Full wwPDB EM Validation Report ⓘ

Feb 22, 2025 – 01:10 PM EST

PDB ID	:	9HA7
EMDB ID	:	EMD-51979
Title	:	Pooled 50S subunit C-CP_(L22)- H61 precursor states supplemented with Api137
Authors	:	Lauer, S.; Nikolay, R.; Spahn, C.M.T.
Deposited on	:	2024-11-01
Resolution	:	4.37 Å(reported)

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

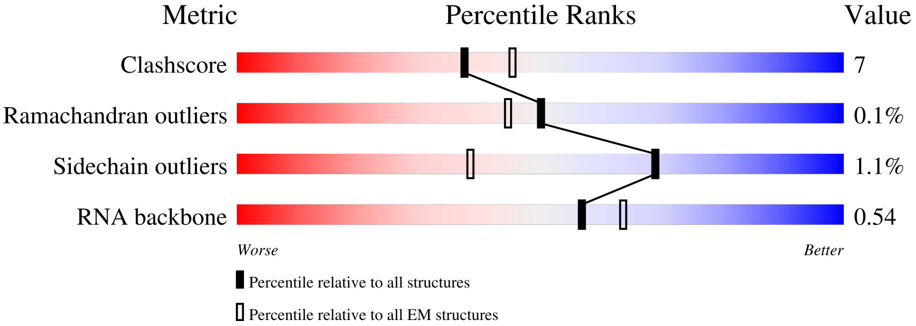
EMDB validation analysis	:	0.0.1.dev117
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.4

1 Overall quality at a glance ⓘ

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

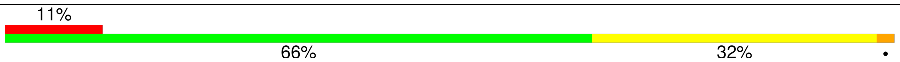
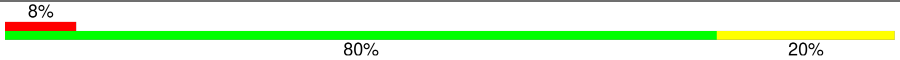
The reported resolution of this entry is 4.37 Å.

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
RNA backbone	6643	2191

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	2	46	
2	B	120	
3	F	177	
4	J	142	
5	L	143	
6	N	120	
7	O	116	

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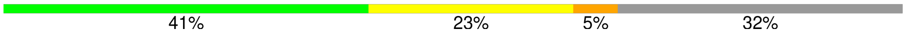
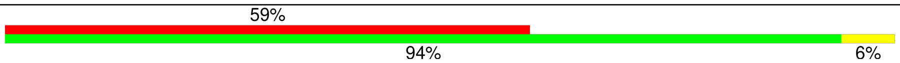
Mol	Chain	Length	Quality of chain
8	Q	117	
9	R	103	
10	T	93	
11	U	102	
12	V	94	
13	W	75	
14	Y	63	
15	Z	58	
16	A	2903	
17	D	209	
18	E	201	
19	y	17	

2 Entry composition (i)

There are 19 unique types of molecules in this entry. The entry contains 59416 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 Large ribosomal subunit protein bL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	2	38	309	185	77	46	1	0	0

- Molecule 2 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	B	120	2572	1145	471	836	120	0	0

- Molecule 3 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	F	177	1410	899	249	256	6	0	0

- Molecule 4 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	J	142	1129	714	212	199	4	0	0

- Molecule 5 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	L	143	1045	649	206	189	1	0	0

- Molecule 6 is a protein called Large ribosomal subunit protein bL17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	N	120	957	592	196	164	5	0	0

- Molecule 7 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms				AltConf	Trace
7	O	116	Total	C	N	O	0	0
			892	552	178	162		

- Molecule 8 is a protein called Large ribosomal subunit protein bL20.

Mol	Chain	Residues	Atoms				AltConf	Trace
8	Q	117	Total	C	N	O	0	0
			947	604	192	151		

- Molecule 9 is a protein called Large ribosomal subunit protein bL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	R	103	Total	C	N	O	S	0	0
			816	516	153	145	2		

- Molecule 10 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	T	93	Total	C	N	O	S	0	0
			738	466	139	131	2		

- Molecule 11 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms				AltConf	Trace
11	U	102	Total	C	N	O	0	0
			779	492	146	141		

- Molecule 12 is a protein called Large ribosomal subunit protein bL25.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	V	94	Total	C	N	O	S	0	0
			753	479	137	134	3		

- Molecule 13 is a protein called Large ribosomal subunit protein bL27.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	W	75	Total	C	N	O	S	0	0
			575	356	116	102	1		

- Molecule 14 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	Y	63	Total 509	C 313	N 99	O 95	S 2	0	0

- Molecule 15 is a protein called Large ribosomal subunit protein uL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	Z	58	Total 449	C 281	N 87	O 79	S 2	0	0

- Molecule 16 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	A	1988	Total 42736	C 19062	N 7924	O 13762	P 1988	0	0

- Molecule 17 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	D	173	Total 1284	C 805	N 231	O 244	S 4	0	0

- Molecule 18 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	E	176	Total 1368	C 862	N 243	O 258	S 5	0	0

- Molecule 19 is a protein called Apidaecins type 22.

Mol	Chain	Residues	Atoms				AltConf	Trace
19	y	17	Total 148	C 94	N 33	O 21	0	0

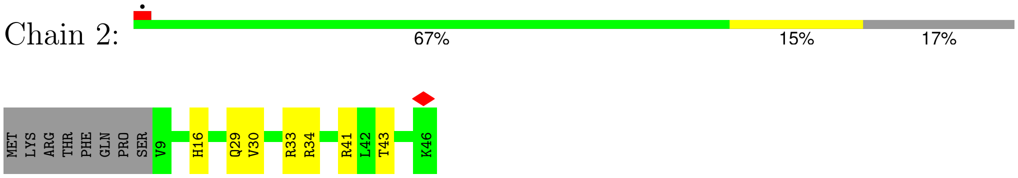
There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
y	10	ARG	GLN	conflict	UNP P35581

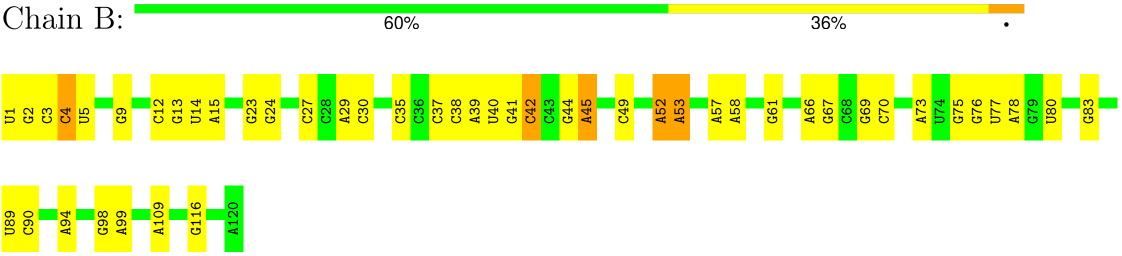
3 Residue-property plots ⓘ

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.

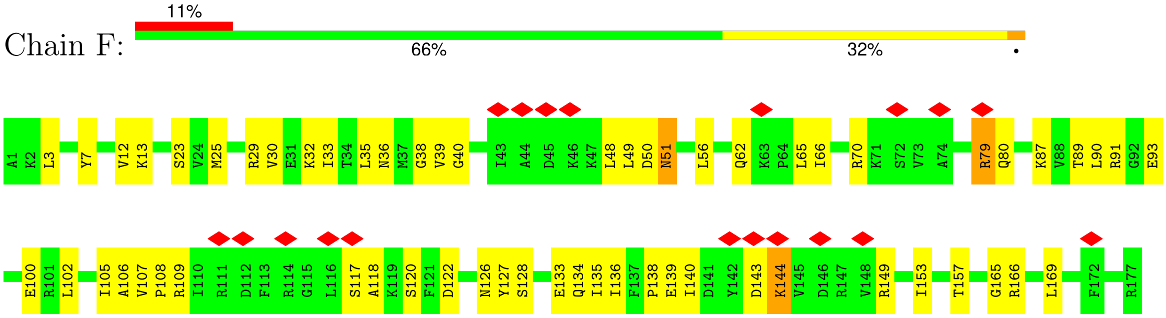
- Molecule 1: Large ribosomal subunit protein bL34



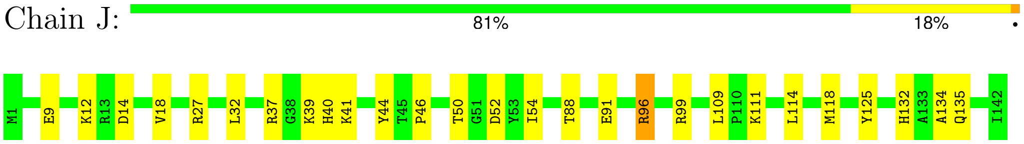
- Molecule 2: 5S ribosomal RNA



- Molecule 3: Large ribosomal subunit protein uL5

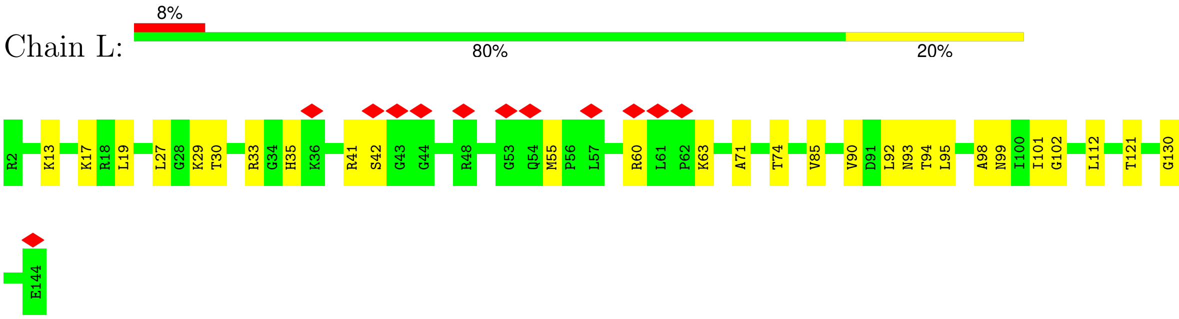


- Molecule 4: Large ribosomal subunit protein uL13



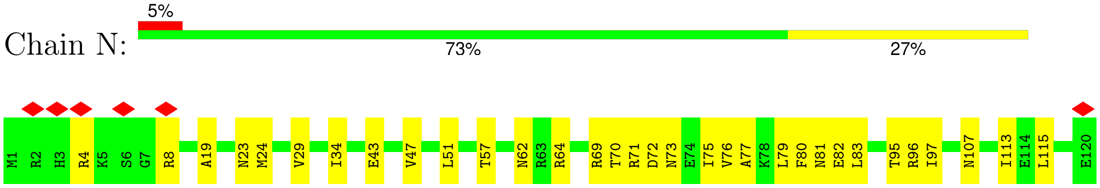
- Molecule 5: Large ribosomal subunit protein uL15

Chain L:



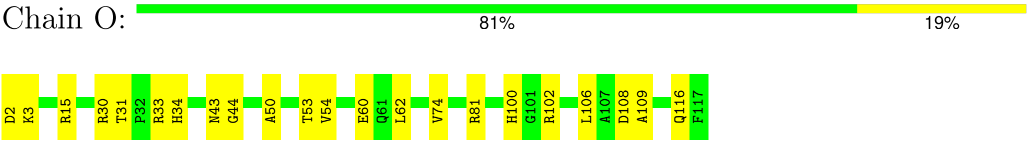
- Molecule 6: Large ribosomal subunit protein bL17

Chain N:



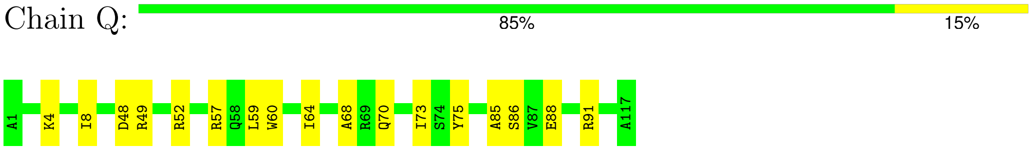
- Molecule 7: Large ribosomal subunit protein uL18

Chain O:



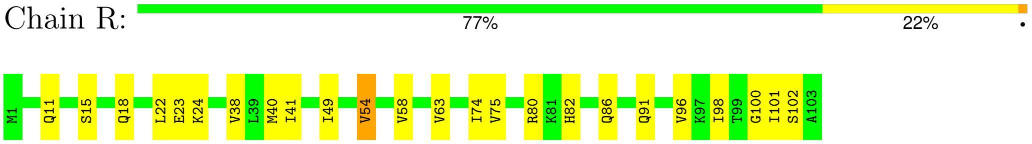
- Molecule 8: Large ribosomal subunit protein bL20

Chain Q:



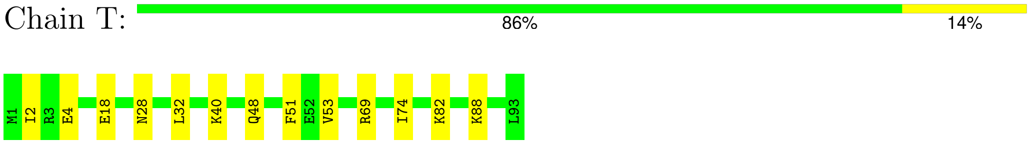
- Molecule 9: Large ribosomal subunit protein bL21

Chain R:



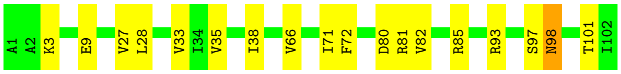
- Molecule 10: Large ribosomal subunit protein uL23

Chain T:



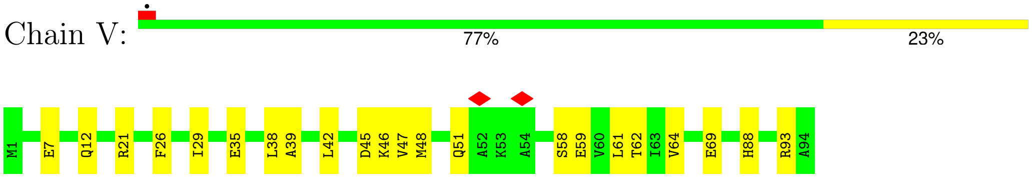
- Molecule 11: Large ribosomal subunit protein uL24

Chain U:



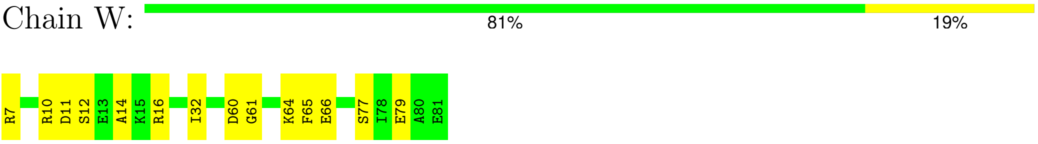
- Molecule 12: Large ribosomal subunit protein bL25

Chain V:



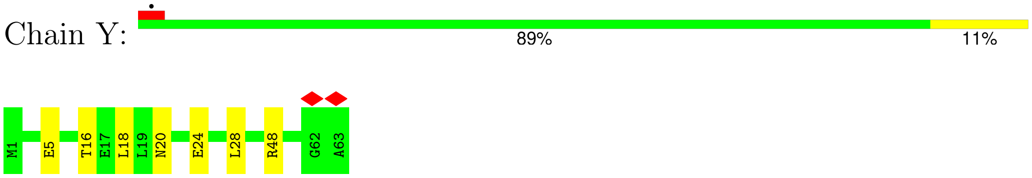
- Molecule 13: Large ribosomal subunit protein bL27

Chain W:



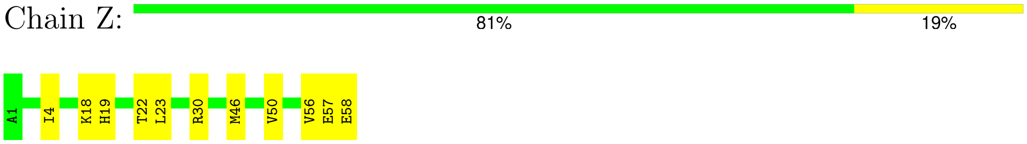
- Molecule 14: Large ribosomal subunit protein uL29

Chain Y:



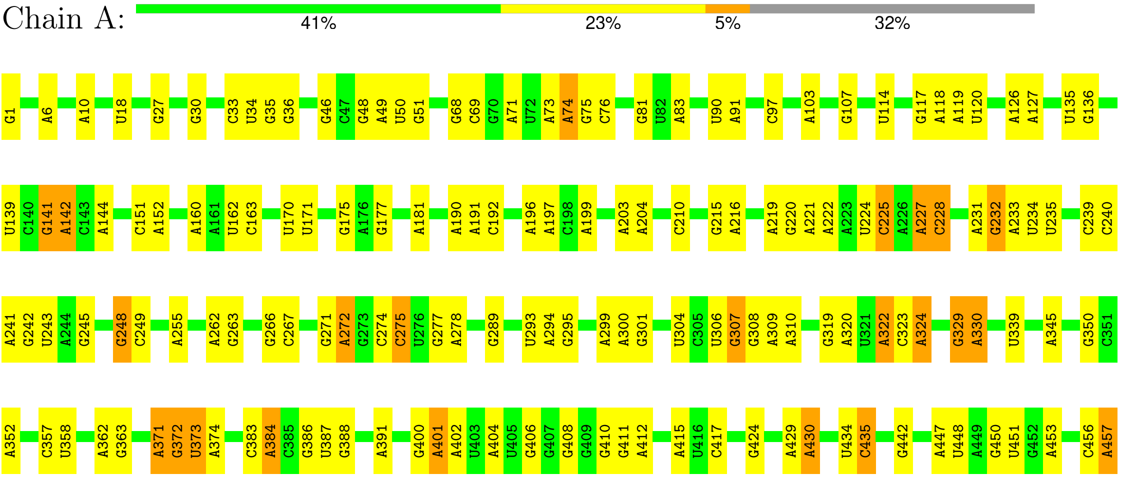
- Molecule 15: Large ribosomal subunit protein uL30

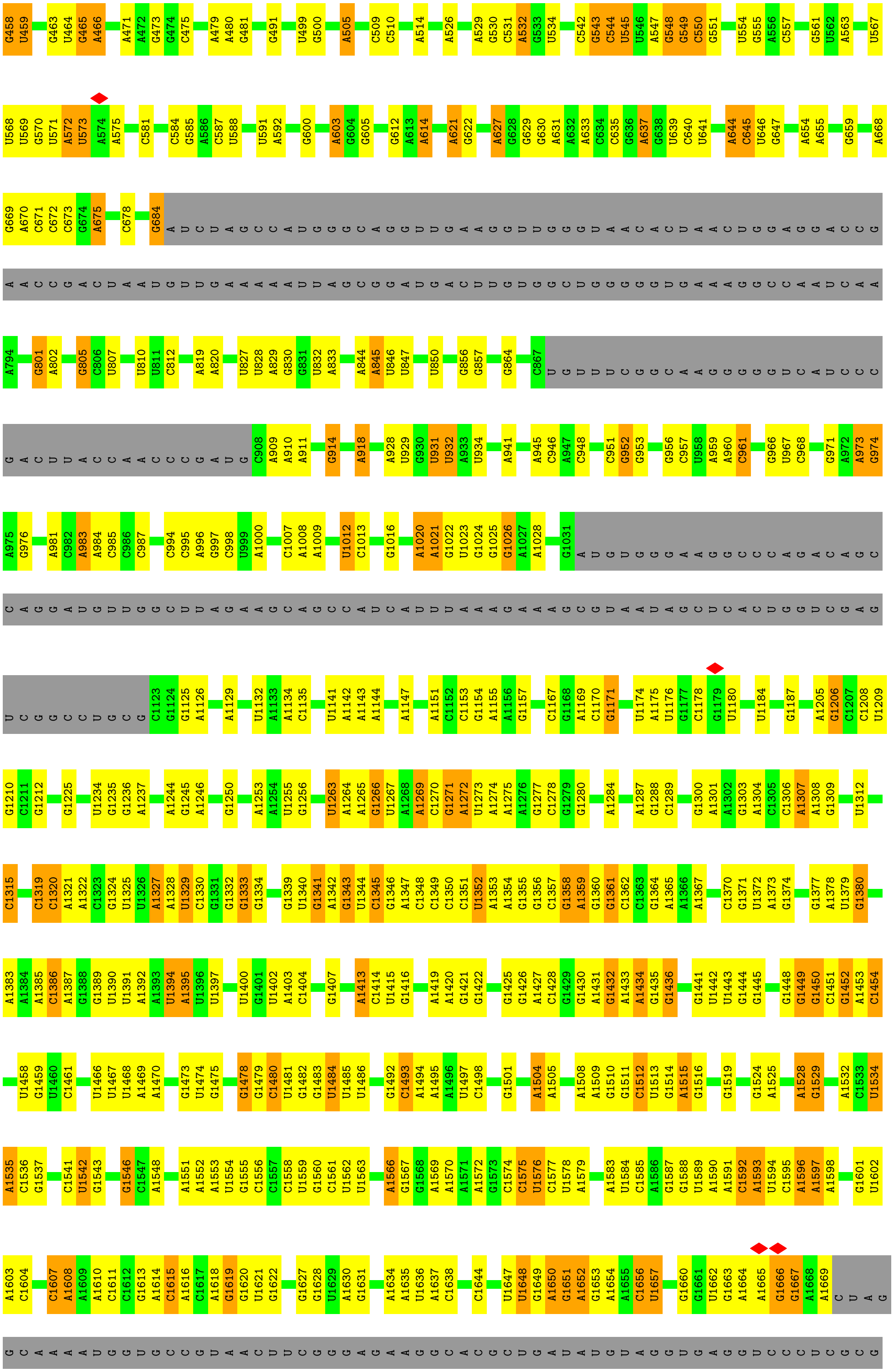
Chain Z:

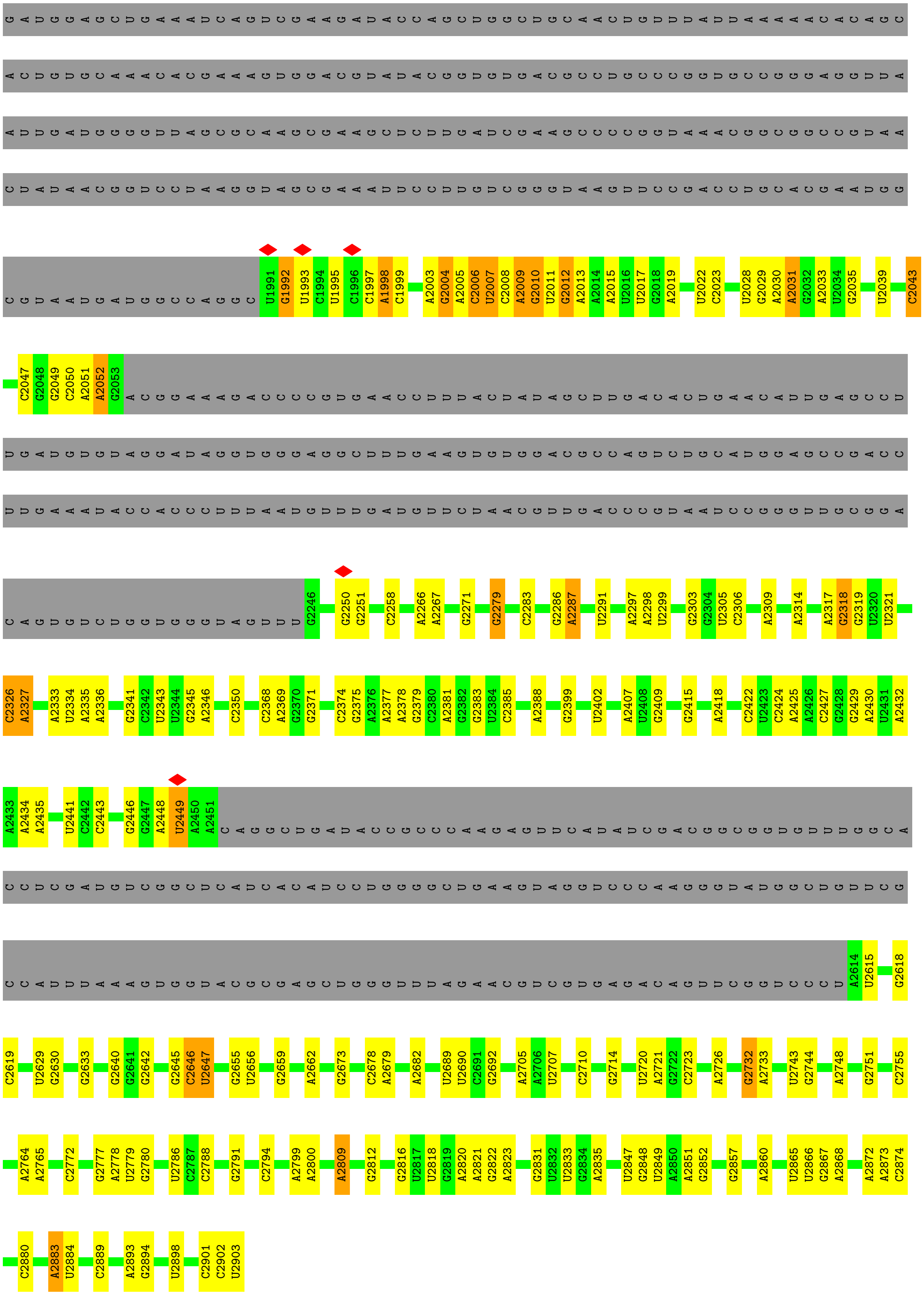


- Molecule 16: 23S ribosomal RNA

Chain A:

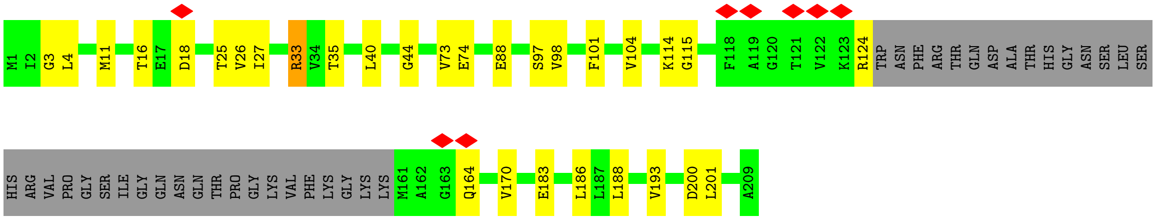



G458 U459 G463 U464 G465 A466 A471 A472 G473 G474 C475 A479 A480 G481 G491 U499 G500 A505 C509 C510 A514 A526 A529 G530 C531 A532 G533 U534 C542 G543 C544 U545 U546 A547 G548 G549 C550 G551 U554 G555 A556 C557 G561 U562 A563 U567
U568 U569 G570 U571 A572 U573 A574 A575 C581 C584 G585 A586 C587 U588 U591 A592 G600 A603 G604 G605 G612 A613 A614 A621 G622 A627 G628 G629 G630 A631 A632 A633 C634 C635 G636 A637 G638 U639 C640 U641 A644 C645 U646 G647 A654 A655 G659 A668
G669 A670 C671 C672 C673 G674 A675 C678 G684 A U C U A G C C A U G G G C A G G U U G A A G G U U G G G U A A C A C U A A C U G G A G G A C C G
A A C C G A C U A A U G U U G A A A A U U A G C G G A U G A C U U G U G G C U G G G G G U G A A A G G C C A A U C A A
A794 G801 A802 G805 C806 U807 U810 U811 C812 A819 A820 U827 U828 A829 G830 G831 U832 A833 A844 A845 U846 U847 U850 G856 G857 G864 C867 U G U U U C G G G C A A G G G G U C A U C C C
G A C U U A C C A A C C C G A U G C908 A909 A910 A911 G914 A918 A928 U929 G930 U931 U932 A933 U934 A941 A945 C946 A947 C948 C951 G952 G953 G956 C957 U958 A959 A960 C961 G966 U967 C968 G971 A972 A973 G974
A975 G976 A981 C982 A983 A984 C985 C986 C987 C994 C995 A996 G997 C998 U999 A1000 C1007 A1008 A1009 U1012 C1013 G1016 A1020 A1021 G1022 U1023 G1024 G1025 G1026 A1027 A1028 G1031 A U G U G G G A A G G C C C A G A C A G C
C A G G A U G U U G G C U U A G A A G C A G C C C A U C A U U U A A A G A A A G C G U A A U A G C U C A C U G G U C G A G
U C G G C C U G C G C1123 G1124 G1125 A1126 A1129 U1132 A1133 A1134 C1135 U1141 A1142 A1143 A1144 A1147 A1151 C1152 C1153 G1154 A1155 A1156 G1157 C1167 G1168 A1169 C1170 G1171 U1174 A1175 U1176 G1177 C1178 G1179 U1180 U1184 G1187 A1205 G1206 C1207 C1208 U1209
G1210 C1211 G1212 G1225 U1234 G1235 G1236 A1237 A1244 G1245 A1246 G1250 A1253 A1254 U1255 G1256 U1263 A1264 A1265 G1266 U1267 A1268 A1269 C1270 G1271 A1272 U1273 A1274 A1275 A1276 G1277 C1278 G1279 G1280 A1284 A1287 G1288 C1289 G1300 A1301 A1302 G1303 A1304 C1305 C1306 A1307 A1308 G1309 U1312
C1315 C1319 C1320 A1321 A1322 C1323 G1324 U1325 U1326 A1327 A1328 U1329 C1330 G1331 G1332 G1333 G1334 G1339 U1340 G1341 A1342 G1343 U1344 C1345 G1346 A1347 C1348 C1349 C1350 C1351 U1352 A1353 A1354 G1355 G1356 C1357 G1358 A1359 G1360 G1361 C1362 C1363 G1364 A1365 A1366 A1367 C1370 G1371 U1372 A1373 G1374 G1377 A1378 U1379 G1380
A1383 A1384 A1385 C1386 A1387 G1388 G1389 U1390 U1391 A1392 A1393 U1394 A1395 U1396 U1397 U1400 G1401 U1402 A1403 C1404 G1407 A1413 C1414 U1415 G1416 A1419 A1420 G1421 G1422 G1425 G1426 A1427 C1428 G1429 G1430 A1431 G1432 A1433 A1434 G1435 G1436 G1441 U1442 U1443 G1444 G1445 G1448 G1449 G1450 C1451 G1452 A1453 C1454
U1458 G1459 U1460 C1461 U1466 U1467 U1468 A1469 A1470 G1473 U1474 G1475 G1478 G1479 C1480 U1481 G1482 G1483 U1484 U1485 U1486 G1492 C1493 A1494 A1495 A1496 U1497 C1498 G1501 A1504 A1505 A1508 A1509 G1510 G1511 C1512 U1513 G1514 A1515 G1516 G1519 G1524 A1525 A1528 G1529 A1532 C1533 U1534
A1535 C1536 G1537 C1541 U1542 G1543 G1546 C1547 A1548 A1551 A1552 A1553 U1554 G1555 C1556 C1557 C1558 U1559 G1560 C1561 U1562 U1563 A1566 G1567 G1568 A1569 A1570 A1571 A1572 G1573 C1574 C1575 U1576 C1577 U1578 A1579 A1583 U1584 C1585 A1586 G1587 G1588 U1589 A1590 A1591 C1592 A1593 U1594 C1595 A1596 A1597 A1598 G1601 U1602
A1603 C1604 C1607 A1608 A1609 A1610 C1611 C1612 G1613 A1614 C1615 A1616 C1617 A1618 G1619 G1620 U1621 G1622 G1627 G1628 U1629 A1630 G1631 A1634 A1635 U1636 A1637 C1638 C1644 U1647 U1648 G1649 A1650 G1651 A1652 G1653 A1654 A1655 C1656 U1657 G1660 G1661 U1662 G1663 A1664 A1665 G1666 G1667 A1668 A1669 C U A G
G C A A A U G G U G G C C G U A A C U U C G G G A G A A G G C A C C G C U G A U A U G U A G G U G A G G U C C C U C G C G



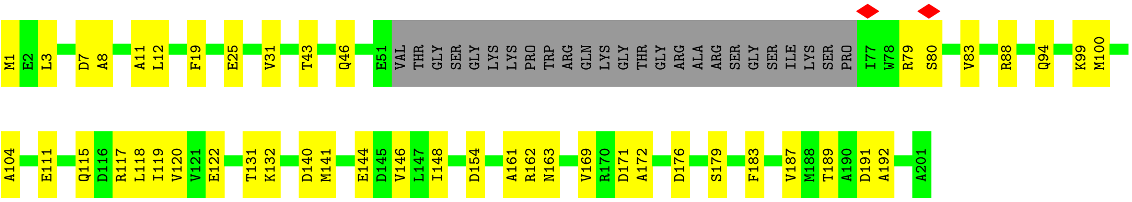
- Molecule 17: 50S ribosomal protein L3

Chain D:



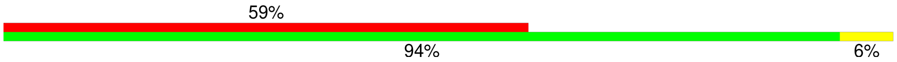
- Molecule 18: Large ribosomal subunit protein uL4

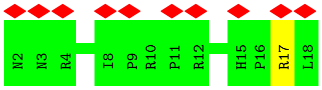
Chain E:



- Molecule 19: Apidaecins type 22

Chain y:





4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	28649	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 ($e^-/\text{Å}^2$)	46.2	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	2.499	Depositor
Minimum map value	-0.761	Depositor
Average map value	-0.012	Depositor
Map value standard deviation	0.142	Depositor
Recommended contour level	0.255	Depositor
Map size (Å)	399.6, 399.6, 399.6	wwPDB
Map dimensions	200, 200, 200	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.998, 1.998, 1.998	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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	2	0.23	0/310	0.65	0/405
2	B	0.24	1/2876 (0.0%)	0.69	0/4483
3	F	0.25	0/1434	0.52	0/1926
4	J	0.24	0/1152	0.49	0/1551
5	L	0.25	0/1054	0.57	0/1403
6	N	0.25	0/970	0.58	0/1297
7	O	0.24	0/902	0.54	0/1209
8	Q	0.24	0/960	0.52	0/1278
9	R	0.25	0/829	0.53	0/1107
10	T	0.24	0/744	0.50	0/994
11	U	0.25	0/787	0.51	0/1051
12	V	0.25	0/766	0.49	0/1025
13	W	0.25	0/582	0.53	0/769
14	Y	0.25	0/510	0.49	0/677
15	Z	0.24	0/453	0.54	0/605
16	A	0.16	1/47875 (0.0%)	0.72	6/74684 (0.0%)
17	D	0.25	0/1296	0.52	0/1742
18	E	0.24	0/1382	0.47	0/1860
19	y	0.48	0/155	0.65	0/212
All	All	0.19	2/65037 (0.0%)	0.68	6/98278 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	A	1	G	OP3-P	-10.70	1.48	1.61
2	B	1	U	OP3-P	-10.57	1.48	1.61

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	A	1541	C	N3-C2-O2	-7.06	116.96	121.90
16	A	1541	C	N1-C2-O2	6.82	122.99	118.90
16	A	1512	C	N3-C2-O2	-5.58	117.99	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	A	363	G	N1-C2-N2	-5.55	111.21	116.20
16	A	1529	G	N3-C4-N9	5.39	129.23	126.00
16	A	1512	C	N1-C2-O2	5.19	122.02	118.90

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	2	309	0	344	5	0
2	B	2572	0	1302	33	0
3	F	1410	0	1447	46	0
4	J	1129	0	1162	22	0
5	L	1045	0	1117	23	0
6	N	957	0	998	22	0
7	O	892	0	923	17	0
8	Q	947	0	1022	16	0
9	R	816	0	839	16	0
10	T	738	0	807	10	0
11	U	779	0	834	14	0
12	V	753	0	780	17	0
13	W	575	0	592	9	0
14	Y	509	0	543	5	0
15	Z	449	0	491	11	0
16	A	42736	0	21494	377	0
17	D	1284	0	1339	24	0
18	E	1368	0	1421	35	0
19	y	148	0	151	0	0
All	All	59416	0	37606	621	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 (621) 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)
16:A:239:C:HO2'	16:A:622:G:HO2'	1.07	0.95
16:A:1007:C:OP2	16:A:1008:A:O2'	1.90	0.88
16:A:1667:G:N2	16:A:1669:A:N6	2.24	0.86
4:J:134:ALA:O	16:A:2898:U:O2'	1.94	0.86
16:A:951:C:N4	16:A:952:G:O6	2.10	0.85
16:A:909:A:O2'	16:A:911:A:OP2	1.95	0.84
16:A:514:A:N3	16:A:581:C:O2'	2.08	0.84
16:A:2865:U:OP2	16:A:2866:U:O2'	1.95	0.84
16:A:542:C:N4	16:A:543:G:O6	2.11	0.83
16:A:1492:G:OP2	16:A:1493:C:O2'	1.96	0.83
16:A:2642:G:N2	16:A:2772:C:O2	2.11	0.83
16:A:1315:C:O2'	16:A:1392:A:N3	2.11	0.82
16:A:1378:A:O2'	16:A:1380:G:N7	2.12	0.82
16:A:83:A:O2'	16:A:103:A:N6	2.11	0.82
16:A:571:U:O2'	16:A:573:U:OP2	1.98	0.82
16:A:126:A:O2'	16:A:127:A:O4'	1.96	0.82
16:A:1287:A:N1	16:A:1648:U:O2'	2.11	0.82
16:A:1414:C:O2'	16:A:1415:U:O4'	1.98	0.81
18:E:46:GLN:O	18:E:88:ARG:NH2	2.13	0.81
2:B:39:A:O2'	2:B:40:U:O4'	1.99	0.81
3:F:109:ARG:NH2	3:F:136:ILE:O	2.14	0.81
16:A:675:A:N3	16:A:2443:C:O2'	2.13	0.81
16:A:177:G:OP2	16:A:177:G:N2	2.13	0.80
16:A:2049:G:N2	16:A:2619:C:O2	2.13	0.80
3:F:38:GLY:O	16:A:2306:C:N4	2.15	0.80
7:O:50:ALA:O	7:O:81:ARG:NH1	2.15	0.80
16:A:1667:G:H21	16:A:1669:A:N6	1.77	0.80
16:A:548:G:O2'	16:A:549:G:O4'	1.98	0.79
16:A:2743:U:OP2	16:A:2755:C:N4	2.15	0.79
2:B:14:U:OP2	2:B:70:C:O2'	2.01	0.79
16:A:1604:C:O2'	16:A:1610:A:N1	2.13	0.79
3:F:87:LYS:NZ	16:A:2314:A:OP1	2.16	0.79
2:B:5:U:OP1	2:B:61:G:O2'	2.00	0.79
16:A:1667:G:N2	16:A:1669:A:H62	1.80	0.78
12:V:58:SER:OG	12:V:59:GLU:OE1	2.01	0.78
16:A:2678:C:OP1	17:D:124:ARG:NH2	2.16	0.78
16:A:463:G:N2	16:A:466:A:OP2	2.16	0.78
3:F:70:ARG:NH1	16:A:2298:A:OP1	2.16	0.78
11:U:3:LYS:O	11:U:93:ARG:NH1	2.16	0.77
5:L:41:ARG:NH2	16:A:807:U:OP2	2.18	0.77
16:A:2050:C:O2	16:A:2618:G:N2	2.16	0.77
16:A:532:A:N1	16:A:2035:G:N2	2.33	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:A:966:G:O4'	16:A:2267:A:N6	2.18	0.77
16:A:2326:C:O2'	16:A:2327:A:OP1	2.02	0.77
16:A:234:U:O4	16:A:263:G:N2	2.19	0.76
16:A:2645:G:OP2	16:A:2645:G:N2	2.17	0.76
16:A:2816:G:N3	16:A:2883:A:O2'	2.18	0.76
6:N:77:ALA:O	6:N:81:ASN:ND2	2.18	0.76
16:A:569:U:OP1	16:A:945:A:O2'	2.03	0.76
16:A:629:G:N3	16:A:639:U:O2'	2.19	0.76
16:A:2646:C:OP2	16:A:2732:G:O2'	2.02	0.76
3:F:133:GLU:OE1	3:F:133:GLU:N	2.19	0.76
16:A:1466:U:HO2'	16:A:1546:G:HO2'	1.00	0.76
16:A:227:A:O2'	16:A:228:C:O5'	2.02	0.76
3:F:120:SER:OG	3:F:128:SER:O	2.03	0.76
16:A:2788:C:O2'	16:A:2809:A:N3	2.17	0.75
16:A:117:G:OP2	16:A:119:A:O2'	2.03	0.75
16:A:805:G:N2	16:A:829:A:OP1	2.20	0.75
16:A:2009:A:O2'	16:A:2010:G:O4'	2.01	0.75
15:Z:18:LYS:NZ	16:A:850:U:OP1	2.19	0.74
16:A:2258:C:O2'	16:A:2427:C:OP2	2.05	0.74
2:B:75:G:O2'	12:V:88:HIS:NE2	2.20	0.74
16:A:1322:A:N1	16:A:1333:G:O2'	2.20	0.74
16:A:570:G:O2'	16:A:983:A:N1	2.20	0.74
17:D:16:THR:OG1	17:D:18:ASP:OD1	2.03	0.74
16:A:220:G:O2'	16:A:233:A:O2'	2.05	0.74
1:2:16:HIS:NE2	16:A:464:U:O2	2.21	0.72
16:A:192:C:O2'	16:A:802:A:N3	2.20	0.72
16:A:1359:A:OP2	16:A:1371:G:N2	2.21	0.72
16:A:322:A:OP1	18:E:162:ARG:NE	2.21	0.72
16:A:1024:G:OP2	16:A:1025:G:O2'	2.03	0.71
16:A:239:C:O2'	16:A:622:G:O2'	1.96	0.71
16:A:1588:G:O2'	16:A:1589:U:O4'	2.05	0.71
6:N:95:THR:HB	6:N:113:ILE:HD11	1.72	0.71
16:A:18:U:O2'	16:A:554:U:OP1	2.07	0.71
5:L:55:MET:O	5:L:60:ARG:NH1	2.23	0.70
4:J:88:THR:OG1	4:J:91:GLU:OE1	2.09	0.70
16:A:931:U:O2	16:A:1167:C:O2'	2.09	0.70
16:A:1272:A:N6	16:A:1619:G:OP2	2.24	0.70
16:A:48:G:N2	16:A:177:G:OP1	2.22	0.70
18:E:122:GLU:N	18:E:122:GLU:OE1	2.25	0.70
9:R:80:ARG:NH1	16:A:572:A:OP2	2.25	0.70
3:F:117:SER:O	3:F:127:TYR:OH	2.10	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:J:46:PRO:HD3	8:Q:59:LEU:HD11	1.73	0.69
14:Y:48:ARG:NH1	16:A:76:C:OP1	2.25	0.69
12:V:48:MET:SD	12:V:51:GLN:NE2	2.64	0.69
16:A:550:C:N4	16:A:551:G:O6	2.25	0.69
16:A:2043:C:OP1	16:A:2777:G:O2'	2.07	0.69
5:L:95:LEU:HD23	5:L:101:ILE:HD13	1.75	0.69
15:Z:4:ILE:HD11	15:Z:56:VAL:CG2	2.22	0.69
16:A:464:U:O4	16:A:684:G:O2'	2.11	0.69
16:A:372:G:O2'	16:A:373:U:O5'	2.12	0.68
16:A:961:C:O2	16:A:2031:A:N6	2.26	0.68
16:A:1319:C:O2'	16:A:1320:C:OP1	2.12	0.68
16:A:1125:G:OP2	16:A:1126:A:O2'	2.08	0.68
1:2:29:GLN:NE2	16:A:210:C:OP1	2.26	0.68
12:V:64:VAL:HG22	12:V:69:GLU:OE1	1.93	0.68
12:V:45:ASP:OD1	12:V:46:LYS:N	2.28	0.67
7:O:60:GLU:OE1	7:O:60:GLU:N	2.26	0.67
16:A:612:G:N2	16:A:614:A:O2'	2.27	0.67
16:A:475:C:O2	16:A:479:A:N6	2.27	0.67
16:A:224:U:OP2	16:A:408:G:N2	2.27	0.67
16:A:1341:G:OP1	16:A:1602:U:O2'	2.10	0.67
16:A:1638:C:OP1	16:A:2710:C:O2'	2.13	0.67
3:F:89:THR:OG1	3:F:91:ARG:NH2	2.27	0.67
10:T:48:GLN:NE2	10:T:53:VAL:O	2.27	0.67
10:T:40:LYS:NZ	16:A:1343:G:OP1	2.28	0.67
15:Z:30:ARG:NH2	16:A:1184:U:OP2	2.28	0.67
16:A:248:G:O2'	16:A:2432:A:OP1	2.09	0.66
2:B:9:G:OP2	7:O:15:ARG:NH2	2.28	0.66
16:A:1651:G:O5'	16:A:2006:C:N4	2.29	0.66
16:A:659:G:O3'	18:E:94:GLN:NE2	2.27	0.66
16:A:1415:U:O2	16:A:1587:G:N2	2.28	0.66
2:B:42:C:H5	3:F:65:LEU:HD13	1.61	0.66
16:A:627:A:O4'	16:A:637:A:N6	2.29	0.66
5:L:93:ASN:O	5:L:94:THR:OG1	2.09	0.66
16:A:453:A:N3	16:A:457:A:O2'	2.28	0.66
16:A:227:A:HO2'	16:A:228:C:P	2.19	0.66
2:B:37:C:O2	7:O:100:HIS:NE2	2.28	0.65
7:O:2:ASP:OD1	7:O:3:LYS:N	2.29	0.65
16:A:605:G:OP1	18:E:99:LYS:NZ	2.29	0.65
9:R:23:GLU:OE2	9:R:91:GLN:NE2	2.29	0.65
16:A:631:A:N3	16:A:2415:G:O2'	2.27	0.65
16:A:191:A:O2'	16:A:678:C:O2	2.13	0.65

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Atom-1	**Atom-2**	**Interatomic distance (Å)**	**Clash overlap (Å)**
16:A:2751:G:N2	16:A:2751:G:OP1	2.26	0.65
16:A:1390:U:O2	16:A:1395:A:N7	2.30	0.65
3:F:23:SER:OG	3:F:25:MET:SD	2.54	0.64
8:Q:52:ARG:NH2	16:A:994:C:OP1	2.30	0.64
3:F:50:ASP:OD1	3:F:51:ASN:N	2.30	0.64
5:L:13:LYS:NZ	16:A:1245:G:OP1	2.29	0.64
16:A:1209:U:O2'	16:A:1237:A:N1	2.25	0.64
8:Q:88:GLU:N	8:Q:88:GLU:OE1	2.31	0.64
16:A:1650:A:O2'	16:A:1652:A:OP1	2.14	0.64
16:A:2822:G:OP1	17:D:164:GLN:NE2	2.30	0.64
6:N:64:ARG:NH1	16:A:2851:A:O2'	2.31	0.64
6:N:8:ARG:N	6:N:43:GLU:OE2	2.29	0.64
16:A:1024:G:O2'	16:A:1144:A:O2'	2.16	0.64
16:A:1413:A:O2'	16:A:1414:C:O4'	2.14	0.64
4:J:91:GLU:OE1	4:J:91:GLU:N	2.31	0.63
6:N:24:MET:SD	16:A:1277:G:O2'	2.56	0.63
16:A:2291:U:O2'	16:A:2374:C:O2	2.16	0.63
16:A:2659:G:N2	16:A:2662:A:OP2	2.31	0.63
4:J:109:LEU:HD13	4:J:118:MET:HG3	1.81	0.63
11:U:81:ARG:NH2	16:A:301:G:OP2	2.32	0.63
15:Z:4:ILE:HD11	15:Z:56:VAL:HG23	1.81	0.63
16:A:2633:G:N2	16:A:2786:U:O2	2.32	0.62
16:A:1422:G:O2'	16:A:1492:G:N2	2.32	0.62
16:A:569:U:O2'	16:A:971:G:N2	2.31	0.62
11:U:9:GLU:OE1	11:U:9:GLU:N	2.33	0.62
16:A:1270:C:O2	16:A:2010:G:N1	2.32	0.62
18:E:111:GLU:OE2	18:E:115:GLN:NE2	2.32	0.62
5:L:27:LEU:HD23	5:L:27:LEU:H	1.65	0.62
16:A:1651:G:N2	16:A:2006:C:OP2	2.31	0.62
16:A:448:U:O4'	18:E:79:ARG:NE	2.31	0.61
2:B:77:U:OP1	12:V:21:ARG:NH1	2.32	0.61
16:A:844:A:N1	16:A:845:A:N6	2.48	0.61
8:Q:4:LYS:NZ	16:A:30:G:OP2	2.27	0.61
16:A:97:C:O2	16:A:103:A:O2'	2.17	0.61
17:D:26:VAL:CG1	17:D:186:LEU:HD12	2.30	0.61
4:J:39:LYS:NZ	16:A:1007:C:OP1	2.31	0.61
16:A:1026:G:OP2	16:A:1134:A:O2'	2.10	0.61
1:2:34:ARG:NH2	1:2:41:ARG:O	2.34	0.61
16:A:612:G:N2	16:A:614:A:HO2'	1.98	0.61
16:A:2446:G:N2	16:A:2449:U:O2	2.30	0.60
11:U:80:ASP:OD1	11:U:81:ARG:N	2.33	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:A:69:C:O2	16:A:73:A:O2'	2.18	0.60
17:D:33:ARG:HG3	17:D:73:VAL:HG13	1.83	0.60
3:F:35:LEU:HG	3:F:56:LEU:HD11	1.82	0.60
18:E:117:ARG:NH2	18:E:183:PHE:O	2.35	0.60
16:A:372:G:HO2'	16:A:373:U:P	2.24	0.60
2:B:27:C:OP1	7:O:34:HIS:NE2	2.34	0.60
6:N:107:ASN:ND2	16:A:1652:A:OP2	2.34	0.60
9:R:58:VAL:N	9:R:102:SER:OG	2.35	0.60
16:A:68:G:N2	16:A:74:A:O4'	2.35	0.60
16:A:1534:U:O2'	16:A:1535:A:OP1	2.20	0.60
16:A:442:G:N2	18:E:43:THR:O	2.33	0.60
17:D:25:THR:HG21	17:D:193:VAL:HG22	1.83	0.60
16:A:644:A:O2'	16:A:645:C:O5'	2.20	0.59
3:F:133:GLU:HG2	3:F:135:ILE:HG22	1.84	0.59
5:L:63:LYS:NZ	16:A:249:C:O2'	2.24	0.59
8:Q:57:ARG:NH2	16:A:998:C:OP2	2.36	0.59
16:A:2399:G:O6	16:A:2418:A:N6	2.35	0.59
16:A:152:A:N6	16:A:175:G:O6	2.36	0.59
16:A:2341:G:N2	16:A:2374:C:O3'	2.35	0.59
10:T:82:LYS:NZ	16:A:1339:G:OP1	2.36	0.59
3:F:93:GLU:OE1	3:F:93:GLU:N	2.35	0.59
4:J:135:GLN:N	4:J:135:GLN:OE1	2.36	0.59
16:A:1271:G:N2	16:A:1615:C:H42	2.01	0.58
18:E:46:GLN:N	18:E:46:GLN:OE1	2.36	0.58
5:L:33:ARG:NH2	16:A:587:C:O2	2.36	0.58
7:O:116:GLN:N	7:O:116:GLN:OE1	2.36	0.58
5:L:99:ASN:ND2	16:A:621:A:OP2	2.37	0.58
16:A:1651:G:H22	16:A:2006:C:P	2.26	0.58
6:N:96:ARG:O	6:N:113:ILE:HD12	2.04	0.58
3:F:134:GLN:N	3:F:134:GLN:OE1	2.36	0.58
16:A:2375:G:O2'	16:A:2377:A:N6	2.37	0.58
17:D:88:GLU:N	17:D:88:GLU:OE1	2.37	0.58
16:A:1451:C:O2'	16:A:1452:G:O4'	2.17	0.58
10:T:28:ASN:ND2	10:T:88:LYS:O	2.37	0.58
16:A:548:G:O2'	16:A:549:G:O5'	2.21	0.58
16:A:603:A:N6	16:A:655:A:O4'	2.37	0.57
16:A:1589:U:O4	16:A:1590:A:N6	2.37	0.57
16:A:2050:C:N3	16:A:2618:G:N1	2.45	0.57
6:N:82:GLU:HG2	6:N:83:LEU:HD22	1.86	0.57
16:A:224:U:O4	16:A:232:G:N2	2.36	0.57
16:A:324:A:N6	16:A:339:U:O4'	2.37	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:W:10:ARG:NH2	16:A:2279:G:N7	2.52	0.57
16:A:2007:U:O2'	16:A:2009:A:OP2	2.17	0.57
16:A:526:A:O2'	16:A:2043:C:O2	2.22	0.57
18:E:176:ASP:OD1	18:E:179:SER:OG	2.15	0.57
16:A:2049:G:N1	16:A:2619:C:N3	2.44	0.56
5:L:19:LEU:HD23	5:L:27:LEU:HD12	1.87	0.56
16:A:371:A:N6	16:A:402:A:OP2	2.38	0.56
16:A:2326:C:HO2'	16:A:2327:A:P	2.27	0.56
2:B:80:U:O2'	16:A:918:A:N3	2.36	0.56
16:A:2692:G:N3	16:A:2847:U:O2'	2.34	0.56
2:B:75:G:HO2'	12:V:88:HIS:CD2	2.22	0.56
5:L:93:ASN:OD1	5:L:94:THR:N	2.38	0.56
16:A:1271:G:H22	16:A:1615:C:N4	2.04	0.56
16:A:987:C:O2'	16:A:1000:A:N3	2.34	0.56
16:A:2375:G:N2	16:A:2378:A:OP2	2.38	0.56
18:E:171:ASP:OD1	18:E:172:ALA:N	2.39	0.56
1:2:43:THR:OG1	16:A:126:A:N6	2.39	0.56
16:A:864:G:O2'	16:A:914:G:O6	2.23	0.56
3:F:30:VAL:HG22	3:F:157:THR:HG22	1.88	0.55
2:B:38:C:O4'	7:O:100:HIS:NE2	2.39	0.55
16:A:1515:A:O2'	16:A:1556:C:O2	2.23	0.55
17:D:3:GLY:C	17:D:4:LEU:HD12	2.27	0.55
2:B:42:C:C5	3:F:65:LEU:HD13	2.41	0.55
7:O:31:THR:OG1	7:O:33:ARG:O	2.22	0.55
18:E:144:GLU:N	18:E:144:GLU:OE1	2.40	0.55
16:A:673:C:P	16:A:801:G:H21	2.29	0.55
18:E:1:MET:SD	18:E:1:MET:N	2.79	0.55
3:F:62:GLN:OE1	3:F:62:GLN:N	2.40	0.55
16:A:644:A:O2'	16:A:645:C:O4'	2.23	0.54
3:F:134:GLN:NE2	3:F:149:ARG:O	2.40	0.54
2:B:76:G:OP2	12:V:12:GLN:NE2	2.39	0.54
16:A:271:G:O2'	16:A:272:A:OP2	2.22	0.54
16:A:976:G:HO2'	16:A:1155:A:HO2'	1.55	0.54
4:J:37:ARG:NH1	4:J:44:TYR:OH	2.41	0.53
16:A:1432:G:H2'	16:A:1433:A:C8	2.43	0.53
4:J:96:ARG:NH1	16:A:2640:G:OP1	2.42	0.53
16:A:549:G:HO2'	16:A:550:C:P	2.31	0.53
16:A:1414:C:HO2'	16:A:1415:U:C4'	2.20	0.53
8:Q:48:ASP:OD1	8:Q:49:ARG:N	2.42	0.53
16:A:549:G:O2'	16:A:550:C:OP1	2.26	0.53
18:E:189:THR:OG1	18:E:191:ASP:OD1	2.18	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:15:A:OP2	2:B:69:G:N2	2.37	0.53
5:L:30:THR:HG22	16:A:810:U:O4	2.08	0.53
16:A:659:G:O2'	18:E:94:GLN:NE2	2.42	0.53
16:A:1319:C:HO2'	16:A:1320:C:P	2.30	0.53
8:Q:48:ASP:OD2	16:A:534:U:O2'	2.17	0.53
13:W:14:ALA:O	13:W:16:ARG:NH1	2.39	0.53
16:A:289:G:O6	16:A:352:A:N6	2.42	0.53
13:W:7:ARG:O	13:W:10:ARG:NH1	2.42	0.53
3:F:143:ASP:OD1	3:F:144:LYS:N	2.42	0.52
16:A:308:G:O2'	16:A:329:G:N2	2.43	0.52
16:A:1596:A:H2'	16:A:1597:A:H5'	1.92	0.52
16:A:2857:G:N2	16:A:2860:A:OP2	2.36	0.52
14:Y:16:THR:O	14:Y:20:ASN:ND2	2.41	0.52
16:A:2345:G:O2'	16:A:2381:A:N3	2.38	0.52
16:A:2821:A:OP2	17:D:115:GLY:N	2.40	0.52
16:A:532:A:OP1	16:A:561:G:N2	2.33	0.52
9:R:15:SER:OG	9:R:18:GLN:NE2	2.43	0.52
16:A:1352:U:O2'	16:A:1570:A:N3	2.39	0.52
2:B:52:A:O2'	2:B:53:A:O5'	2.27	0.52
16:A:2017:U:O2'	16:A:2019:A:OP2	2.10	0.52
4:J:114:LEU:HD12	4:J:114:LEU:H	1.75	0.52
4:J:41:LYS:NZ	4:J:52:ASP:OD1	2.25	0.51
11:U:71:ILE:HD12	11:U:82:VAL:HG21	1.91	0.51
16:A:1244:A:N6	16:A:1245:G:O6	2.44	0.51
16:A:1656:C:N4	16:A:1657:U:O4	2.43	0.51
3:F:35:LEU:HD12	3:F:36:ASN:N	2.26	0.51
10:T:32:LEU:HD12	10:T:32:LEU:O	2.10	0.51
16:A:1021:A:N6	16:A:1142:A:H61	2.08	0.51
16:A:1271:G:H22	16:A:1615:C:H42	1.56	0.51
16:A:1358:G:O2'	16:A:1359:A:O5'	2.25	0.51
9:R:49:ILE:HG21	9:R:54:VAL:HG12	1.92	0.51
16:A:373:U:O4	16:A:401:A:N7	2.44	0.51
16:A:584:C:N4	16:A:585:G:O6	2.43	0.51
2:B:75:G:HO2'	12:V:88:HIS:CE1	2.27	0.51
9:R:38:VAL:O	9:R:54:VAL:HG13	2.11	0.51
16:A:274:C:H2'	16:A:275:C:C1'	2.39	0.51
16:A:673:C:OP1	16:A:801:G:N2	2.39	0.51
16:A:1402:U:O2'	16:A:1470:A:N1	2.29	0.51
16:A:2299:U:O4	16:A:2318:G:N2	2.44	0.51
16:A:2317:A:H2'	16:A:2318:G:O4'	2.11	0.51
16:A:2705:A:O2'	16:A:2852:G:OP1	2.25	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:J:40:HIS:O	8:Q:70:GLN:NE2	2.43	0.51
6:N:4:ARG:NH2	16:A:2874:C:OP1	2.43	0.51
4:J:27:ARG:NH1	16:A:1012:U:O2	2.44	0.51
9:R:100:GLY:O	9:R:101:ILE:HD13	2.11	0.51
12:V:29:ILE:HD12	12:V:38:LEU:O	2.11	0.51
7:O:53:THR:HG23	7:O:74:VAL:CG2	2.40	0.51
12:V:26:PHE:HZ	12:V:47:VAL:HG11	1.76	0.51
16:A:1303:G:O6	16:A:1304:A:N6	2.44	0.51
18:E:140:ASP:OD1	18:E:141:MET:N	2.43	0.51
16:A:1329:U:OP2	16:A:1330:C:N4	2.42	0.51
2:B:52:A:O2’	2:B:53:A:P	2.68	0.50
16:A:68:G:N2	16:A:74:A:O5’	2.44	0.50
3:F:120:SER:OG	16:A:2303:G:O2’	2.29	0.50
6:N:73:ASN:OD1	16:A:1454:C:N4	2.43	0.50
17:D:200:ASP:C	17:D:201:LEU:HD12	2.30	0.50
6:N:69:ARG:O	6:N:70:THR:OG1	2.19	0.50
6:N:71:ARG:NH1	16:A:2707:U:O2	2.44	0.50
16:A:1016:G:O6	16:A:1147:A:N6	2.44	0.50
16:A:299:A:N3	16:A:319:G:O2’	2.25	0.50
16:A:1020:A:H4’	16:A:1021:A:O5’	2.12	0.50
10:T:51:PHE:O	10:T:53:VAL:HG13	2.11	0.50
4:J:135:GLN:NE2	16:A:6:A:N3	2.60	0.50
16:A:1205:A:O2’	16:A:1206:G:OP1	2.29	0.50
16:A:1413:A:H2’	16:A:1414:C:C6	2.47	0.50
16:A:1992:G:N1	16:A:1995:U:O4	2.45	0.50
16:A:591:U:O4	16:A:592:A:N6	2.43	0.50
16:A:640:C:N4	16:A:641:U:O4	2.45	0.50
16:A:2723:C:OP1	17:D:114:LYS:NZ	2.28	0.50
18:E:25:GLU:OE1	18:E:25:GLU:N	2.40	0.50
6:N:57:THR:HG23	6:N:62:ASN:ND2	2.27	0.49
12:V:35:GLU:N	12:V:35:GLU:OE1	2.45	0.49
11:U:33:VAL:HG13	11:U:66:VAL:HG22	1.93	0.49
15:Z:57:GLU:N	15:Z:57:GLU:OE1	2.44	0.49
18:E:148:ILE:HB	18:E:169:VAL:HG22	1.93	0.49
16:A:245:G:O2’	16:A:384:A:N1	2.42	0.49
10:T:18:GLU:OE1	10:T:18:GLU:N	2.41	0.49
16:A:434:U:O2	16:A:435:C:N4	2.41	0.49
2:B:49:C:OP2	7:O:30:ARG:NH1	2.46	0.49
3:F:32:LYS:C	3:F:33:ILE:HD12	2.33	0.49
10:T:2:ILE:HD11	16:A:144:A:H4’	1.93	0.49
16:A:554:U:H2’	16:A:555:G:O4’	2.13	0.49

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Atom-1	**Atom-2**	**Interatomic distance (Å)**	**Clash overlap (Å)**
16:A:231:A:H2'	16:A:232:G:O4'	2.12	0.49
17:D:40:LEU:HD13	17:D:44:GLY:O	2.12	0.49
18:E:3:LEU:HD13	18:E:120:VAL:HG21	1.94	0.49
16:A:307:G:N1	16:A:309:A:O5'	2.46	0.49
16:A:549:G:O2'	16:A:550:C:P	2.70	0.49
16:A:948:C:O2	16:A:984:A:O2'	2.07	0.49
16:A:1512:C:H2'	16:A:1513:U:N1	2.27	0.49
16:A:141:G:N2	16:A:142:A:N3	2.60	0.49
16:A:2647:U:O2	16:A:2673:G:O6	2.31	0.49
2:B:42:C:C5	3:F:65:LEU:HD22	2.48	0.49
16:A:1028:A:OP2	16:A:1126:A:N6	2.44	0.49
3:F:3:LEU:HD22	3:F:100:GLU:HG2	1.93	0.49
9:R:63:VAL:HA	9:R:96:VAL:HG12	1.95	0.49
15:Z:4:ILE:HD12	15:Z:58:GLU:OE2	2.13	0.49
16:A:90:U:OP2	16:A:91:A:O2'	2.27	0.49
5:L:112:LEU:HD22	5:L:130:GLY:HA3	1.94	0.48
11:U:81:ARG:NH2	16:A:300:A:O5'	2.46	0.48
16:A:1170:C:N4	16:A:1171:G:O6	2.47	0.48
2:B:42:C:N3	3:F:89:THR:HG22	2.28	0.48
8:Q:57:ARG:NH1	16:A:997:G:OP2	2.45	0.48
12:V:62:THR:OG1	12:V:69:GLU:OE2	2.19	0.48
16:A:1386:C:H2'	16:A:1387:A:C8	2.47	0.48
2:B:3:C:H3'	2:B:4:C:H5"	1.94	0.48
6:N:97:ILE:CD1	6:N:113:ILE:HD13	2.43	0.48
16:A:1441:G:H2'	16:A:1442:U:C6	2.48	0.48
12:V:7:GLU:N	12:V:7:GLU:OE1	2.47	0.48
16:A:391:A:O2'	16:A:410:G:OP1	2.32	0.48
16:A:1266:G:N2	16:A:2012:G:O2'	2.47	0.48
16:A:1608:A:N7	16:A:1621:U:O2	2.46	0.48
16:A:330:A:N7	16:A:1210:G:O2'	2.42	0.48
2:B:78:A:H62	2:B:98:G:H21	1.61	0.48
16:A:956:G:O2'	16:A:960:A:N6	2.47	0.48
16:A:1448:G:H2'	16:A:1449:G:O4'	2.14	0.48
18:E:161:ALA:CB	18:E:169:VAL:HG23	2.43	0.48
18:E:191:ASP:OD1	18:E:192:ALA:N	2.46	0.48
16:A:1324:G:O2'	16:A:1328:A:N6	2.46	0.48
4:J:125:TYR:HH	4:J:132:HIS:HE2	1.61	0.47
16:A:1266:G:N2	16:A:2012:G:HO2'	2.12	0.47
16:A:1588:G:H2'	16:A:1589:U:C6	2.49	0.47
17:D:33:ARG:NH2	17:D:74:GLU:OE1	2.48	0.47
18:E:7:ASP:OD1	18:E:8:ALA:N	2.46	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:102:LEU:HD12	3:F:106:ALA:CB	2.45	0.47
6:N:19:ALA:O	6:N:23:ASN:ND2	2.42	0.47
16:A:320:A:N7	18:E:132:LYS:NZ	2.59	0.47
16:A:415:A:N6	16:A:2409:G:O6	2.48	0.47
16:A:1434:A:H2’	16:A:1435:G:C8	2.49	0.47
16:A:1449:G:H3’	16:A:1450:G:O4’	2.15	0.47
7:O:43:ASN:OD1	7:O:44:GLY:N	2.47	0.47
15:Z:22:THR:HG22	16:A:850:U:O2’	2.14	0.47
16:A:1435:G:H2’	16:A:1436:G:C8	2.49	0.47
16:A:1466:U:O2’	16:A:1546:G:O2’	1.93	0.47
16:A:1386:C:H2’	16:A:1387:A:H8	1.79	0.47
2:B:39:A:H2’	2:B:40:U:C6	2.49	0.47
8:Q:85:ALA:O	8:Q:86:SER:OG	2.25	0.47
12:V:61:LEU:HD12	12:V:61:LEU:N	2.30	0.47
16:A:36:G:N3	16:A:450:G:O2’	2.48	0.47
16:A:573:U:O4	16:A:2029:G:O2’	2.20	0.47
16:A:107:G:O3’	16:A:293:U:O2’	2.26	0.47
18:E:31:VAL:HG21	18:E:104:ALA:HB2	1.96	0.47
5:L:85:VAL:HG13	5:L:98:ALA:HB2	1.97	0.47
17:D:26:VAL:HG12	17:D:186:LEU:HD12	1.97	0.47
9:R:11:GLN:N	9:R:11:GLN:OE1	2.48	0.47
15:Z:18:LYS:O	15:Z:22:THR:HG23	2.14	0.47
4:J:50:THR:O	4:J:50:THR:HG22	2.15	0.46
5:L:35:HIS:NE2	16:A:567:U:OP1	2.48	0.46
12:V:38:LEU:HD23	12:V:39:ALA:N	2.30	0.46
16:A:357:C:C2	16:A:358:U:C5	3.03	0.46
16:A:2375:G:N1	16:A:2379:G:O6	2.48	0.46
6:N:72:ASP:O	6:N:76:VAL:HG23	2.14	0.46
16:A:203:A:OP2	16:A:204:A:O2’	2.14	0.46
16:A:1510:G:H2’	16:A:1511:G:C8	2.50	0.46
16:A:224:U:H2’	16:A:225:C:O4’	2.15	0.46
16:A:1551:A:H2’	16:A:1552:A:O4’	2.16	0.46
10:T:69:ARG:HG2	10:T:74:ILE:HG22	1.97	0.46
3:F:139:GLU:OE1	3:F:139:GLU:N	2.45	0.46
6:N:34:ILE:HD11	16:A:1278:C:O3’	2.16	0.46
16:A:600:G:H1’	18:E:100:MET:HE3	1.97	0.46
16:A:974:G:OP1	16:A:1187:G:O2’	2.18	0.46
16:A:1524:G:H2’	16:A:1525:A:C8	2.51	0.46
13:W:32:ILE:N	13:W:32:ILE:HD12	2.30	0.46
16:A:451:U:C4	16:A:453:A:C8	3.03	0.46
16:A:1345:C:N4	16:A:1346:G:O6	2.48	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:35:LEU:HD13	3:F:153:ILE:HD13	1.97	0.46
13:W:79:GLU:OE1	13:W:79:GLU:N	2.49	0.46
15:Z:4:ILE:HD11	15:Z:56:VAL:HG21	1.95	0.46
16:A:932:U:O2'	16:A:934:U:O4	2.28	0.46
16:A:1000:A:OP2	16:A:1154:G:N1	2.43	0.46
16:A:1263:U:H2'	16:A:1264:A:N9	2.31	0.46
16:A:1360:G:C8	16:A:1361:G:C8	3.04	0.46
16:A:2047:C:O2'	16:A:2823:A:N1	2.46	0.46
9:R:58:VAL:H	9:R:102:SER:HG	1.61	0.46
2:B:116:G:H4'	7:O:54:VAL:HG12	1.97	0.45
15:Z:19:HIS:O	15:Z:23:LEU:HD23	2.15	0.45
16:A:549:G:C2'	16:A:550:C:O5'	2.64	0.45
16:A:1344:U:H3'	16:A:1345:C:H5'	1.98	0.45
5:L:17:LYS:CE	5:L:27:LEU:HD13	2.46	0.45
16:A:1269:A:H2'	16:A:1270:C:O4'	2.16	0.45
17:D:183:GLU:OE1	17:D:183:GLU:N	2.43	0.45
2:B:29:A:O2'	2:B:58:A:N1	2.49	0.45
6:N:79:LEU:HD13	6:N:83:LEU:HB2	1.99	0.45
8:Q:75:TYR:OH	8:Q:91:ARG:NH1	2.48	0.45
13:W:60:ASP:OD1	13:W:61:GLY:N	2.49	0.45
16:A:81:G:O2'	16:A:295:G:O2'	2.33	0.45
17:D:27:ILE:N	17:D:27:ILE:HD12	2.31	0.45
16:A:543:G:O6	16:A:551:G:O6	2.34	0.45
18:E:79:ARG:O	18:E:80:SER:OG	2.32	0.45
16:A:299:A:N6	16:A:322:A:O2'	2.46	0.45
16:A:1413:A:C2'	16:A:1414:C:O4'	2.65	0.45
16:A:219:A:N3	16:A:234:U:O2'	2.50	0.45
3:F:33:ILE:O	3:F:90:LEU:HD23	2.17	0.45
4:J:114:LEU:HD11	16:A:557:C:O2'	2.17	0.45
16:A:500:G:O2'	16:A:505:A:N6	2.50	0.45
16:A:307:G:H22	16:A:309:A:H3'	1.82	0.45
16:A:1351:C:H2'	16:A:1352:U:O4'	2.16	0.45
16:A:1601:G:H2'	16:A:1602:U:O4'	2.17	0.45
16:A:2679:A:H5'	17:D:170:VAL:HG21	1.98	0.45
2:B:2:G:H2'	2:B:3:C:C6	2.52	0.44
2:B:23:G:O2'	2:B:24:G:O4'	2.35	0.44
7:O:106:LEU:HD23	7:O:106:LEU:O	2.17	0.44
16:A:543:G:H2'	16:A:544:C:C6	2.52	0.44
16:A:1309:G:N2	16:A:1611:C:O4'	2.43	0.44
16:A:1484:U:H2'	16:A:1485:U:O4'	2.16	0.44
18:E:146:VAL:HG21	18:E:187:VAL:HG13	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:39:VAL:HG11	3:F:149:ARG:HH21	1.82	0.44
3:F:48:LEU:HD12	3:F:49:LEU:N	2.32	0.44
16:A:1542:U:H2'	16:A:1543:G:C8	2.53	0.44
16:A:320:A:H2'	18:E:131:THR:HG21	1.99	0.44
16:A:1443:U:C2	16:A:1444:G:C8	3.05	0.44
13:W:11:ASP:OD1	13:W:12:SER:N	2.51	0.44
16:A:548:G:C2'	16:A:549:G:O4'	2.65	0.44
16:A:820:A:OP2	16:A:973:A:N6	2.42	0.44
16:A:1307:A:H2'	16:A:1308:A:O4'	2.17	0.44
16:A:1342:A:O2'	16:A:1345:C:N4	2.50	0.44
16:A:1349:C:C2	16:A:1350:C:C5	3.05	0.44
16:A:1478:G:H2'	16:A:1479:G:C1'	2.48	0.44
18:E:176:ASP:OD1	18:E:176:ASP:N	2.50	0.44
16:A:49:A:N1	16:A:177:G:N2	2.66	0.44
16:A:374:A:N6	16:A:400:G:O2'	2.51	0.44
16:A:151:C:N4	16:A:152:A:H62	2.16	0.44
16:A:471:A:OP1	18:E:79:ARG:NH1	2.47	0.44
6:N:115:LEU:HD12	6:N:115:LEU:H	1.83	0.44
7:O:31:THR:O	7:O:102:ARG:NH2	2.49	0.44
9:R:40:MET:SD	9:R:41:ILE:N	2.91	0.44
16:A:383:C:N3	16:A:391:A:N6	2.64	0.44
3:F:118:ALA:O	3:F:166:ARG:NH1	2.48	0.44
4:J:32:LEU:HD23	4:J:54:ILE:HD13	2.00	0.44
5:L:90:VAL:N	5:L:121:THR:O	2.46	0.44
8:Q:68:ALA:HB1	8:Q:73:ILE:HG23	1.99	0.44
16:A:262:A:N3	16:A:430:A:O2'	2.41	0.44
16:A:966:G:H4'	16:A:2271:G:H22	1.83	0.44
9:R:74:ILE:N	9:R:74:ILE:HD12	2.31	0.43
16:A:630:G:N2	16:A:633:A:OP2	2.43	0.43
1:2:30:VAL:HG22	1:2:33:ARG:NH2	2.34	0.43
2:B:30:C:H1'	2:B:57:A:H61	1.83	0.43
11:U:27:VAL:HG12	11:U:33:VAL:HG12	2.00	0.43
17:D:188:LEU:HD12	17:D:188:LEU:N	2.33	0.43
2:B:77:U:O2	2:B:99:A:N7	2.51	0.43
16:A:240:C:OP2	16:A:241:A:O2'	2.20	0.43
5:L:42:SER:OG	16:A:672:C:OP2	2.32	0.43
9:R:98:ILE:HG21	9:R:101:ILE:HD11	2.00	0.43
17:D:26:VAL:C	17:D:27:ILE:HD12	2.38	0.43
4:J:9:GLU:OE1	4:J:9:GLU:N	2.46	0.43
16:A:549:G:H2'	16:A:550:C:O4'	2.18	0.43
16:A:1346:G:H2'	16:A:1347:A:O4'	2.17	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:A:1348:C:C2	16:A:1349:C:C6	3.07	0.43
16:A:1425:G:H2'	16:A:1426:G:O4'	2.18	0.43
16:A:2321:U:O2	16:A:2321:U:H2'	2.19	0.43
17:D:97:SER:OG	17:D:98:VAL:N	2.52	0.43
18:E:118:LEU:HD23	18:E:119:ILE:N	2.33	0.43
3:F:66:ILE:N	3:F:66:ILE:HD12	2.33	0.43
6:N:29:VAL:HG11	6:N:75:ILE:HG23	2.00	0.43
16:A:235:U:O4	16:A:263:G:N2	2.52	0.43
16:A:1205:A:HO2'	16:A:1206:G:P	2.42	0.43
16:A:1494:A:N3	16:A:1494:A:H2'	2.34	0.43
6:N:47:VAL:O	6:N:51:LEU:HD23	2.19	0.43
8:Q:8:ILE:HD12	8:Q:8:ILE:H	1.84	0.43
16:A:545:U:O4	16:A:548:G:O6	2.36	0.43
16:A:1566:A:H2'	16:A:1566:A:N3	2.34	0.43
16:A:2009:A:C2'	16:A:2010:G:O4'	2.66	0.43
11:U:97:SER:O	11:U:98:ASN:OD1	2.36	0.43
16:A:1414:C:O2'	16:A:1415:U:C4'	2.67	0.43
14:Y:5:GLU:OE1	14:Y:5:GLU:N	2.47	0.43
16:A:33:C:O2	16:A:447:A:N6	2.51	0.43
16:A:2004:G:H2'	16:A:2005:A:O4'	2.18	0.43
17:D:101:PHE:HA	17:D:104:VAL:HG12	2.01	0.43
3:F:39:VAL:HG23	3:F:40:GLY:N	2.34	0.42
4:J:111:LYS:NZ	16:A:2039:U:OP1	2.37	0.42
16:A:465:G:H21	16:A:684:G:H1'	1.84	0.42
18:E:11:ALA:C	18:E:12:LEU:HD22	2.39	0.42
4:J:12:LYS:NZ	4:J:14:ASP:OD1	2.50	0.42
6:N:79:LEU:O	6:N:80:PHE:HB2	2.19	0.42
16:A:544:C:H2'	16:A:545:U:C2	2.53	0.42
16:A:2051:A:N3	16:A:2052:A:N6	2.67	0.42
5:L:29:LYS:O	5:L:30:THR:OG1	2.30	0.42
16:A:1141:U:H4'	16:A:1142:A:O4'	2.20	0.42
16:A:1245:G:H2'	16:A:1246:A:C8	2.55	0.42
16:A:1319:C:O2'	16:A:1320:C:P	2.77	0.42
16:A:1364:G:O2'	16:A:1367:A:N6	2.53	0.42
16:A:1591:A:H2'	16:A:1592:C:O4'	2.18	0.42
5:L:92:LEU:O	5:L:92:LEU:HD23	2.20	0.42
16:A:170:U:C2	16:A:171:U:C5	3.07	0.42
16:A:832:U:O2	16:A:833:A:C8	2.73	0.42
16:A:1576:U:H2'	16:A:1577:C:C6	2.55	0.42
16:A:2287:A:N6	16:A:2346:A:N7	2.68	0.42
3:F:165:GLY:O	3:F:169:LEU:HD13	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:A:2028:U:O4	16:A:2033:A:N7	2.52	0.42
5:L:71:ALA:HA	5:L:74:THR:HG22	2.01	0.42
12:V:35:GLU:OE2	12:V:93:ARG:NH1	2.53	0.42
13:W:66:GLU:N	13:W:66:GLU:OE1	2.52	0.42
14:Y:24:GLU:O	14:Y:28:LEU:HD12	2.20	0.42
16:A:1370:C:H2'	16:A:1371:G:O4'	2.20	0.42
16:A:1430:G:C4	16:A:1431:A:C8	3.08	0.42
16:A:2399:G:C6	16:A:2418:A:C6	3.08	0.42
2:B:73:A:N3	2:B:73:A:H2'	2.35	0.42
9:R:75:VAL:HG22	9:R:86:GLN:OE1	2.19	0.42
11:U:98:ASN:O	11:U:98:ASN:CG	2.58	0.42
16:A:1208:C:H2'	16:A:1209:U:O4'	2.19	0.42
16:A:1357:C:H2'	16:A:1358:G:O4'	2.20	0.42
17:D:33:ARG:CG	17:D:73:VAL:HG13	2.48	0.42
18:E:31:VAL:HG21	18:E:104:ALA:CB	2.48	0.42
16:A:1021:A:H61	16:A:1142:A:H61	1.68	0.42
16:A:1389:G:H2'	16:A:1390:U:O4'	2.20	0.42
16:A:1480:C:H2'	16:A:1481:U:O4'	2.19	0.42
16:A:1998:A:H2'	16:A:1999:C:C6	2.55	0.42
3:F:122:ASP:OD2	3:F:126:ASN:ND2	2.44	0.41
10:T:4:GLU:CD	14:Y:18:LEU:HD13	2.41	0.41
16:A:1504:A:N1	16:A:1505:A:N6	2.67	0.41
16:A:2831:G:N2	16:A:2884:U:OP2	2.53	0.41
8:Q:8:ILE:HD12	8:Q:8:ILE:N	2.35	0.41
3:F:48:LEU:O	3:F:51:ASN:ND2	2.53	0.41
7:O:108:ASP:OD1	7:O:109:ALA:N	2.54	0.41
8:Q:60:TRP:O	8:Q:64:ILE:HG12	2.20	0.41
13:W:64:LYS:N	13:W:77:SER:O	2.48	0.41
16:A:2345:G:O6	16:A:2371:G:O6	2.39	0.41
5:L:17:LYS:HE3	5:L:27:LEU:HD13	2.03	0.41
8:Q:91:ARG:NH1	16:A:1153:C:OP1	2.47	0.41
15:Z:46:MET:O	15:Z:50:VAL:HG22	2.20	0.41
16:A:1327:A:H2'	16:A:1328:A:O4'	2.21	0.41
16:A:1385:A:H1'	16:A:1386:C:C6	2.55	0.41
16:A:1561:C:H2'	16:A:1562:U:O4'	2.20	0.41
16:A:2720:U:C2	16:A:2721:A:C8	3.09	0.41
3:F:107:VAL:N	3:F:108:PRO:CD	2.84	0.41
16:A:1595:C:H2'	16:A:1596:A:O4'	2.20	0.41
16:A:2848:G:O2'	16:A:2868:A:N6	2.46	0.41
9:R:23:GLU:OE1	9:R:24:LYS:N	2.50	0.41
16:A:1346:G:N1	16:A:1601:G:C6	2.88	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:A:1353:A:N7	16:A:1377:G:N2	2.68	0.41
16:A:1414:C:C2'	16:A:1415:U:O4'	2.68	0.41
3:F:12:VAL:HG13	3:F:13:LYS:N	2.36	0.41
3:F:33:ILE:HD12	3:F:33:ILE:N	2.36	0.41
9:R:82:HIS:ND1	9:R:82:HIS:O	2.53	0.41
16:A:967:U:H2'	16:A:968:C:C6	2.56	0.41
16:A:1234:U:H2'	16:A:1235:G:O4'	2.21	0.41
16:A:1593:A:H2'	16:A:1594:U:O4'	2.21	0.41
3:F:65:LEU:HD23	3:F:65:LEU:H	1.86	0.41
11:U:85:ARG:NH2	11:U:101:THR:OG1	2.54	0.41
16:A:306:U:H2'	16:A:307:G:O4'	2.20	0.41
16:A:1358:G:N1	16:A:1372:U:OP2	2.45	0.41
16:A:1451:C:C2'	16:A:1452:G:OP2	2.69	0.41
16:A:1528:A:OP2	16:A:1543:G:N2	2.41	0.41
4:J:18:VAL:CG2	4:J:54:ILE:HD11	2.51	0.41
11:U:35:VAL:HG23	11:U:38:ILE:HB	2.02	0.41
16:A:1425:G:N2	16:A:1574:C:N4	2.69	0.41
16:A:1607:C:O4'	16:A:1621:U:N3	2.53	0.41
16:A:1630:A:H2'	16:A:1631:G:O4'	2.20	0.41
16:A:1665:A:C2'	16:A:1666:G:O5'	2.69	0.41
2:B:83:G:O6	2:B:94:A:N6	2.53	0.41
3:F:79:ARG:NH1	3:F:80:GLN:O	2.54	0.41
16:A:1351:C:H1'	16:A:1572:A:H1'	2.03	0.41
16:A:2368:C:O2	16:A:2369:A:C8	2.74	0.41
3:F:105:ILE:HD12	3:F:138:PRO:HG2	2.03	0.40
7:O:62:LEU:HD22	7:O:62:LEU:N	2.36	0.40
11:U:9:GLU:O	11:U:72:PHE:N	2.46	0.40
11:U:28:LEU:HD22	11:U:28:LEU:N	2.36	0.40
16:A:1354:A:H62	16:A:1377:G:H21	1.68	0.40
17:D:25:THR:HG21	17:D:193:VAL:CG2	2.50	0.40
16:A:1513:U:H2'	16:A:1514:G:O4'	2.22	0.40
16:A:2812:G:N2	16:A:2889:C:C2	2.89	0.40
2:B:45:A:O4'	3:F:91:ARG:NH1	2.55	0.40
18:E:154:ASP:OD1	18:E:154:ASP:N	2.48	0.40
3:F:140:ILE:N	3:F:140:ILE:HD12	2.36	0.40
16:A:635:C:O2'	16:A:639:U:OP1	2.40	0.40
16:A:928:A:H2'	16:A:929:U:C6	2.56	0.40
16:A:1347:A:C5	16:A:1348:C:C6	3.09	0.40
17:D:35:THR:HG22	17:D:73:VAL:HG11	2.04	0.40
5:L:101:ILE:HG13	5:L:102:GLY:N	2.37	0.40
16:A:458:G:C2'	16:A:459:U:OP2	2.70	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
16:A:499:U:H2'	16:A:500:G:O4'	2.22	0.40
16:A:1372:U:O4	16:A:1373:A:N6	2.55	0.40
16:A:1394:U:H2'	16:A:1395:A:O4'	2.22	0.40
16:A:1413:A:H2'	16:A:1414:C:O4'	2.22	0.40
16:A:1574:C:H2'	16:A:1575:C:O4'	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	2	36/46 (78%)	36 (100%)	0	0	100	100
3	F	175/177 (99%)	169 (97%)	6 (3%)	0	100	100
4	J	140/142 (99%)	139 (99%)	1 (1%)	0	100	100
5	L	141/143 (99%)	129 (92%)	12 (8%)	0	100	100
6	N	118/120 (98%)	107 (91%)	11 (9%)	0	100	100
7	O	114/116 (98%)	111 (97%)	3 (3%)	0	100	100
8	Q	115/117 (98%)	113 (98%)	2 (2%)	0	100	100
9	R	101/103 (98%)	97 (96%)	3 (3%)	1 (1%)	13	48
10	T	91/93 (98%)	86 (94%)	5 (6%)	0	100	100
11	U	100/102 (98%)	89 (89%)	11 (11%)	0	100	100
12	V	92/94 (98%)	89 (97%)	3 (3%)	0	100	100
13	W	73/75 (97%)	71 (97%)	2 (3%)	0	100	100
14	Y	61/63 (97%)	59 (97%)	2 (3%)	0	100	100
15	Z	56/58 (97%)	55 (98%)	1 (2%)	0	100	100
17	D	169/209 (81%)	163 (96%)	6 (4%)	0	100	100
18	E	172/201 (86%)	168 (98%)	3 (2%)	1 (1%)	22	59

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
19	y	15/17 (88%)	11 (73%)	4 (27%)	0	100	100
All	All	1769/1876 (94%)	1692 (96%)	75 (4%)	2 (0%)	50	83

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
9	R	54	VAL
18	E	83	VAL

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	2	30/38 (79%)	30 (100%)	0	100	100
3	F	148/148 (100%)	143 (97%)	5 (3%)	32	53
4	J	116/116 (100%)	114 (98%)	2 (2%)	56	73
5	L	102/102 (100%)	102 (100%)	0	100	100
6	N	99/100 (99%)	99 (100%)	0	100	100
7	O	86/86 (100%)	86 (100%)	0	100	100
8	Q	89/89 (100%)	89 (100%)	0	100	100
9	R	84/84 (100%)	83 (99%)	1 (1%)	67	79
10	T	80/80 (100%)	80 (100%)	0	100	100
11	U	83/83 (100%)	82 (99%)	1 (1%)	67	79
12	V	78/78 (100%)	77 (99%)	1 (1%)	65	77
13	W	57/57 (100%)	56 (98%)	1 (2%)	54	71
14	Y	55/55 (100%)	55 (100%)	0	100	100
15	Z	48/48 (100%)	48 (100%)	0	100	100
17	D	134/164 (82%)	132 (98%)	2 (2%)	60	75
18	E	146/165 (88%)	144 (99%)	2 (1%)	62	76
19	y	17/17 (100%)	16 (94%)	1 (6%)	16	38

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	1452/1510 (96%)	1436 (99%)	16 (1%)	69	80

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	F	7	TYR
3	F	29	ARG
3	F	51	ASN
3	F	79	ARG
3	F	144	LYS
4	J	96	ARG
4	J	99	ARG
9	R	22	LEU
11	U	98	ASN
12	V	42	LEU
13	W	65	PHE
17	D	11	MET
17	D	33	ARG
18	E	19	PHE
18	E	163	ASN
19	y	17	ARG

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

Mol	Chain	Res	Type
4	J	80	HIS
5	L	99	ASN
6	N	107	ASN
8	Q	70	GLN
9	R	18	GLN
18	E	94	GLN
19	y	3	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
16	A	1981/2903 (68%)	428 (21%)	17 (0%)
2	B	119/120 (99%)	14 (11%)	2 (1%)
All	All	2100/3023 (69%)	442 (21%)	19 (0%)

All (442) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	B	4	C
2	B	12	C
2	B	13	G
2	B	35	C
2	B	41	G
2	B	42	C
2	B	44	G
2	B	45	A
2	B	53	A
2	B	66	A
2	B	67	G
2	B	89	U
2	B	90	C
2	B	109	A
16	A	10	A
16	A	27	G
16	A	34	U
16	A	35	G
16	A	46	G
16	A	50	U
16	A	51	G
16	A	71	A
16	A	74	A
16	A	75	G
16	A	114	U
16	A	118	A
16	A	120	U
16	A	135	U
16	A	136	G
16	A	139	U
16	A	141	G
16	A	142	A
16	A	160	A
16	A	162	U
16	A	163	C
16	A	181	A
16	A	190	A
16	A	196	A
16	A	197	A
16	A	199	A
16	A	215	G
16	A	216	A

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Mol	Chain	Res	Type
16	A	221	A
16	A	222	A
16	A	225	C
16	A	228	C
16	A	232	G
16	A	242	G
16	A	243	U
16	A	248	G
16	A	255	A
16	A	266	G
16	A	267	C
16	A	272	A
16	A	275	C
16	A	277	G
16	A	278	A
16	A	294	A
16	A	304	U
16	A	307	G
16	A	310	A
16	A	322	A
16	A	323	C
16	A	324	A
16	A	329	G
16	A	330	A
16	A	345	A
16	A	350	G
16	A	362	A
16	A	371	A
16	A	372	G
16	A	373	U
16	A	384	A
16	A	386	G
16	A	387	U
16	A	388	G
16	A	401	A
16	A	404	A
16	A	406	G
16	A	411	G
16	A	412	A
16	A	417	C
16	A	424	G
16	A	429	A

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Mol	Chain	Res	Type
16	A	430	A
16	A	435	C
16	A	456	C
16	A	457	A
16	A	458	G
16	A	459	U
16	A	465	G
16	A	466	A
16	A	473	G
16	A	480	A
16	A	481	G
16	A	491	G
16	A	505	A
16	A	509	C
16	A	510	C
16	A	529	A
16	A	530	G
16	A	531	C
16	A	532	A
16	A	543	G
16	A	544	C
16	A	545	U
16	A	547	A
16	A	549	G
16	A	550	C
16	A	563	A
16	A	568	U
16	A	572	A
16	A	573	U
16	A	575	A
16	A	588	U
16	A	603	A
16	A	614	A
16	A	621	A
16	A	627	A
16	A	637	A
16	A	645	C
16	A	646	U
16	A	647	G
16	A	654	A
16	A	668	A
16	A	669	G

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Mol	Chain	Res	Type
16	A	670	A
16	A	671	C
16	A	675	A
16	A	684	G
16	A	801	G
16	A	805	G
16	A	812	C
16	A	819	A
16	A	827	U
16	A	828	U
16	A	830	G
16	A	845	A
16	A	846	U
16	A	847	U
16	A	856	G
16	A	857	G
16	A	910	A
16	A	914	G
16	A	918	A
16	A	931	U
16	A	932	U
16	A	941	A
16	A	946	C
16	A	952	G
16	A	953	G
16	A	957	C
16	A	959	A
16	A	961	C
16	A	973	A
16	A	974	G
16	A	981	A
16	A	983	A
16	A	985	C
16	A	995	C
16	A	996	A
16	A	1009	A
16	A	1012	U
16	A	1013	C
16	A	1021	A
16	A	1022	G
16	A	1023	U
16	A	1026	G

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Mol	Chain	Res	Type
16	A	1129	A
16	A	1132	U
16	A	1135	C
16	A	1143	A
16	A	1151	A
16	A	1157	G
16	A	1169	A
16	A	1171	G
16	A	1174	U
16	A	1175	A
16	A	1176	U
16	A	1178	C
16	A	1180	U
16	A	1206	G
16	A	1212	G
16	A	1225	G
16	A	1236	G
16	A	1250	G
16	A	1253	A
16	A	1255	U
16	A	1256	G
16	A	1263	U
16	A	1265	A
16	A	1266	G
16	A	1267	U
16	A	1269	A
16	A	1271	G
16	A	1272	A
16	A	1273	U
16	A	1274	A
16	A	1275	A
16	A	1280	G
16	A	1284	A
16	A	1288	G
16	A	1289	C
16	A	1300	G
16	A	1301	A
16	A	1306	C
16	A	1307	A
16	A	1312	U
16	A	1315	C
16	A	1320	C

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Mol	Chain	Res	Type
16	A	1321	A
16	A	1325	U
16	A	1327	A
16	A	1329	U
16	A	1332	G
16	A	1333	G
16	A	1334	G
16	A	1340	U
16	A	1341	G
16	A	1343	G
16	A	1345	C
16	A	1352	U
16	A	1355	G
16	A	1356	G
16	A	1359	A
16	A	1361	G
16	A	1362	C
16	A	1365	A
16	A	1374	G
16	A	1379	U
16	A	1380	G
16	A	1383	A
16	A	1386	C
16	A	1391	U
16	A	1394	U
16	A	1395	A
16	A	1397	U
16	A	1400	U
16	A	1403	A
16	A	1404	C
16	A	1407	G
16	A	1413	A
16	A	1416	G
16	A	1419	A
16	A	1420	A
16	A	1421	G
16	A	1427	A
16	A	1428	C
16	A	1432	G
16	A	1434	A
16	A	1436	G
16	A	1445	G

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Mol	Chain	Res	Type
16	A	1449	G
16	A	1450	G
16	A	1452	G
16	A	1453	A
16	A	1454	C
16	A	1458	U
16	A	1459	G
16	A	1461	C
16	A	1467	U
16	A	1468	U
16	A	1469	A
16	A	1473	G
16	A	1474	U
16	A	1475	G
16	A	1478	G
16	A	1480	C
16	A	1482	G
16	A	1483	G
16	A	1484	U
16	A	1486	U
16	A	1493	C
16	A	1495	A
16	A	1497	U
16	A	1498	C
16	A	1501	G
16	A	1504	A
16	A	1508	A
16	A	1509	A
16	A	1515	A
16	A	1516	G
16	A	1519	G
16	A	1528	A
16	A	1529	G
16	A	1532	A
16	A	1535	A
16	A	1536	C
16	A	1537	G
16	A	1542	U
16	A	1546	G
16	A	1548	A
16	A	1553	A
16	A	1554	U

Continued on next page...

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Mol	Chain	Res	Type
16	A	1555	G
16	A	1558	C
16	A	1559	U
16	A	1560	G
16	A	1563	U
16	A	1566	A
16	A	1567	G
16	A	1569	A
16	A	1575	C
16	A	1576	U
16	A	1578	U
16	A	1579	A
16	A	1583	A
16	A	1584	U
16	A	1585	C
16	A	1592	C
16	A	1593	A
16	A	1596	A
16	A	1597	A
16	A	1598	A
16	A	1603	A
16	A	1607	C
16	A	1608	A
16	A	1613	G
16	A	1614	A
16	A	1615	C
16	A	1616	A
16	A	1618	A
16	A	1619	G
16	A	1620	G
16	A	1622	G
16	A	1627	G
16	A	1628	G
16	A	1634	A
16	A	1635	A
16	A	1636	U
16	A	1637	A
16	A	1644	C
16	A	1647	U
16	A	1648	U
16	A	1649	G
16	A	1650	A

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Mol	Chain	Res	Type
16	A	1651	G
16	A	1652	A
16	A	1653	G
16	A	1654	A
16	A	1656	C
16	A	1657	U
16	A	1660	G
16	A	1662	U
16	A	1663	G
16	A	1664	A
16	A	1666	G
16	A	1667	G
16	A	1992	G
16	A	1993	U
16	A	1997	C
16	A	1998	A
16	A	2003	A
16	A	2004	G
16	A	2006	C
16	A	2007	U
16	A	2008	C
16	A	2009	A
16	A	2011	U
16	A	2012	G
16	A	2013	A
16	A	2015	A
16	A	2022	U
16	A	2023	C
16	A	2030	A
16	A	2031	A
16	A	2043	C
16	A	2052	A
16	A	2250	G
16	A	2251	G
16	A	2266	A
16	A	2279	G
16	A	2283	C
16	A	2286	G
16	A	2287	A
16	A	2297	A
16	A	2305	U
16	A	2309	A

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Mol	Chain	Res	Type
16	A	2319	G
16	A	2327	A
16	A	2333	A
16	A	2334	U
16	A	2335	A
16	A	2336	A
16	A	2343	U
16	A	2350	C
16	A	2383	G
16	A	2385	C
16	A	2388	A
16	A	2402	U
16	A	2407	A
16	A	2422	C
16	A	2424	C
16	A	2425	A
16	A	2429	G
16	A	2430	A
16	A	2434	A
16	A	2435	A
16	A	2441	U
16	A	2448	A
16	A	2449	U
16	A	2615	U
16	A	2629	U
16	A	2630	G
16	A	2646	C
16	A	2647	U
16	A	2655	G
16	A	2656	U
16	A	2682	A
16	A	2689	U
16	A	2690	U
16	A	2714	G
16	A	2726	A
16	A	2732	G
16	A	2733	A
16	A	2744	G
16	A	2748	A
16	A	2764	A
16	A	2765	A
16	A	2778	A

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Mol	Chain	Res	Type
16	A	2779	U
16	A	2780	G
16	A	2791	G
16	A	2794	C
16	A	2799	A
16	A	2800	A
16	A	2809	A
16	A	2818	U
16	A	2820	A
16	A	2833	U
16	A	2835	A
16	A	2849	U
16	A	2867	G
16	A	2872	A
16	A	2873	A
16	A	2880	C
16	A	2883	A
16	A	2893	A
16	A	2894	G
16	A	2901	C
16	A	2902	C
16	A	2903	U

All (19) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	B	52	A
2	B	66	A
16	A	227	A
16	A	242	G
16	A	372	G
16	A	458	G
16	A	548	G
16	A	549	G
16	A	644	A
16	A	1020	A
16	A	1022	G
16	A	1319	C
16	A	1358	G
16	A	1427	A
16	A	1534	U
16	A	2010	G

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Mol	Chain	Res	Type
16	A	2318	G
16	A	2326	C
16	A	2655	G

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 ⓘ

There are no ligands in this entry.

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.

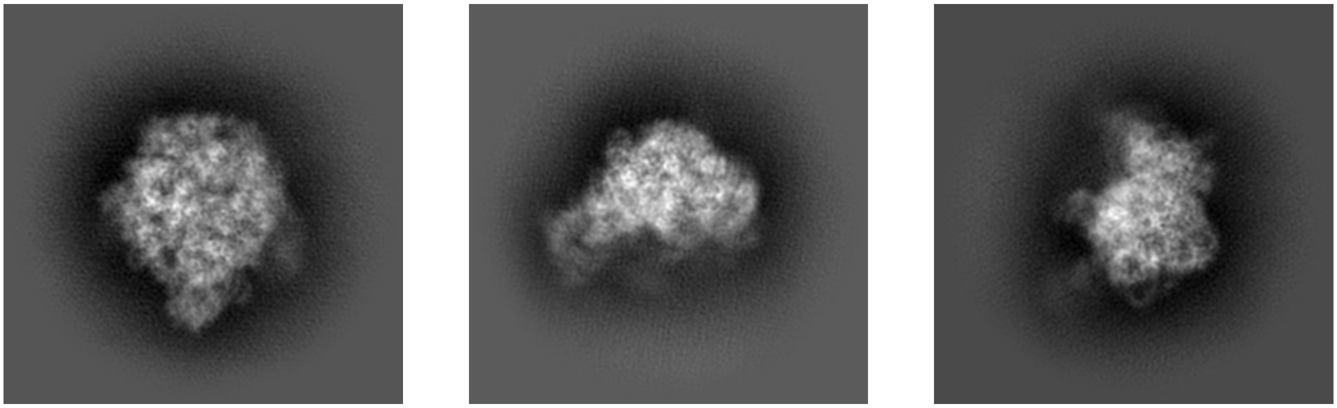
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-51979. 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.

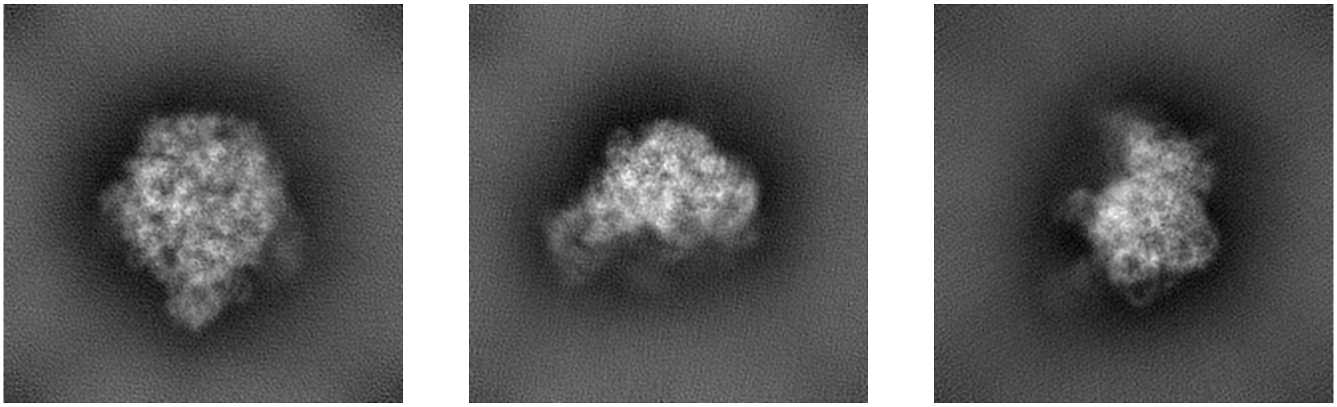
6.1 Orthogonal projections

6.1.1 Primary map



X Y Z

6.1.2 Raw map

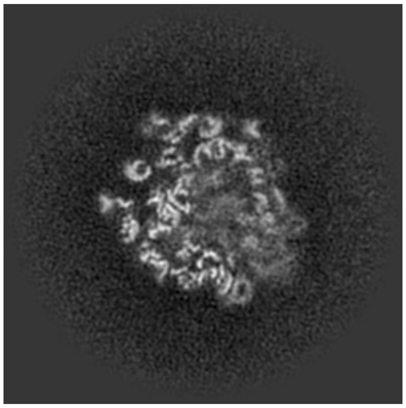


X Y Z

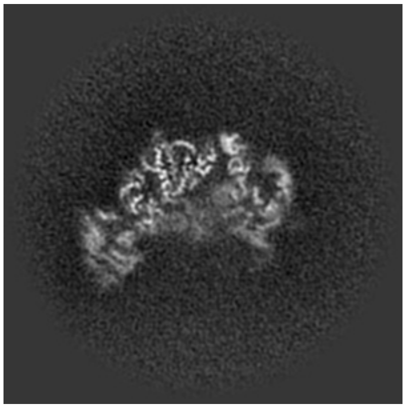
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ

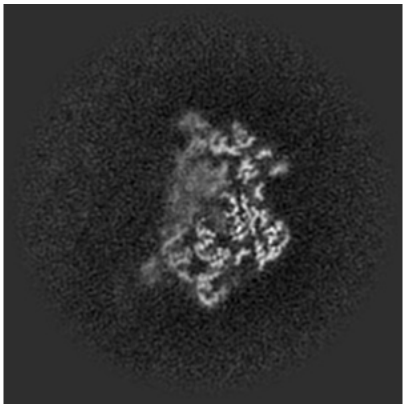
6.2.1 Primary map



X Index: 100

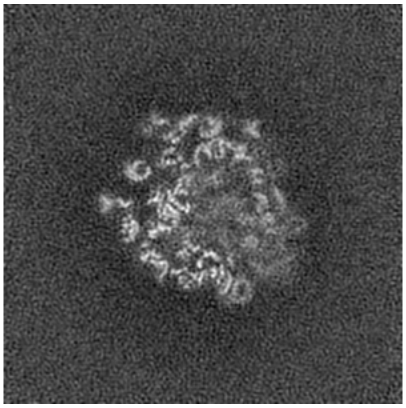


Y Index: 100

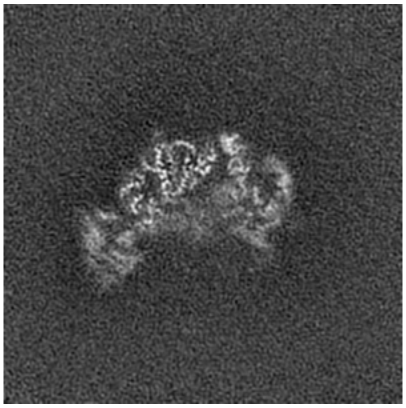


Z Index: 100

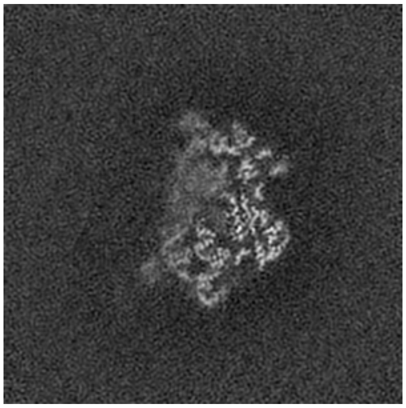
6.2.2 Raw map



X Index: 100



Y Index: 100

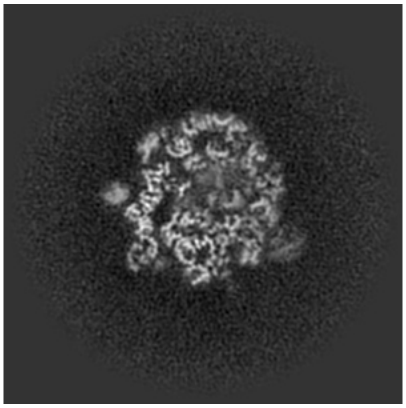


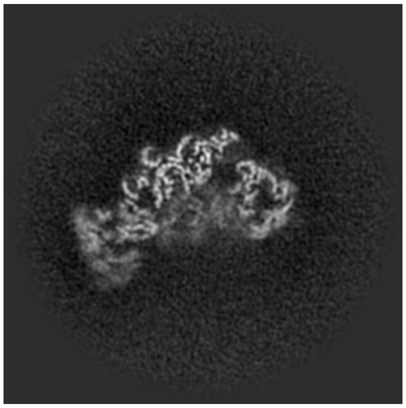
Z Index: 100

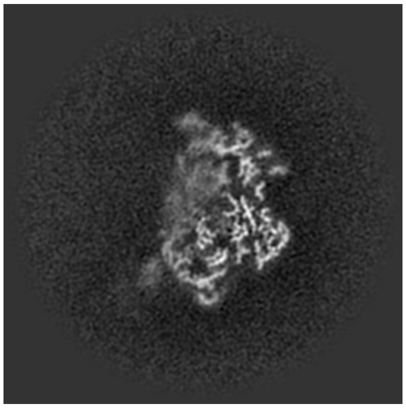
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices ⓘ

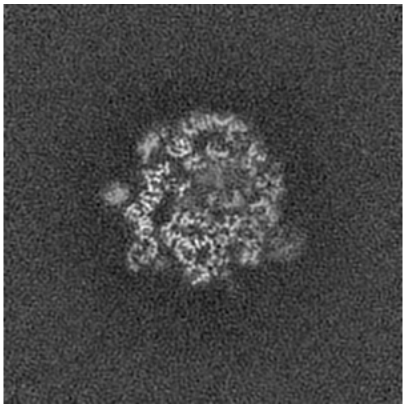
6.3.1 Primary map

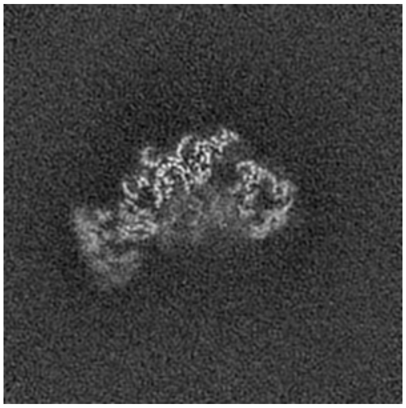

X Index: 109

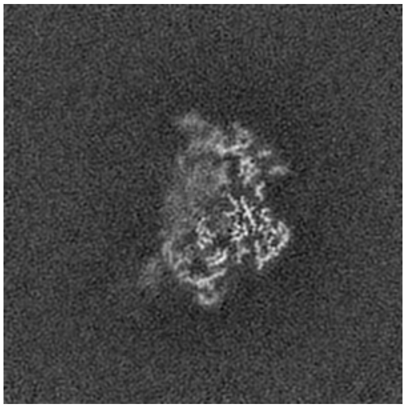

Y Index: 95


Z Index: 99

6.3.2 Raw map


X Index: 109

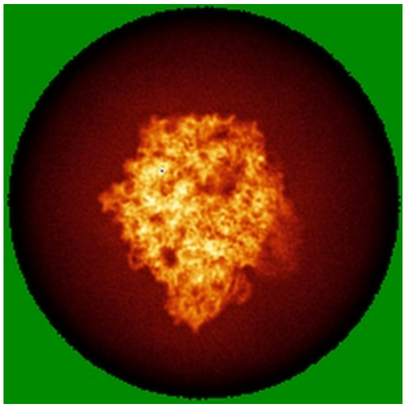

Y Index: 95

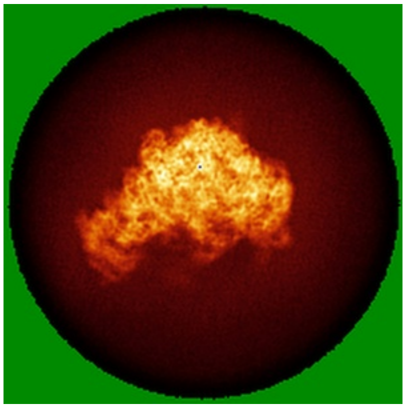

Z Index: 99

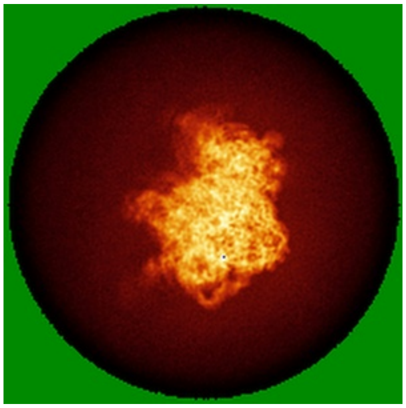
The images above show the largest variance slices of the map in three orthogonal directions.

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

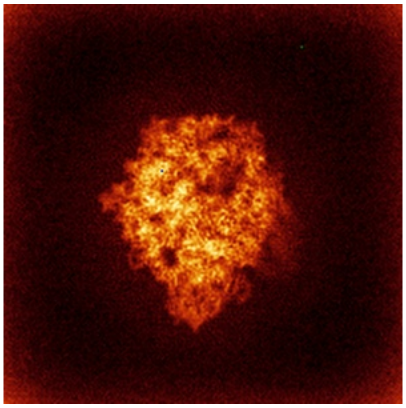
6.4.1 Primary map

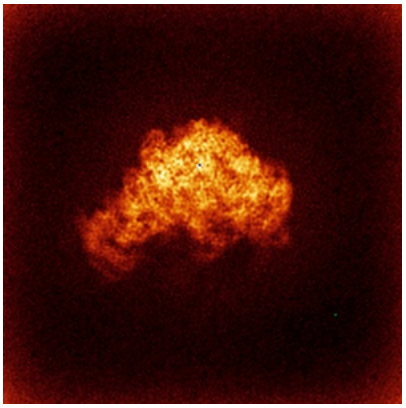

X

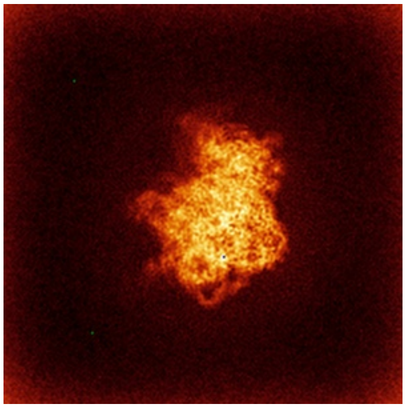

Y


Z

6.4.2 Raw map


X

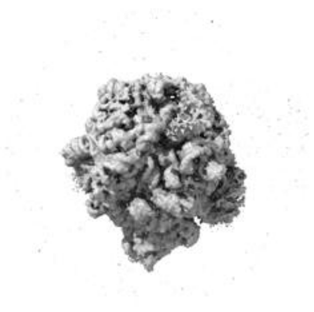

Y


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

6.5.1 Primary map



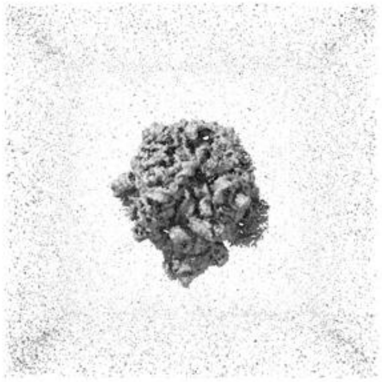
X

Y

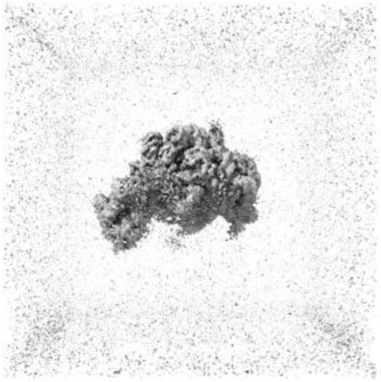
Z

The images above show the 3D surface view of the map at the recommended contour level 0.255. 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.

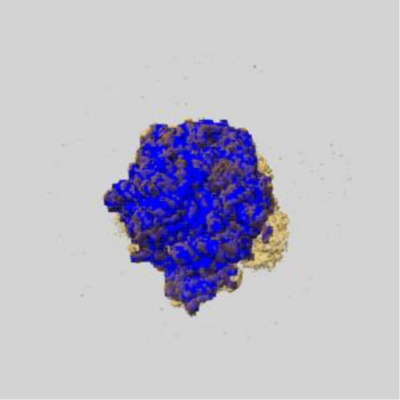
6.6 Mask visualisation ⓘ

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

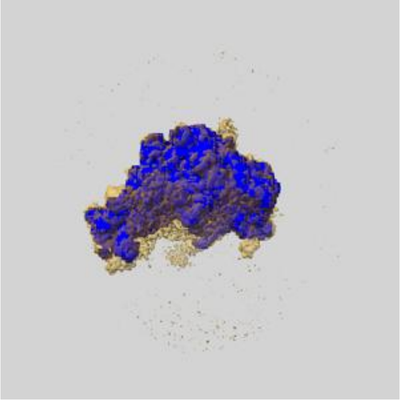
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

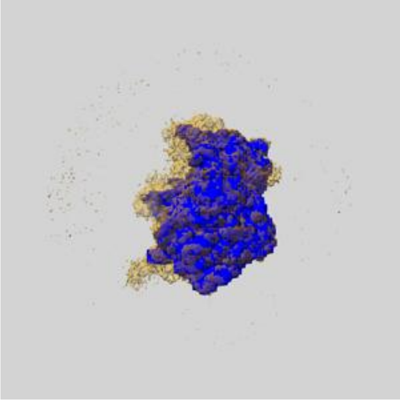
6.6.1 emd_51979_msk_1.map ⓘ



X



Y

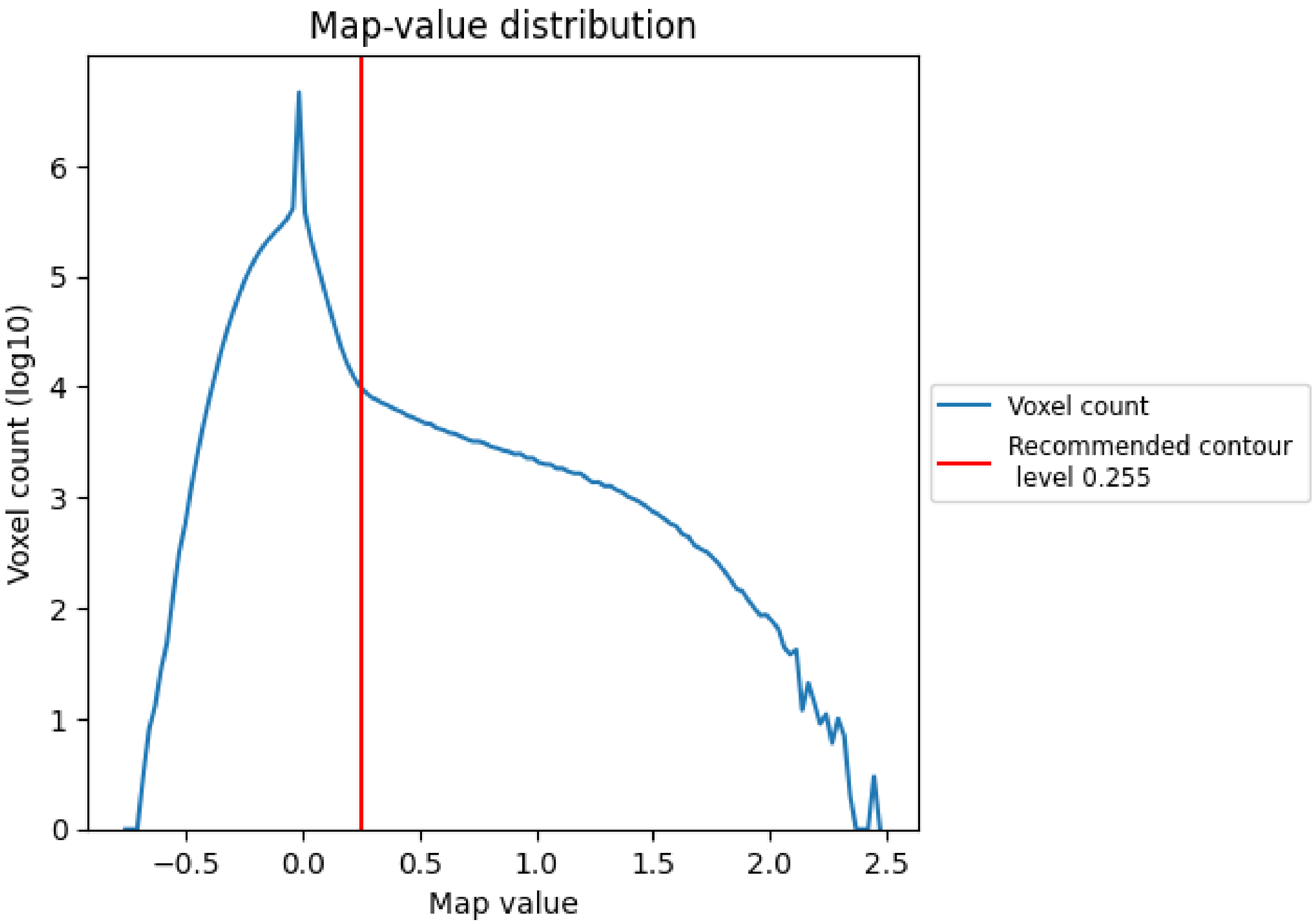


Z

7 Map analysis ⓘ

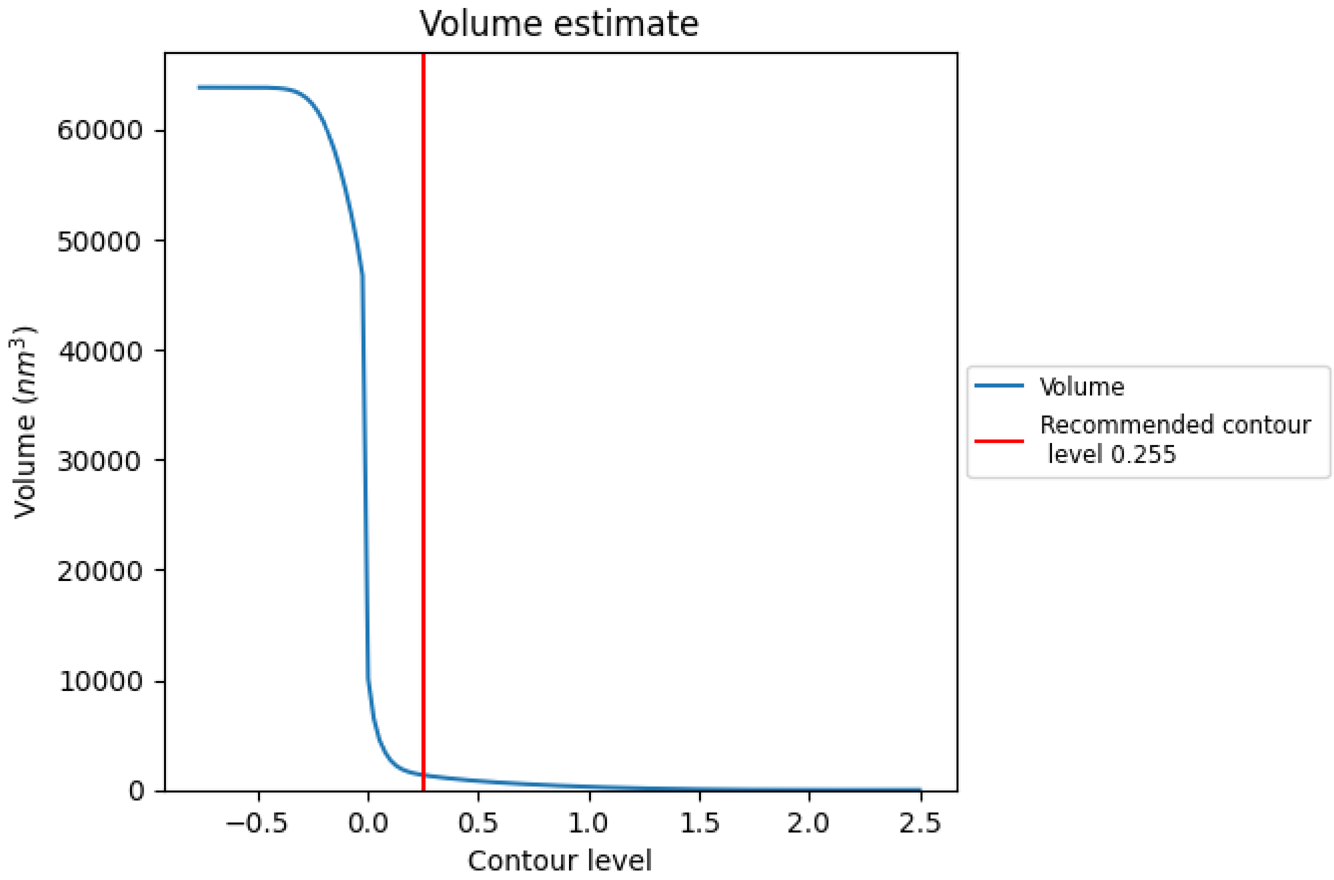
This section contains the results of statistical analysis of the map.

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.

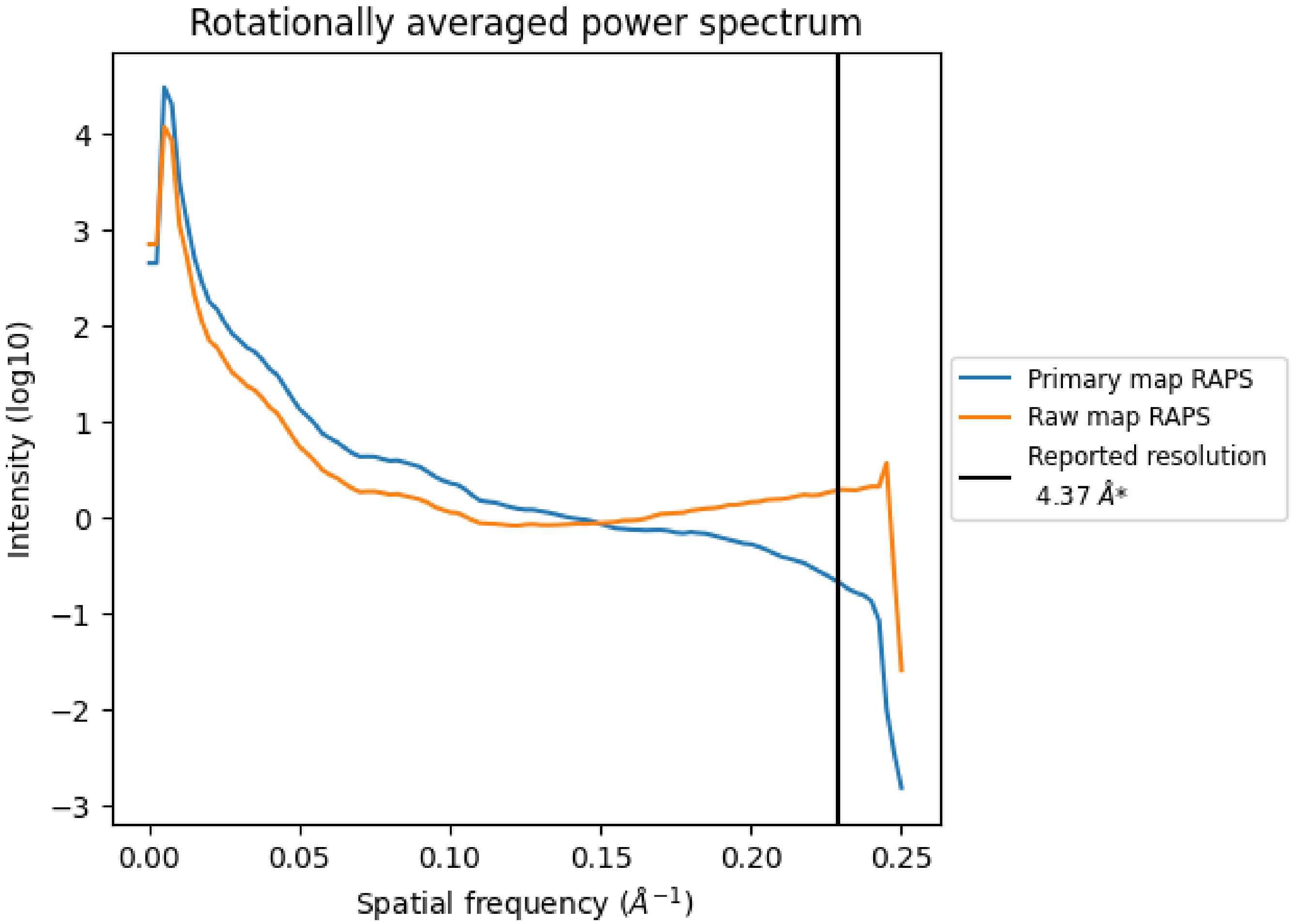
7.2 Volume estimate ⓘ



The volume at the recommended contour level is 1342 nm^3; this corresponds to an approximate mass of 1212 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 ⓘ

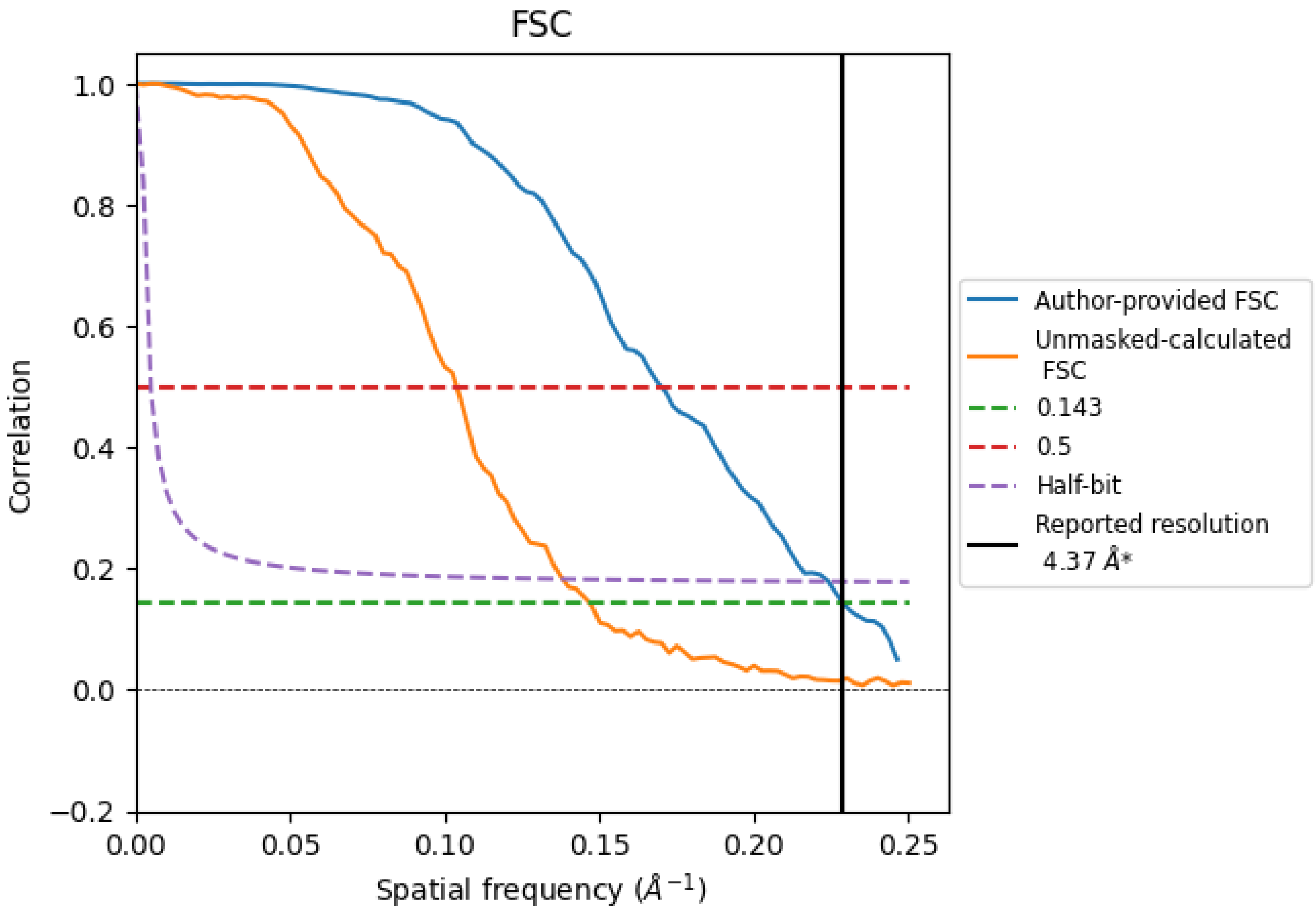


*Reported resolution corresponds to spatial frequency of 0.229 $Å^{-1}$

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 0.229 Å^{-1}

8.2 Resolution estimates ⓘ

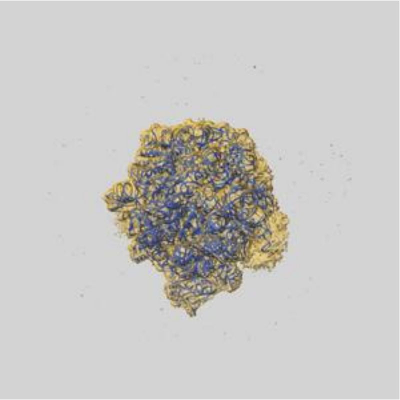
Resolution estimate (Å)	**Estimation criterion (FSC cut-off)**		
	0.143	0.5	Half-bit
Reported by author	4.37	-	-
Author-provided FSC curve	4.37	5.88	4.46
Unmasked-calculated*	6.81	9.62	7.24

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.81 differs from the reported value 4.37 by more than 10 %

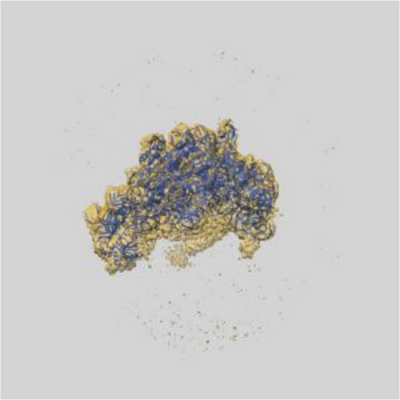
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-51979 and PDB model 9HA7. Per-residue inclusion information can be found in section 3 on page 7.

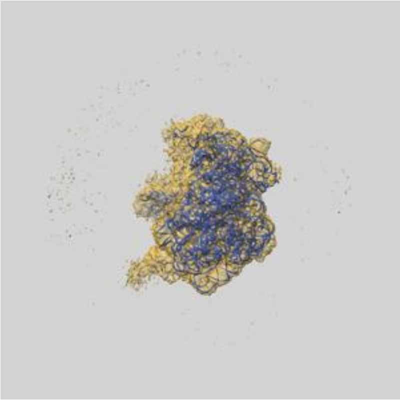
9.1 Map-model overlay



X



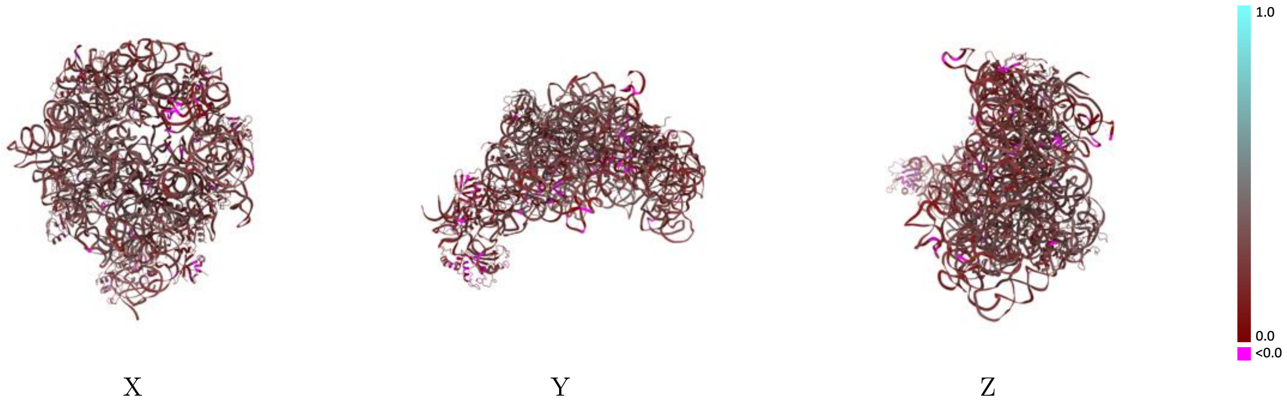
Y



Z

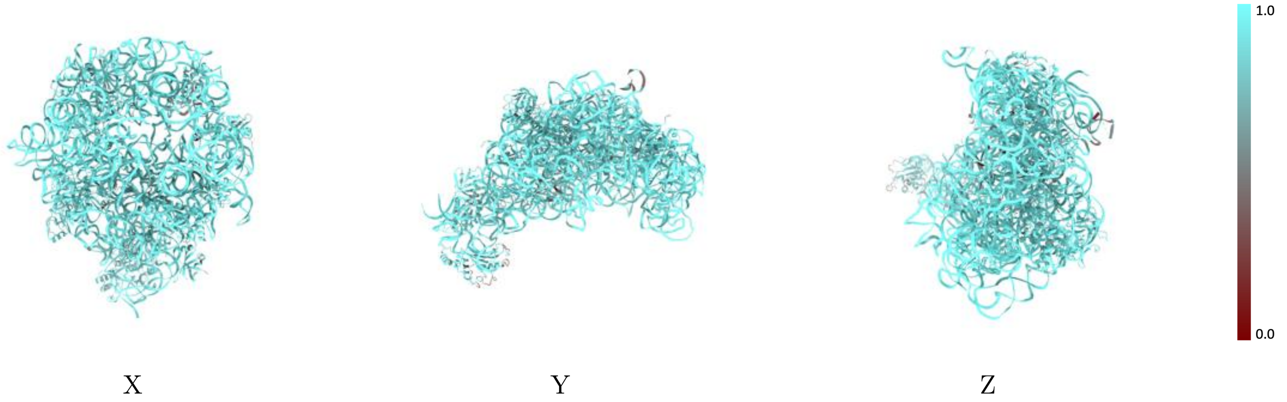
The images above show the 3D surface view of the map at the recommended contour level 0.255 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model ⓘ



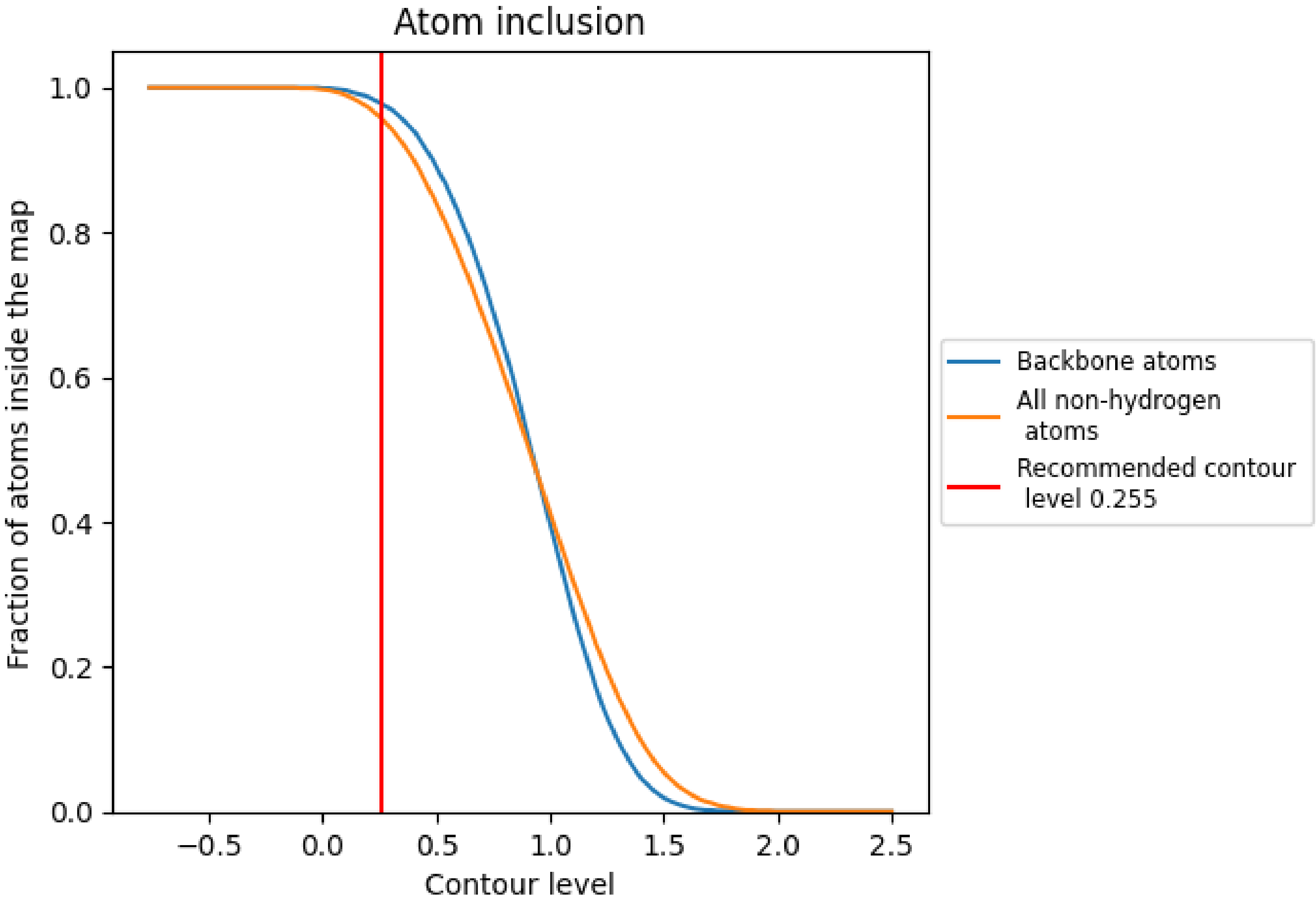
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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



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 (0.255).

9.4 Atom inclusion ⓘ



At the recommended contour level, 98% of all backbone atoms, 96% 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 (0.255) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	▬ 0.9580	▬ 0.2430
2	▬ 0.9030	▬ 0.2520
A	▬ 0.9810	▬ 0.2550
B	▬ 0.9760	▬ 0.1940
D	▬ 0.8870	▬ 0.1710
E	▬ 0.8960	▬ 0.2690
F	▬ 0.8030	▬ 0.1160
J	▬ 0.9370	▬ 0.2770
L	▬ 0.8130	▬ 0.1800
N	▬ 0.8760	▬ 0.1920
O	▬ 0.9300	▬ 0.1730
Q	▬ 0.9350	▬ 0.2620
R	▬ 0.9250	▬ 0.3000
T	▬ 0.8890	▬ 0.2500
U	▬ 0.9330	▬ 0.2920
V	▬ 0.8560	▬ 0.1370
W	▬ 0.9120	▬ 0.2270
Y	▬ 0.8790	▬ 0.2260
Z	▬ 0.9290	▬ 0.2440
y	▬ 0.4100	▬ 0.0950