	721	HIS	-	expression tag	UNP Q04779
G	722	PRO	-	expression tag	UNP Q04779
G	723	GLN	-	expression tag	UNP Q04779
G	724	PHE	-	expression tag	UNP Q04779
G	725	GLU	-	expression tag	UNP Q04779
G	726	LYS	-	expression tag	UNP Q04779
G	727	GLU	-	expression tag	UNP Q04779
G	728	ASN	-	expression tag	UNP Q04779
G	729	LEU	-	expression tag	UNP Q04779
G	730	TYR	-	expression tag	UNP Q04779
G	731	PHE	-	expression tag	UNP Q04779
G	732	GLN	-	expression tag	UNP Q04779
G	733	SER	-	expression tag	UNP Q04779

- Molecule 5 is a protein called Histone H3.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	O	99	Total 822	C 521	N 159	O 140	S 2	0	0
5	S	103	Total 848	C 535	N 164	O 147	S 2	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
O	9	GLN	LYS	engineered mutation	UNP A0A310TTQ1
O	110	ALA	CYS	engineered mutation	UNP A0A310TTQ1
S	9	GLN	LYS	engineered mutation	UNP A0A310TTQ1
S	110	ALA	CYS	engineered mutation	UNP A0A310TTQ1

- Molecule 6 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	P	79	Total 637	C 403	N 124	O 109	S 1	0	0
6	T	79	Total 637	C 403	N 124	O 109	S 1	0	0

- Molecule 7 is a protein called Histone H2A.

Mol	Chain	Residues	Atoms				AltConf	Trace
7	Q	107	Total 825	C 519	N 163	O 143	0	0
7	U	107	Total 825	C 519	N 163	O 143	0	0

- Molecule 8 is a protein called Histone H2B 1.1.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	R	93	Total 730	C 460	N 131	O 137	S 2	0	0
8	V	91	Total 715	C 451	N 128	O 134	S 2	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
R	29	THR	SER	engineered mutation	UNP P02281
V	29	THR	SER	engineered mutation	UNP P02281

- Molecule 9 is a DNA chain called 187bp DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	X	164	Total 3384	C 1599	N 639	O 982	P 164	0	0

- Molecule 10 is a DNA chain called 187bp DNA.

| Mol	Chain	Residues	Atoms					AltConf	Trace
10	Y	164	Total 3340	C 1585	N 605	O 986	P 164	0	0
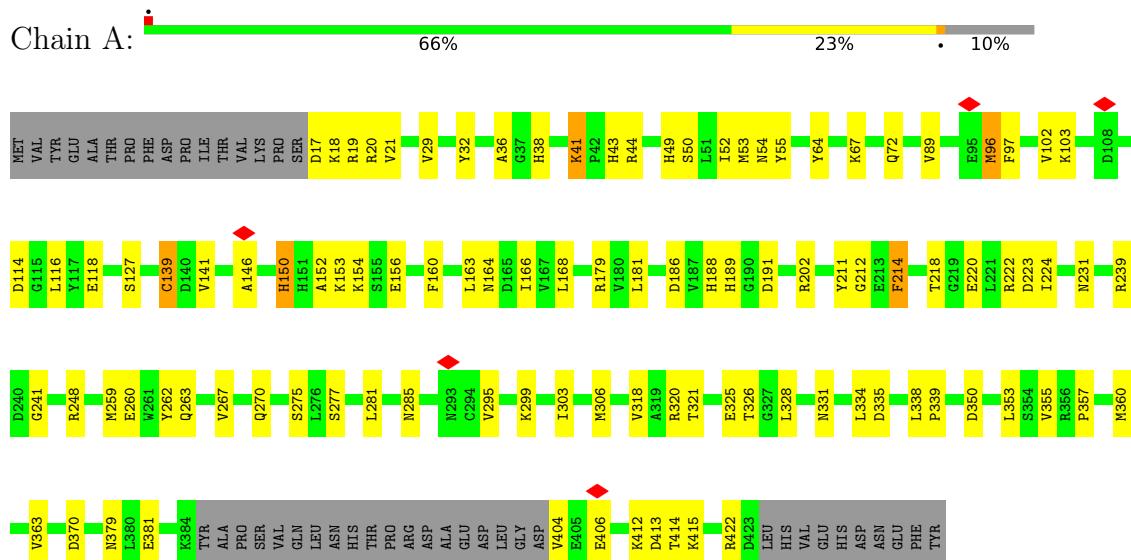
- Molecule 11 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
11	A	1	Total 1	Zn 1	0
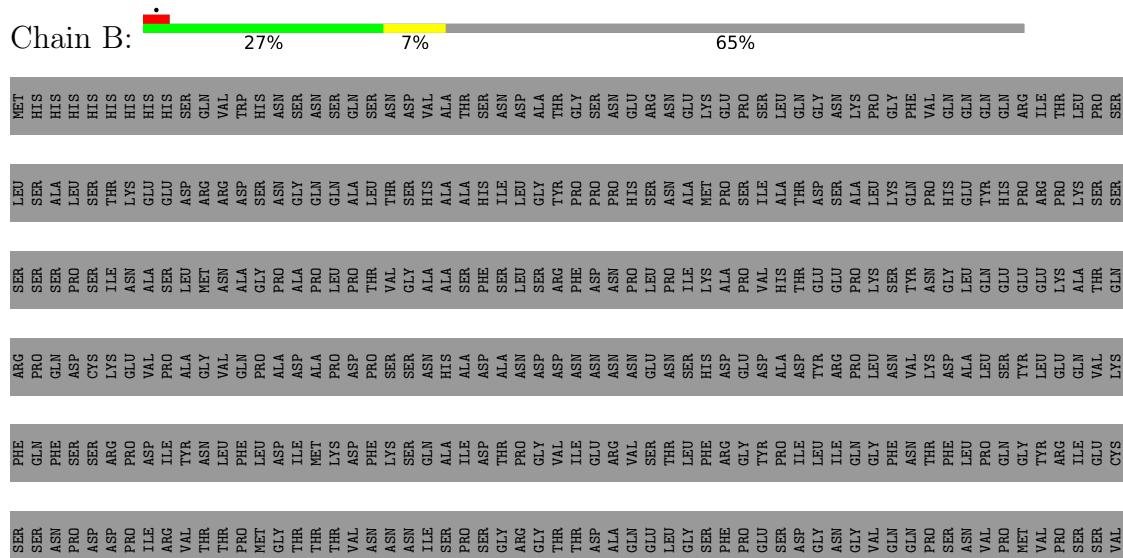
3 Residue-property plots ⓘ
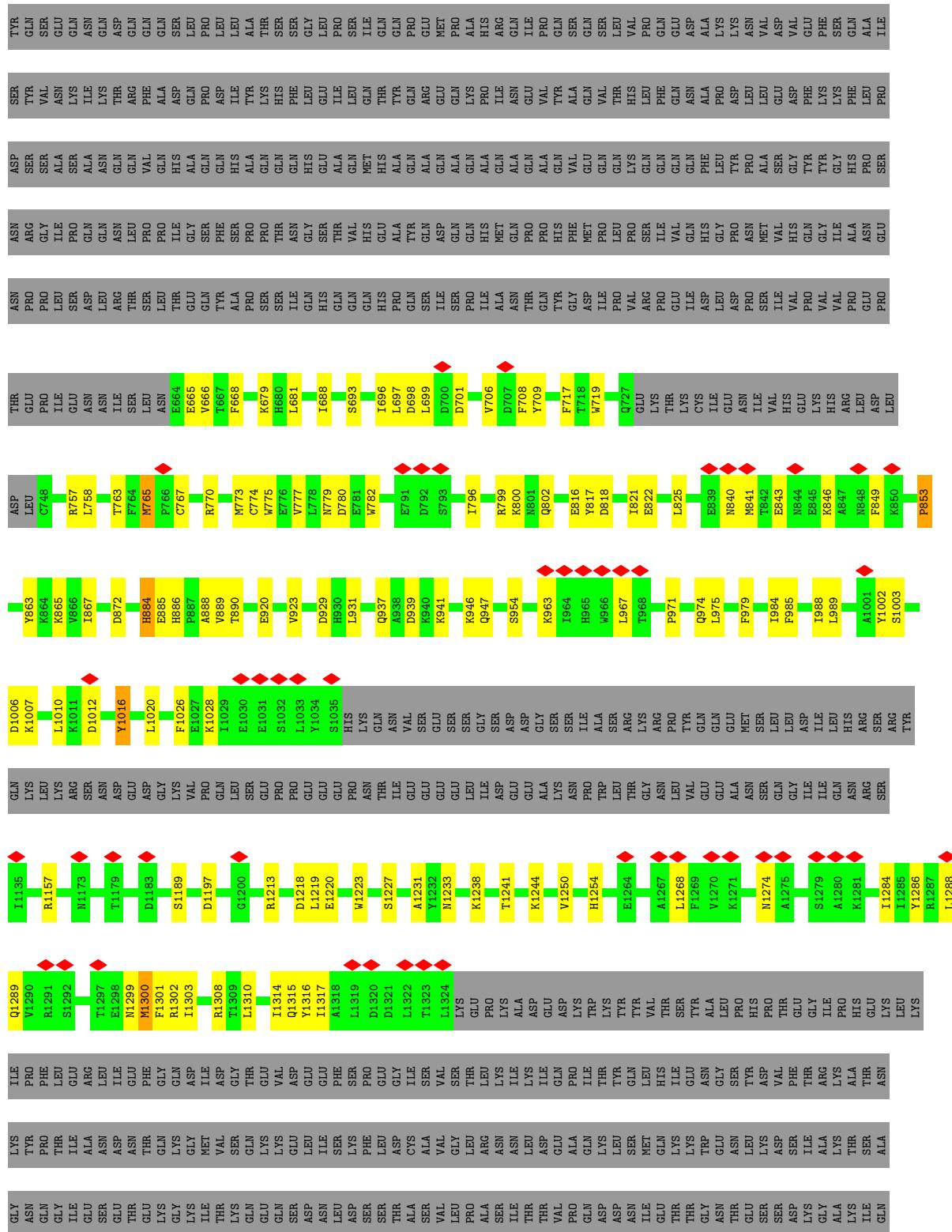
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Histone deacetylase RPD3

Chain A:
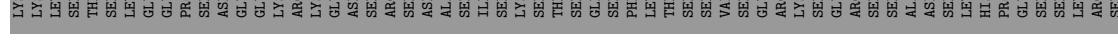
- Molecule 2: Transcriptional regulatory protein SIN3

Chain B:

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

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

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

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

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

• Molecule 3: Chromatin modification-related protein EAF3

• Molecule 3: Chromatin modification-related protein EAF3

Chain F:

35%
39%
10%
50%

• Molecule 4: Transcriptional regulatory protein RCO1

Chain E:

6%
32%
11%
57%

MET ASP THR SER LYS LYS ASP THR THR ARG SER PRO HIS SER ASN SER SER PRO SER SER SER LEU SER SER SER SER LYS GLU K33 K34 R38 L39 N43 Y46 D47 L48 K49 R50 R51 I54 T55 S56 I59 E60 R61 N65 E66 HIS ASN

LEU ALA VAL GLU ASP ASN ILE PRO GLU GLU GLU PRO LYS GLU LEU LEU GLU LEU LYS ASP SER LYS GLY ASN ILE ILE LYS LEU ASN GLU PRO SER THR ILE SER GLU ASP SER LYS VAL SER VAL THR GLY LEU PRO LEU ASN LYS GLY PRO SER GLU LYS ILE ARG GLU LEU SER LEU TRP

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

ASP ILE ILE ASN ARG THR ARG ASP ARG GLU GLU PRO GLU ASP ARG ASP ARG ASN LYS LYS LEU SER ASN THR ALA THR TYR ASP SER LYS SER LEU PHE GLN ASN SER ILE LYS SER THR SER ASN ALA SER GLU LYS ILE PHE ARG ASP

LYS ASN ASN SER THR ILE ASP PHE E258 Q268 H283 L287 D288 P289 P290 I291 P297 K298 G299 C303 C306 K309 I310 F311 I312 N313 M316 A317 T318 L319 K320 K321 S324 K328 Q329 N330 N331 N332 V333 K334 I335 F336 A337 K338 I343 Q352 I357

K358 E359 T360 V364 R369 D374 D377 L381 T382 D383 R384 Q385 L386 F387 N388 T389 S390 Y391 G392 Q393 S394 T396 K397 L398 D399 S400 Y401 D404 D408 S409 N410 Y418 K419 Q422 T423 R424 E432 R435 C440 T445 C451 S456 F457

L460 G461 S462 S470 K473 K476 K477 I478 HIS HIS CYS GLN GLU ASP ASN SER VAL N488 Y489 K490 K493 K494 Q495 R496 L497 I498 K501 N502 Y505 P508 I520 I523 P524 THR THR SER HIS THR ASP TYR PHE ASP GLN ASN GLN D536 Q541 I542 D543 K548

Y549 K554 I555 Y556 K557 M560 V561 GLN LYS ARG LYS LEU TRP ASP LYS LEU PHE GLU LYS GLU LEU THR ASN VAL VAL PRO ASN GLU LEU ASP SER ILE GLN PHE GLU ASN GLY ASN SER GLU GLU ASN MET VAL LYS ASP ILE ALA SER LEU ILE TYR LEU LYS LEU ILE ILE GLU GLN SER LYS PRO GLU LEU LEU LYS

LYS SER ALA SER LYS SER ASN ASN LEU GLN SER GLU MET HIS HIS HIS HIS HIS HIS PRO GLN LEU ALA MET TRP SER HIS PRO GLN PHE GLU LYS GLY GLY GLY SER GLY GLY GLY SER GLY GLY SER TRP SER HIS PRO GLN PHE GLU LYS ASN LEU TYR PHE GLN

PHE LEU ASN ILE GLU ASN PRO GLU ASN GLN SER GLU MET HIS HIS HIS HIS HIS HIS PRO GLN LEU ALA MET TRP SER HIS PRO GLN PHE GLU LYS GLY GLY GLY SER GLY GLY GLY SER GLY GLY SER TRP SER HIS PRO GLN PHE GLU LYS ASN LEU TYR PHE GLN

SER

• Molecule 4: Transcriptional regulatory protein RCO1

13%

Chain G: 13% • 83%

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

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

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

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

ASN ALA SER GLU LYS ILE PHE ARG ASP ASP D261 F262 C263 S264 A265 C266 N267 Q268 S269 G270 S271 F272 L273 C274 C275 D276 T277 C278 P279 K280 S281 F282 H283 F284 L285 C286 L287 D288 P289 P290 I291 D292 P293 N294 ASN LEU PRO K298 G299 D300

W301 H302 C303 N304 E305 C306 K307 F308 K309 I310 F311 I312 N313 N314 S315 M316 A317 T318 L319 K320 S324 N325 K328 Q329 N330 N331 N332 V333 K334 I335 F336 A337 K338 L339 L340 F341 N342 I343 D344 S345 H346 N347 P348 K349 Q350 F351 Q352 L353 P354 N355 Y356 I357 K358 GLU THR PHE PRO ALA

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

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

ASP ASN SER VAL ASN TYR LYS VAL TRP LYS LYS GLN ARG LEU ILE LYS LYS ASN GLN LEU TYR TYR GLU LEU PRO LEU GLN LYS ILE GLY TYR GLN ASN ASN GLY ASN ILE GLN ILE ILE PRO THR THR SER HIS ASP ASP PHE GLN ASP PHE GLN ASP PHE LYS ILE T540 Q541 I542 D543

E544 N545 S546 I547 F552 D553 K554 I555 Y556 K559 K563 R564 K565 L566 F567 Q568 F569 Q570 GLU SER LEU ILE ASP LYS VAL LEU SER ASN GLY SER GLN ASN GLY ASN SER GLU ASP ASN MET VAL LYS ASP ILE ALA SER LEU ILE TYR PHE GLN VAL SER ASN ASP ASN ASP LYS SER

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

LEU LEU LYS PHE LEU ASN ILE GLU ASN PRO GLU ASN GLN GLU SER GLU MET HIS HIS HIS HIS HIS HIS HIS PRO GLN LEU ALA MET TRP SER HIS PRO GLN PHE GLU LYS GLY GLY GLY SER GLY GLY GLY SER TRP SER HIS PRO GLN PHE GLU LYS ASN LEU

TYR PHE GLN SER

- Molecule 5: Histone H3

Chain O: 59% 15% 27%

ALA ARG THR LYS GLN THR ALA ARG GLN SER THR GLY GLY LYS ALA PRO ARG LYS GLN LEU ALA THR LYS ALA ALA ARG LYS SER ALA PRO ALA THR GLY GLY VAL K36 R40 Y41 R42 T45 K56 L61 I62 R63 R69 K79 T80 D81 L82 Q85 M90 A91

L92 Q93 N108 K115 D123 R128 R129 E133 R134 ALA

- Molecule 5: Histone H3

Chain S: 59% 17% 24%

ALA ARG THR LYS GLN THR ALA R8 Q9 S10 T11 G12 GLY LYS ALA PRO ARG LYS GLN LEU ALA THR LYS ALA ALA ARG LYS SER ALA PRO ALA THR GLY GLY VAL K36 R40 Y41 R42 P43 L61 I62 R63 K64 R72 E73 K79 F84 Q85 S86 S87 A88 V89 M90

Q93 E94 N108 H113 R116 R128 E133 ARG ALA

- Molecule 6: Histone H4

Chain P: 62% 15% 23%

SER GLY ARG GLY LYS GLY GLY LYS GLY LEU GLY LYS GLY GLY ALA LYS ARG HIS ARG LYS VAL **L22** **R23** P32 R35 R36 L37 A38 R39 R40 G41 G42 V43 K44 S47 G48 L49 M84 D85 V86 V87 Y88 K91 T96 F100 GLY GLY

- Molecule 6: Histone H4

Chain T:

| 58% | 19% | 23% |

SER GLY ARG GLY LYS GLY GLY LYS GLY LEU GLY LYS GLY GLY ALA LYS ARG HIS ARG LYS VAL **L22** **R23** **D24** N25 P32 R35 R36 L37 A38 R39 G42 V43 K44 V57 A69 E74 H75 A76 K79 T80 V81 M84 K91 R92 L97 F100 GLY GLY

- Molecule 7: Histone H2A

Chain Q:

| 62% | 19% | 17% |

SER GLY ARG GLY LYS GLN GLY GLY LYS THR R11 T16 L23 R29 V30 K36 G37 N38 L51 A52 A53 V54 L63 N68 R71 I78 R81 H82 L83 Q84 D90 L93 N94 K95 L96 L97 V100 A103 Q104 G105 G106 **I111** Q112 L115

L116 P117 LYS LYS THR GLU SER LYS SER ALA LYS LYS

- Molecule 7: Histone H2A

Chain U:

| 72% | 10% | 17% |

SER GLY ARG GLY LYS GLN GLY GLY LYS THR R11 A12 R29 Y50 V54 L63 N68 R71 D90 L97 V100 Q112 L115 L116 P117 LYS LYS THR GLU SER LYS SER ALA LYS LYS

- Molecule 8: Histone H2B 1.1

Chain R:

| 70% | 6% | 24% |

ALA LYS SER ALA PRO ALA PRO LYS LYS GLY SER LYS LYS ALA VAL THR LYS THR GLN LYS LYS ASP GLY LYS LYS ARG ARG **K28** S33 L42 K43 T49 S52 F67 V95 S109 S120 ALA LYS

- Molecule 8: Histone H2B 1.1

Chain V:

| 62% | 11% | 25% |
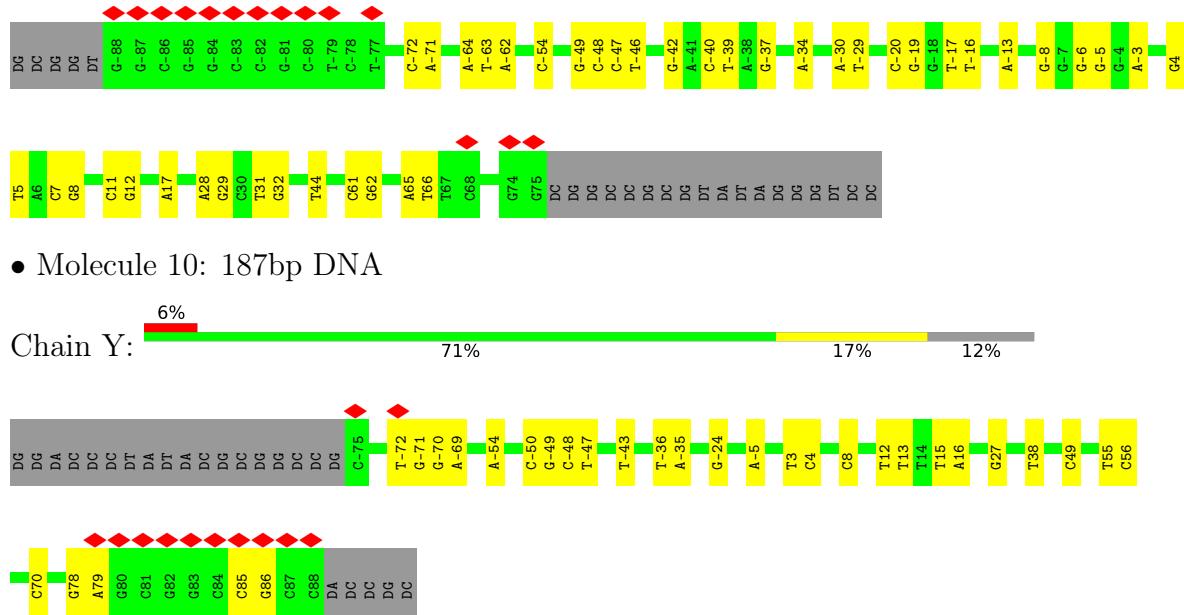
ALA LYS SER ALA PRO ALA PRO LYS LYS GLY SER LYS LYS ALA VAL THR LYS THR GLN LYS LYS ASP GLY LYS LYS ARG ARG LYS **T29** **R30** L42 K43 H46 S53 Y80 N81 K82 R83 R89 V95 L98 L99 E102 K105 H106 A107 V108 S109 T119 SER

ALA LYS

- Molecule 9: 187bp DNA

Chain X:

| 7% | 65% | 22% | 12% |

• Molecule 10: 187bp DNA

Chain Y:

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	117400	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/Å^2)$	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.570	Depositor
Minimum map value	-0.046	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.011	Depositor
Recommended contour level	0.0496	Depositor
Map size (Å)	383.4, 383.4, 383.4	wwPDB
Map dimensions	540, 540, 540	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.71, 0.71, 0.71	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, M3L

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	0.28	0/3147	0.52	1/4250 (0.0%)
2	B	0.27	0/4648	0.53	1/6267 (0.0%)
3	D	0.29	0/1922	0.69	5/2594 (0.2%)
3	F	0.28	0/1681	0.65	2/2268 (0.1%)
4	E	0.30	0/2683	0.59	1/3611 (0.0%)
4	G	0.28	0/1068	0.51	1/1430 (0.1%)
5	O	0.25	0/823	0.58	1/1106 (0.1%)
5	S	0.25	0/848	0.58	1/1138 (0.1%)
6	P	0.25	0/644	0.62	0/863
6	T	0.25	0/644	0.56	0/863
7	Q	0.27	0/835	0.59	0/1127
7	U	0.26	0/835	0.59	0/1127
8	R	0.24	0/741	0.50	0/997
8	V	0.25	0/726	0.50	0/978
9	X	0.55	0/3801	0.90	0/5870
10	Y	0.52	0/3741	0.89	0/5766
All	All	0.36	0/28787	0.68	13/40255 (0.0%)

There are no bond length outliers.

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	319	PRO	CA-N-CD	-10.13	97.32	111.50
3	D	111	LEU	CA-CB-CG	7.81	133.26	115.30
3	D	107	MET	CA-CB-CG	7.05	125.29	113.30
4	G	566	LEU	CA-CB-CG	7.05	131.52	115.30
3	D	386	LEU	CA-CB-CG	6.45	130.13	115.30
2	B	853	PRO	CA-N-CD	-6.36	102.60	111.50
3	D	107	MET	CB-CG-SD	5.90	130.10	112.40
3	F	338	LEU	CA-CB-CG	5.63	128.25	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	O	90	MET	CB-CG-SD	5.40	128.61	112.40
3	F	363	LEU	CA-CB-CG	5.38	127.68	115.30
1	A	96	MET	CB-CG-SD	5.31	128.33	112.40
5	S	90	MET	CB-CG-SD	5.14	127.81	112.40
4	E	396	THR	N-CA-CB	5.03	119.86	110.30

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	3073	0	2937	73	0
2	B	4545	0	4507	79	0
3	D	1884	0	1876	39	0
3	F	1647	0	1661	25	0
4	E	2620	0	2593	77	0
4	G	1043	0	1021	21	0
5	O	822	0	874	17	0
5	S	848	0	896	18	0
6	P	637	0	681	12	0
6	T	637	0	681	24	0
7	Q	825	0	882	27	0
7	U	825	0	882	10	0
8	R	730	0	755	12	0
8	V	715	0	737	17	0
9	X	3384	0	1838	30	0
10	Y	3340	0	1840	21	0
11	A	1	0	0	0	0
All	All	27576	0	24661	389	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 7.

All (389) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

W O R L D W I D E
wwPDB
PROTEIN DATA BANK

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:36:ALA:CB	4:E:48:LEU:CD2	1.81	1.52
1:A:36:ALA:HB1	4:E:48:LEU:CD2	0.97	1.44
1:A:36:ALA:CB	4:E:48:LEU:HD22	1.47	1.35
1:A:224:ILE:HD12	1:A:231:ASN:OD1	1.35	1.25
2:B:1299:ASN:ND2	2:B:1301:PHE:CZ	2.10	1.18
7:Q:51:LEU:HD21	8:R:67:PHE:CE1	1.82	1.15
2:B:872:ASP:OD1	4:E:54:ILE:O	1.71	1.08
1:A:224:ILE:CD1	1:A:231:ASN:OD1	2.03	1.06
1:A:36:ALA:HB1	4:E:48:LEU:HD21	1.04	1.04
1:A:103:LYS:HG3	3:D:393:GLN:HB3	1.38	1.03
4:E:395:ILE:O	4:E:395:ILE:HG23	1.54	1.03
2:B:985:PHE:O	2:B:989:LEU:HD13	1.59	1.03
5:S:73:GLU:HB2	6:T:25:ASN:HD22	1.25	1.01
6:T:76:ALA:HB2	8:V:81:ASN:HD21	1.25	0.98
7:Q:30:VAL:HG13	7:Q:51:LEU:HD23	1.42	0.97
2:B:816:GLU:OE1	4:E:47:ASP:OD1	1.85	0.94
7:Q:51:LEU:HD21	8:R:67:PHE:CD1	2.02	0.93
3:D:363:LEU:O	3:D:367:LEU:HD13	1.67	0.92
2:B:1299:ASN:HD22	2:B:1301:PHE:HZ	1.13	0.92
3:D:293:LEU:O	3:D:298:LEU:HD13	1.69	0.91
1:A:36:ALA:CB	4:E:48:LEU:HD23	2.00	0.89
7:Q:30:VAL:CG1	7:Q:51:LEU:HD23	2.03	0.88
1:A:36:ALA:HB2	4:E:48:LEU:CD2	2.04	0.85
1:A:295:VAL:HG21	1:A:325:GLU:OE1	1.75	0.85
4:E:288:ASP:O	4:E:290:PRO:HD3	1.75	0.85
2:B:773:MET:O	2:B:777:VAL:HG22	1.76	0.85
7:Q:51:LEU:CD2	8:R:67:PHE:CE1	2.61	0.83
4:E:395:ILE:O	4:E:395:ILE:CG2	2.24	0.82
3:D:225:PRO:CB	3:D:367:LEU:HD21	2.10	0.80
1:A:36:ALA:HB1	4:E:48:LEU:HD22	0.79	0.79
4:E:523:ILE:HG23	4:E:524:PRO:HD2	1.66	0.77
2:B:1016:TYR:CE1	2:B:1020:LEU:HD22	2.20	0.77
6:T:76:ALA:HB2	8:V:81:ASN:ND2	2.00	0.76
4:E:47:ASP:OD1	4:E:48:LEU:N	2.19	0.75
2:B:1284:ILE:O	2:B:1288:LEU:HD13	1.87	0.75
2:B:985:PHE:O	2:B:989:LEU:CD1	2.34	0.73
2:B:885:GLU:OE1	2:B:886:HIS:NE2	2.09	0.71
2:B:1299:ASN:HD21	2:B:1316:TYR:HE1	1.37	0.70
1:A:36:ALA:CB	4:E:48:LEU:HD21	1.78	0.70
3:D:363:LEU:O	3:D:367:LEU:CD1	2.40	0.68
2:B:796:ILE:HD12	4:E:395:ILE:HG21	1.78	0.66
3:F:297:LEU:HA	3:F:333:ARG:HH21	1.60	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:G:303:CYS:SG	4:G:306:CYS:N	2.63	0.66
1:A:102:VAL:O	1:A:103:LYS:HB3	1.95	0.65
4:G:304:ASN:HA	4:G:307:LYS:HD2	1.77	0.65
4:E:399:ASP:O	4:E:400:SER:OG	2.12	0.65
3:D:225:PRO:CG	3:D:367:LEU:HD21	2.27	0.65
4:E:523:ILE:HD12	4:E:541:GLN:CG	2.28	0.64
6:T:76:ALA:CB	8:V:81:ASN:HD21	2.05	0.64
5:O:128:ARG:HE	5:O:133:GLU:HB2	1.63	0.64
4:E:333:VAL:HG23	4:E:337:ALA:HB2	1.79	0.63
2:B:1220:GLU:HB3	2:B:1223:TRP:HD1	1.63	0.63
6:T:22:LEU:HB3	6:T:25:ASN:HD21	1.63	0.63
3:D:293:LEU:HD22	3:D:298:LEU:CD1	2.29	0.63
7:Q:51:LEU:CD2	8:R:67:PHE:HE1	2.07	0.63
3:F:295:ASN:O	4:G:348:PRO:HB3	2.00	0.62
1:A:52:ILE:HG12	1:A:326:THR:HG21	1.80	0.62
1:A:36:ALA:HB3	4:E:48:LEU:HD22	1.69	0.61
6:T:76:ALA:CB	8:V:81:ASN:ND2	2.63	0.61
1:A:404:VAL:HG23	1:A:406:GLU:H	1.65	0.61
5:S:85:GLN:HG3	5:S:88:ALA:H	1.64	0.61
3:D:293:LEU:CD2	3:D:298:LEU:HD11	2.30	0.61
1:A:212:GLY:HA3	4:E:456:SER:HB3	1.82	0.61
7:U:68:ASN:OD1	7:U:71:ARG:NH2	2.34	0.61
2:B:770:ARG:HD2	2:B:774:CYS:HB3	1.82	0.60
1:A:36:ALA:HB2	4:E:48:LEU:HD23	1.73	0.60
3:D:229:LYS:HD3	4:E:360:THR:HG21	1.83	0.60
1:A:363:VAL:HG11	4:E:398:LEU:HB3	1.84	0.60
6:T:92:ARG:HH22	8:V:98:LEU:HD23	1.66	0.60
2:B:979:PHE:HB2	2:B:1310:LEU:HB3	1.83	0.59
1:A:36:ALA:CA	4:E:48:LEU:HD21	2.32	0.59
5:S:40:ARG:HH22	9:X:-8:DG:H21	1.50	0.59
1:A:320:ARG:HD2	1:A:353:LEU:HA	1.85	0.58
5:O:56:LYS:NZ	9:X:-64:DA:OP2	2.37	0.58
2:B:757:ARG:NH1	3:D:379:PRO:O	2.37	0.58
3:D:293:LEU:HD13	3:D:298:LEU:HD21	1.85	0.58
4:E:473:LYS:HD2	4:E:493:LYS:HE3	1.86	0.58
1:A:224:ILE:HD12	1:A:231:ASN:CG	2.19	0.58
1:A:224:ILE:HG21	1:A:379:ASN:ND2	2.19	0.58
7:Q:11:ARG:HH21	9:X:44:DT:H1'	1.69	0.57
1:A:260:GLU:O	1:A:263:GLN:NE2	2.38	0.57
6:T:39:ARG:NH1	6:T:43:VAL:O	2.36	0.57
4:E:377:ASP:HA	4:E:462:SER:HA	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:357:PRO:HD2	2:B:1233:ASN:HD21	1.68	0.57
4:E:288:ASP:HB3	4:E:289:PRO:HD3	1.87	0.57
7:Q:54:VAL:HG21	8:R:95:VAL:HG11	1.87	0.57
5:S:72:ARG:HH21	5:S:84:PHE:HB2	1.70	0.57
2:B:763:THR:HG23	2:B:780:ASP:HB2	1.87	0.57
1:A:103:LYS:HB2	3:D:397:VAL:HG23	1.87	0.56
8:V:83:ARG:HH21	9:X:-34:DA:H3'	1.70	0.56
3:F:297:LEU:HA	3:F:333:ARG:NH2	2.21	0.56
1:A:154:LYS:HE3	2:B:770:ARG:HH22	1.71	0.56
3:D:225:PRO:HB3	3:D:367:LEU:HD21	1.87	0.56
3:D:293:LEU:HD13	3:D:298:LEU:CD2	2.36	0.56
2:B:889:VAL:HG23	2:B:890:THR:HG23	1.88	0.56
4:E:303:CYS:SG	4:E:306:CYS:N	2.76	0.56
5:S:128:ARG:HE	5:S:133:GLU:HG3	1.70	0.55
5:O:69:ARG:NH2	9:X:17:DA:OP2	2.39	0.55
7:U:63:LEU:HD13	8:V:42:LEU:HB2	1.87	0.55
4:E:476:LYS:HE3	4:E:490:LYS:HB2	1.88	0.55
2:B:1197:ASP:OD1	2:B:1197:ASP:N	2.39	0.55
6:P:39:ARG:NH1	6:P:43:VAL:O	2.40	0.55
2:B:853:PRO:HA	2:B:884:HIS:NE2	2.21	0.55
6:P:35:ARG:NH1	9:X:8:DG:OP2	2.40	0.55
2:B:666:VAL:HG11	4:G:552:PHE:HD1	1.71	0.54
1:A:114:ASP:HB2	2:B:865:LYS:HD3	1.88	0.54
1:A:103:LYS:HA	3:D:393:GLN:HA	1.88	0.54
1:A:220:GLU:H	1:A:223:ASP:HB2	1.73	0.54
7:Q:115:LEU:HG	6:T:44:LYS:HD3	1.88	0.54
2:B:1157:ARG:HG2	2:B:1238:LYS:HB3	1.89	0.54
4:E:543:ASP:OD1	4:E:543:ASP:N	2.39	0.54
6:T:22:LEU:HB3	6:T:25:ASN:ND2	2.21	0.54
9:X:-17:DT:H2"	9:X:-16:DT:C5	2.43	0.54
2:B:698:ASP:OD1	2:B:698:ASP:N	2.35	0.53
3:D:224:ILE:HB	3:D:229:LYS:HE3	1.90	0.53
2:B:1227:SER:O	2:B:1231:ALA:HB2	2.09	0.53
4:E:556:TYR:HD2	3:F:273:GLY:HA2	1.72	0.53
1:A:152:ALA:O	1:A:164:ASN:ND2	2.42	0.53
1:A:163:LEU:HD11	1:A:168:LEU:HD11	1.90	0.53
1:A:20:ARG:HG3	1:A:139:CYS:HA	1.90	0.53
1:A:224:ILE:HG21	1:A:379:ASN:HD22	1.72	0.53
4:E:291:ILE:HG21	4:E:297:PRO:HD3	1.90	0.53
1:A:186:ASP:HA	1:A:275:SER:HB3	1.89	0.53
4:G:303:CYS:O	4:G:307:LYS:HG3	2.08	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:275:GLN:N	3:F:275:GLN:OE1	2.42	0.53
5:S:108:ASN:ND2	6:T:42:GLY:O	2.42	0.53
7:U:12:ALA:HB3	9:X:-42:DG:H4'	1.91	0.53
7:U:54:VAL:HG21	8:V:95:VAL:HG21	1.91	0.53
1:A:281:LEU:HD13	5:S:9:GLN:HB2	1.91	0.53
3:F:323:ILE:HG23	3:F:324:ARG:HG2	1.90	0.53
2:B:1002:TYR:O	2:B:1007:LYS:NZ	2.42	0.52
4:E:385:GLN:O	4:E:395:ILE:HG12	2.08	0.52
2:B:984:ILE:O	2:B:988:ILE:HD12	2.09	0.52
5:O:42:ARG:NH1	10:Y:-5:DA:OP1	2.43	0.52
2:B:799:ARG:HB2	4:E:394:SER:HB2	1.91	0.52
5:O:108:ASN:ND2	6:P:42:GLY:O	2.43	0.52
4:E:419:LYS:HD3	4:E:451:CYS:HB3	1.91	0.52
4:E:440:CYS:HB3	4:E:445:THR:H	1.75	0.52
7:Q:30:VAL:HG13	8:R:67:PHE:HE1	1.75	0.52
2:B:1016:TYR:CZ	2:B:1020:LEU:HD22	2.44	0.52
3:F:266:SER:HB3	3:F:278:LEU:CD2	2.40	0.52
1:A:64:TYR:CE1	1:A:415:LYS:HD2	2.45	0.52
6:T:32:PRO:HA	6:T:35:ARG:HB3	1.92	0.52
1:A:150:HIS:HB3	1:A:166:ILE:HD12	1.92	0.51
1:A:241:GLY:HA2	1:A:285:ASN:HB2	1.92	0.51
3:F:266:SER:HB3	3:F:278:LEU:HD23	1.91	0.51
3:D:225:PRO:HG2	3:D:367:LEU:HD21	1.92	0.51
3:D:293:LEU:HD22	3:D:298:LEU:HD11	1.93	0.51
4:G:305:GLU:HA	4:G:308:PHE:CD1	2.45	0.51
7:Q:16:THR:HA	10:Y:-43:DT:H5"	1.91	0.51
6:T:91:LYS:NZ	8:V:80:TYR:OH	2.43	0.51
1:A:21:VAL:HG22	1:A:141:VAL:HB	1.93	0.51
4:E:394:SER:O	4:E:395:ILE:HG22	2.11	0.51
5:S:61:LEU:HD12	6:T:37:LEU:HD23	1.93	0.51
4:E:422:GLN:HB2	4:E:424:ARG:HG2	1.92	0.50
3:F:299:TYR:O	3:F:303:ARG:N	2.40	0.50
4:G:302:HIS:O	4:G:307:LYS:HE3	2.11	0.50
7:Q:38:ASN:O	7:Q:38:ASN:ND2	2.44	0.50
7:Q:68:ASN:OD1	7:Q:71:ARG:NH2	2.44	0.50
1:A:103:LYS:HG3	3:D:393:GLN:CB	2.26	0.50
2:B:665:GLU:HG3	2:B:719:TRP:HZ2	1.75	0.50
5:S:73:GLU:HB2	6:T:25:ASN:ND2	2.09	0.50
4:E:501:LYS:HE3	3:F:100:TYR:HE1	1.76	0.50
2:B:937:GLN:HG2	9:X:-20:DC:H4'	1.93	0.50
2:B:939:ASP:OD2	2:B:1241:THR:OG1	2.30	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:796:ILE:HG23	4:E:460:LEU:HD11	1.94	0.50
2:B:1268:LEU:HD13	2:B:1289:GLN:HE22	1.76	0.50
5:S:73:GLU:CB	6:T:25:ASN:HD22	2.12	0.50
9:X:65:DA:H2"	9:X:66:DT:C2	2.46	0.50
3:D:293:LEU:CD1	3:D:298:LEU:HD21	2.42	0.50
1:A:188:HIS:H	1:A:214:PHE:HE2	1.60	0.50
4:E:456:SER:OG	4:E:457:PHE:N	2.45	0.50
3:F:316:ASP:OD1	3:F:316:ASP:N	2.44	0.50
2:B:846:LYS:HE2	2:B:888:ALA:HB1	1.93	0.49
4:G:344:ASP:OD1	4:G:344:ASP:N	2.45	0.49
3:F:80:HIS:NE2	10:Y:12:DT:OP1	2.44	0.49
2:B:799:ARG:NH1	4:E:390:SER:O	2.45	0.49
3:D:251:ASP:OD1	3:D:251:ASP:N	2.41	0.49
3:D:271:SER:OG	3:D:275:GLN:NE2	2.46	0.49
4:E:283:HIS:O	4:E:287:LEU:HG	2.12	0.49
8:R:52:SER:HA	10:Y:-54:DA:H5"	1.93	0.49
2:B:1302:ARG:NE	2:B:1315:GLN:OE1	2.45	0.49
8:R:43:LYS:NZ	8:R:49:THR:O	2.39	0.49
3:D:237:GLU:OE1	4:E:496:ARG:NH2	2.44	0.49
7:U:112:GLN:HB2	7:U:115:LEU:HG	1.94	0.49
1:A:414:THR:HG22	1:A:415:LYS:N	2.28	0.49
2:B:1299:ASN:ND2	2:B:1301:PHE:CE1	2.78	0.49
2:B:1299:ASN:ND2	2:B:1316:TYR:HE1	2.09	0.49
2:B:1303:ILE:HG12	2:B:1314:ILE:HG23	1.95	0.49
7:Q:103:ALA:HB2	6:T:97:LEU:HD11	1.95	0.49
6:T:74:GLU:O	8:V:89:ARG:NH1	2.46	0.49
4:E:408:ASP:OD1	4:E:408:ASP:N	2.45	0.48
7:U:54:VAL:HG22	8:V:107:ALA:HB1	1.94	0.48
2:B:779:ASN:OD1	2:B:779:ASN:N	2.46	0.48
2:B:706:VAL:HA	2:B:709:TYR:HB2	1.95	0.48
4:E:404:ASP:OD1	4:E:404:ASP:N	2.46	0.48
10:Y:-50:DC:H2"	10:Y:-49:DG:H5"	1.94	0.48
2:B:774:CYS:HA	2:B:777:VAL:HG22	1.94	0.48
2:B:822:GLU:HA	2:B:825:LEU:HB2	1.95	0.48
4:G:292:ASP:OD1	4:G:292:ASP:N	2.47	0.48
5:O:61:LEU:HD22	6:P:36:ARG:HB3	1.95	0.48
5:O:79:LYS:HD3	5:O:82:LEU:HD13	1.94	0.48
6:T:69:ALA:HB1	6:T:81:VAL:HG21	1.96	0.48
9:X:31:DT:H2"	9:X:32:DG:H5"	1.96	0.48
5:O:63:ARG:HD3	9:X:17:DA:H4'	1.96	0.48
3:D:338:LEU:HA	3:D:341:LEU:HD12	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:360:GLU:HA	3:F:363:LEU:HG	1.96	0.48
5:O:85:GLN:HA	10:Y:-24:DG:H5"	1.95	0.48
7:Q:84:GLN:NE2	7:Q:106:GLY:O	2.47	0.48
4:E:508:PRO:HB3	4:E:541:GLN:HB2	1.94	0.48
2:B:1227:SER:O	2:B:1231:ALA:CB	2.62	0.47
5:O:62:ILE:HD11	6:P:37:LEU:HD11	1.96	0.47
7:Q:29:ARG:NH1	8:R:33:SER:O	2.47	0.47
1:A:350:ASP:OD1	1:A:350:ASP:N	2.47	0.47
1:A:181:LEU:HD23	1:A:267:VAL:HG22	1.97	0.47
1:A:318:VAL:HA	1:A:321:THR:HG22	1.96	0.47
3:F:340:GLU:OE2	3:F:340:GLU:N	2.37	0.47
5:S:43:PRO:HB3	10:Y:8:DC:H4'	1.96	0.47
7:Q:63:LEU:HD22	8:R:42:LEU:HD13	1.95	0.47
1:A:179:ARG:NH1	1:A:262:TYR:O	2.48	0.47
1:A:320:ARG:HH21	1:A:355:VAL:HA	1.79	0.47
7:Q:23:LEU:HD21	7:Q:53:ALA:HA	1.97	0.47
2:B:920:GLU:HA	2:B:923:VAL:HB	1.97	0.47
7:Q:97:LEU:HD22	7:Q:100:VAL:HG21	1.97	0.47
2:B:693:SER:HA	4:E:554:LYS:HE2	1.96	0.47
3:D:238:TYR:HA	3:D:242:ASP:HB2	1.96	0.47
5:O:62:ILE:O	5:O:93:GLN:NE2	2.45	0.47
7:Q:112:GLN:HB2	7:Q:115:LEU:HD13	1.96	0.47
10:Y:85:DC:H2"	10:Y:86:DG:C8	2.49	0.47
2:B:840:ASN:OD1	2:B:840:ASN:N	2.47	0.47
2:B:1218:ASP:OD1	2:B:1218:ASP:N	2.48	0.47
6:P:44:LYS:HG3	7:U:115:LEU:HD22	1.97	0.46
5:S:116:ARG:HD3	9:X:-3:DA:H3'	1.96	0.46
1:A:32:TYR:OH	1:A:118:GLU:OE1	2.32	0.46
2:B:818:ASP:HA	2:B:821:ILE:HB	1.97	0.46
4:E:523:ILE:HD12	4:E:541:GLN:HG2	1.95	0.46
4:E:523:ILE:CG2	4:E:524:PRO:HD2	2.39	0.46
5:O:123:ASP:OD1	5:S:113:HIS:NE2	2.42	0.46
3:D:300:ARG:HA	3:D:303:ARG:HG2	1.95	0.46
1:A:103:LYS:HB2	3:D:397:VAL:CG2	2.45	0.46
1:A:89:VAL:HG11	1:A:116:LEU:HD23	1.97	0.46
7:U:97:LEU:HD22	7:U:100:VAL:HG21	1.96	0.46
1:A:191:ASP:OD1	1:A:191:ASP:N	2.35	0.46
4:G:276:ASP:OD1	4:G:276:ASP:N	2.47	0.46
3:D:257:VAL:HG22	3:D:373:TYR:HE2	1.81	0.46
3:D:293:LEU:CD1	3:D:298:LEU:HD11	2.46	0.46
1:A:44:ARG:HD2	1:A:318:VAL:HG11	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:224:ILE:HD12	4:E:357:ILE:HD11	1.96	0.46
1:A:38:HIS:O	1:A:41:LYS:NZ	2.36	0.45
3:F:98:ARG:HD2	3:F:100:TYR:H	1.80	0.45
3:F:299:TYR:HB3	3:F:302:GLU:HB2	1.99	0.45
1:A:49:HIS:O	1:A:53:MET:HG2	2.17	0.45
1:A:50:SER:O	1:A:54:ASN:ND2	2.39	0.45
1:A:55:TYR:HE2	1:A:334:LEU:HB3	1.82	0.45
8:V:53:SER:N	9:X:-54:DC:OP1	2.50	0.45
3:F:335:ILE:HA	3:F:338:LEU:HD22	1.98	0.45
1:A:43:HIS:NE2	2:B:822:GLU:OE2	2.50	0.45
1:A:321:THR:O	1:A:325:GLU:HG2	2.17	0.45
3:D:225:PRO:HG2	3:D:367:LEU:CD2	2.47	0.45
4:E:389:THR:O	4:E:393:GLN:HB2	2.16	0.45
4:G:266:CYS:SG	4:G:283:HIS:ND1	2.90	0.45
5:S:108:ASN:HB2	6:T:43:VAL:HG22	1.98	0.45
8:V:102:GLU:HA	8:V:105:LYS:HD3	1.98	0.45
2:B:696:ILE:HG23	4:E:476:LYS:HE2	1.99	0.44
2:B:1299:ASN:ND2	2:B:1301:PHE:CE2	2.80	0.44
8:V:95:VAL:HG13	8:V:99:LEU:HD12	1.99	0.44
4:G:300:ASP:N	4:G:300:ASP:OD1	2.49	0.44
2:B:963:LYS:HE3	2:B:971:PRO:HD3	1.99	0.44
4:G:355:ASN:N	4:G:355:ASN:OD1	2.49	0.44
9:X:-37:DG:N2	10:Y:38:DT:O2	2.51	0.44
10:Y:-70:DG:H2"	10:Y:-69:DA:C8	2.52	0.44
2:B:974:GLN:HE21	2:B:1316:TYR:H	1.66	0.44
1:A:295:VAL:CG2	1:A:325:GLU:OE1	2.57	0.44
2:B:779:ASN:HB2	2:B:782:TRP:HD1	1.81	0.44
5:O:40:ARG:HD2	5:O:40:ARG:HA	1.85	0.44
1:A:17:ASP:O	1:A:331:ASN:ND2	2.45	0.44
1:A:189:HIS:NE2	1:A:218:THR:O	2.50	0.44
1:A:335:ASP:OD1	1:A:335:ASP:N	2.49	0.44
2:B:697:LEU:HG	2:B:701:ASP:HB2	2.00	0.44
2:B:765:MET:SD	2:B:767:CYS:SG	2.95	0.44
2:B:767:CYS:HB3	2:B:770:ARG:HG3	2.00	0.44
3:D:236:TRP:O	3:D:240:THR:OG1	2.36	0.44
5:S:62:ILE:O	5:S:93:GLN:NE2	2.51	0.44
4:G:265:ALA:HA	4:G:349:LYS:HA	1.99	0.44
7:Q:78:ILE:HA	7:Q:82:HIS:HD1	1.82	0.44
1:A:338:LEU:HD12	1:A:339:PRO:HD2	1.99	0.43
2:B:679:LYS:HA	2:B:679:LYS:HD3	1.86	0.43
4:E:497:LEU:HD12	4:E:498:ILE:H	1.83	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:363:LEU:HA	3:F:366:LEU:HG	1.99	0.43
5:S:128:ARG:HH11	6:T:57:VAL:HG22	1.82	0.43
4:G:305:GLU:HA	4:G:308:PHE:CE1	2.53	0.43
4:E:520:ILE:HD12	4:E:542:ILE:HG21	2.00	0.43
7:Q:29:ARG:HE	7:Q:29:ARG:HB2	1.67	0.43
9:X:-49:DG:H2"	9:X:-48:DC:H5"	2.00	0.43
2:B:863:TYR:O	2:B:867:ILE:HG12	2.19	0.43
2:B:1274:ASN:OD1	2:B:1274:ASN:N	2.52	0.43
3:F:355:LEU:HD13	3:F:358:GLN:NE2	2.33	0.43
1:A:19:ARG:HD3	1:A:299:LYS:HD3	2.01	0.43
5:O:45:THR:OG1	10:Y:70:DC:OP1	2.34	0.43
1:A:17:ASP:HB3	1:A:18:LYS:H	1.63	0.43
2:B:947:GLN:NE2	4:E:401:TYR:HE2	2.16	0.43
2:B:1010:LEU:HD21	2:B:1250:VAL:HG13	2.00	0.43
1:A:29:VAL:HG21	1:A:146:ALA:HB1	2.00	0.43
2:B:1213:ARG:HG2	2:B:1219:LEU:HD13	2.01	0.43
4:E:399:ASP:C	4:E:400:SER:HG	2.17	0.43
9:X:-40:DC:C6	9:X:-39:DT:H72	2.54	0.43
9:X:4:DG:H2"	9:X:5:DT:C4	2.54	0.43
3:D:300:ARG:NH1	4:E:268:GLN:OE1	2.42	0.43
3:D:347:MET:HG2	4:E:338:LYS:HD2	2.00	0.43
4:E:501:LYS:CE	3:F:100:TYR:CE1	3.02	0.43
9:X:-6:DG:H2"	9:X:-5:DG:N7	2.32	0.43
2:B:941:LYS:HG3	9:X:-19:DG:H4'	2.01	0.43
2:B:963:LYS:O	2:B:967:LEU:N	2.52	0.43
4:E:432:GLU:O	4:E:435:ARG:NH2	2.49	0.43
9:X:-63:DT:H2"	9:X:-62:DA:C8	2.54	0.43
4:E:333:VAL:O	4:E:337:ALA:N	2.52	0.43
5:O:92:LEU:HG	6:P:86:VAL:HG11	2.00	0.43
2:B:1241:THR:HB	2:B:1244:LYS:HB2	2.01	0.42
3:D:281:TYR:HA	4:E:335:ILE:HD11	2.00	0.42
4:E:501:LYS:CE	3:F:100:TYR:HE1	2.32	0.42
5:O:115:LYS:HA	5:O:115:LYS:HD3	1.79	0.42
6:P:47:SER:HA	9:X:7:DC:H5"	2.01	0.42
6:P:88:TYR:HA	6:P:91:LYS:HB3	2.02	0.42
7:Q:90:ASP:HB3	7:Q:93:LEU:HB2	2.00	0.42
8:V:43:LYS:HA	8:V:43:LYS:HD2	1.90	0.42
9:X:28:DA:H2"	9:X:29:DG:H5"	2.00	0.42
3:F:355:LEU:HD13	3:F:358:GLN:HE22	1.85	0.42
6:P:49:LEU:HD23	6:P:49:LEU:HA	1.93	0.42
1:A:360:MET:HA	2:B:931:LEU:HG	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:G:308:PHE:CE1	4:G:345:SER:HA	2.54	0.42
6:T:36:ARG:NH1	9:X:-13:DA:OP1	2.52	0.42
4:E:364:VAL:HA	4:E:374:ASP:HA	2.01	0.42
7:Q:104:GLN:NE2	5:S:94:GLU:OE2	2.47	0.42
1:A:328:LEU:HD23	1:A:328:LEU:HA	1.90	0.42
2:B:681:LEU:HD13	4:E:418:TYR:HE2	1.85	0.42
2:B:799:ARG:HB2	4:E:394:SER:CB	2.49	0.42
5:S:61:LEU:O	6:T:36:ARG:NH2	2.53	0.42
3:F:243:LYS:HB2	3:F:243:LYS:HE3	1.81	0.42
4:E:396:THR:HG23	4:E:399:ASP:OD1	2.19	0.41
2:B:688:ILE:HD11	4:E:470:SER:HA	2.01	0.41
2:B:1300:MET:HG3	2:B:1317:ILE:HG13	2.01	0.41
3:D:356:ILE:O	3:D:360:GLU:HG2	2.21	0.41
8:V:105:LYS:H	8:V:105:LYS:HG3	1.69	0.41
1:A:267:VAL:HG23	1:A:303:ILE:HD11	2.02	0.41
3:F:105:ILE:HG23	3:F:108:LYS:HA	2.02	0.41
1:A:239:ARG:HB3	4:E:398:LEU:HD23	2.02	0.41
2:B:947:GLN:HE22	4:E:401:TYR:HE2	1.66	0.41
4:E:343:ILE:HD13	4:E:343:ILE:HA	1.96	0.41
3:F:368:MET:H	3:F:368:MET:HG3	1.66	0.41
4:G:554:LYS:HD3	4:G:554:LYS:HA	1.82	0.41
10:Y:55:DT:H2"	10:Y:56:DC:C5	2.56	0.41
7:Q:63:LEU:HD13	8:R:42:LEU:HB2	2.02	0.41
6:T:79:LYS:HB2	10:Y:27:DG:H3'	2.02	0.41
9:X:-72:DC:H2"	9:X:-71:DA:C8	2.55	0.41
9:X:-47:DC:H2"	9:X:-46:DT:C5	2.56	0.41
9:X:61:DC:H2"	9:X:62:DG:H5"	2.02	0.41
3:D:257:VAL:HG22	3:D:373:TYR:CE2	2.55	0.41
3:D:258:LEU:HD21	3:D:285:LEU:HD23	2.02	0.41
6:P:91:LYS:HA	6:P:96:THR:HG22	2.03	0.41
10:Y:78:DG:H2"	10:Y:79:DA:C8	2.56	0.41
4:E:390:SER:OG	4:E:391:TYR:N	2.52	0.41
6:P:32:PRO:HA	6:P:35:ARG:HB2	2.02	0.41
7:Q:51:LEU:HD23	8:R:67:PHE:HE1	1.86	0.41
3:D:293:LEU:HG	3:D:322:PRO:HB3	2.02	0.41
4:E:523:ILE:CD1	4:E:541:GLN:HG2	2.51	0.41
7:U:29:ARG:NH2	10:Y:49:DC:OP1	2.52	0.41
8:V:53:SER:OG	9:X:-54:DC:OP1	2.34	0.41
9:X:11:DC:H2"	9:X:12:DG:C8	2.56	0.41
2:B:758:LEU:HD23	2:B:758:LEU:HA	1.96	0.41
4:G:278:CYS:SG	4:G:280:LYS:NZ	2.94	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:G:336:PHE:HB2	4:G:339:LEU:HD11	2.03	0.40
9:X:-30:DA:H2'	9:X:-29:DT:H71	2.04	0.40
4:E:523:ILE:HD12	4:E:541:GLN:HG3	2.00	0.40
4:G:335:ILE:H	4:G:335:ILE:HD12	1.87	0.40
4:G:555:ILE:HD13	4:G:555:ILE:HA	1.89	0.40
5:O:128:ARG:NH2	5:O:133:GLU:O	2.42	0.40
7:Q:30:VAL:HG11	7:Q:51:LEU:HD23	1.95	0.40
10:Y:3:DT:H2"	10:Y:4:DC:C5	2.56	0.40
10:Y:12:DT:H2"	10:Y:13:DT:C5	2.56	0.40
1:A:404:VAL:HG23	1:A:406:GLU:HB3	2.03	0.40
2:B:843:GLU:HA	2:B:846:LYS:HB3	2.03	0.40
2:B:699:LEU:HD23	2:B:699:LEU:HA	1.91	0.40
10:Y:-36:DT:H2"	10:Y:-35:DA:N7	2.36	0.40
1:A:72:GLN:HB3	1:A:404:VAL:HA	2.04	0.40
4:E:43:ASN:OD1	4:E:43:ASN:N	2.53	0.40
7:U:116:LEU:HA	7:U:117:PRO:HD3	1.98	0.40
10:Y:-72:DT:H2"	10:Y:-71:DG:C8	2.57	0.40
10:Y:-48:DC:H2"	10:Y:-47:DT:C5	2.56	0.40
10:Y:15:DT:H2"	10:Y:16:DA:C8	2.57	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	384/433 (89%)	366 (95%)	18 (5%)	0	100	100
2	B	536/1544 (35%)	516 (96%)	20 (4%)	0	100	100
3	D	225/401 (56%)	209 (93%)	16 (7%)	0	100	100
3	F	194/401 (48%)	187 (96%)	7 (4%)	0	100	100
4	E	310/733 (42%)	264 (85%)	46 (15%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	G	120/733 (16%)	112 (93%)	8 (7%)	0	100	100
5	O	97/135 (72%)	96 (99%)	1 (1%)	0	100	100
5	S	99/135 (73%)	96 (97%)	3 (3%)	0	100	100
6	P	77/102 (76%)	75 (97%)	2 (3%)	0	100	100
6	T	77/102 (76%)	76 (99%)	1 (1%)	0	100	100
7	Q	105/129 (81%)	103 (98%)	2 (2%)	0	100	100
7	U	105/129 (81%)	103 (98%)	2 (2%)	0	100	100
8	R	91/122 (75%)	89 (98%)	2 (2%)	0	100	100
8	V	89/122 (73%)	89 (100%)	0	0	100	100
All	All	2509/5221 (48%)	2381 (95%)	128 (5%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2   Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	326/367 (89%)	302 (93%)	24 (7%)	13	38
2	B	504/1399 (36%)	478 (95%)	26 (5%)	23	55
3	D	210/359 (58%)	200 (95%)	10 (5%)	25	58
3	F	184/359 (51%)	166 (90%)	18 (10%)	8	24
4	E	302/692 (44%)	287 (95%)	15 (5%)	24	57
4	G	121/692 (18%)	115 (95%)	6 (5%)	24	57
5	O	85/108 (79%)	84 (99%)	1 (1%)	71	91
5	S	88/108 (82%)	83 (94%)	5 (6%)	20	51
6	P	66/78 (85%)	63 (96%)	3 (4%)	27	61
6	T	66/78 (85%)	64 (97%)	2 (3%)	41	75
7	Q	84/101 (83%)	79 (94%)	5 (6%)	19	49
7	U	84/101 (83%)	81 (96%)	3 (4%)	35	69

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
8	R	80/102 (78%)	78 (98%)	2 (2%)	47	78
8	V	78/102 (76%)	75 (96%)	3 (4%)	33	67
All	All	2278/4646 (49%)	2155 (95%)	123 (5%)	26	54

All (123) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	LYS
1	A	67	LYS
1	A	96	MET
1	A	97	PHE
1	A	127	SER
1	A	139	CYS
1	A	150	HIS
1	A	153	LYS
1	A	156	GLU
1	A	160	PHE
1	A	202	ARG
1	A	211	TYR
1	A	214	PHE
1	A	222	ARG
1	A	248	ARG
1	A	259	MET
1	A	270	GLN
1	A	277	SER
1	A	306	MET
1	A	370	ASP
1	A	381	GLU
1	A	412	LYS
1	A	413	ASP
1	A	422	ARG
2	B	668	PHE
2	B	708	PHE
2	B	717	PHE
2	B	765	MET
2	B	775	TRP
2	B	800	LYS
2	B	802	GLN
2	B	817	TYR
2	B	841	MET
2	B	849	PHE

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Mol	Chain	Res	Type
2	B	884	HIS
2	B	929	ASP
2	B	946	LYS
2	B	954	SER
2	B	975	LEU
2	B	1003	SER
2	B	1006	ASP
2	B	1012	ASP
2	B	1016	TYR
2	B	1026	PHE
2	B	1028	LYS
2	B	1189	SER
2	B	1254	HIS
2	B	1286	TYR
2	B	1300	MET
2	B	1308	ARG
3	D	13	ARG
3	D	85	LYS
3	D	108	LYS
3	D	109	LYS
3	D	223	GLN
3	D	296	MET
3	D	344	SER
3	D	348	ASP
3	D	381	ARG
3	D	401	MET
4	E	34	LYS
4	E	38	ARG
4	E	61	ARG
4	E	316	MET
4	E	352	GLN
4	E	369	ARG
4	E	395	ILE
4	E	494	LYS
4	E	505	TYR
4	E	543	ASP
4	E	548	LYS
4	E	549	TYR
4	E	554	LYS
4	E	557	LYS
4	E	560	MET
3	F	13	ARG

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Mol	Chain	Res	Type
3	F	88	TRP
3	F	89	ASP
3	F	91	TRP
3	F	94	TYR
3	F	96	ARG
3	F	232	LEU
3	F	235	ASP
3	F	247	ARG
3	F	288	TYR
3	F	289	PHE
3	F	291	LYS
3	F	298	LEU
3	F	307	ASP
3	F	338	LEU
3	F	358	GLN
3	F	362	PHE
3	F	371	ASP
4	G	284	PHE
4	G	298	LYS
4	G	303	CYS
4	G	316	MET
4	G	556	TYR
4	G	566	LEU
5	O	129	ARG
6	P	40	ARG
6	P	84	MET
6	P	88	TYR
7	Q	36	LYS
7	Q	38	ASN
7	Q	81	ARG
7	Q	90	ASP
7	Q	95	LYS
8	R	33	SER
8	R	109	SER
5	S	41	TYR
5	S	42	ARG
5	S	64	LYS
5	S	79	LYS
5	S	87	SER
6	T	35	ARG
6	T	84	MET
7	U	29	ARG

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Mol	Chain	Res	Type
7	U	50	TYR
7	U	90	ASP
8	V	46	HIS
8	V	83	ARG
8	V	109	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	886	HIS
4	E	402	ASN
4	G	302	HIS
7	Q	73	ASN
5	S	108	ASN
6	T	25	ASN
8	V	81	ASN

5.3.3 RNA ⓘ

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	$\#|Z| > 2$
5	M3L	S	36	5	10,11,12	0.51	0	9,14,16	0.48	0
5	M3L	O	36	5	10,11,12	0.57	0	9,14,16	0.45	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
5	M3L	S	36	5	-	1/9/10/12	-
5	M3L	O	36	5	-	<mark>5/9/10/12</mark>	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	O	36	M3L	N-CA-CB-CG
5	O	36	M3L	C-CA-CB-CG
5	O	36	M3L	CG-CD-CE-NZ
5	O	36	M3L	CA-CB-CG-CD
5	O	36	M3L	CE-CD-CG-CB
5	S	36	M3L	N-CA-CB-CG

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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.
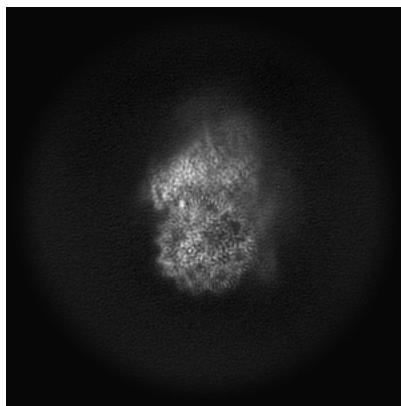
6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-37123. These allow visual inspection of the internal detail of the map and identification of artifacts.
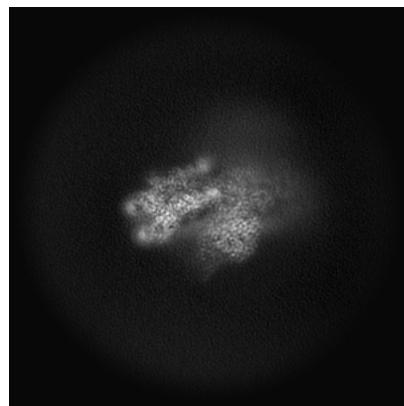
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections ⓘ
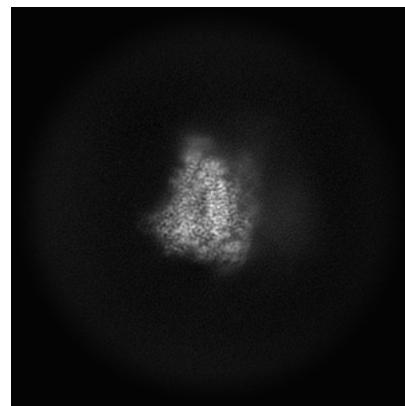
6.1.1 Primary map

X Y Z
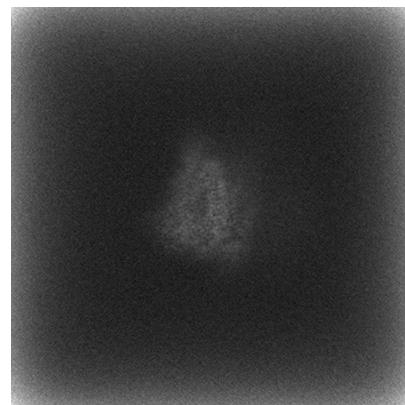
6.1.2 Raw map

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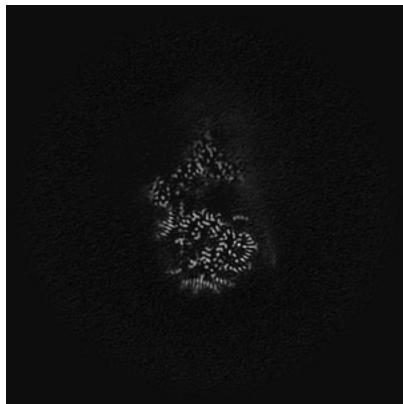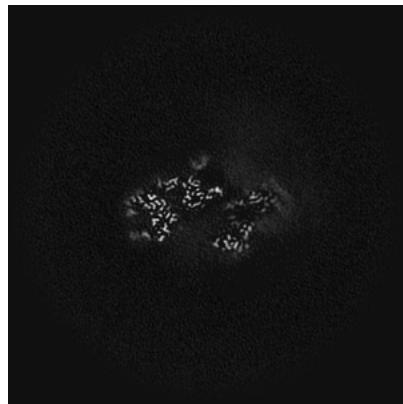
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ

6.2.1 Primary map
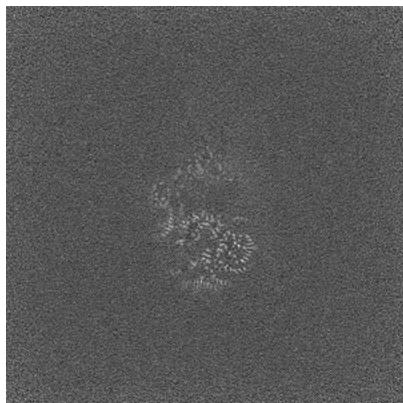
X Index: 270   Y Index: 270   Z Index: 270

6.2.2 Raw map
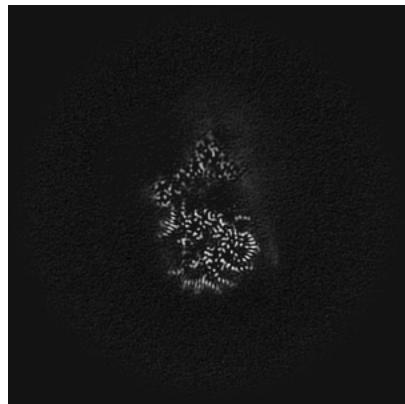
X Index: 270   Y Index: 270   Z Index: 270
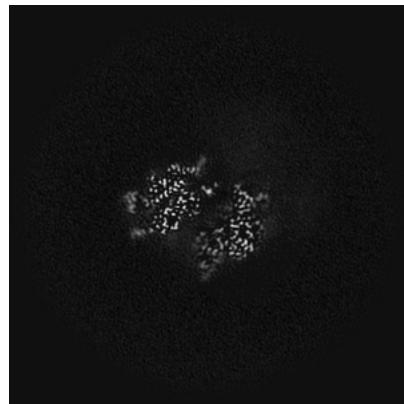
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices ⓘ
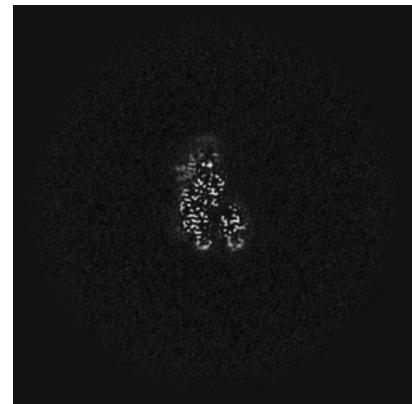
6.3.1 Primary map
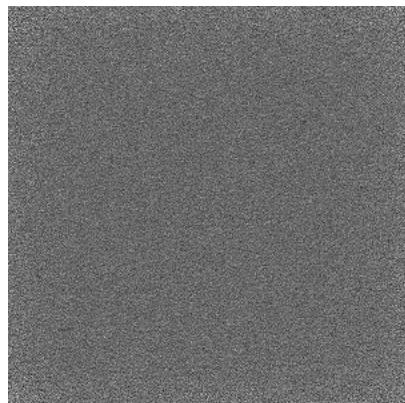
| X Index: 271 | Y Index: 248 | Z Index: 210 |
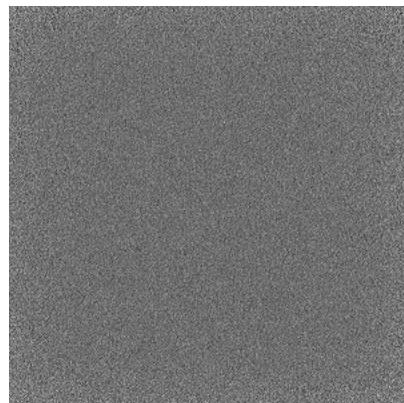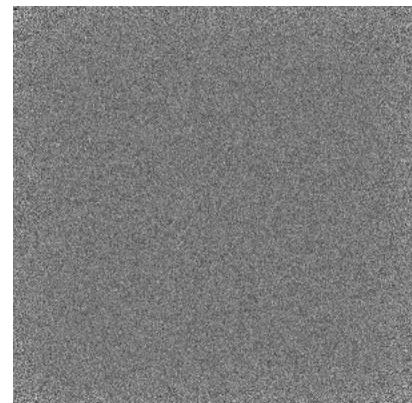
6.3.2 Raw map
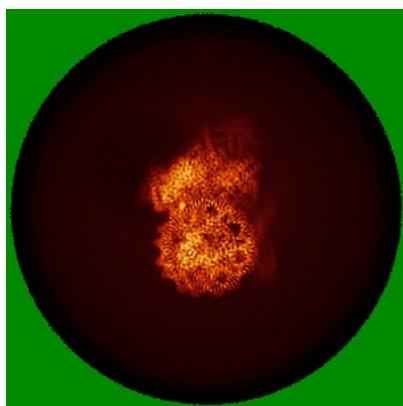
| X Index: 0 | Y Index: 0 | Z Index: 539 |
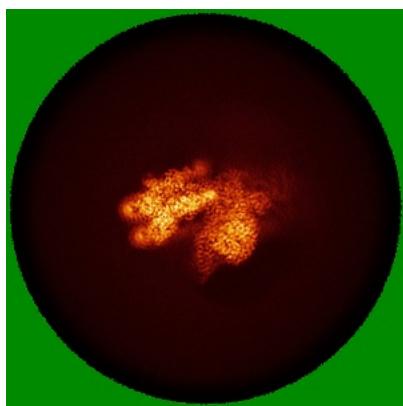
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) ⓘ
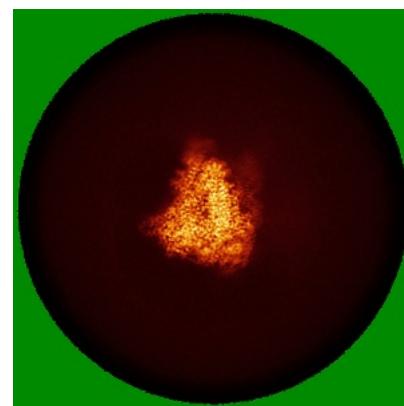
6.4.1 Primary map
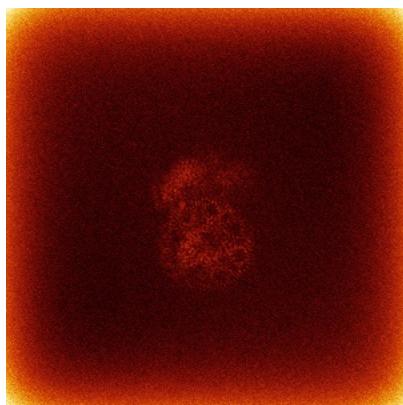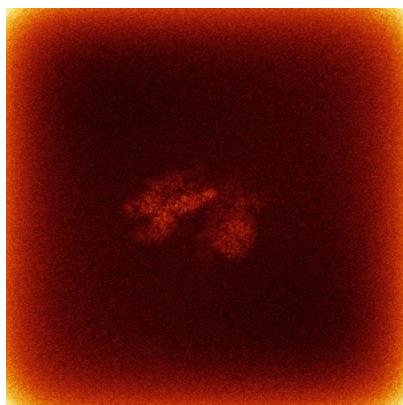
| X | Y | Z |
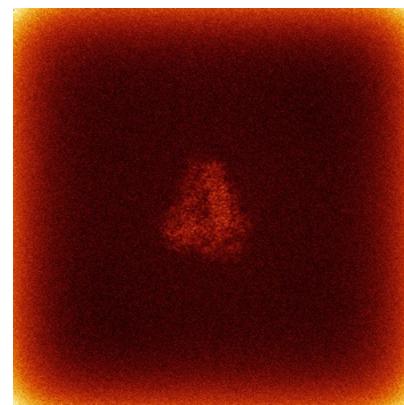
6.4.2 Raw map

| X | Y | Z |
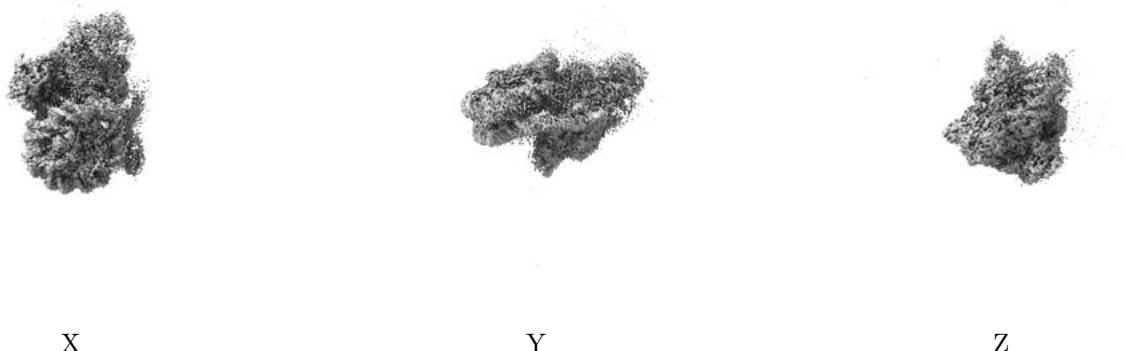
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.
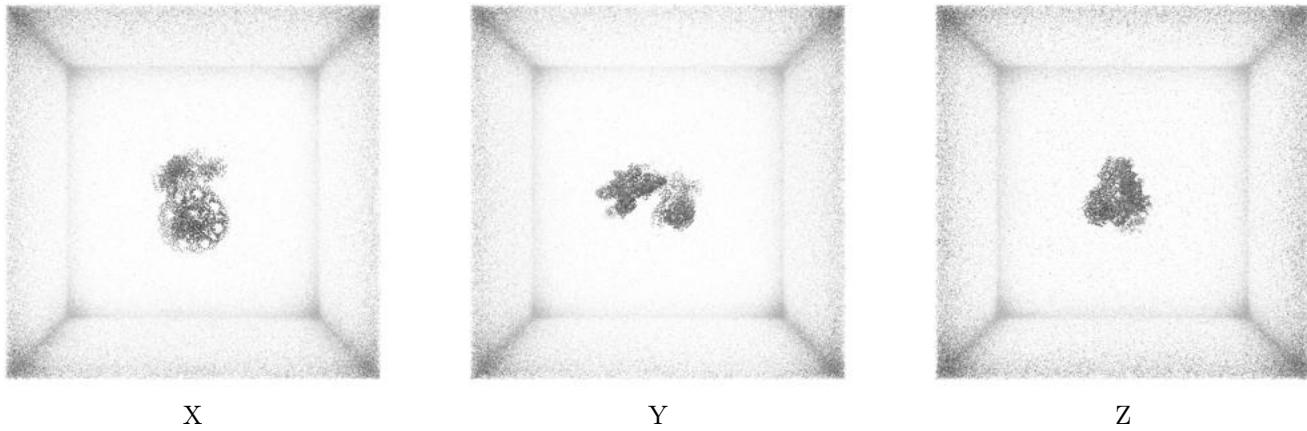
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X   Y   Z

The images above show the 3D surface view of the map at the recommended contour level 0.0496. 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

X   Y   Z

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.
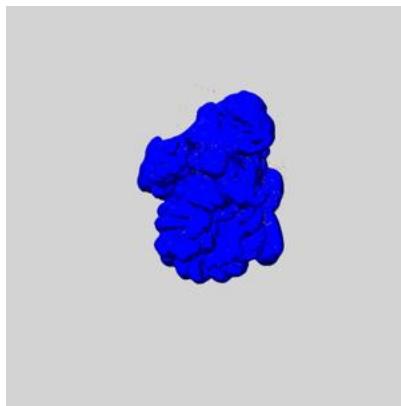
6.6　Mask visualisation ⓘ

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency
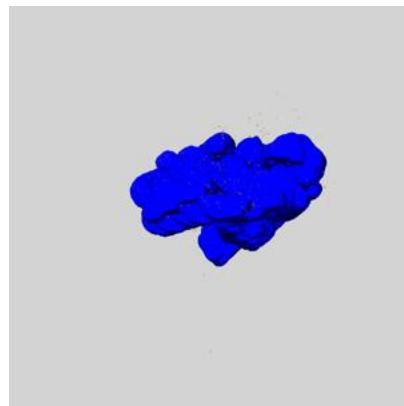
A mask typically either:

- Encompasses the whole structure

- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure
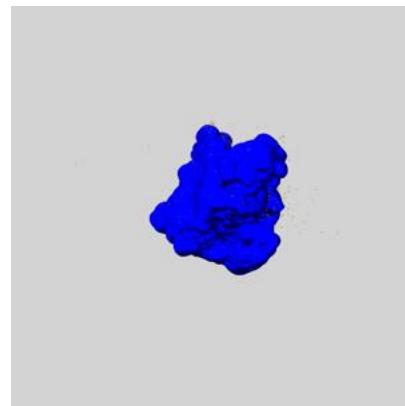
6.6.1　emd_37123_msk_1.map ⓘ

X　　　　　　　　　　　　　　　Y　　　　　　　　　　　　　　　Z
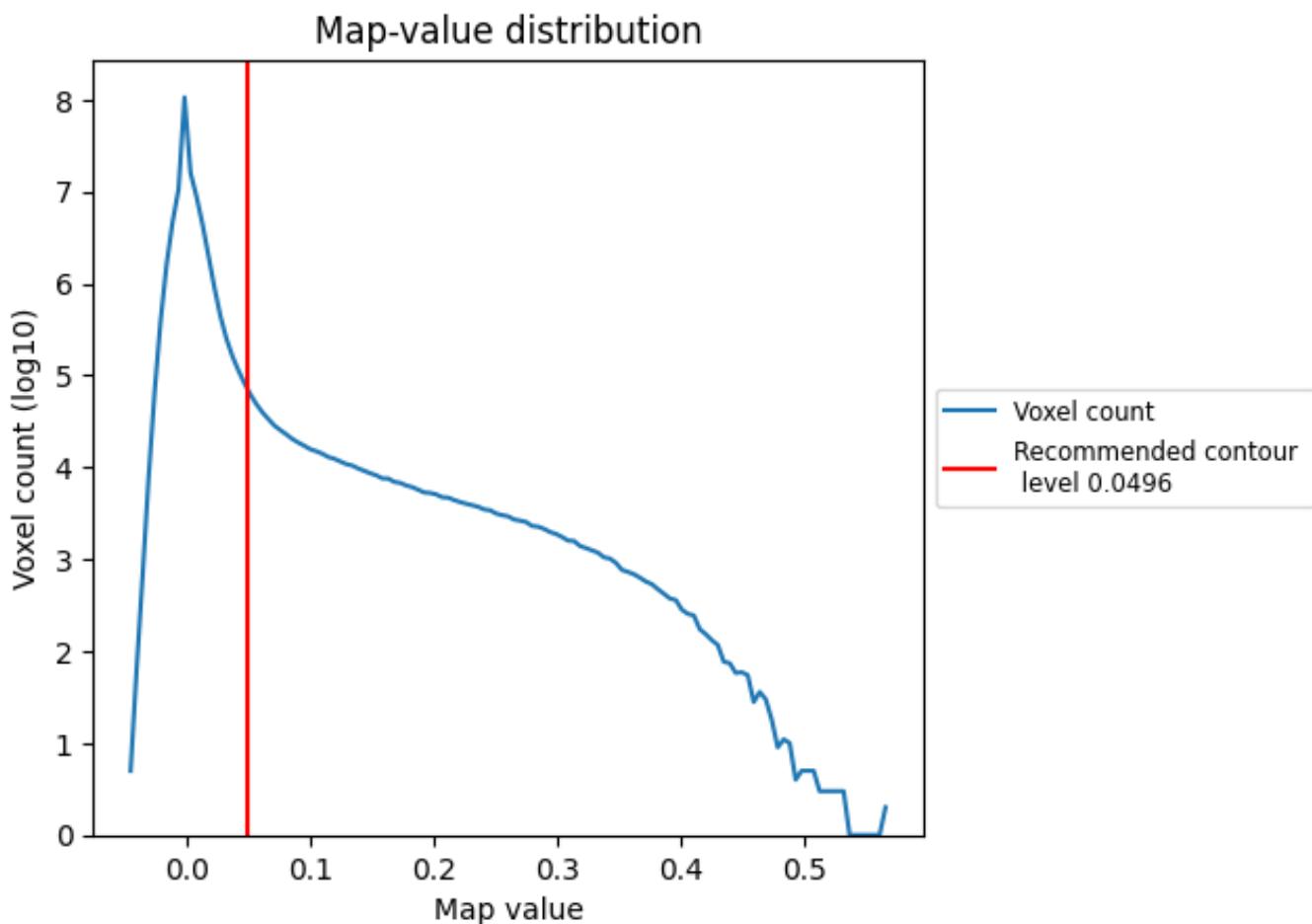
7 Map analysis ⓘ
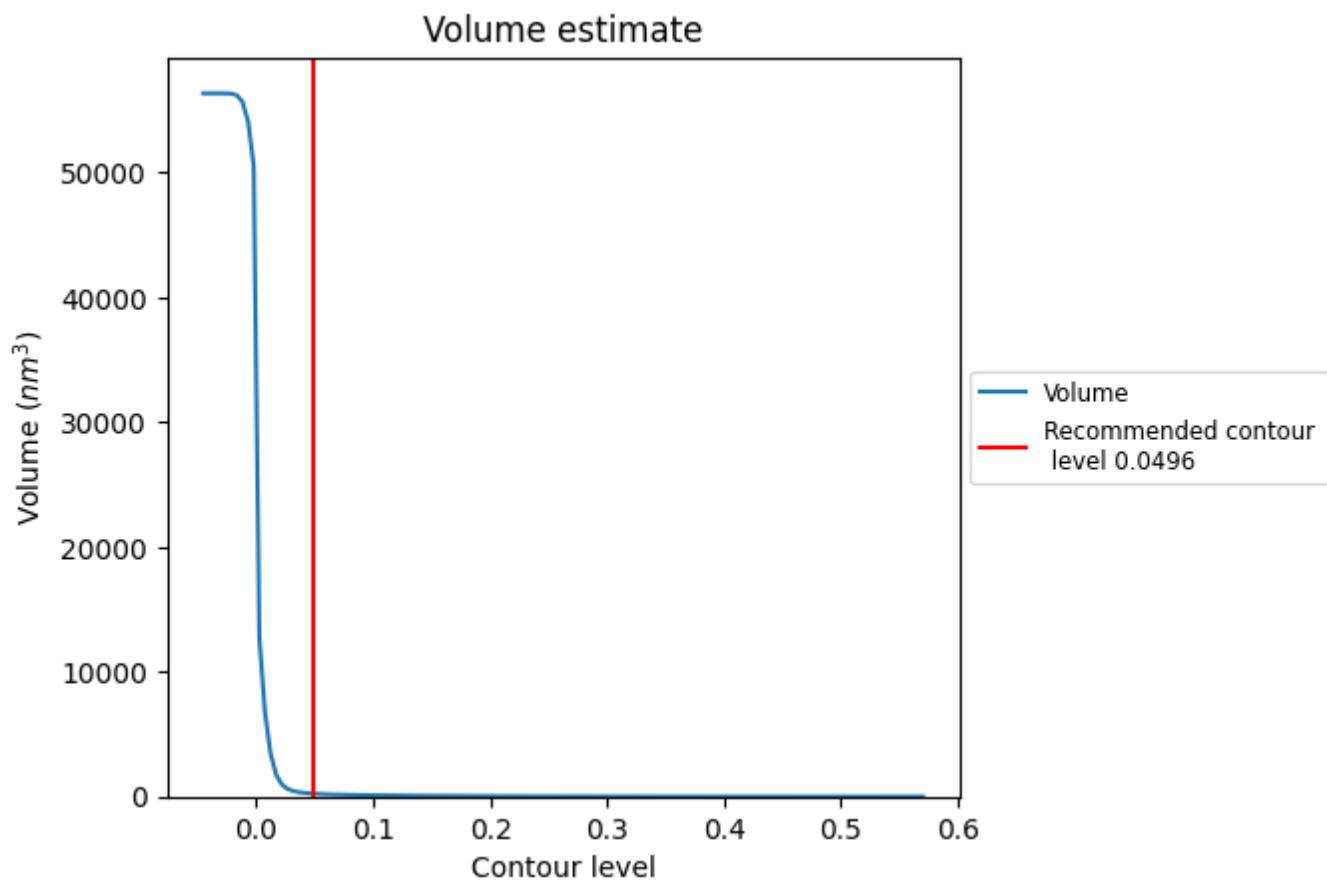
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution ⓘ

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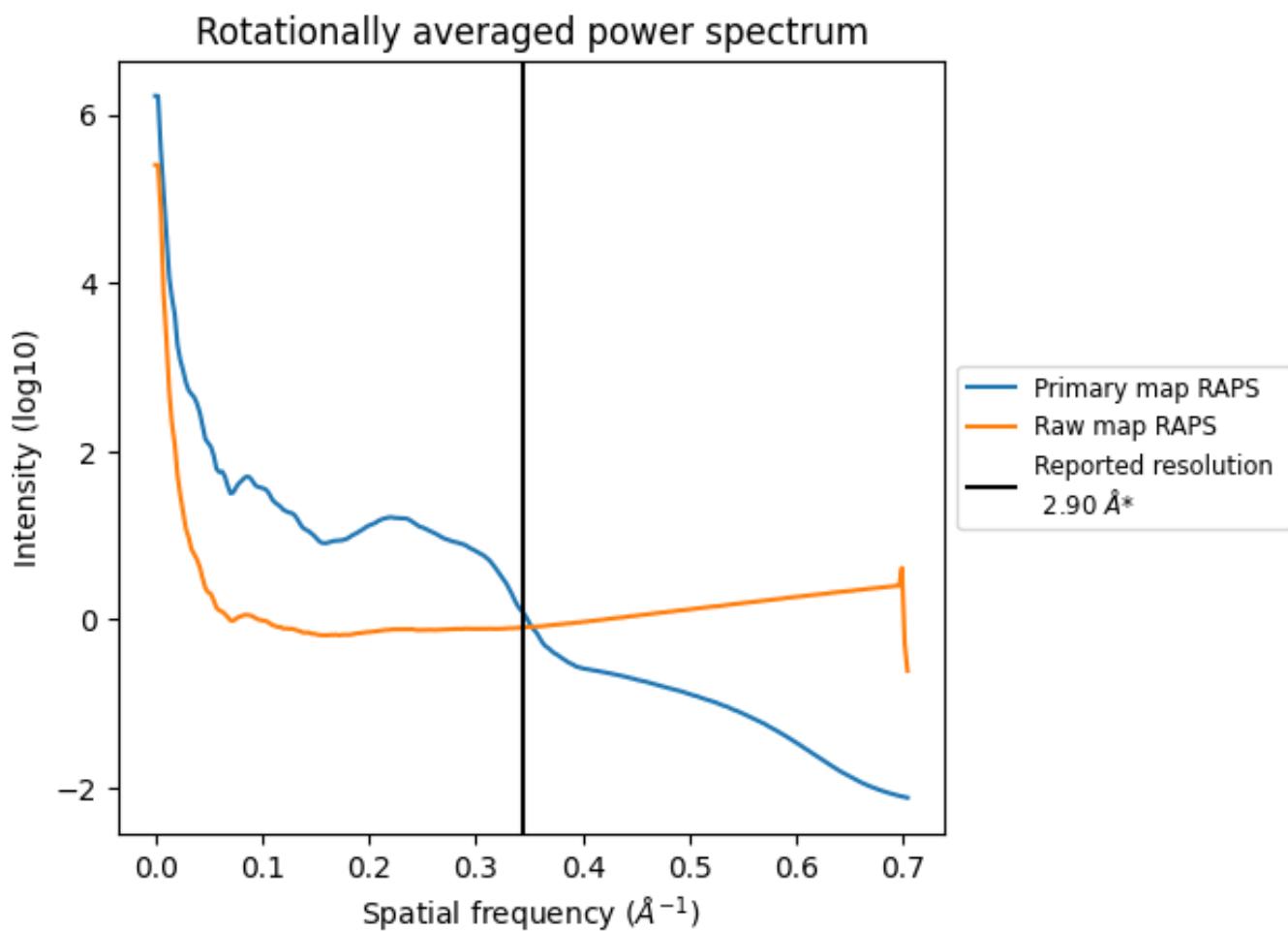
7.2　Volume estimate ⓘ

The volume at the recommended contour level is 227 nm^3; this corresponds to an approximate mass of 205 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 ⓘ
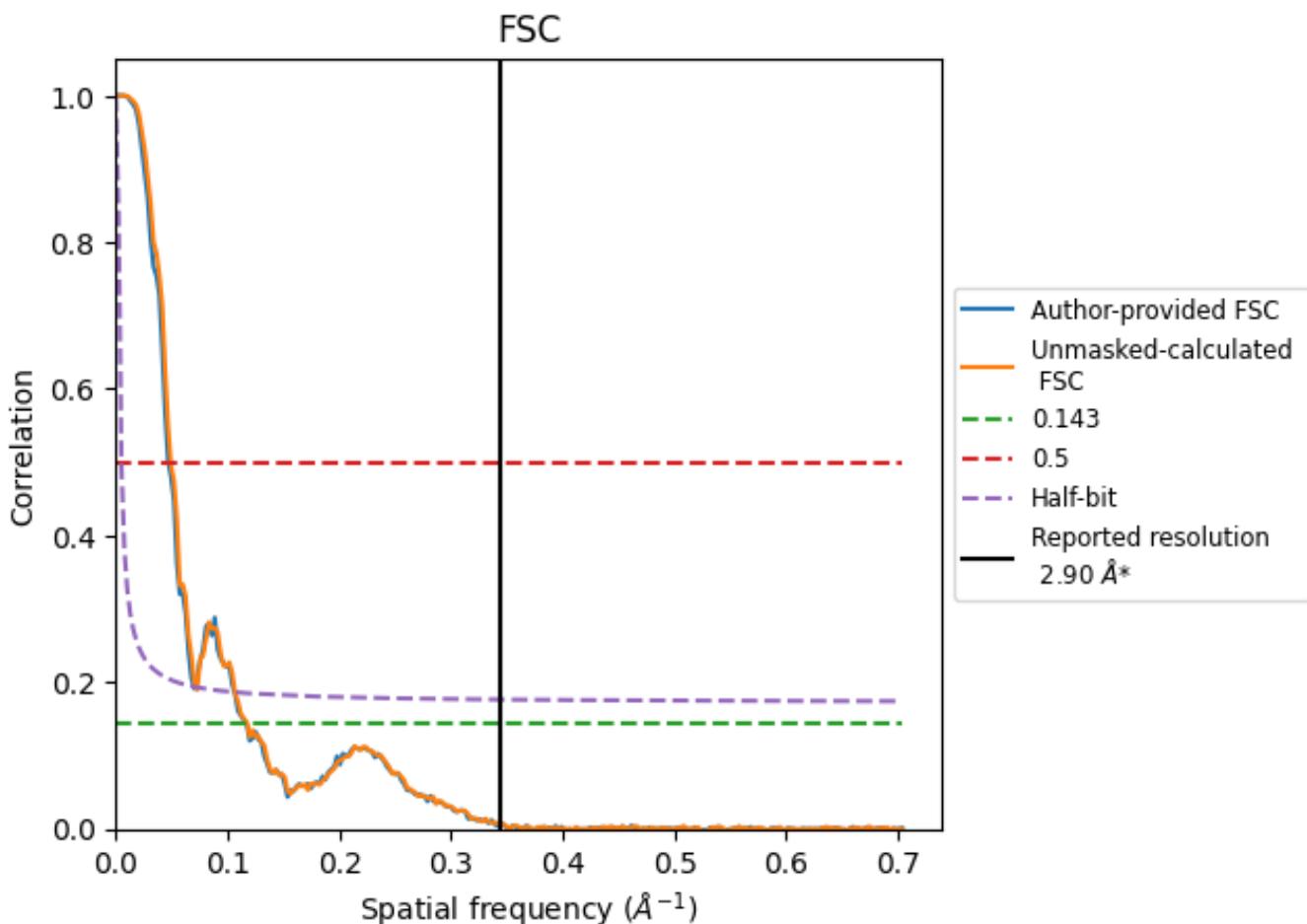
*Reported resolution corresponds to spatial frequency of 0.345 Å^{-1}

8 Fourier-Shell correlation ⓘ

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 ⓘ

*Reported resolution corresponds to spatial frequency of 0.345 Å^{-1}

8.2 Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.90	-	-
Author-provided FSC curve	8.55	21.19	14.27
Unmasked-calculated*	8.50	20.28	13.89
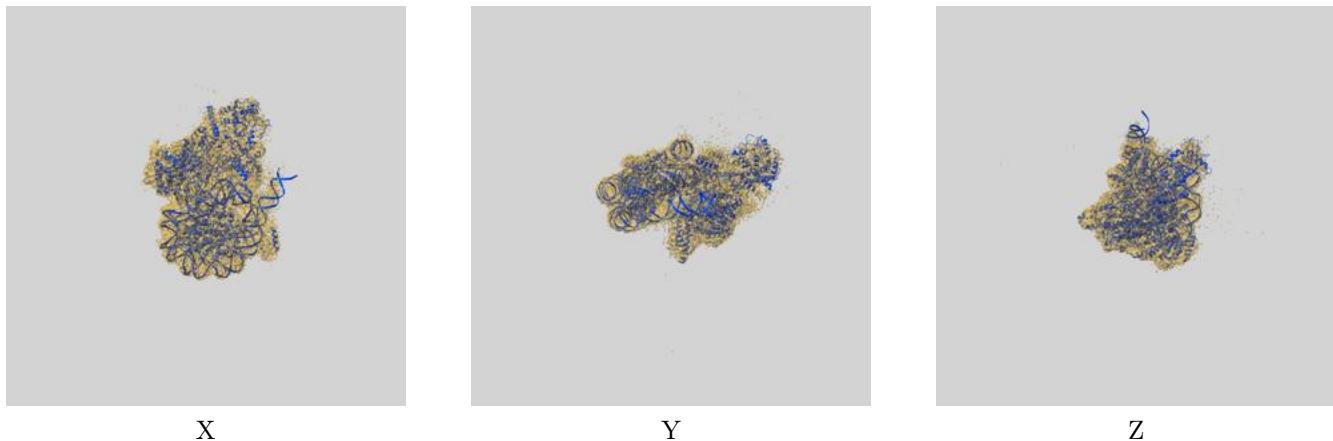
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 8.55 differs from the reported value 2.9 by more than 10 %

The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 8.50 differs from the reported value 2.9 by more than 10 %

9 Map-model fit ⓘ
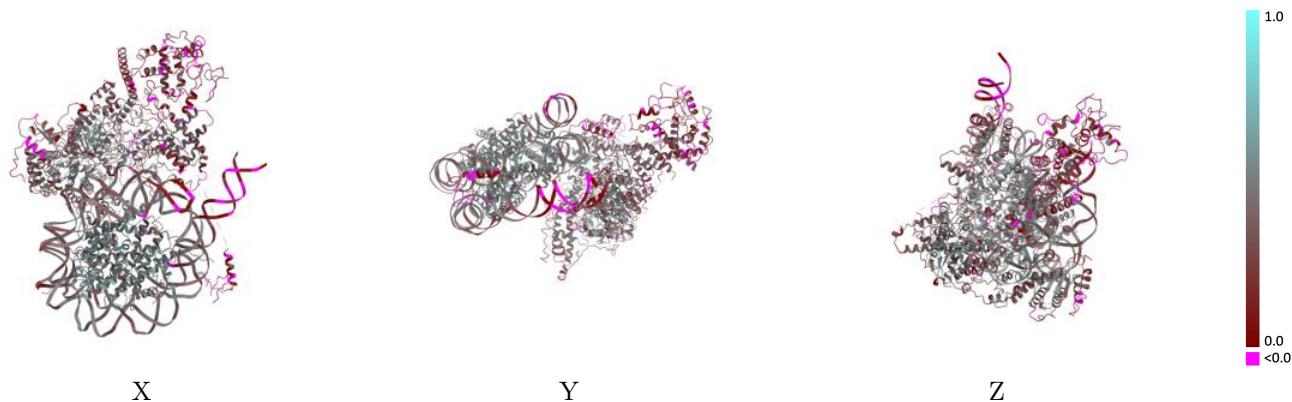
This section contains information regarding the fit between EMDB map EMD-37123 and PDB model 8KD3. Per-residue inclusion information can be found in section 3 on page 10.

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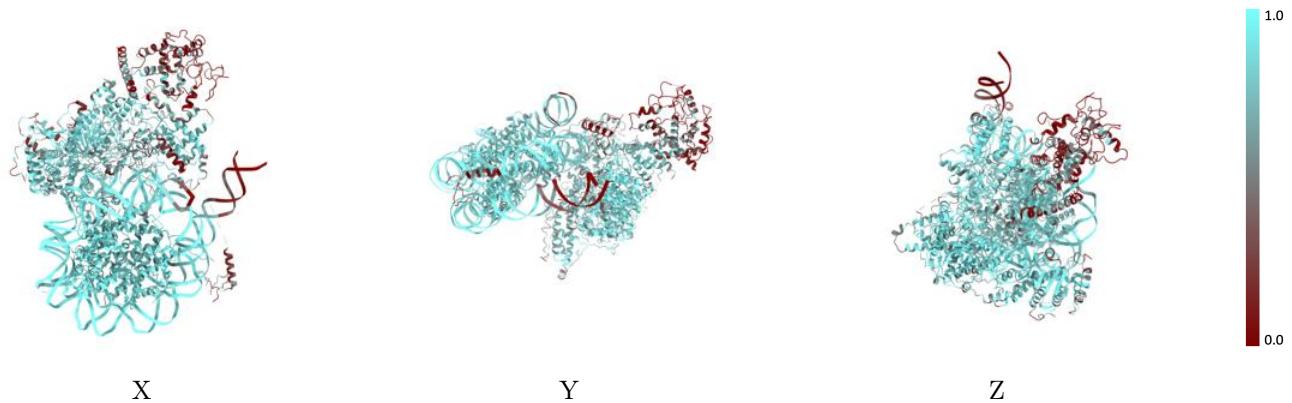
| X | Y | Z |

The images above show the 3D surface view of the map at the recommended contour level 0.0496 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　ⓘ

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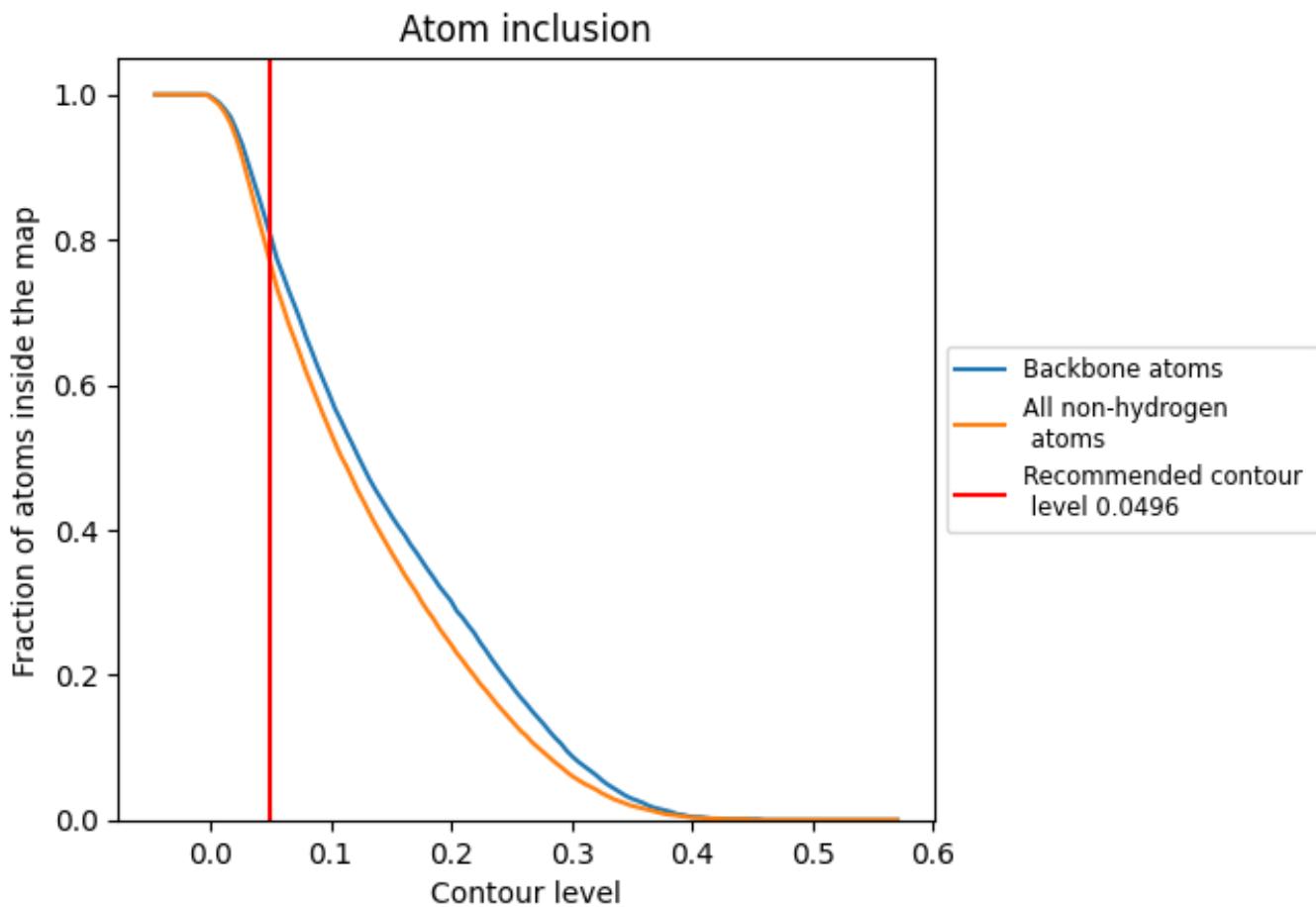
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3　Atom inclusion mapped to coordinate model　ⓘ

X　　　　　　　　　　　　　　Y　　　　　　　　　　　　　　Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.0496).

9.4   Atom inclusion ⓘ

At the recommended contour level, 81% of all backbone atoms, 77% 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 (0.0496) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7700	0.3760
A	0.8740	0.4180
B	0.7730	0.3650
D	0.7370	0.3390
E	0.7290	0.3350
F	0.2770	0.1630
G	0.2030	0.1560
O	0.8910	0.5040
P	0.9300	0.5330
Q	0.9110	0.5030
R	0.9260	0.5060
S	0.8650	0.4690
T	0.8950	0.5230
U	0.8960	0.4820
V	0.8970	0.4870
X	0.8350	0.3630
Y	0.8390	0.3680

1.0

0.0
<0.0