Full wwPDB EM Validation Report ⓘ

Jun 30, 2025 – 06:28 PM EDT

PDB ID	:	9E22 / pdb_00009e22
EMDB ID	:	EMD-47429
Title	:	Cryo-EM structure of human cytoplasmic dynein-1 bound to LIS1 in the presence of ATP
Authors	:	Nguyen, K.H.V.; Kendrick, A.A.; Leschziner, A.E.
Deposited on	:	2024-10-21
Resolution	:	3.30 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:

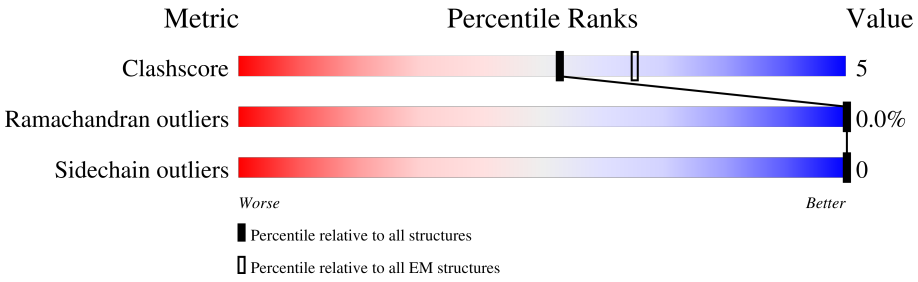
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0rc1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

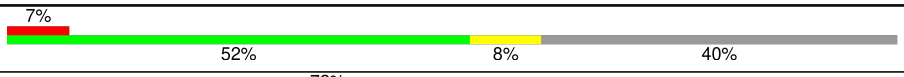
The reported resolution of this entry is 3.30 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	4843	
2	E	411	

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 24612 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 Cytoplasmic dynein 1 heavy chain 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	2925	22914	14535	3984	4283	112	0	0

There are 198 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-196	GLY	-	expression tag	UNP Q14204
A	-195	ASP	-	expression tag	UNP Q14204
A	-194	TYR	-	expression tag	UNP Q14204
A	-193	ASP	-	expression tag	UNP Q14204
A	-192	ILE	-	expression tag	UNP Q14204
A	-191	PRO	-	expression tag	UNP Q14204
A	-190	THR	-	expression tag	UNP Q14204
A	-189	THR	-	expression tag	UNP Q14204
A	-188	GLU	-	expression tag	UNP Q14204
A	-187	ASN	-	expression tag	UNP Q14204
A	-186	LEU	-	expression tag	UNP Q14204
A	-185	TYR	-	expression tag	UNP Q14204
A	-184	PHE	-	expression tag	UNP Q14204
A	-183	GLN	-	expression tag	UNP Q14204
A	-182	GLY	-	expression tag	UNP Q14204
A	-181	ASP	-	expression tag	UNP Q14204
A	-180	LYS	-	expression tag	UNP Q14204
A	-179	ASP	-	expression tag	UNP Q14204
A	-178	CYS	-	expression tag	UNP Q14204
A	-177	GLU	-	expression tag	UNP Q14204
A	-176	MET	-	expression tag	UNP Q14204
A	-175	LYS	-	expression tag	UNP Q14204
A	-174	ARG	-	expression tag	UNP Q14204
A	-173	THR	-	expression tag	UNP Q14204
A	-172	THR	-	expression tag	UNP Q14204
A	-171	LEU	-	expression tag	UNP Q14204
A	-170	ASP	-	expression tag	UNP Q14204
A	-169	SER	-	expression tag	UNP Q14204

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-168	PRO	-	expression tag	UNP Q14204
A	-167	LEU	-	expression tag	UNP Q14204
A	-166	GLY	-	expression tag	UNP Q14204
A	-165	LYS	-	expression tag	UNP Q14204
A	-164	LEU	-	expression tag	UNP Q14204
A	-163	GLU	-	expression tag	UNP Q14204
A	-162	LEU	-	expression tag	UNP Q14204
A	-161	SER	-	expression tag	UNP Q14204
A	-160	GLY	-	expression tag	UNP Q14204
A	-159	CYS	-	expression tag	UNP Q14204
A	-158	GLU	-	expression tag	UNP Q14204
A	-157	GLN	-	expression tag	UNP Q14204
A	-156	GLY	-	expression tag	UNP Q14204
A	-155	LEU	-	expression tag	UNP Q14204
A	-154	HIS	-	expression tag	UNP Q14204
A	-153	ARG	-	expression tag	UNP Q14204
A	-152	ILE	-	expression tag	UNP Q14204
A	-151	ILE	-	expression tag	UNP Q14204
A	-150	PHE	-	expression tag	UNP Q14204
A	-149	LEU	-	expression tag	UNP Q14204
A	-148	GLY	-	expression tag	UNP Q14204
A	-147	LYS	-	expression tag	UNP Q14204
A	-146	GLY	-	expression tag	UNP Q14204
A	-145	THR	-	expression tag	UNP Q14204
A	-144	SER	-	expression tag	UNP Q14204
A	-143	ALA	-	expression tag	UNP Q14204
A	-142	ALA	-	expression tag	UNP Q14204
A	-141	ASP	-	expression tag	UNP Q14204
A	-140	ALA	-	expression tag	UNP Q14204
A	-139	VAL	-	expression tag	UNP Q14204
A	-138	GLU	-	expression tag	UNP Q14204
A	-137	VAL	-	expression tag	UNP Q14204
A	-136	PRO	-	expression tag	UNP Q14204
A	-135	ALA	-	expression tag	UNP Q14204
A	-134	PRO	-	expression tag	UNP Q14204
A	-133	ALA	-	expression tag	UNP Q14204
A	-132	ALA	-	expression tag	UNP Q14204
A	-131	VAL	-	expression tag	UNP Q14204
A	-130	LEU	-	expression tag	UNP Q14204
A	-129	GLY	-	expression tag	UNP Q14204
A	-128	GLY	-	expression tag	UNP Q14204
A	-127	PRO	-	expression tag	UNP Q14204

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-126	GLU	-	expression tag	UNP Q14204
A	-125	PRO	-	expression tag	UNP Q14204
A	-124	LEU	-	expression tag	UNP Q14204
A	-123	MET	-	expression tag	UNP Q14204
A	-122	GLN	-	expression tag	UNP Q14204
A	-121	ALA	-	expression tag	UNP Q14204
A	-120	THR	-	expression tag	UNP Q14204
A	-119	ALA	-	expression tag	UNP Q14204
A	-118	TRP	-	expression tag	UNP Q14204
A	-117	LEU	-	expression tag	UNP Q14204
A	-116	ASN	-	expression tag	UNP Q14204
A	-115	ALA	-	expression tag	UNP Q14204
A	-114	TYR	-	expression tag	UNP Q14204
A	-113	PHE	-	expression tag	UNP Q14204
A	-112	HIS	-	expression tag	UNP Q14204
A	-111	GLN	-	expression tag	UNP Q14204
A	-110	PRO	-	expression tag	UNP Q14204
A	-109	GLU	-	expression tag	UNP Q14204
A	-108	ALA	-	expression tag	UNP Q14204
A	-107	ILE	-	expression tag	UNP Q14204
A	-106	GLU	-	expression tag	UNP Q14204
A	-105	GLU	-	expression tag	UNP Q14204
A	-104	PHE	-	expression tag	UNP Q14204
A	-103	PRO	-	expression tag	UNP Q14204
A	-102	VAL	-	expression tag	UNP Q14204
A	-101	PRO	-	expression tag	UNP Q14204
A	-100	ALA	-	expression tag	UNP Q14204
A	-99	LEU	-	expression tag	UNP Q14204
A	-98	HIS	-	expression tag	UNP Q14204
A	-97	HIS	-	expression tag	UNP Q14204
A	-96	PRO	-	expression tag	UNP Q14204
A	-95	VAL	-	expression tag	UNP Q14204
A	-94	PHE	-	expression tag	UNP Q14204
A	-93	GLN	-	expression tag	UNP Q14204
A	-92	GLN	-	expression tag	UNP Q14204
A	-91	GLU	-	expression tag	UNP Q14204
A	-90	SER	-	expression tag	UNP Q14204
A	-89	PHE	-	expression tag	UNP Q14204
A	-88	THR	-	expression tag	UNP Q14204
A	-87	ARG	-	expression tag	UNP Q14204
A	-86	GLN	-	expression tag	UNP Q14204
A	-85	VAL	-	expression tag	UNP Q14204

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-84	LEU	-	expression tag	UNP Q14204
A	-83	TRP	-	expression tag	UNP Q14204
A	-82	LYS	-	expression tag	UNP Q14204
A	-81	LEU	-	expression tag	UNP Q14204
A	-80	LEU	-	expression tag	UNP Q14204
A	-79	LYS	-	expression tag	UNP Q14204
A	-78	VAL	-	expression tag	UNP Q14204
A	-77	VAL	-	expression tag	UNP Q14204
A	-76	LYS	-	expression tag	UNP Q14204
A	-75	PHE	-	expression tag	UNP Q14204
A	-74	GLY	-	expression tag	UNP Q14204
A	-73	GLU	-	expression tag	UNP Q14204
A	-72	VAL	-	expression tag	UNP Q14204
A	-71	ILE	-	expression tag	UNP Q14204
A	-70	SER	-	expression tag	UNP Q14204
A	-69	TYR	-	expression tag	UNP Q14204
A	-68	SER	-	expression tag	UNP Q14204
A	-67	HIS	-	expression tag	UNP Q14204
A	-66	LEU	-	expression tag	UNP Q14204
A	-65	ALA	-	expression tag	UNP Q14204
A	-64	ALA	-	expression tag	UNP Q14204
A	-63	LEU	-	expression tag	UNP Q14204
A	-62	ALA	-	expression tag	UNP Q14204
A	-61	GLY	-	expression tag	UNP Q14204
A	-60	ASN	-	expression tag	UNP Q14204
A	-59	PRO	-	expression tag	UNP Q14204
A	-58	ALA	-	expression tag	UNP Q14204
A	-57	ALA	-	expression tag	UNP Q14204
A	-56	THR	-	expression tag	UNP Q14204
A	-55	ALA	-	expression tag	UNP Q14204
A	-54	ALA	-	expression tag	UNP Q14204
A	-53	VAL	-	expression tag	UNP Q14204
A	-52	LYS	-	expression tag	UNP Q14204
A	-51	THR	-	expression tag	UNP Q14204
A	-50	ALA	-	expression tag	UNP Q14204
A	-49	LEU	-	expression tag	UNP Q14204
A	-48	SER	-	expression tag	UNP Q14204
A	-47	GLY	-	expression tag	UNP Q14204
A	-46	ASN	-	expression tag	UNP Q14204
A	-45	PRO	-	expression tag	UNP Q14204
A	-44	VAL	-	expression tag	UNP Q14204
A	-43	PRO	-	expression tag	UNP Q14204

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-42	ILE	-	expression tag	UNP Q14204
A	-41	LEU	-	expression tag	UNP Q14204
A	-40	ILE	-	expression tag	UNP Q14204
A	-39	PRO	-	expression tag	UNP Q14204
A	-38	CYS	-	expression tag	UNP Q14204
A	-37	HIS	-	expression tag	UNP Q14204
A	-36	ARG	-	expression tag	UNP Q14204
A	-35	VAL	-	expression tag	UNP Q14204
A	-34	VAL	-	expression tag	UNP Q14204
A	-33	GLN	-	expression tag	UNP Q14204
A	-32	GLY	-	expression tag	UNP Q14204
A	-31	ASP	-	expression tag	UNP Q14204
A	-30	LEU	-	expression tag	UNP Q14204
A	-29	ASP	-	expression tag	UNP Q14204
A	-28	VAL	-	expression tag	UNP Q14204
A	-27	GLY	-	expression tag	UNP Q14204
A	-26	GLY	-	expression tag	UNP Q14204
A	-25	TYR	-	expression tag	UNP Q14204
A	-24	GLU	-	expression tag	UNP Q14204
A	-23	GLY	-	expression tag	UNP Q14204
A	-22	GLY	-	expression tag	UNP Q14204
A	-21	LEU	-	expression tag	UNP Q14204
A	-20	ALA	-	expression tag	UNP Q14204
A	-19	VAL	-	expression tag	UNP Q14204
A	-18	LYS	-	expression tag	UNP Q14204
A	-17	GLU	-	expression tag	UNP Q14204
A	-16	TRP	-	expression tag	UNP Q14204
A	-15	LEU	-	expression tag	UNP Q14204
A	-14	LEU	-	expression tag	UNP Q14204
A	-13	ALA	-	expression tag	UNP Q14204
A	-12	HIS	-	expression tag	UNP Q14204
A	-11	GLU	-	expression tag	UNP Q14204
A	-10	GLY	-	expression tag	UNP Q14204
A	-9	HIS	-	expression tag	UNP Q14204
A	-8	ARG	-	expression tag	UNP Q14204
A	-7	LEU	-	expression tag	UNP Q14204
A	-6	GLY	-	expression tag	UNP Q14204
A	-5	LYS	-	expression tag	UNP Q14204
A	-4	PRO	-	expression tag	UNP Q14204
A	-3	GLY	-	expression tag	UNP Q14204
A	-2	LEU	-	expression tag	UNP Q14204
A	-1	GLY	-	expression tag	UNP Q14204

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Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	expression tag	UNP Q14204
A	1	SER	-	expression tag	UNP Q14204

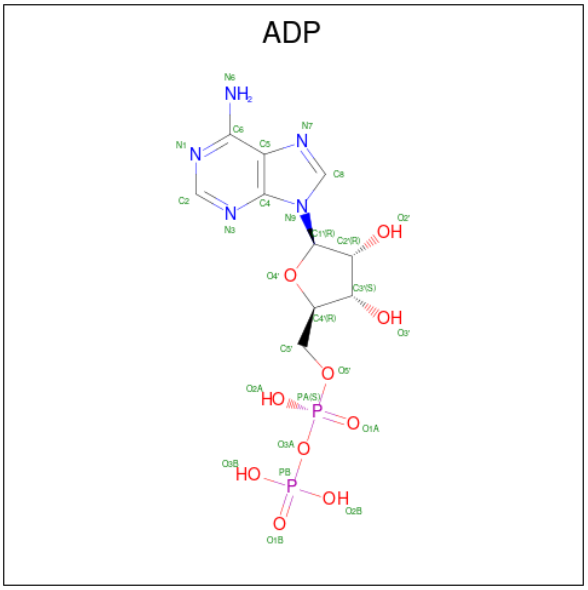
- Molecule 2 is a protein called Platelet-activating factor acetylhydrolase IB subunit beta.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	E	320	Total	C	N	O	0	0
			1581	940	320	321		

There are 2 discrepancies between the modelled and reference sequences:

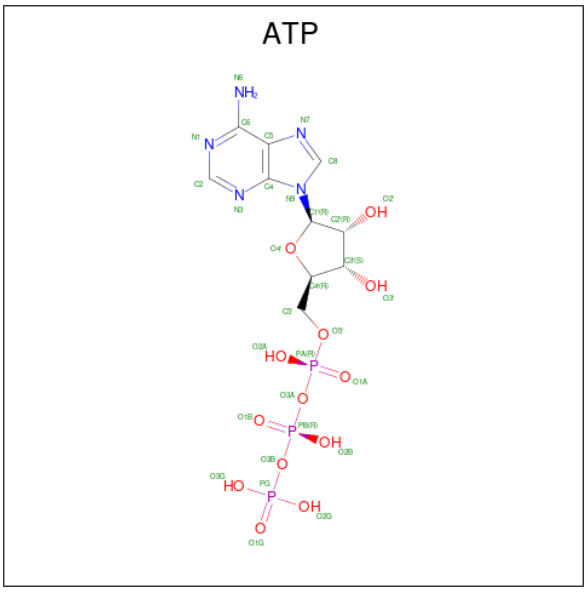
Chain	Residue	Modelled	Actual	Comment	Reference
E	0	GLY	-	expression tag	UNP P43034
E	1	SER	-	expression tag	UNP P43034

- Molecule 3 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
3	A	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	A	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 4 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
4	A	1	Total	C	N	O	P	0
			31	10	5	13	3	
4	A	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 5 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

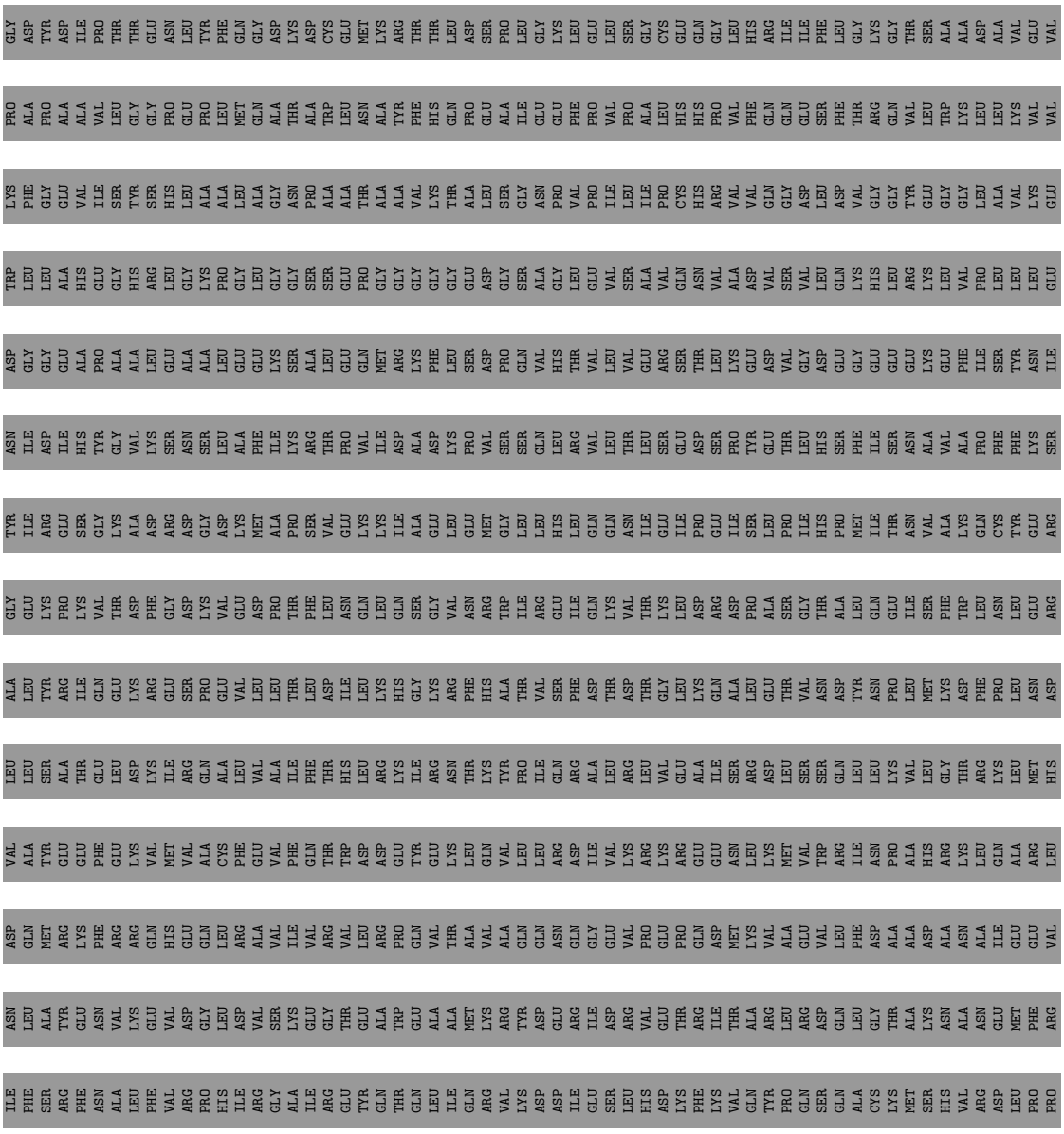
Mol	Chain	Residues	Atoms		AltConf
5	A	1	Total	Mg	0
			1	1	

3 Residue-property plots (i)

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

- Molecule 1: Cytoplasmic dynein 1 heavy chain 1

Chain A:



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

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

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

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

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

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

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

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

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

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

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

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

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

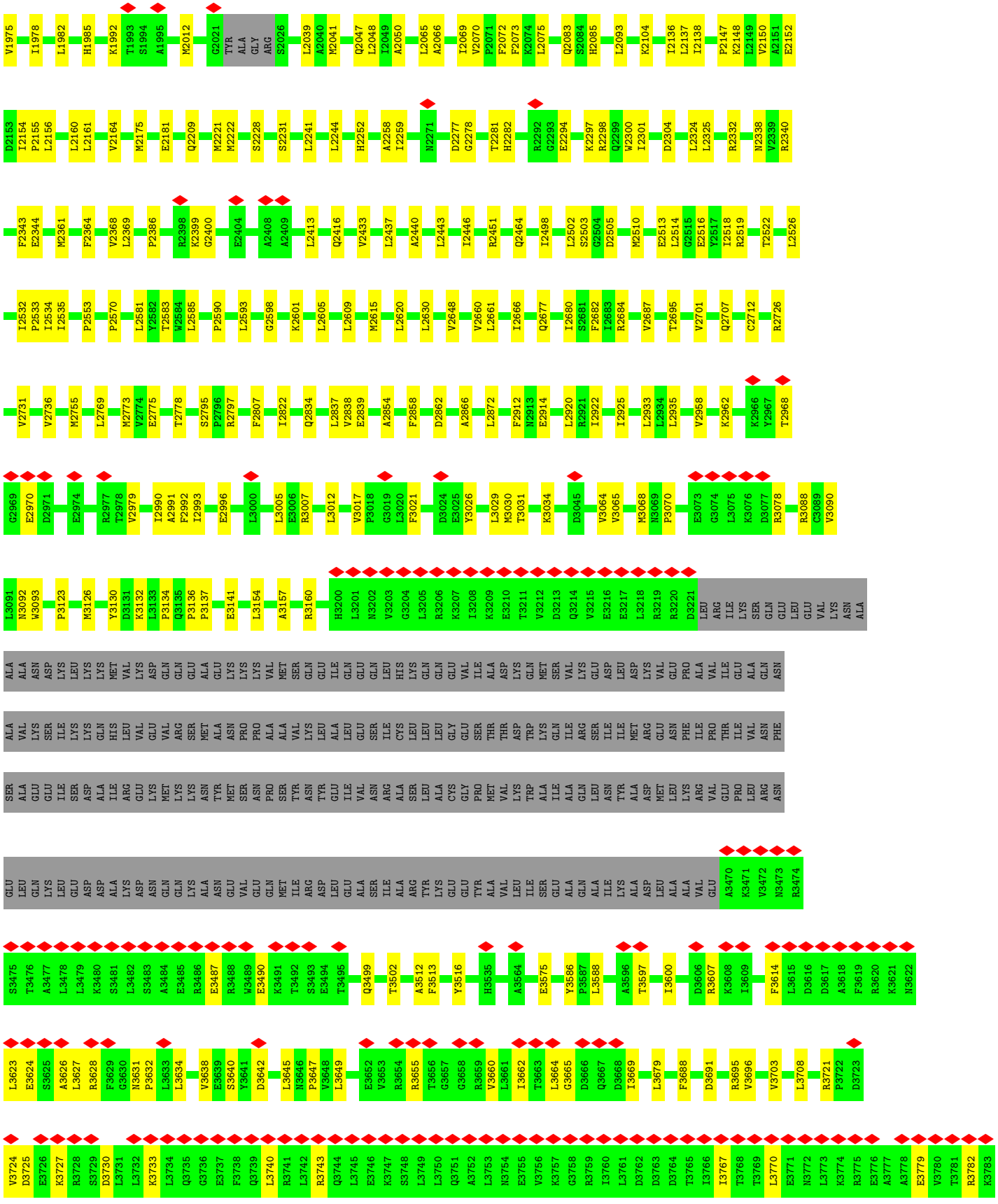
TRP VAL VAL SER GLU LEU THR LEU GLY GLN ILE TRP ASP VAL ASP LEU GLN LYS ASN GLU ALA ILE VAL LYS ASP V1449 L1450 L1451 V1452 A1453 Q1454 G1455 E1456 M1457 A1458 L1459 E1460 E1461 F1462 L1463 K1464 Q1465 I1466 R1467 E1468 V1469 W1470 N1471 T1472 Y1473 E1474 L1475 D1476 L1477 V1478 N1479 Y1480 Q1481 N1482 K1483

C1484 R1485 L1486 I1487 R1488 G1489 W1490 D1491 D1492 L1493 F1494 N1495 K1496 V1497 K1498 E1499 H1500 I1501 V1504 S1505 A1506 M1507 K1508 L1509 S1510 P1511 Y1512 Y1513 K1514 V1515 F1516 E1517 E1518 D1519 A1520 L1521 S1522 W1523 E1524 D1525 K1526 L1527 N1528 R1529 I1530 M1531 A1532 L1533 F1534 D1535 V1536 W1537 I1538 D1539 V1540 Q1541 R1542 R1543 W1544

V1545 Y1546 L1547 E1548 G1549 I1550 F1551 T1552 G1553 S1554 K1558 H1559 L1560 L1561 P1562 V1563 Q1566 R1567 F1568 Q1569 S1570 I1571 S1572 T1573 E1574 F1575 L1576 A1577 L1578 M1579 K1580 K1581 V1582 S1583 K1584 S1585 P1586 L1587 V1588 M1589 D1590 V1591 L1592 N1593 I1594 Q1595 G1596 V1597 Q1598 R1599 S1600 L1601 E1602 R1603 L1604 A1605 D1606 L1607

Q1612 K1613 A1614 E1622 P1627 R1628 F1629 G1633 I1640 V1647 A1648 K1649 L1650 I1664 I1676 K1687 I1698 N1699 E1700 W1701 E1708 V1711 T1712 L1713 A1714 K1715 L1716 K1729 W1741 I1742 V1750 V1751 L1766 M1769 L1792 Q1800 R1805 R1806 K1807 L1808

L1811 I1812 T1813 E1814 Q1818 F1836 L1839 V1853 Q1856 Q1860 A1864 K1865 F1870 K1878 L1879 V1880 Q1881 T1882 T1891 E1897 A1898 R1899 K1912 T1913 E1914 K1917 V1927 F1930 Q1939 I1944 L1948 C1949 Q1950 V1951 G1952 A1953 E1964 M1967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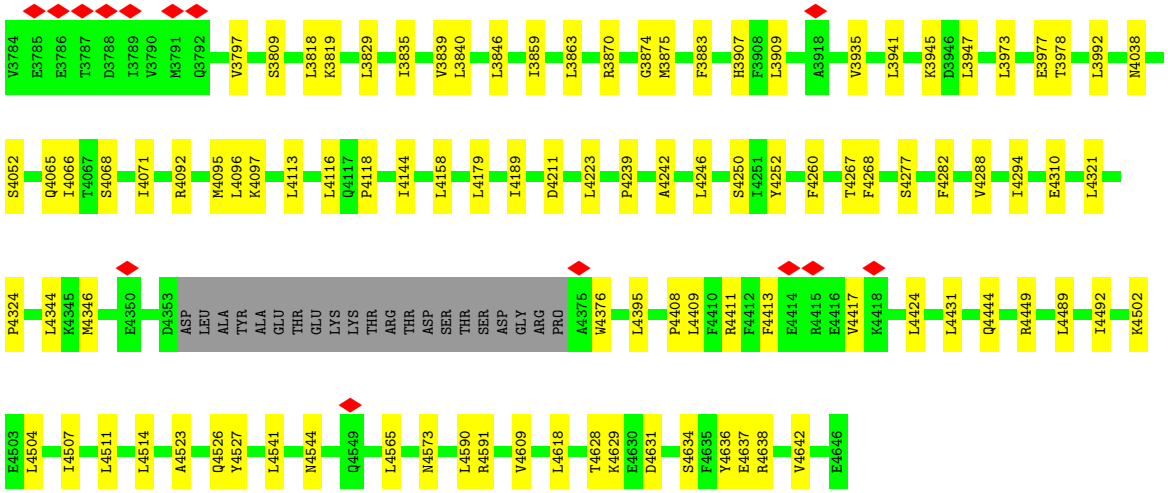
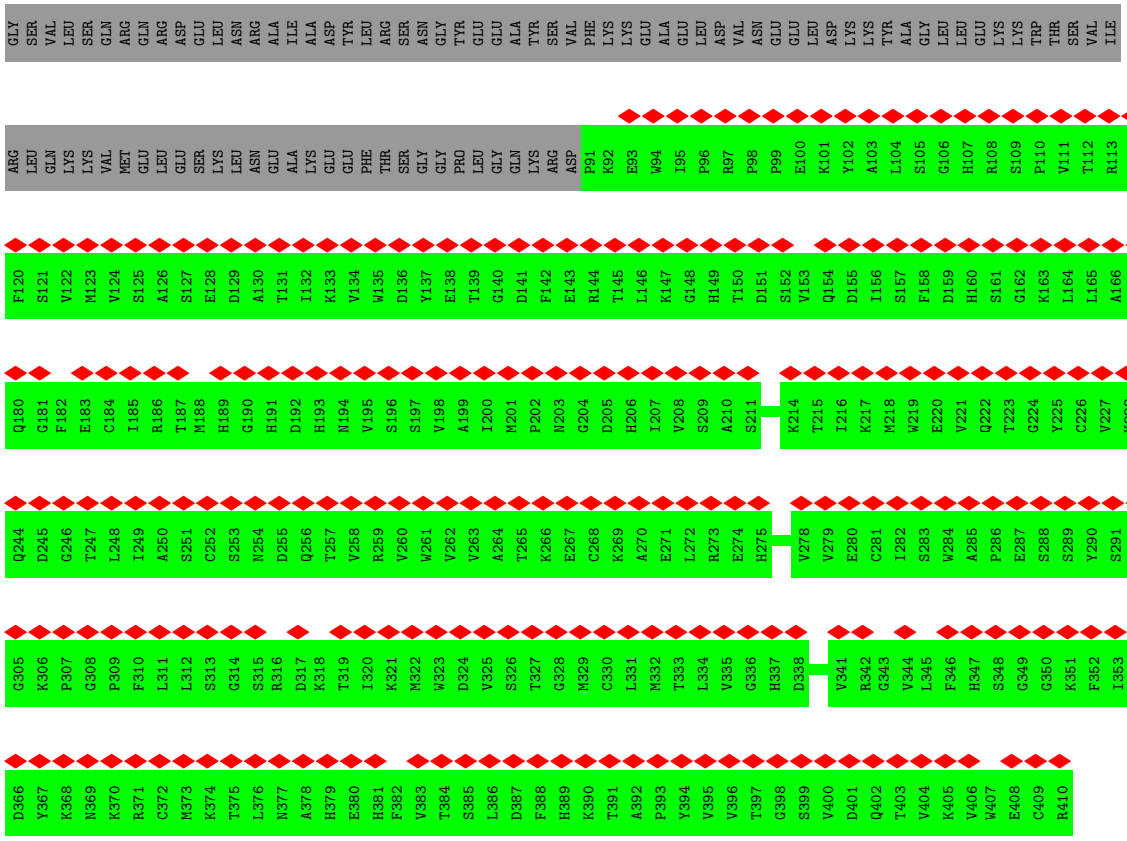
D2153 I2154 P2155 L2156 L2160 L2161 V2164 M2175 E2181 Q2209 M2221 M2222 S2228 S2231 L2241 L2244 H2252 A2258 I2259 N2271 D2277 G2278 T2281 H2282 R2292 G2293 E2294 K2297 R2298 Q2299 W2300 I2301 D2304 L2324 L2325 R2332 N2338 V2339 R2340
F2343 E2344 M2361 F2364 V2368 L2369 P2386 R2398 K2399 G2400 E2404 A2408 A2409 L2413 Q2416 V2433 L2437 A2440 L2443 I2446 R2451 Q2464 I2498 L2502 S2503 G2504 D2505 M2510 E2513 L2514 G2515 E2516 Y2517 I2518 R2519 T2522 L2526
I2532 P2533 I2534 I2535 P2553 P2570 L2581 Y2582 T2583 W2584 L2585 P2590 L2593 G2598 K2601 L2605 L2609 M2615 L2620 L2630 V2648 V2660 L2661 I2666 Q2677 I2680 S2681 F2682 I2683 R2684 V2687 T2695 V2701 Q2707 C2712 R2726
V2731 V2736 M2755 L2769 M2773 V2774 E2775 T2778 S2795 P2796 R2797 F2807 I2822 Q2834 L2837 V2838 E2839 A2854 F2858 D2862 A2866 L2872 F2912 N2913 E2914 L2920 R2921 I2922 I2925 L2933 L2934 L2935 V2958 K2962 K2966 Y2967 T2968
G2969 E2970 D2971 E2974 R2977 T2978 V2979 I2990 A2991 F2992 I2993 E2996 L3000 L3005 E3006 R3007 L3012 V3017 P3018 G3019 L3020 F3021 D3024 E3025 Y3026 L3029 M3030 T3031 K3034 D3045 V3064 V3065 M3068 N3069 P3070 E3073 G3074 L3075 K3076 D3077 R3078 R3088 C3089 V3090
L3091 N3092 W3093 P3123 M3126 Y3130 D3131 K3132 L3133 P3134 Q3135 P3136 P3137 E3141 L3154 A3157 R3160 H3200 L3201 N3202 V3203 G3204 L3205 R3206 K3207 I3208 K3209 E3210 T3211 V3212 D3213 Q3214 V3215 E3216 E3217 L3218 R3219 R3220 D3221 LEU ARG ILE LYS SER GLN GLU LEU GLU VAL ASN ALA
ALA ALA ASN ASP LYS LEU LYS LYS MET VAL LYS ASP GLN GLN GLU ALA GLU LYS LYS LYS VAL MET SER GLN GLU ILE GLN GLU GLN LEU HIS LYS GLN GLN GLU VAL ILE ALA ASP LYS GLN MET SER VAL LYS GLU ASP LEU ASP LYS VAL GLU ASN PRO PRO
ALA VAL LYS SER ILE LYS LYS GLN HIS LEU VAL GLU VAL ARG SER MET ALA ASN PRO PRO ALA ALA VAL LYS LEU ALA LEU GLU SER ILE CYS LEU LEU LEU GLY GLU SER THR THR ASP TRP LYS GLN ILE ALA ARG SER ILE ILE MET ARG GLU ASN PHE ILE PRO THR ILE VAL ASN PHE
SER ALA GLU GLU ILE SER ASP ALA ILE ARG GLU LYS MET LYS LYS ASN TYR MET SER ASN PRO SER TYR ASN TYR GLU ILE GLU VAL ASN ARG ALA SER LEU ALA CYS GLY PRO MET VAL LYS TRP ALA ILE ALA GLN LEU ASN TYR ALA ASP MET LEU LYS ARG VAL GLU PRO LEU ARG ASN
GLU LEU GLN LYS LEU GLU ASP ASP ALA LYS ASP ASN GLN GLN LYS ALA ASN GLU VAL GLU GLN MET ILE ARG ASP LEU GLU ALA SER ILE ALA ARG TYR LYS GLU GLU TYR ALA VAL LEU ILE SER GLU ALA GLN ALA ILE LYS ALA ASP LEU ALA ALA VAL GLU A3470 K3471 V3472 N3473 R3474
S3475 T3476 A3477 L3478 L3479 K3480 S3481 L3482 S3483 A3484 E3485 R3486 E3487 R3488 W3489 E3490 K3491 T3492 S3493 E3494 T3495 Q3499 T3502 A3512 F3513 Y3516 H3535 A3564 E3575 Y3586 P3587 L3588 A3596 T3597 I3600 D3606 R3607 K3608 I3609 F3614 L3615 D3616 D3617 A3618 F3619 R3620 K3621 N3622
L3623 E3624 S3625 A3626 L3627 R3628 F3629 G3630 N3631 P3632 L3633 L3634 V3638 E3639 S3640 Y3641 D3642 L3645 N3646 P3647 V3648 L3649 E3652 V3653 R3654 R3655 T3656 G3657 G3658 R3659 V3660 L3661 I3662 T3663 L3664 G3665 D3666 Q3667 D3668 I3669 L3679 F3688 D3691 R3695 V3696 V3703 L3708 R3721 P3722 D3723
V3724 D3725 E3726 K3727 R3728 S3729 D3730 L3731 L3732 K3733 L3734 Q3735 G3736 E3737 F3738 Q3739 L3740 R3741 L3742 R3743 Q3744 L3745 E3746 K3747 S3748 L3749 L3750 Q3751 A3752 L3753 N3754 E3755 V3756 K3757 G3758 R3759 I3760 L3761 D3762 D3763 D3764 T3765 I3766 I3767 T3768 T3769 L3770 E3771 N3772 L3773 K3774 R3775 E3776 A3777 A3778 E3779 V3780 T3781 R3782 K3783



• Molecule 2: Platelet-activating factor acetylhydrolase IB subunit beta

Chain E:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	69831	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	55	Depositor
Minimum defocus (nm)	610	Depositor
Maximum defocus (nm)	3250	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.918	Depositor
Minimum map value	-0.525	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.023	Depositor
Recommended contour level	0.084	Depositor
Map size (Å)	329.12, 329.12, 329.12	wwPDB
Map dimensions	352, 352, 352	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.935, 0.935, 0.935	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MG, ADP, ATP

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	0.14	0/23382	0.34	0/31728
2	E	0.08	0/1580	0.25	0/2197
All	All	0.14	0/24962	0.34	0/33925

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	22914	0	22417	244	0
2	E	1581	0	693	0	0
3	A	54	0	24	1	0
4	A	62	0	24	0	0
5	A	1	0	0	0	0
All	All	24612	0	23158	244	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (244) 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)
1:A:3721:ARG:O	1:A:3725:ASP:HB2	1.74	0.88
1:A:2231:SER:HB3	1:A:2344:GLU:OE2	1.78	0.83
1:A:3645:LEU:O	1:A:3649:LEU:HB2	1.81	0.80
1:A:3624:GLU:O	1:A:3628:ARG:HB2	1.84	0.77
1:A:2601:LYS:HB3	1:A:2736:VAL:HG21	1.70	0.72
1:A:1792:LEU:HD11	1:A:1808:LEU:HD22	1.72	0.72
1:A:1713:LEU:HD11	1:A:1870:PHE:HB3	1.75	0.68
1:A:2503:SER:HB3	1:A:2514:LEU:HD23	1.78	0.66
1:A:1640:ILE:HG12	1:A:1650:LEU:HG	1.78	0.66
1:A:3586:TYR:HD2	1:A:3649:LEU:HD12	1.62	0.64
1:A:3607:ARG:HB3	1:A:3632:PRO:HD3	1.79	0.64
1:A:1627:PRO:HB3	1:A:1950:GLN:HB3	1.80	0.64
1:A:1627:PRO:HB2	1:A:1951:VAL:HB	1.79	0.64
1:A:1864:ALA:HB2	1:A:1897:GLU:HB2	1.79	0.64
1:A:1664:ILE:HG22	1:A:1676:ILE:HG22	1.80	0.63
1:A:1622:GLU:HA	1:A:1699:ASN:HD22	1.64	0.63
1:A:1948:LEU:HD22	1:A:1953:ALA:HB3	1.80	0.63
1:A:2834:GLN:HA	1:A:2837:LEU:HD23	1.80	0.62
1:A:1647:VAL:HA	1:A:1650:LEU:HD13	1.82	0.62
1:A:3499:GLN:HA	1:A:3502:THR:HG22	1.81	0.61
1:A:2838:VAL:HG13	1:A:2839:GLU:HG2	1.83	0.60
1:A:2962:LYS:HE2	1:A:3665:GLY:H	1.67	0.60
1:A:3649:LEU:HD11	1:A:3696:VAL:HG12	1.83	0.60
1:A:3512:ALA:O	1:A:3516:TYR:HB2	2.02	0.60
1:A:1836:PHE:HA	1:A:1839:LEU:HB2	1.83	0.59
1:A:3647:PRO:HG3	1:A:3664:LEU:HB2	1.85	0.59
1:A:4511:LEU:HA	1:A:4514:LEU:HD12	1.85	0.59
1:A:2518:ILE:O	1:A:2522:THR:HB	2.02	0.59
1:A:2519:ARG:HG3	1:A:2526:LEU:HD12	1.84	0.59
1:A:3708:LEU:HD23	1:A:3809:SER:HA	1.84	0.58
1:A:2154:ILE:HG13	1:A:2155:PRO:HD3	1.85	0.58
1:A:3012:LEU:HD21	1:A:3064:VAL:HG11	1.85	0.58
1:A:2148:LYS:HG3	1:A:2361:MET:HB2	1.84	0.58
1:A:4068:SER:HA	1:A:4095:MET:HB2	1.85	0.58
1:A:3909:LEU:HB3	1:A:4344:LEU:HD13	1.87	0.57
1:A:1750:VAL:HG12	1:A:1811:LEU:HD11	1.87	0.56
1:A:3840:LEU:HA	1:A:3859:ILE:HD11	1.87	0.56
1:A:3007:ARG:HB2	1:A:3017:VAL:HG11	1.85	0.56
1:A:2769:LEU:HG	1:A:2773:MET:HE2	1.87	0.56
1:A:3655:ARG:HG2	1:A:3660:VAL:HG22	1.86	0.56
1:A:2324:LEU:HD11	1:A:2332:ARG:HB3	1.88	0.56
1:A:2085:HIS:HB2	1:A:2361:MET:HE1	1.88	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2677:GLN:HB2	1:A:2680:ILE:HG22	1.87	0.56
1:A:3779:GLU:HG2	1:A:3782:ARG:HH12	1.70	0.56
1:A:4628:THR:HG22	1:A:4629:LYS:H	1.71	0.56
1:A:3839:VAL:HG21	1:A:3863:LEU:HA	1.88	0.56
1:A:2992:PHE:HB3	1:A:3064:VAL:HA	1.87	0.55
1:A:3875:MET:HE1	1:A:3883:PHE:HB2	1.87	0.55
1:A:4544:ASN:HA	1:A:4573:ASN:HD21	1.72	0.55
1:A:2992:PHE:HD2	1:A:3064:VAL:HG13	1.70	0.55
1:A:1766:LEU:HA	1:A:1769:MET:HE2	1.88	0.55
1:A:2138:ILE:HG23	1:A:2161:LEU:HD21	1.89	0.55
1:A:4413:PHE:O	1:A:4417:VAL:HB	2.07	0.55
1:A:2437:LEU:HD21	1:A:2451:ARG:HG3	1.87	0.54
1:A:3645:LEU:O	1:A:3649:LEU:CB	2.52	0.54
1:A:3623:LEU:HD22	1:A:3664:LEU:HD23	1.88	0.54
1:A:2386:PRO:HA	1:A:2416:GLN:HE22	1.73	0.54
1:A:1711:VAL:HG12	1:A:1853:VAL:HG21	1.89	0.54
1:A:2862:ASP:O	1:A:2866:ALA:HB2	2.08	0.54
1:A:3026:TYR:O	1:A:3030:MET:HG2	2.08	0.53
1:A:3935:VAL:HG13	1:A:3947:LEU:HD23	1.90	0.53
1:A:1952:GLY:HA2	1:A:2012:MET:HB3	1.91	0.53
1:A:2433:VAL:HG22	1:A:2498:ILE:HD11	1.90	0.53
1:A:4268:PHE:HE1	1:A:4637:GLU:HG2	1.73	0.53
1:A:2922:ILE:HG12	1:A:2933:LEU:HD21	1.91	0.53
1:A:2222:MET:HG2	1:A:2364:PHE:HE2	1.74	0.53
1:A:2609:LEU:HD11	1:A:2660:VAL:HG11	1.91	0.53
1:A:1708:GLU:HA	1:A:1711:VAL:HG22	1.91	0.52
1:A:1860:GLN:HG2	1:A:1865:LYS:HA	1.92	0.52
1:A:3835:ILE:HG12	1:A:3870:ARG:HD3	1.91	0.52
1:A:2083:GLN:HE22	1:A:2150:VAL:HG21	1.75	0.52
1:A:3005:LEU:HD21	1:A:3078:ARG:HD3	1.91	0.52
1:A:4113:LEU:HA	1:A:4116:LEU:HD22	1.91	0.52
1:A:2958:VAL:HA	1:A:2991:ALA:HB3	1.92	0.51
1:A:2533:PRO:HB2	1:A:2535:ILE:HG22	1.92	0.51
1:A:2259:ILE:HD11	1:A:2695:THR:HG22	1.92	0.51
1:A:3767:ILE:HA	1:A:3770:LEU:HD12	1.93	0.51
1:A:2399:LYS:HG3	1:A:2400:GLY:H	1.74	0.50
1:A:2221:MET:HG2	1:A:2343:PHE:HB2	1.94	0.50
1:A:1899:ARG:HH12	1:A:1982:LEU:HD22	1.76	0.50
1:A:2304:ASP:HA	1:A:2344:GLU:HB3	1.93	0.50
1:A:2464:GLN:HG2	1:A:2583:THR:HA	1.94	0.50
1:A:2150:VAL:HG12	1:A:2152:GLU:H	1.76	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3721:ARG:O	1:A:3725:ASP:CB	2.55	0.50
1:A:4409:LEU:HB3	1:A:4504:LEU:HD21	1.93	0.50
1:A:4211:ASP:HB3	1:A:4252:TYR:HE1	1.76	0.50
1:A:1741:TRP:CZ2	1:A:1750:VAL:HG13	2.47	0.50
1:A:4376:TRP:H	1:A:4376:TRP:CD1	2.29	0.50
1:A:4408:PRO:HB3	1:A:4526:GLN:HE21	1.76	0.50
1:A:2281:THR:HG22	1:A:2325:LEU:HD21	1.94	0.49
1:A:2797:ARG:HH12	1:A:3088:ARG:HD2	1.77	0.49
1:A:2933:LEU:HB3	1:A:3065:VAL:HG22	1.94	0.49
1:A:3691:ASP:O	1:A:3695:ARG:HG2	2.13	0.49
1:A:4444:GLN:HG3	1:A:4449:ARG:HB3	1.95	0.49
1:A:2294:GLU:HA	1:A:2297:LYS:HE3	1.95	0.49
1:A:3638:VAL:HG11	1:A:3679:LEU:HB3	1.94	0.49
1:A:2300:TRP:HE1	1:A:2340:ARG:HD2	1.76	0.48
1:A:2968:THR:HG22	1:A:2970:GLU:H	1.77	0.48
1:A:2648:VAL:HB	1:A:2701:VAL:HG12	1.95	0.48
1:A:2666:ILE:HG22	1:A:2712:CYS:HB3	1.96	0.48
1:A:3624:GLU:O	1:A:3628:ARG:CB	2.59	0.48
1:A:2066:ALA:HA	1:A:2069:ILE:HG22	1.96	0.48
1:A:2298:ARG:HA	1:A:2338:ASN:HB2	1.95	0.48
1:A:2912:PHE:HE2	1:A:2914:GLU:HB2	1.79	0.48
1:A:4052:SER:HB3	1:A:4097:LYS:HE3	1.96	0.48
1:A:1917:LYS:HG2	1:A:1927:VAL:HG11	1.95	0.47
1:A:2553:PRO:HD2	1:A:2570:PRO:HB2	1.96	0.47
1:A:3626:ALA:HA	1:A:3631:ASN:HD21	1.79	0.47
1:A:1975:VAL:HA	1:A:1978:ILE:HG12	1.96	0.47
1:A:1930:PHE:HZ	1:A:1944:ILE:HG21	1.79	0.47
1:A:2660:VAL:HG22	1:A:2707:GLN:HB2	1.96	0.47
1:A:3973:LEU:HD12	1:A:3992:LEU:HD21	1.96	0.47
1:A:2241:LEU:HB3	1:A:2298:ARG:HH22	1.79	0.47
1:A:1882:THR:HG22	1:A:2048:LEU:HD23	1.96	0.47
1:A:2258:ALA:HB1	1:A:2682:PHE:HD1	1.80	0.47
1:A:3977:GLU:HG2	1:A:3978:THR:HG23	1.96	0.47
1:A:2221:MET:HB2	1:A:2361:MET:HG2	1.97	0.47
1:A:1698:ILE:HA	1:A:1701:TRP:CD1	2.49	0.47
1:A:2047:GLN:HA	1:A:2070:VAL:HG21	1.97	0.47
1:A:1813:THR:HG23	1:A:1880:VAL:HG22	1.95	0.47
1:A:2147:PRO:HG3	1:A:2209:GLN:HB3	1.96	0.47
1:A:2872:LEU:HD23	1:A:2920:LEU:HD12	1.97	0.47
1:A:4065:GLN:HB3	1:A:4092:ARG:HD2	1.96	0.47
1:A:2231:SER:HB3	1:A:2344:GLU:CD	2.40	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:4260:PHE:HE2	1:A:4618:LEU:HD11	1.79	0.46
1:A:4544:ASN:HD22	1:A:4591:ARG:HH22	1.62	0.46
1:A:2979:VAL:HG13	1:A:2990:ILE:HD13	1.98	0.46
1:A:4267:THR:HG21	1:A:4636:TYR:HD2	1.79	0.46
1:A:1912:LYS:HG2	1:A:2041:MET:HG3	1.97	0.46
1:A:3624:GLU:HA	1:A:3669:ILE:HG22	1.97	0.46
1:A:1713:LEU:HA	1:A:1716:LEU:HG	1.98	0.46
1:A:2519:ARG:HE	1:A:2534:ILE:HD11	1.80	0.46
1:A:2620:LEU:HD11	1:A:2630:LEU:HD21	1.98	0.46
1:A:2775:GLU:HA	1:A:2778:THR:HG22	1.96	0.46
1:A:3730:ASP:HA	1:A:3733:LYS:HD2	1.98	0.46
1:A:4413:PHE:CZ	1:A:4417:VAL:HG21	2.51	0.46
1:A:1814:GLU:O	1:A:1818:GLN:HG2	2.16	0.46
1:A:2581:LEU:O	1:A:2585:LEU:HB2	2.17	0.45
1:A:3874:GLY:HA3	1:A:4144:ILE:HG23	1.97	0.45
1:A:3724:VAL:HG11	1:A:3797:VAL:HG21	1.99	0.45
1:A:4288:VAL:HG21	1:A:4294:ILE:HG13	1.97	0.45
1:A:4324:PRO:HD3	1:A:4638:ARG:HG3	1.98	0.45
1:A:3642:ASP:HB3	1:A:3645:LEU:HG	1.99	0.45
1:A:4179:LEU:HD12	1:A:4223:LEU:HD11	1.98	0.45
1:A:1964:GLU:H	1:A:1967:MET:HE3	1.81	0.45
1:A:3130:TYR:CZ	1:A:3132:LYS:HB2	2.52	0.45
1:A:4211:ASP:HB3	1:A:4252:TYR:CE1	2.51	0.45
1:A:3703:VAL:HG11	1:A:3829:LEU:HD22	1.97	0.44
1:A:2075:LEU:HG	1:A:2160:LEU:HD13	1.97	0.44
1:A:2446:ILE:HG22	1:A:2505:ASP:HB2	1.99	0.44
1:A:2935:LEU:HD23	1:A:3092:ASN:HB2	2.00	0.44
1:A:3614:PHE:HE2	1:A:3640:SER:HB2	1.82	0.44
1:A:4066:ILE:HD11	1:A:4095:MET:HG2	2.00	0.44
1:A:4502:LYS:HE2	1:A:4502:LYS:HB2	1.83	0.44
1:A:1985:HIS:CE1	1:A:1992:LYS:HD2	2.52	0.44
1:A:2684:ARG:HD2	1:A:2726:ARG:HB3	1.99	0.44
1:A:2252:HIS:HB2	1:A:2301:ILE:HG12	1.99	0.44
1:A:2300:TRP:CD1	1:A:2340:ARG:HB2	2.52	0.44
1:A:3724:VAL:HA	1:A:3727:LYS:HB2	1.97	0.44
1:A:1729:LYS:HA	1:A:1729:LYS:HD3	1.67	0.44
1:A:2228:SER:HB2	1:A:2364:PHE:HB3	2.00	0.44
1:A:2368:VAL:HG12	1:A:2369:LEU:HD12	2.00	0.44
1:A:2590:PRO:HB2	1:A:2731:VAL:HG12	2.00	0.44
1:A:1751:VAL:HG11	1:A:1878:LYS:HE3	1.99	0.44
1:A:4504:LEU:HA	1:A:4507:ILE:HD12	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2513:GLU:O	1:A:2516:GLU:HG3	2.18	0.44
1:A:4395:LEU:HD22	1:A:4424:LEU:HD12	2.00	0.44
1:A:2925:ILE:HD12	1:A:3090:VAL:HG11	1.98	0.43
1:A:4158:LEU:HD21	1:A:4310:GLU:HG2	1.99	0.43
1:A:1687:LYS:HE3	1:A:1715:LYS:HD2	2.00	0.43
1:A:2104:LYS:HB2	1:A:2136:ILE:HG21	2.01	0.43
1:A:4609:VAL:HG22	1:A:4642:VAL:HB	2.00	0.43
1:A:1891:THR:HG21	1:A:2039:LEU:HD11	2.00	0.43
1:A:1899:ARG:HH21	1:A:1985:HIS:HB3	1.84	0.43
1:A:3600:ILE:HD13	1:A:3634:LEU:HD13	2.01	0.43
1:A:1800:GLN:H	1:A:1805:ARG:HH22	1.67	0.43
1:A:2996:GLU:HB3	1:A:3068:MET:HB3	2.01	0.43
1:A:3487:GLU:O	1:A:3490:GLU:HG3	2.19	0.43
1:A:3627:LEU:HD23	1:A:3669:ILE:HD12	2.00	0.43
1:A:4408:PRO:HB2	1:A:4523:ALA:HB1	2.00	0.43
1:A:1891:THR:HG22	1:A:4250:SER:HA	2.01	0.42
1:A:3031:THR:HA	1:A:3034:LYS:HG2	2.01	0.42
1:A:2278:GLY:O	1:A:2282:HIS:CB	2.67	0.42
1:A:3513:PHE:HZ	1:A:3575:GLU:HG2	1.84	0.42
1:A:3818:LEU:HA	1:A:4346:MET:HE1	2.01	0.42
1:A:3846:LEU:HD11	1:A:3859:ILE:HD13	2.00	0.42
1:A:2440:ALA:HA	1:A:2443:LEU:HD13	2.00	0.42
1:A:3154:LEU:HD22	1:A:3516:TYR:CD2	2.55	0.42
1:A:2862:ASP:O	1:A:2866:ALA:CB	2.67	0.42
1:A:3588:LEU:HD21	1:A:3688:PHE:CZ	2.54	0.42
1:A:3945:LYS:HA	1:A:3945:LYS:HD3	1.81	0.42
1:A:4246:LEU:HA	1:A:4246:LEU:HD23	1.82	0.42
1:A:2593:LEU:HD11	1:A:2605:LEU:HD13	2.02	0.42
1:A:2838:VAL:HG23	1:A:3093:TRP:CZ2	2.55	0.42
1:A:1698:ILE:HA	1:A:1701:TRP:NE1	2.34	0.42
1:A:1742:ILE:HG23	1:A:1807:LYS:HD2	2.02	0.42
1:A:2065:LEU:HD12	1:A:2137:LEU:HD22	2.00	0.42
1:A:2755:MET:HG3	1:A:2807:PHE:HD1	1.85	0.42
1:A:2222:MET:HG2	1:A:2364:PHE:CE2	2.55	0.42
1:A:4071:ILE:HD11	1:A:4096:LEU:HD22	2.01	0.42
1:A:2440:ALA:HB3	1:A:2502:LEU:HD12	2.02	0.42
1:A:2615:MET:HE2	1:A:2615:MET:HB2	1.99	0.42
1:A:3123:PRO:HG2	1:A:3126:MET:HB2	2.02	0.42
1:A:4631:ASP:HB3	1:A:4634:SER:H	1.85	0.42
1:A:2277:ASP:HB3	1:A:2282:HIS:HB2	2.02	0.42
1:A:2598:GLY:HA3	1:A:2795:SER:HB2	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:4431:LEU:HD12	1:A:4431:LEU:HA	1.89	0.42
1:A:4541:LEU:HD11	1:A:4590:LEU:HD22	2.02	0.42
1:A:2413:LEU:HD23	1:A:2416:GLN:HE21	1.83	0.41
1:A:2072:PHE:HB2	1:A:2164:VAL:HG11	2.02	0.41
1:A:3157:ALA:HA	1:A:3160:ARG:HE	1.84	0.41
1:A:4038:ASN:HB3	1:A:4118:PRO:HG3	2.01	0.41
1:A:3070:PRO:HB3	1:A:3093:TRP:HH2	1.86	0.41
1:A:4408:PRO:HG3	1:A:4527:TYR:HB2	2.03	0.41
1:A:1914:GLU:HG3	3:A:4701:ADP:H3'	2.02	0.41
1:A:2156:LEU:HD11	1:A:4411:ARG:HD3	2.01	0.41
1:A:2993:ILE:HD13	1:A:3065:VAL:HB	2.02	0.41
1:A:4277:SER:HA	1:A:4282:PHE:CG	2.56	0.41
1:A:3662:ILE:H	1:A:3669:ILE:HD11	1.85	0.41
1:A:3819:LYS:HE3	1:A:3819:LYS:HB2	1.88	0.41
1:A:3907:HIS:CG	1:A:3941:LEU:HD11	2.55	0.41
1:A:3597:THR:HA	1:A:3600:ILE:HG22	2.02	0.41
1:A:3740:LEU:HA	1:A:3743:ARG:HG2	2.01	0.41
1:A:4565:LEU:HD12	1:A:4642:VAL:HG22	2.02	0.41
1:A:2175:MET:HE2	1:A:2175:MET:HB3	1.92	0.41
1:A:2181:GLU:HG3	1:A:2244:LEU:HD13	2.01	0.41
1:A:2854:ALA:O	1:A:2858:PHE:HB2	2.21	0.41
1:A:3021:PHE:HB3	1:A:3029:LEU:HD21	2.02	0.41
1:A:3136:PRO:HA	1:A:3137:PRO:HD3	1.92	0.41
1:A:4189:ILE:HD12	1:A:4321:LEU:HA	2.02	0.41
1:A:4239:PRO:HB2	1:A:4242:ALA:HB3	2.03	0.40
1:A:4268:PHE:CE1	1:A:4637:GLU:HG2	2.55	0.40
1:A:2443:LEU:HD23	1:A:2510:MET:HB3	2.02	0.40
1:A:2532:ILE:HD12	1:A:2533:PRO:HD2	2.03	0.40
1:A:2684:ARG:HA	1:A:2687:VAL:HG12	2.03	0.40
1:A:2822:ILE:HD11	1:A:2866:ALA:HB1	2.03	0.40
1:A:4489:LEU:HA	1:A:4492:ILE:HG22	2.04	0.40
1:A:1853:VAL:HA	1:A:1856:GLN:HG3	2.02	0.40
1:A:2050:ALA:HB2	1:A:2093:LEU:HD21	2.03	0.40
1:A:4492:ILE:HD13	1:A:4507:ILE:HG21	2.02	0.40
1:A:2073:PHE:HE2	1:A:2093:LEU:HA	1.86	0.40
1:A:3134:PRO:HD2	1:A:3141:GLU:HG2	2.03	0.40
1:A:2661:LEU:HD23	1:A:2661:LEU:HA	1.92	0.40
1:A:4179:LEU:HD23	1:A:4179:LEU:HA	1.83	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	2917/4843 (60%)	2833 (97%)	83 (3%)	1 (0%)	100	100
2	E	318/411 (77%)	302 (95%)	16 (5%)	0	100	100
All	All	3235/5254 (62%)	3135 (97%)	99 (3%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1629	PHE

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	2434/4279 (57%)	2434 (100%)	0	100	100

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

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (21) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1863	ASN
1	A	1979	GLN
1	A	2083	GLN
1	A	2085	HIS
1	A	2109	GLN

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Mol	Chain	Res	Type
1	A	2271	ASN
1	A	2416	GLN
1	A	2464	GLN
1	A	2549	GLN
1	A	2752	ASN
1	A	3047	HIS
1	A	3158	ASN
1	A	3499	GLN
1	A	3534	HIS
1	A	3646	ASN
1	A	4131	ASN
1	A	4291	HIS
1	A	4466	HIS
1	A	4506	ASN
1	A	4573	ASN
1	A	4595	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 5 ligands modelled in this entry, 1 is 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	$\#\|Z\|>2$
3	ADP	A	4705	-	24,29,29	0.89	0	29,45,45	1.32	4 (13%)
4	ATP	A	4702	5	28,33,33	0.70	0	34,52,52	0.61	1 (2%)
4	ATP	A	4704	-	28,33,33	0.67	0	34,52,52	0.65	1 (2%)
3	ADP	A	4701	-	24,29,29	0.89	0	29,45,45	1.23	2 (6%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADP	A	4705	-	-	3/12/32/32	0/3/3/3
4	ATP	A	4702	5	-	2/18/38/38	0/3/3/3
4	ATP	A	4704	-	-	6/18/38/38	0/3/3/3
3	ADP	A	4701	-	-	3/12/32/32	0/3/3/3

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	4701	ADP	N3-C2-N1	-3.84	123.45	128.67
3	A	4705	ADP	N3-C2-N1	-3.60	123.79	128.67
3	A	4705	ADP	C4-C5-N7	-2.72	106.46	109.34
3	A	4705	ADP	O4'-C1'-N9	2.45	112.00	108.75
4	A	4702	ATP	C5-C6-N6	2.36	123.91	120.31
3	A	4701	ADP	C4-C5-N7	-2.33	106.87	109.34
4	A	4704	ATP	C5-C6-N6	2.29	123.81	120.31
3	A	4705	ADP	C4'-O4'-C1'	-2.10	108.00	109.92

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	4705	ADP	C5'-O5'-PA-O1A
3	A	4705	ADP	C5'-O5'-PA-O2A
3	A	4705	ADP	C5'-O5'-PA-O3A
4	A	4704	ATP	C5'-O5'-PA-O1A
4	A	4704	ATP	C5'-O5'-PA-O3A
4	A	4704	ATP	O4'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
4	A	4704	ATP	C3'-C4'-C5'-O5'
3	A	4701	ADP	PB-O3A-PA-O1A
4	A	4702	ATP	PG-O3B-PB-O1B
4	A	4704	ATP	C5'-O5'-PA-O2A
3	A	4701	ADP	PB-O3A-PA-O2A
3	A	4701	ADP	O4'-C4'-C5'-O5'
4	A	4704	ATP	PG-O3B-PB-O2B
4	A	4702	ATP	PG-O3B-PB-O2B

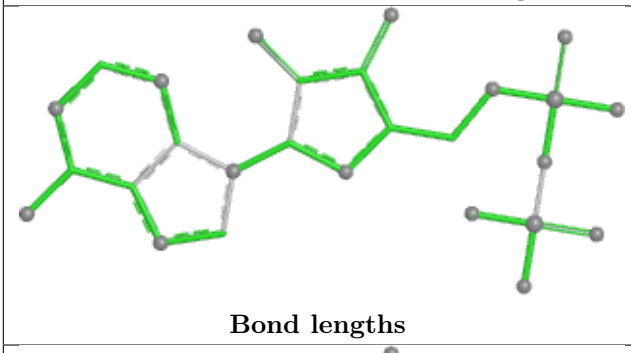
There are no ring outliers.

1 monomer is involved in 1 short contact:

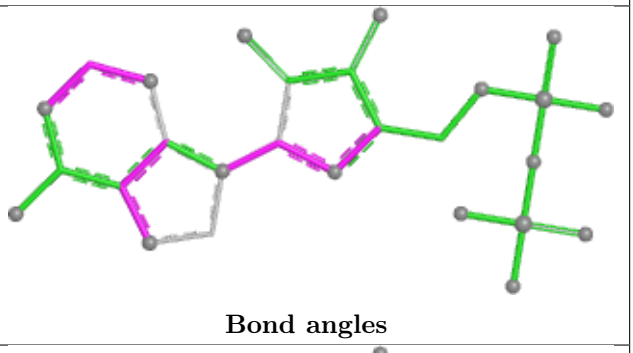
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	4701	ADP	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 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.

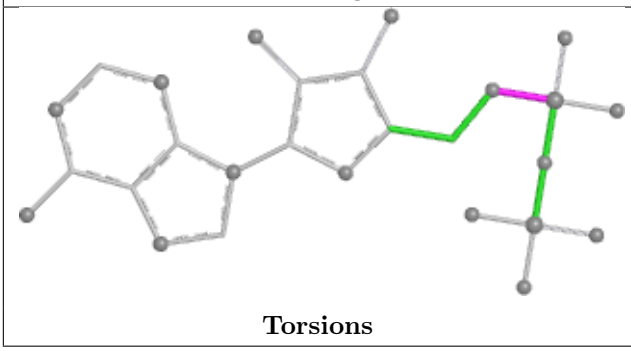
Ligand ADP A 4705



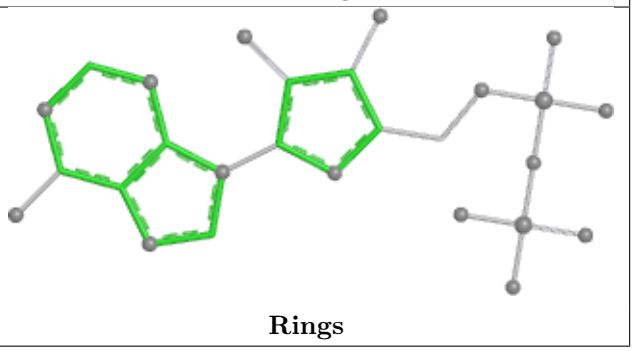
Bond lengths



Bond angles

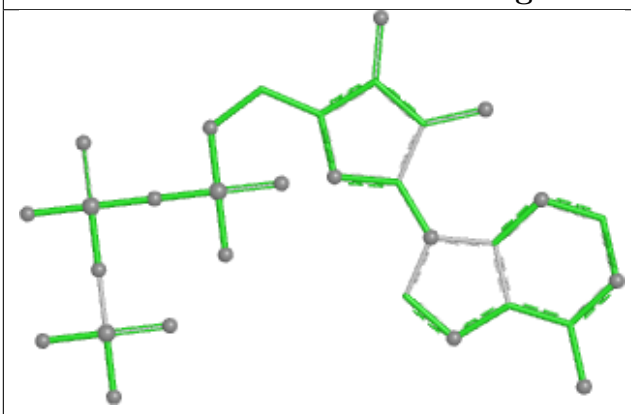


Torsions

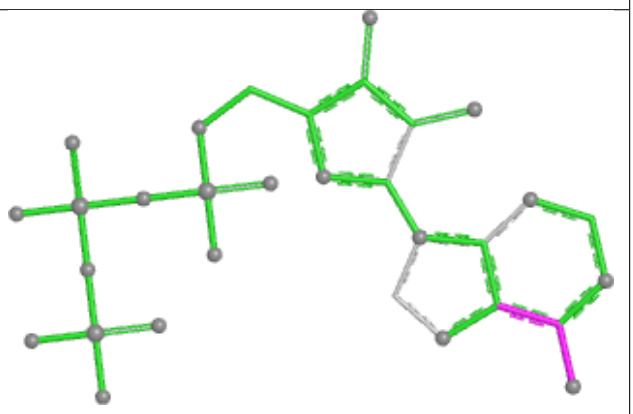


Rings

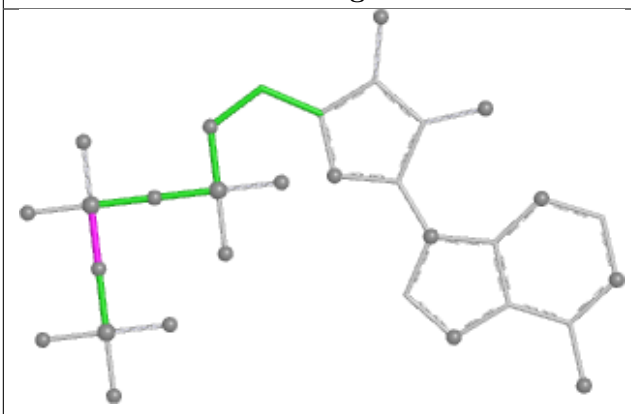
Ligand ATP A 4702



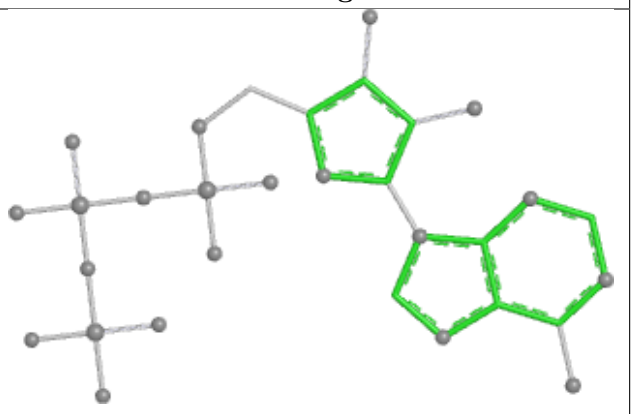
Bond lengths



Bond angles

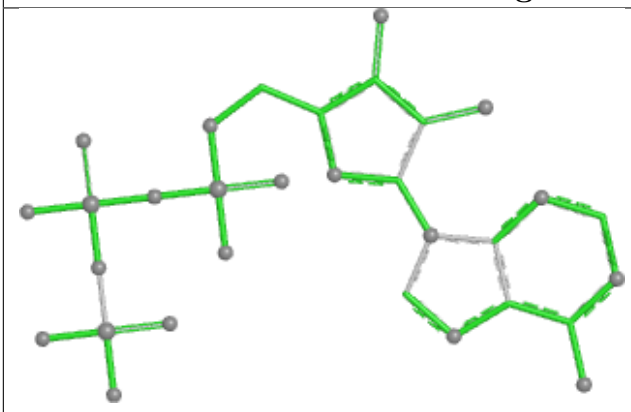


Torsions

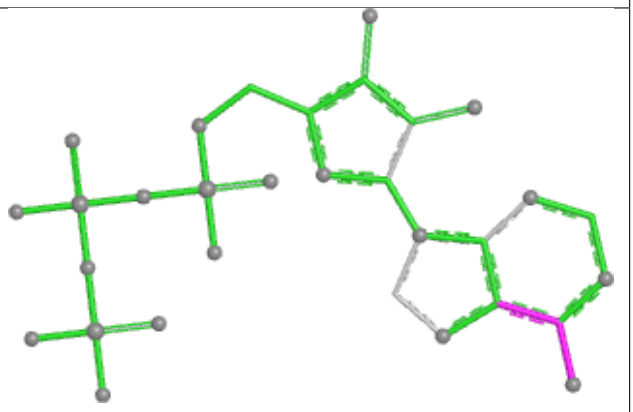


Rings

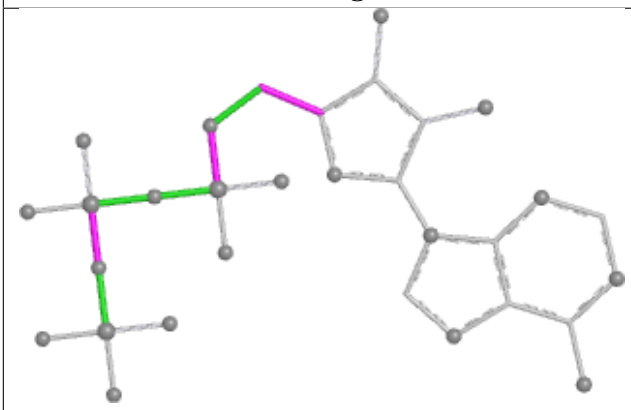
Ligand ATP A 4704



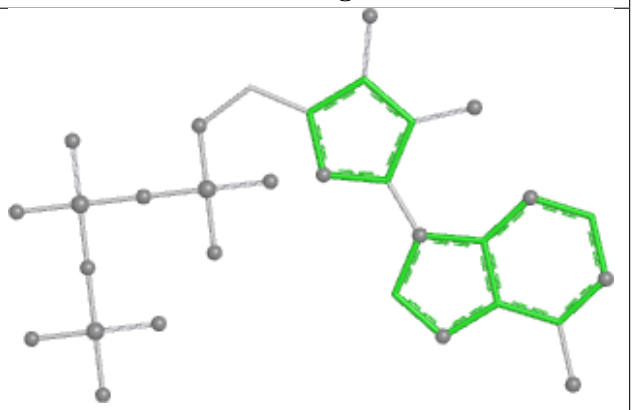
Bond lengths



Bond angles

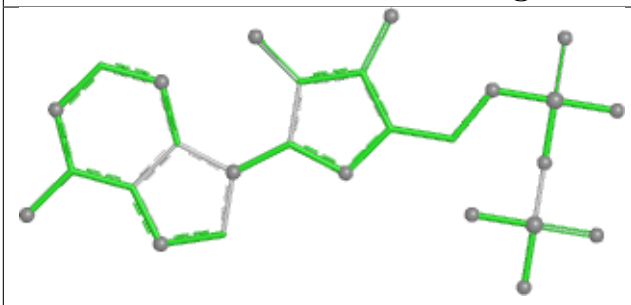


Torsions

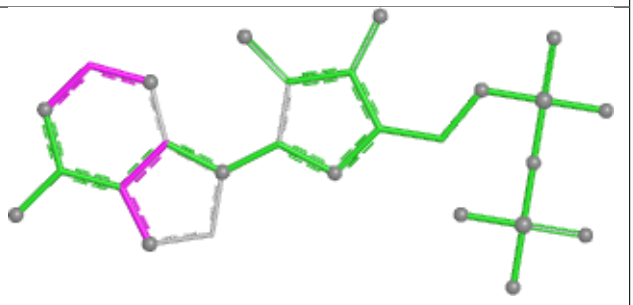


Rings

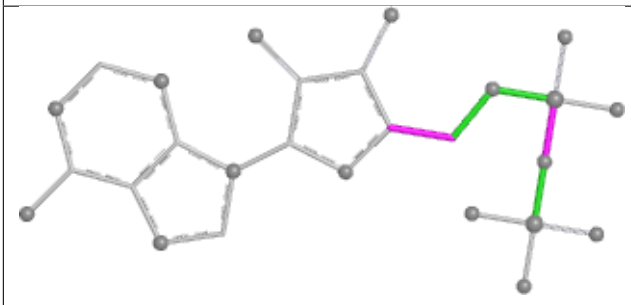
Ligand ADP A 4701



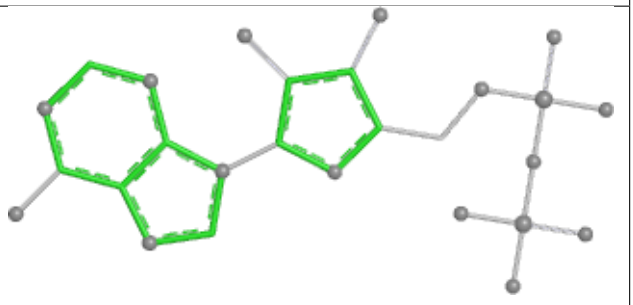
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

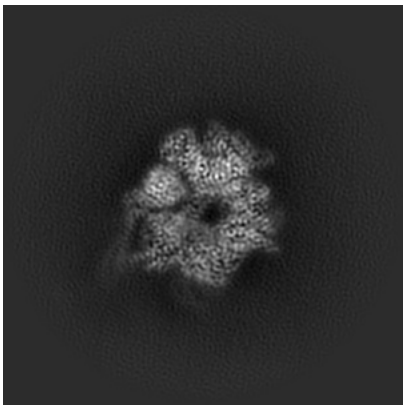
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-47429. These allow visual inspection of the internal detail of the map and identification of artifacts.

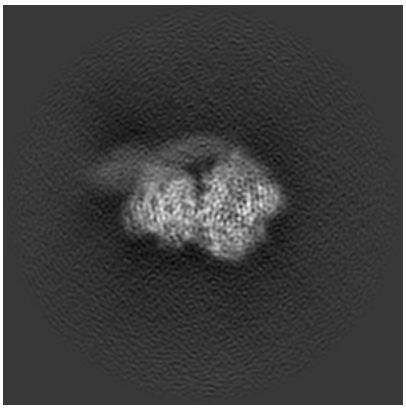
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

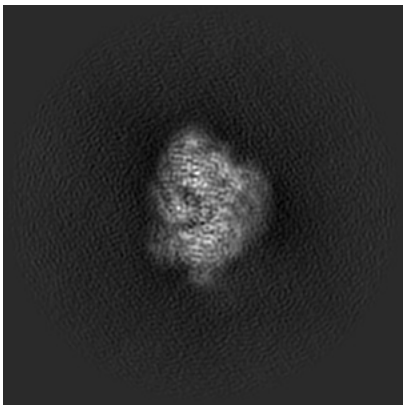
6.1.1 Primary map



X

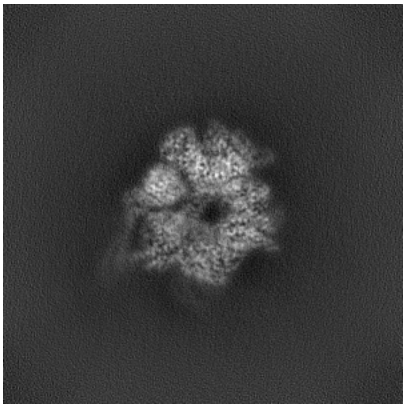


Y

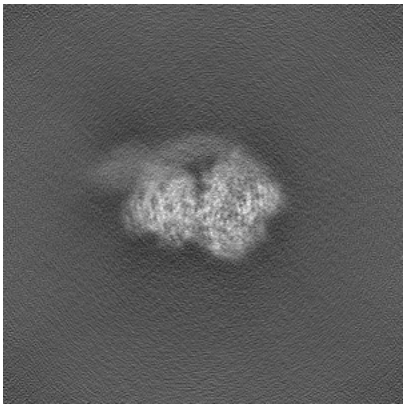


Z

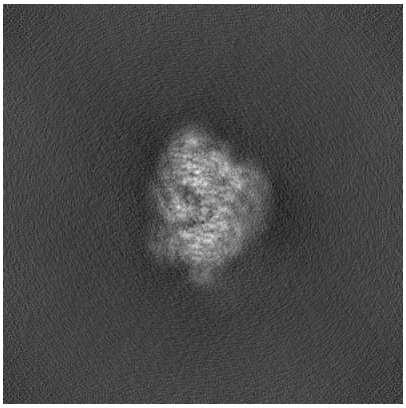
6.1.2 Raw map



X



Y

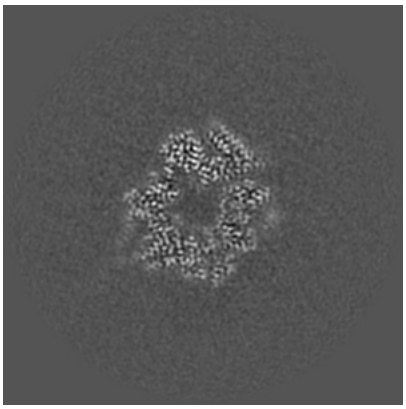


Z

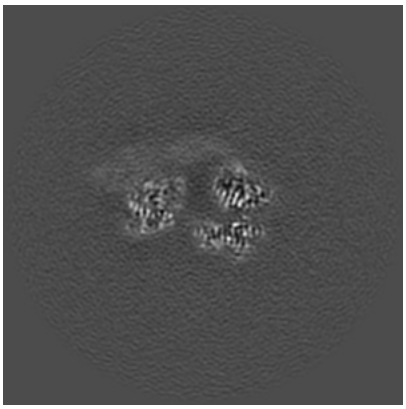
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

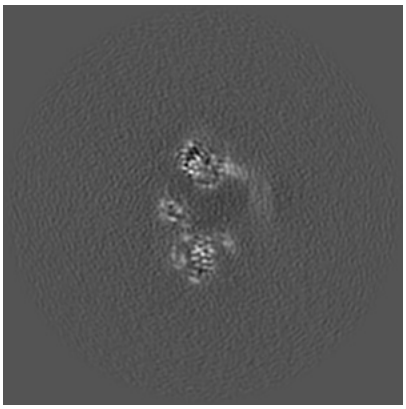
6.2.1 Primary map



X Index: 176

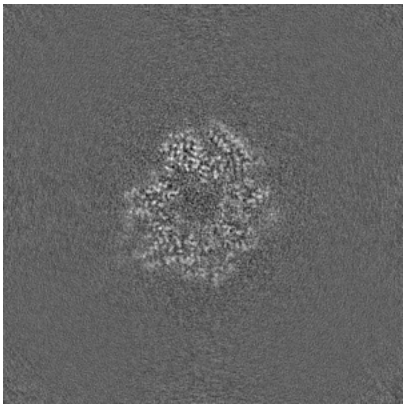


Y Index: 176

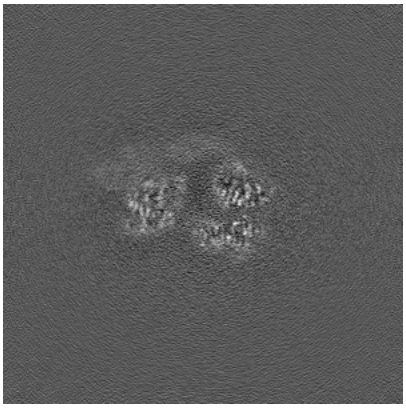


Z Index: 176

6.2.2 Raw map



X Index: 176



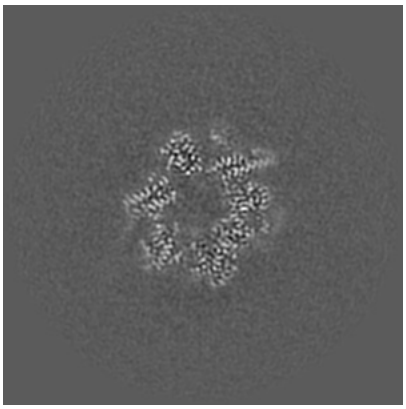
Y Index: 176

Z Index: 176

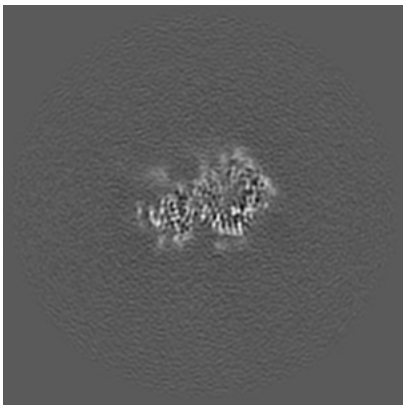
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

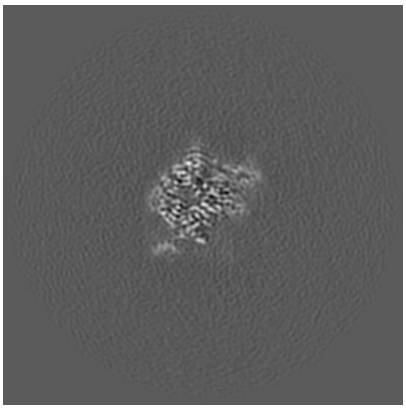
6.3.1 Primary map



X Index: 170

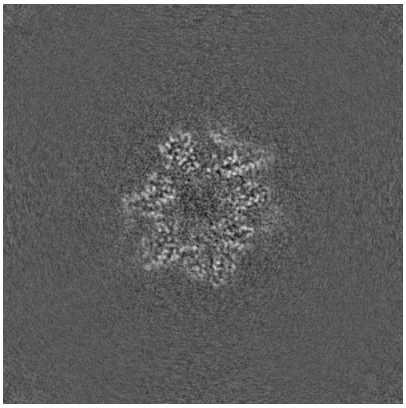


Y Index: 204

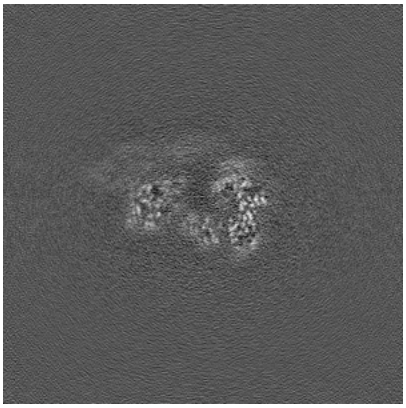


Z Index: 208

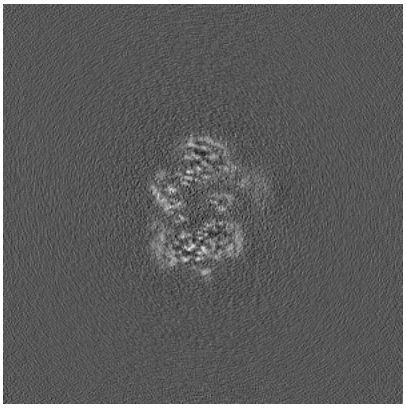
6.3.2 Raw map



X Index: 172



Y Index: 171

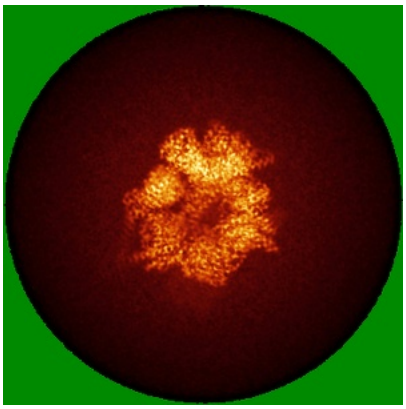


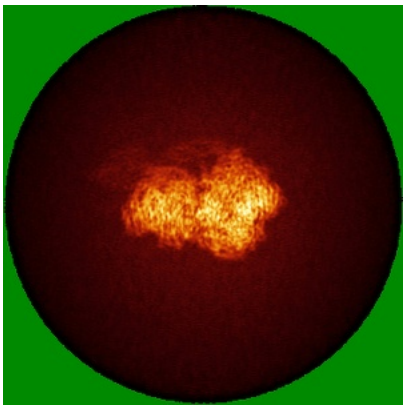
Z Index: 188

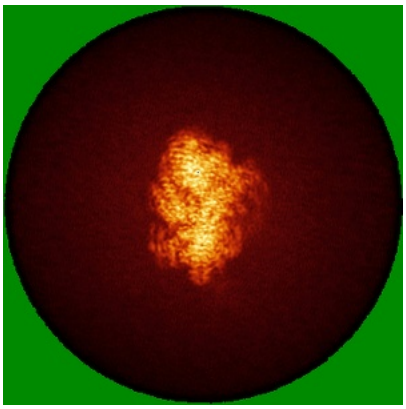
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

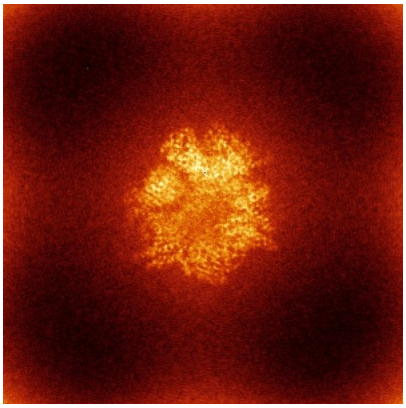
6.4.1 Primary map

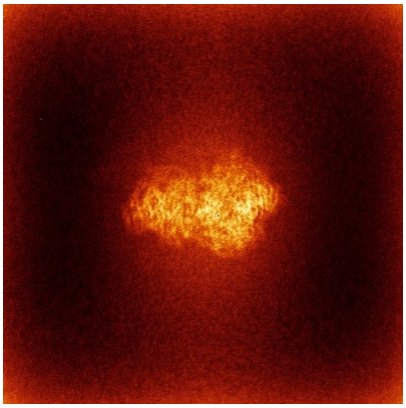

X

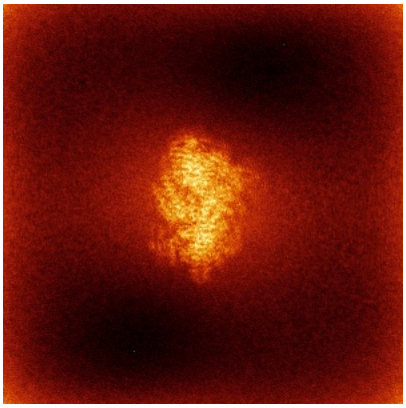

Y


Z

6.4.2 Raw map


X


Y


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

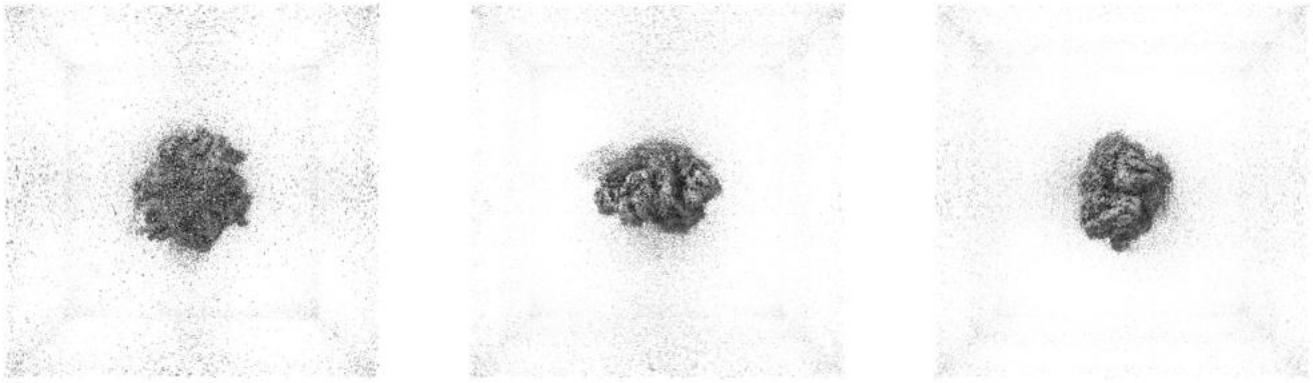
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.084. 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.

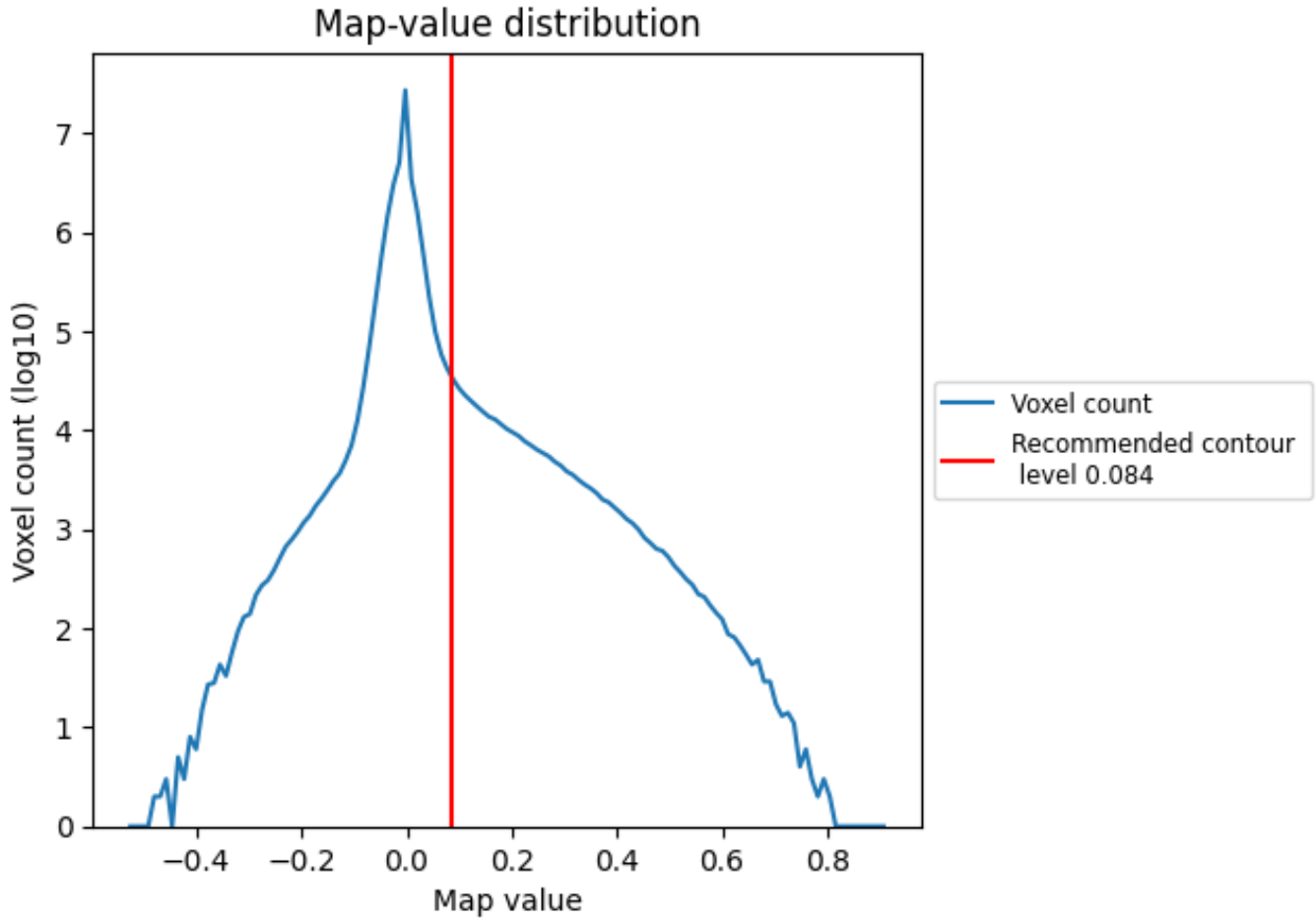
6.6 Mask visualisation (i)

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

7 Map analysis

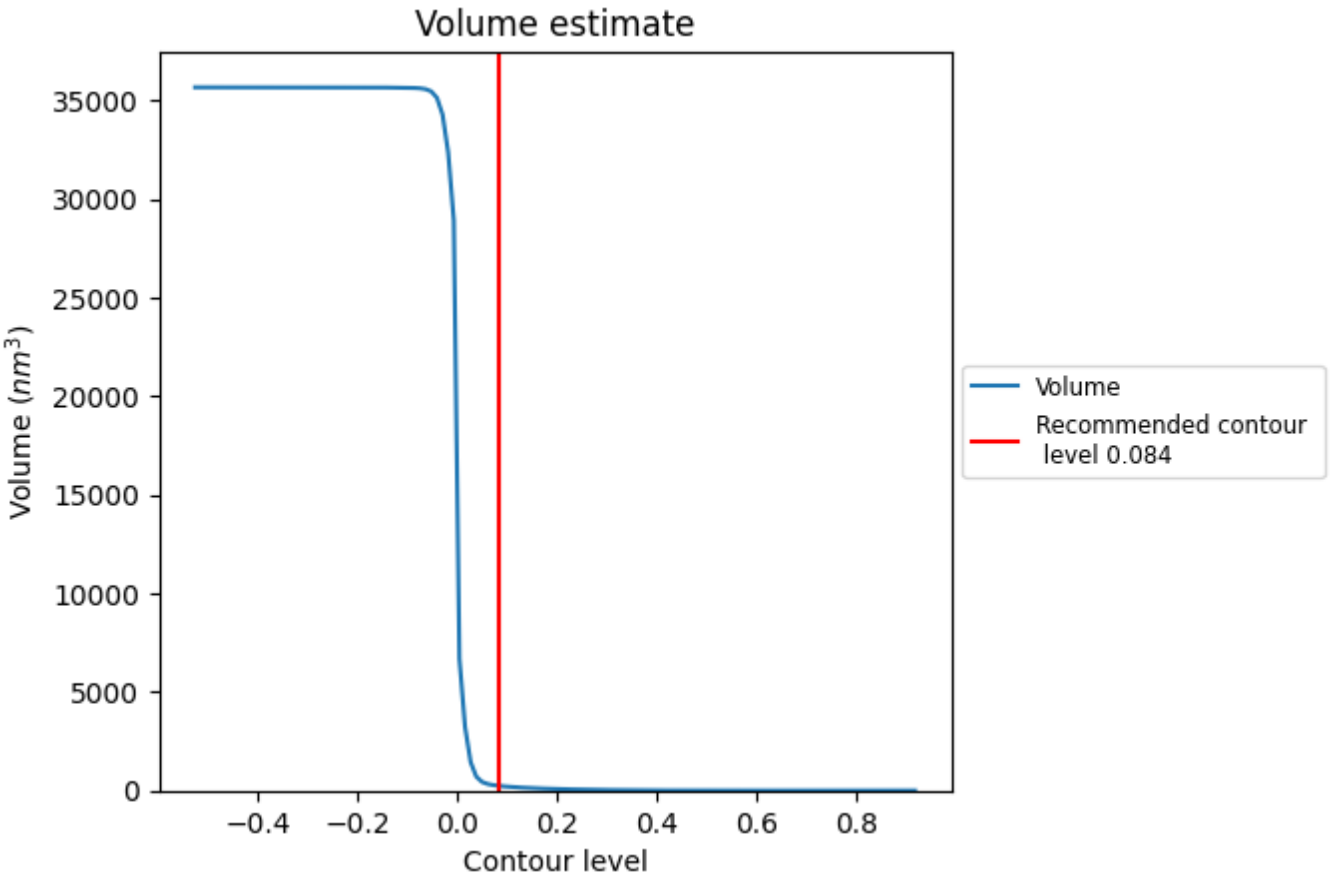
This section contains the results of statistical analysis of the map.

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.

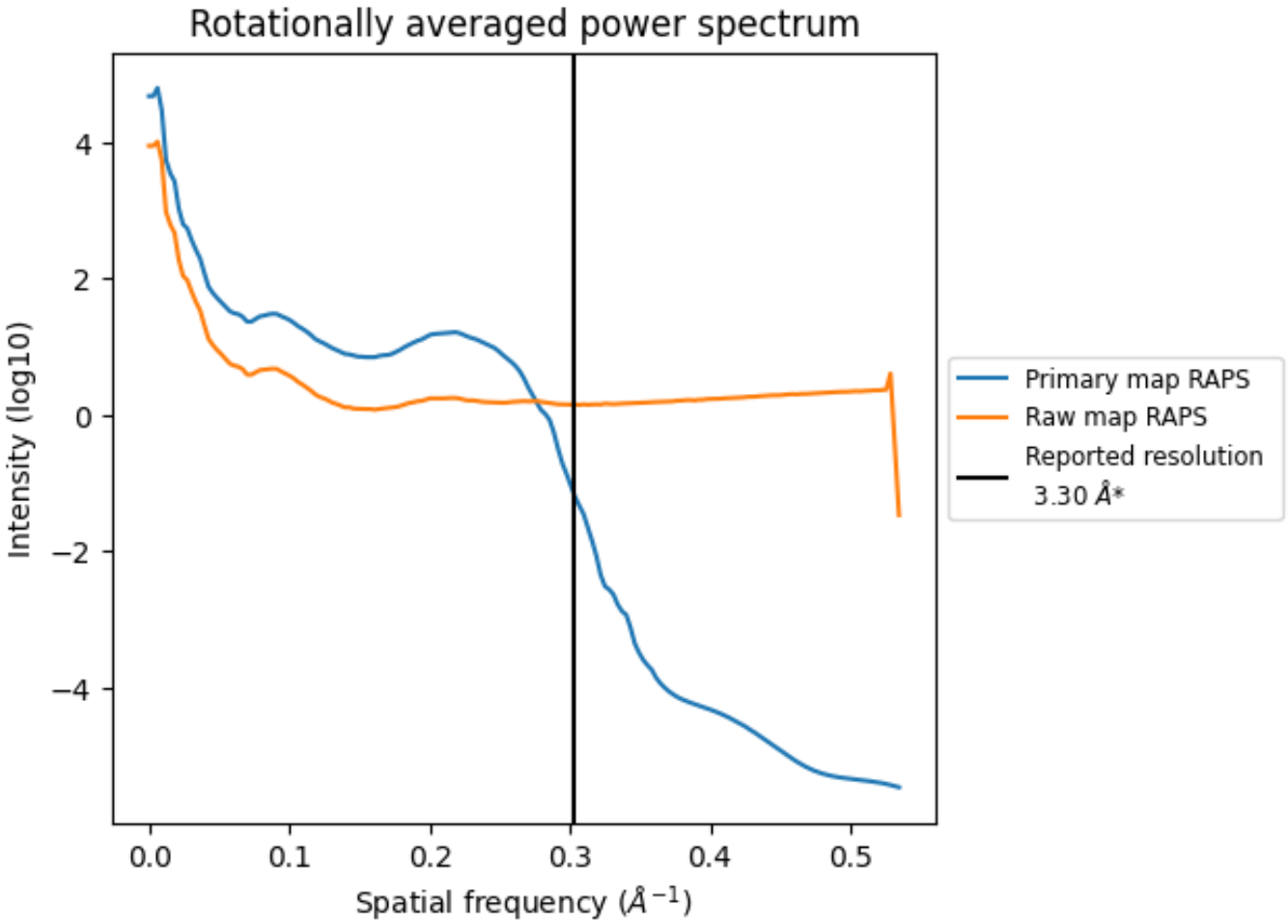
7.2 Volume estimate



The volume at the recommended contour level is 238 nm^3; this corresponds to an approximate mass of 215 kDa.

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

7.3 Rotationally averaged power spectrum (i)

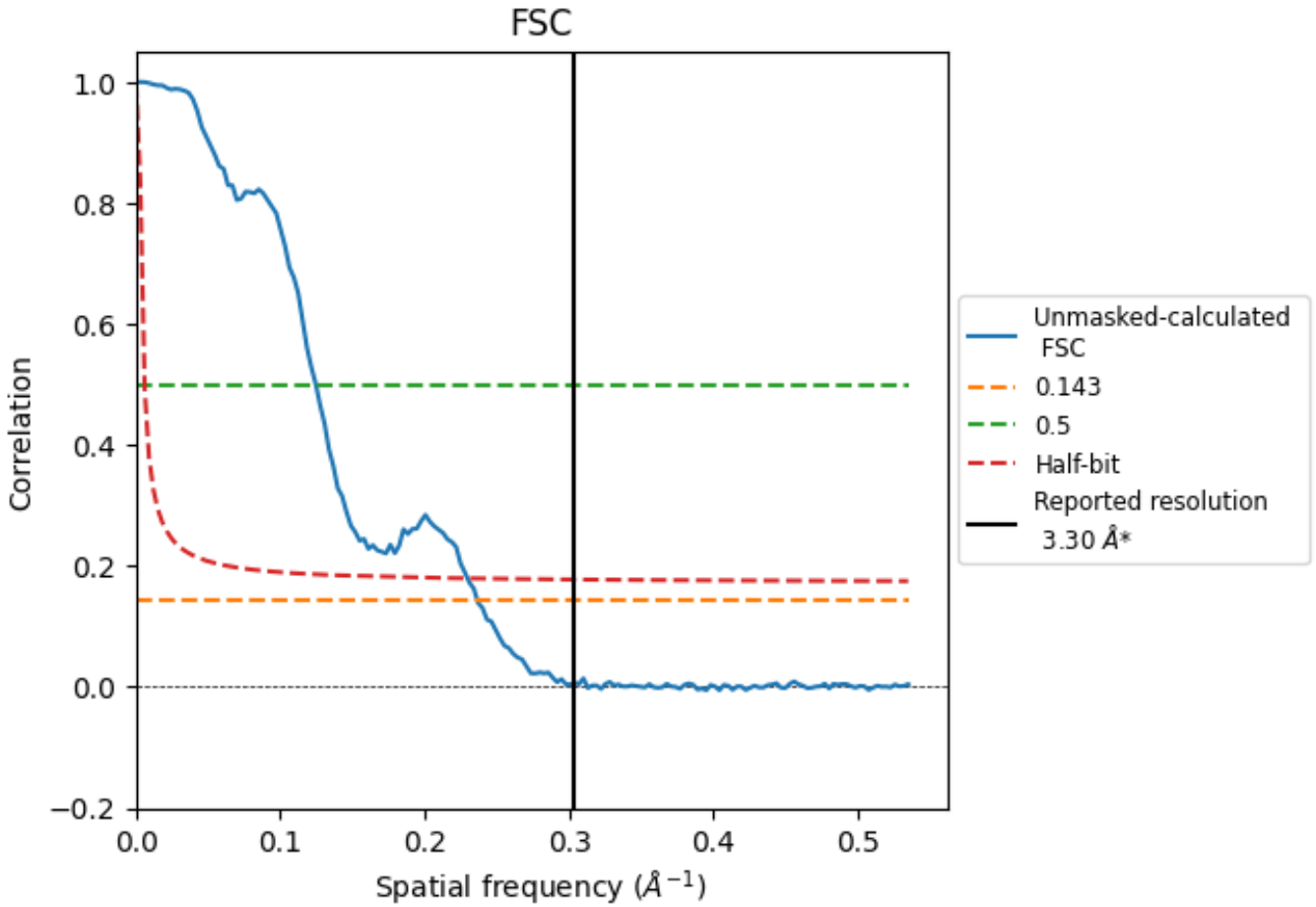


*Reported resolution corresponds to spatial frequency of 0.303 Å^{-1}

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 0.303 Å^{-1}

8.2 Resolution estimates (i)

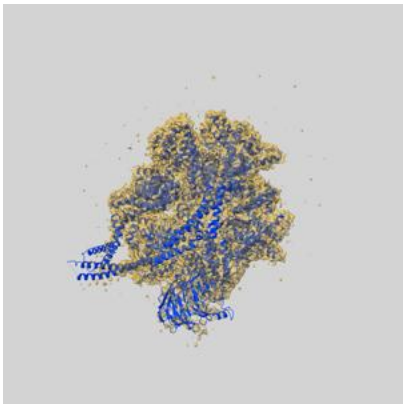
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.23	8.03	4.36

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.23 differs from the reported value 3.3 by more than 10 %

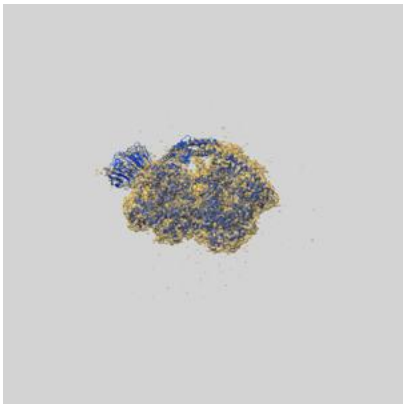
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-47429 and PDB model 9E22. Per-residue inclusion information can be found in section 3 on page 10.

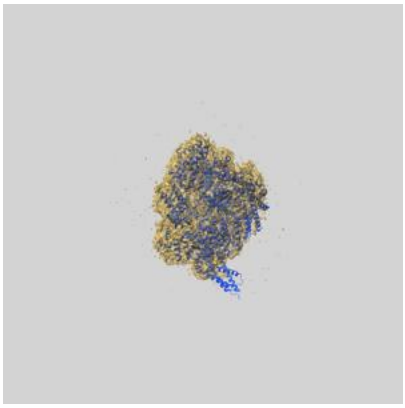
9.1 Map-model overlay



X



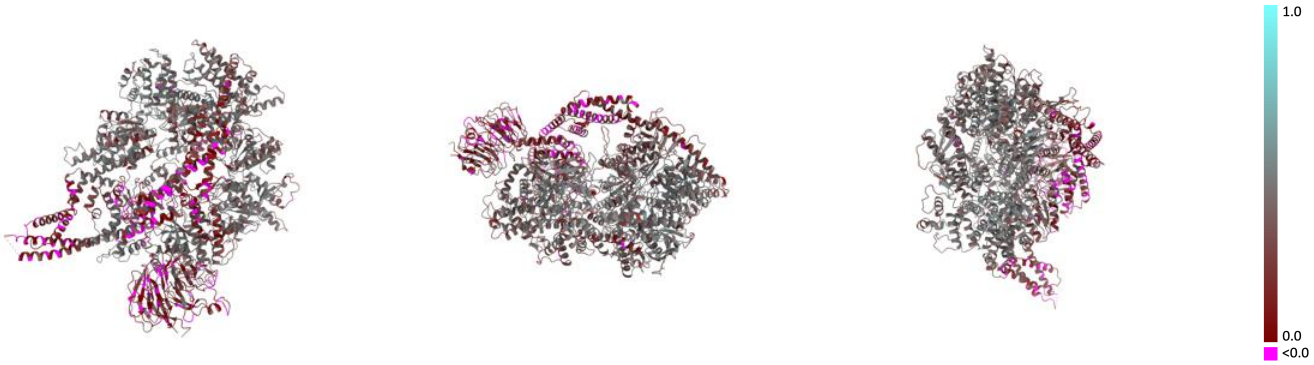
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.084 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.

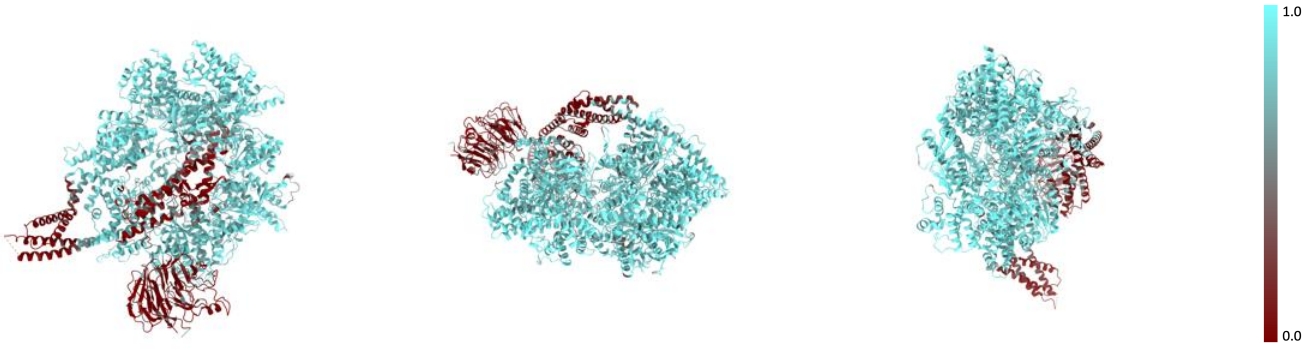
9.2 Q-score mapped to coordinate model (i)



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.

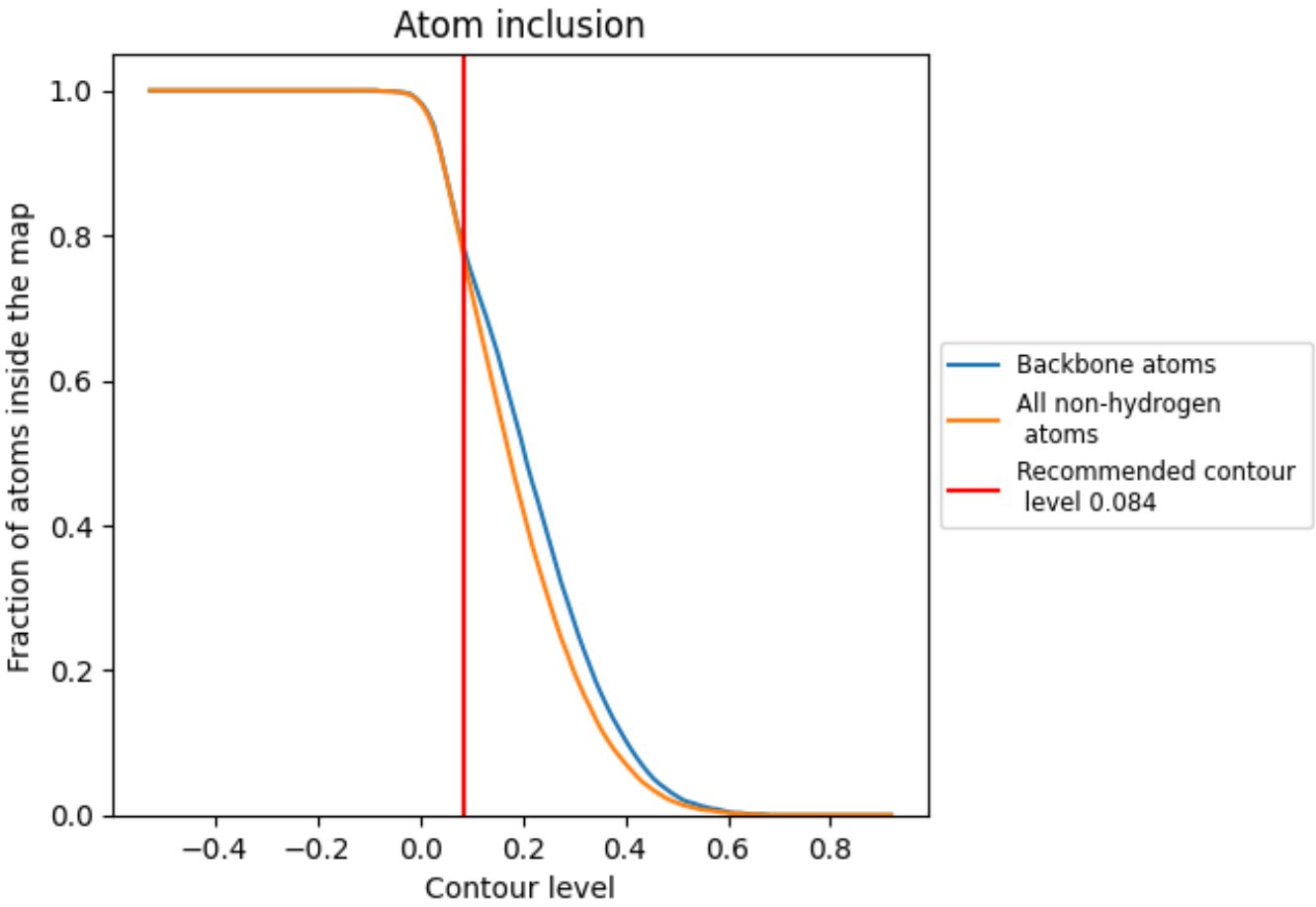
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.084).

9.4 Atom inclusion (i)



At the recommended contour level, 79% of all backbone atoms, 78% 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 (0.084) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7760	0.3650
A	0.8210	0.3770
E	0.1320	0.1830