



# wwPDB EM Validation Summary Report i

Jan 5, 2026 – 07:22 PM JST

PDB ID : 9VX6 / pdb\_00009vx6  
EMDB ID : EMD-65406  
Title : Helical structure of gRNA-tDNA SPARDA complex  
Authors : Li, Y.; Zheng, Q.; Li, S.; Jiang, Y.  
Deposited on : 2025-07-18  
Resolution : 2.64 Å (reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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 i symbol.

The types of validation reports are described at  
<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

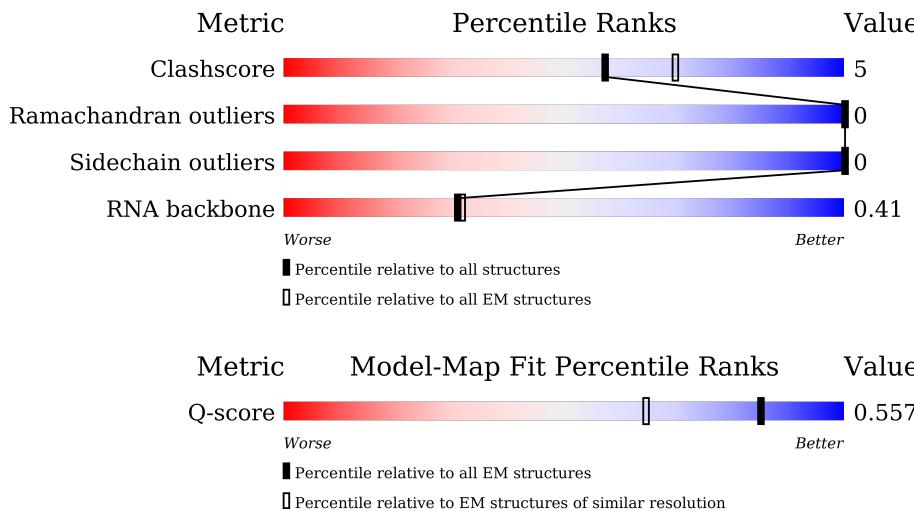
EMDB validation analysis : 0.0.1.dev129  
MolProbity : 4-5-2 with Phenix2.0  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.47

# 1 Overall quality at a glance

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

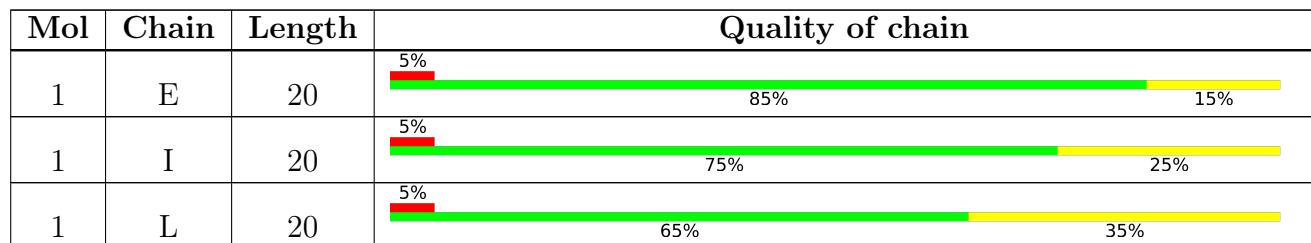
The reported resolution of this entry is 2.64 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
RNA backbone	6643	2191	-
Q-score	-	25397	8968 ( 2.14 - 3.14 )

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.



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Mol	Chain	Length	Quality of chain			
			Bad	Good	Missing	Score
1	Q	20	5%	65%		35%
2	F	20	5%	65%	30%	5%
2	J	20	5%	60%	35%	5%
2	R	20	5%	55%		45%
2	V	20	5%	60%		40%
3	O	485		84%	12%	•
3	S	485		86%	10%	•
3	U	485		86%	11%	•
3	W	485		86%	10%	•
4	P	442	6%	78%	10%	12%
4	T	442	7%	79%	13%	9%
4	X	442	•	79%	9%	12%
4	Y	442	•	78%	14%	9%
5	M	11		45%	55%	
6	N	11		55%	27%	18%

## 2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 31391 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 DNA chain called target DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	L	20	Total	C	N	O	P	0	0
			410	196	71	123	20		
1	E	20	Total	C	N	O	P	0	0
			410	196	71	123	20		
1	I	20	Total	C	N	O	P	0	0
			410	196	71	123	20		
1	Q	20	Total	C	N	O	P	0	0
			410	196	71	123	20		

- Molecule 2 is a RNA chain called guide RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	R	20	Total	C	N	O	P	0	0
			426	191	78	137	20		
2	F	20	Total	C	N	O	P	0	0
			426	191	78	137	20		
2	J	20	Total	C	N	O	P	0	0
			426	191	78	137	20		
2	V	20	Total	C	N	O	P	0	0
			426	191	78	137	20		

- Molecule 3 is a protein called pAGO.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	S	467	Total	C	N	O	S	0	0
			3705	2349	653	688	15		
3	O	467	Total	C	N	O	S	0	0
			3705	2349	653	688	15		
3	W	467	Total	C	N	O	S	0	0
			3705	2349	653	688	15		
3	U	468	Total	C	N	O	S	0	0
			3713	2355	654	689	15		

- Molecule 4 is a protein called DREN-APAZ.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	T	404	Total	C	N	O	S	0	0
			3252	2072	566	605	9		
4	P	387	Total	C	N	O	S	0	0
			3120	1985	543	583	9		
4	Y	404	Total	C	N	O	S	0	0
			3252	2072	566	605	9		
4	X	388	Total	C	N	O	S	0	0
			3137	1994	549	585	9		

- Molecule 5 is a DNA chain called substrate ssDNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	M	11	Total	C	N	O	P	0	0
			226	108	39	68	11		

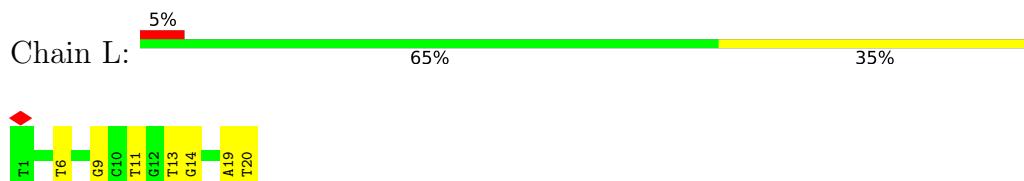
- Molecule 6 is a RNA chain called substrate ssRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	N	11	Total	C	N	O	P	0	0
			232	104	41	76	11		

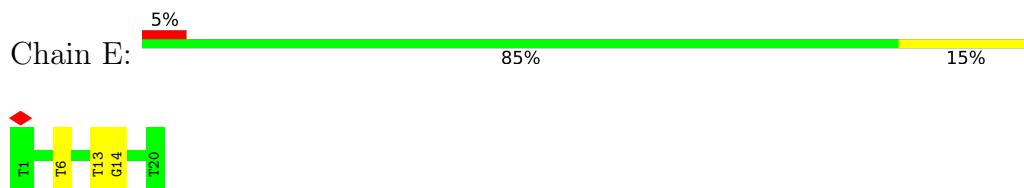
### 3 Residue-property plots

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.

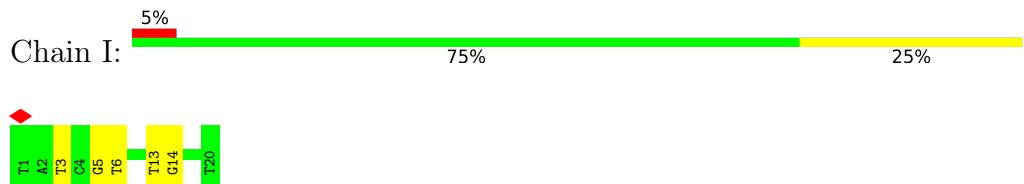
- Molecule 1: target DNA



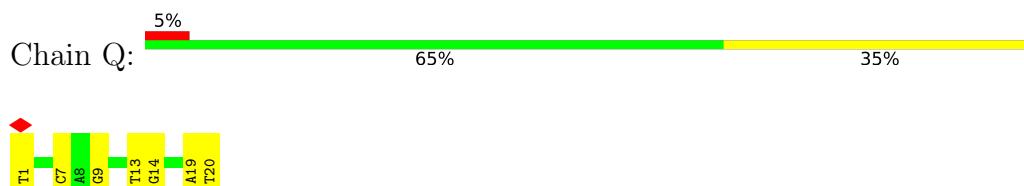
- Molecule 1: target DNA



- Molecule 1: target DNA



- Molecule 1: target DNA



- Molecule 2: guide RNA



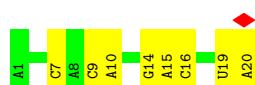
- Molecule 2: guide RNA



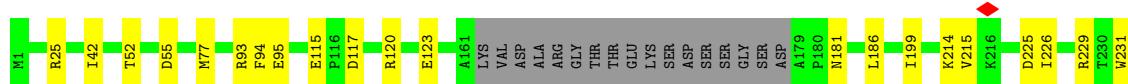
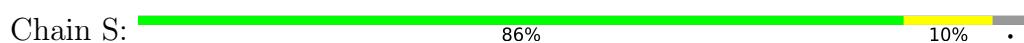
- Molecule 2: guide RNA



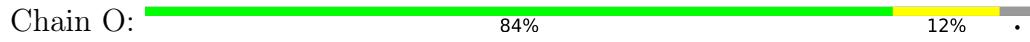
- Molecule 2: guide RNA



- Molecule 3: pAGO



- Molecule 3: pAGO



- Molecule 3: pAGO





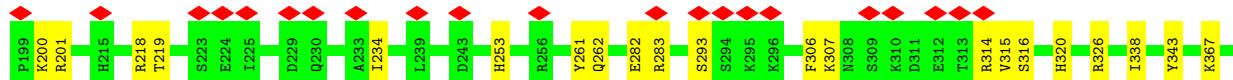
- Molecule 3: pAGO

Chain U:  86% 11% .



- Molecule 4: DREN-APAZ

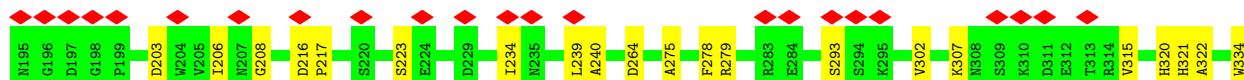
Chain T: 7% 79% 13% 9%



V375	R380	Q384	SER	ASP	HIS	GLU	ASP	LEU	PHE	HIS	SER	GLU	GLU	THR	PRO	GLU	ALA	Y400	L401	P406	P407	D418	G419	W420	VAL	LYS	GLU	LYS	VAL	LYS	ARG	ILE	ASP	GLU	ALA	ALA	GLN	GLY	GLU	GLY	LEU	PHE	SER	ASP	ASP	ILE
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- Molecule 4: DREN-APAZ

Chain P: 6% Red, 78% Green, 10% Yellow, 12% Grey



1347 1350 1353 1356 1359 1362 1365 1368 1371 1374 1377 1380 1383 1386 1389 1392 1395 1398 1401 1404 1407 1410 1413 1416 1419 1422 1425 1428 1431 1434 1437 1440 1443 1446 1449 1452 1455 1458 1461 1464 1467 1470 1473 1476 1479 1482 1485 1488 1491 1494 1497 1490 1493 1496 1499 1502 1505 1508 1511 1514 1517 1520 1523 1526 1529 1532 1535 1538 1541 1544 1547 1550 1553 1556 1559 1562 1565 1568 1571 1574 1577 1580 1583 1586 1589 1592 1595 1598 1601 1604 1607 1610 1613 1616 1619 1622 1625 1628 1631 1634 1637 1640 1643 1646 1649 1652 1655 1658 1661 1664 1667 1670 1673 1676 1679 1682 1685 1688 1691 1694 1697 1690 1693 1696 1699 1702 1705 1708 1711 1714 1717 1720 1723 1726 1729 1732 1735 1738 1741 1744 1747 1750 1753 1756 1759 1762 1765 1768 1771 1774 1777 1780 1783 1786 1789 1792 1795 1798 1801 1804 1807 1810 1813 1816 1819 1822 1825 1828 1831 1834 1837 1840 1843 1846 1849 1852 1855 1858 1861 1864 1867 1870 1873 1876 1879 1882 1885 1888 1891 1894 1897 1900 1903 1906 1909 1912 1915 1918 1921 1924 1927 1930 1933 1936 1939 1942 1945 1948 1951 1954 1957 1960 1963 1966 1969 1972 1975 1978 1981 1984 1987 1990 1993 1996 1999 2002 2005 2008 2011 2014 2017 2020 2023 2026 2029 2032 2035 2038 2041 2044 2047 2050 2053 2056 2059 2062 2065 2068 2071 2074 2077 2080 2083 2086 2089 2092 2095 2098 2101 2104 2107 2110 2113 2116 2119 2122 2125 2128 2131 2134 2137 2140 2143 2146 2149 2152 2155 2158 2161 2164 2167 2170 2173 2176 2179 2182 2185 2188 2191 2194 2197 2200 2203 2206 2209 2212 2215 2218 2221 2224 2227 2230 2233 2236 2239 2242 2245 2248 2251 2254 2257 2260 2263 2266 2269 2272 2275 2278 2281 2284 2287 2290 2293 2296 2299 2302 2305 2308 2311 2314 2317 2320 2323 2326 2329 2332 2335 2338 2341 2344 2347 2350 2353 2356 2359 2362 2365 2368 2371 2374 2377 2380 2383 2386 2389 2392 2395 2398 2401 2404 2407 2409 2412 2415 2418 2421 2424 2427 2430 2433 2436 2439 2442 2445 2448 2451 2454 2457 2460 2463 2466 2469 2472 2475 2478 2481 2484 2487 2490 2493 2496 2499 2502 2505 2508 2511 2514 2517 2520 2523 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3125 3128 3131 3134 3137 3140 3143 3146 3149 3152 3155 3158 3161 3164 3167 3170 3173 3176 3179 3182 3185 3188 3191 3194 3197 3199 3202 3205 3208 3211 3214 3217 3220 3223 3226 3229 3232 3235 3238 3241 3244 3247 3250 3253 3256 3259 3262 3265 3268 3271 3274 3277 3280 3283 3286 3289 3292 3295 3298 3301 3304 3307 3310 3313 3316 3319 3322 3325 3328 3331 3334 3337 3340 3343 3346 3349 3352 3355 3358 3361 3364 3367 3370 3373 3376 3379 3382 3385 3388 3391 3394 3397 3400 3403 3406 3409 3412 3415 3418 3421 3424 3427 3430 3433 3436 3439 3442 3445 3448 3451 3454 3457 3460 3463 3466 3469 3472 3475 3478 3481 3484 3487 3490 3493 3496 3499 3502 3505 3508 3511 3514 3517 3520 3523 3526 3529 3532 3535 3538 3541 3544 3547 3550 3553 3556 3559 3562 3565 3568 3571 3574 3577 3580 3583 3586 3589 3592 3595 3598 3601 3604 3607 3610 3613 3616 3619 3622 3625 3628 3631 3634 3637 3640 3643 3646 3649 3652 3655 3658 3661 3664 3667 3670 3673 3676 3679 3682 3685 3688 3691 3694 3697 3699 3702 3705 3708 3711 3714 3717 3720 3723 3726 3729 3732 3735 3738 3741 3744 3747 3750 3753 3756 3759 3762 3765 3768 3771 3774 3777 3780 3783 3786 3789 3792 3795 3798 3801 3804 3807 3810 3813 3816 3819 3822 3825 3828 3831 3834 3837 3840 3843 3846 3849 3852 3855 3858 3861 3864 3867 3870 3873 3876 3879 3882 3885 3888 3891 3894 3897 3899 3902 3905 3908 3911 3914 3917 3920 3923 3926 3929 3932 3935 3938 3941 3944 3947 3950 3953 3956 3959 3962 3965 3968 3971 3974 3977 3980 3983 3986 3989 3992 3995 3998 4001 4004 4007 4010 4013 4016 4019 4022 4025 4028 4031 4034 4037 4040 4043 4046 4049 4052 4055 4058 4061 4064 4067 4070 4073 4076 4079 4082 4085 4088 4091 4094 4097 4099 4102 4105 4108 4111 4114 4117 4120 4123 4126 4129 4132 4135 4138 4141 4144 4147 4150 4153 4156 4159 4162 4165 4168 4171 4174 4177 4180 4183 4186 4189 4192 4195 4197 4199 4202 4205 4208 4211 4214 4217 4220 4223 4226 4229 4232 4235 4238 4241 4244 4247 4250 4253 4256 4259 4262 4265 4268 4271 4274 4277 4280 4283 4286 4289 4292 4295 4297 4299 4302 4305 4308 4311 4314 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6671 6674 6677 6680 6683 6686 6689 6692 6695 6697 6699 6702 6705 6708 6711 6714 6717 6720 6723 6726 6729 6732 6735 6738 6741 6744 6747 6750 6753 6756 6759 6762 6765 6768 6771 6774 6777 6780 6783 6786 6789 6792 6795 6797 6799 6802 6805 6808 6811 6814 6817 6820 6823 6826 6829 6832 6835 6838 6841 6844 6847 6850 6853 6856 6859 6862 6865 6868 6871 6874 6877 6880 6883 6886 6889 6892 6895 6897 6899 6902 6905 6908 6911 6914 6917 6920 6923 6926 6929 6932 6935 6938 6941 6944 6947 6950 6953 6956 6959 6962 6965 6968 6971 6974 6977 6980 6983 6986 6989 6992 6995 6997 6999 7002 7005 7008 7011 7014 7017 7020 7023 7026 7029 7032 7035 7038 7041 7044 7047 7050 7053 7056 7059 7062 7065 7068 7071 7074 7077 7080 7083 7086 7089 7092 7095 7097 7099 7102 7105 7108 7111 7114 7117 7120 7123 7126 7129 7132 7135 7138 7141 7144 7147 7150 7153 7156 7159 7162 7165 7168 7171 7174 7177 7180 7183 7186 7189 7192 7195 7197 7199 7202 7205 7208 7211 7214 7217 7220 7223 7226 7229 7232 7235 7238 7241 7244 7247 7250 7253 7256 7259 7262 7265 7268 7271 7274 7277 7280 7283 7286 7289 7292 7295 7297 7299 7302 7305 7308 7311 7314 7317 7320 7323 7326 7329 7332 7335 7338 7341 7344 7347 7350 7353 7356 7359 7362 7365 7368 7371 7374 7377 7380 7383 7386 7389 7392 7395 7397 7399 7402 7405 7408 7411 7414 7417 7420 7423 7426 7429 7432 7435 7438 7441 7444 7447 7450 7453 7456 7459 7462 7465 7468 7471 7474 7477 7480 7483 7486 7489 7492 7495 7497 7499 7502 7505 7508 7511 7514 7517 7520 7523 7526 7529 7532 7535 7538 7541 7544 7547 7550 7553 7556 7559 7562 7565 7568 7571 7574 7577 7580 7583 7586 7589 7592 7595 7597 7599 7602 7605 7608 7611 7614 7617 7620 7623 7626 7629 7632 7635 7638 7641 7644 7647 7650 7653 7656 7659 7662 7665 7668 7671 7674 7677 7680 7683 7686 7689 7692 7695 7697 7699 7702 7705 7708 7711 7714 7717 7720 7723 7726 7729 7732 7735 7738 7741 7744 7747 7750 7753 7756 7759 7762 7765 7768 7771 7774 7777 7780 7783 7786 7789 7792 7795 7797 7799 7802 7805 7808 7811 7814 7817 7820 7823 7826 7829 7832 7835 7838 7841 7844 7847 7850 7853 7856 7859 7862 7865 7868 7871 7874 7877 7880 7883 7886 7889 7892 7895 7897 7899 7902 7905 7908 7911 7914 7917 7920 7923 7926 7929 7932 7935 7938 7941 7944 7947 7950 7953 7956 7959 7962 7965 7968 7971 7974 7977 7980 7983 7986 7989 7992 7995 7997 7999 8002 8005 8008 8011 8014 8017 8020 8023 8026 8029 8032 8035 8038 8041 8044 8047 8050 8053 8056 8059 8062 8065 8068 8071 8074 8077 8080 8083 8086 8089 8092 8095 8097 8099 8102 8105 8108 8111 8114 8117 8120 8123 8126 8129 8132 8135 8138 8141 8144 8147 8150 8153 8156 8159 8162 8165 8168 8171 8174 8177 8180 8183 8186 8189 8192 8195 8197 8199 8202 8205 8208 8211 8214 8217 8220 8223 8226 8229 8232 8235 8238 8241 8244 8247 8250 8253 8256 8259 8262 8265 8268 8271 8274 8277 8280 8283 8286 8289 8292 8295 8297 8299 8302 8305 8308 8311 8314 8317 8320 8323 8326 8329 8332 8335 8338 8341 8344 8347 8350 8353 8356 8359 8362 8365 8368 8371 8374 8377 8380 8383 8386 8389 8392 8395 8397 8399 8402 8405 8408 8411 8414 8417 8420 8423 8426 8429 8432 8435 8438 8441 8444 8447 8450 8453 8456 8459 8462 8465 8468 8471 8474 8477 8480 8483 8486 8489 8492 8495 8497 8499 8502 8505 8508 8511 8514 8517 8520 8523 8526 8529 8532 8535 8538 8541 8544 8547 8550 8553 8556 8559 8562 8565 8568 8571 8574 8577 8580 8583 8586 8589 8592 8595 8597 8599 8602 8605 8608 8611 8614 8617 8620 8623 8626 8629 8632 8635 8638 8641 8

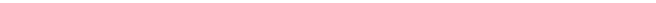


- Molecule 5: substrate ssDNA

Chain M:  45% 55%



- Molecule 6: substrate ssRNA

Chain N:  55% 27% 18%



## 4 Experimental information (i)

Property	Value	Source
EM reconstruction method	HELICAL	Depositor
Imposed symmetry	HELICAL, twist=80°, rise=130 Å, axial sym=C1	Depositor
Number of segments used	57938	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 <sup>-</sup> /Å <sup>2</sup> )	48	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.972	Depositor
Minimum map value	-0.417	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.022	Depositor
Recommended contour level	0.095	Depositor
Map size (Å)	467.99997, 467.99997, 467.99997	wwPDB
Map dimensions	720, 720, 720	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.65, 0.65, 0.65	Depositor

## 5 Model quality i

### 5.1 Standard geometry i

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	E	0.68	0/458	0.71	0/705
1	I	0.68	0/458	0.71	0/705
1	L	0.68	0/458	0.71	0/705
1	Q	0.68	0/458	0.71	0/705
2	F	0.56	0/476	0.47	0/739
2	J	0.56	0/476	0.47	0/739
2	R	0.56	0/476	0.47	0/739
2	V	0.56	0/476	0.47	0/739
3	O	0.59	0/3790	0.60	0/5119
3	S	0.55	0/3790	0.65	2/5119 (0.0%)
3	U	0.59	0/3798	0.59	0/5130
3	W	0.59	0/3790	0.62	2/5119 (0.0%)
4	P	0.39	0/3195	0.55	2/4330 (0.0%)
4	T	0.40	0/3333	0.56	0/4520
4	X	0.41	0/3212	0.55	0/4350
4	Y	0.44	0/3333	0.57	0/4520
5	M	0.53	0/252	0.63	0/387
6	N	0.42	0/258	0.46	0/399
All	All	0.52	0/32487	0.59	6/44769 (0.0%)

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
3	S	303	ARG	CA-C-N	14.15	141.28	121.61
3	S	303	ARG	C-N-CA	14.15	141.28	121.61
3	W	303	ARG	CA-C-N	5.27	139.19	121.27
3	W	303	ARG	C-N-CA	5.27	139.19	121.27
4	P	203	ASP	CA-C-N	5.07	131.22	121.54

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	E	410	0	228	2	0
1	I	410	0	228	4	0
1	L	410	0	228	6	0
1	Q	410	0	228	6	0
2	F	426	0	217	2	0
2	J	426	0	217	3	0
2	R	426	0	217	4	0
2	V	426	0	217	2	0
3	O	3705	0	3683	39	0
3	S	3705	0	3683	29	0
3	U	3713	0	3694	34	0
3	W	3705	0	3683	35	0
4	P	3120	0	3032	27	0
4	T	3252	0	3179	36	0
4	X	3137	0	3061	28	0
4	Y	3252	0	3179	41	0
5	M	226	0	126	5	0
6	N	232	0	120	4	0
All	All	31391	0	29220	269	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.

The worst 5 of 269 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:W:245:ILE:HD12	3:W:445:TRP:CH2	2.07	0.89
1:I:6:DT:H3	2:J:15:A:H62	1.36	0.73
4:T:262:GLN:HE22	4:T:401:LEU:H	1.38	0.72
4:Y:121:GLU:HG3	4:Y:123:ARG:H	1.56	0.70
3:S:245:ILE:HD12	3:S:445:TRP:CH2	2.26	0.70

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
3	O	463/485 (96%)	438 (95%)	25 (5%)	0	100 100
3	S	463/485 (96%)	437 (94%)	26 (6%)	0	100 100
3	U	464/485 (96%)	443 (96%)	21 (4%)	0	100 100
3	W	463/485 (96%)	439 (95%)	24 (5%)	0	100 100
4	P	381/442 (86%)	353 (93%)	28 (7%)	0	100 100
4	T	400/442 (90%)	380 (95%)	20 (5%)	0	100 100
4	X	382/442 (86%)	357 (94%)	25 (6%)	0	100 100
4	Y	400/442 (90%)	383 (96%)	17 (4%)	0	100 100
All	All	3416/3708 (92%)	3230 (95%)	186 (5%)	0	100 100

There are no Ramachandran outliers to report.

### 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
3	O	393/408 (96%)	393 (100%)	0	100 100
3	S	393/408 (96%)	393 (100%)	0	100 100
3	U	394/408 (97%)	394 (100%)	0	100 100
3	W	393/408 (96%)	393 (100%)	0	100 100
4	P	331/380 (87%)	331 (100%)	0	100 100
4	T	346/380 (91%)	346 (100%)	0	100 100

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	X	334/380 (88%)	334 (100%)	0	100	100
4	Y	346/380 (91%)	346 (100%)	0	100	100
All	All	2930/3152 (93%)	2930 (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. 5 of 35 such sidechains are listed below:

Mol	Chain	Res	Type
3	U	118	HIS
3	U	272	GLN
4	X	288	ASN
4	P	8	ASN
3	O	326	HIS

### 5.3.3 RNA [\(i\)](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	F	19/20 (95%)	5 (26%)	0
2	J	19/20 (95%)	5 (26%)	0
2	R	19/20 (95%)	5 (26%)	0
2	V	19/20 (95%)	5 (26%)	0
6	N	10/11 (90%)	3 (30%)	0
All	All	86/91 (94%)	23 (26%)	0

5 of 23 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	R	14	G
2	R	15	A
2	R	16	C
2	R	19	U
2	R	20	A

There are no RNA pucker outliers to report.

### 5.4 Non-standard residues in protein, DNA, RNA chains [\(i\)](#)

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

## 5.5 Carbohydrates [\(i\)](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [\(i\)](#)

There are no ligands in this entry.

## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [\(i\)](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
3	W	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	W	329:THR	C	330:LEU	N	1.19

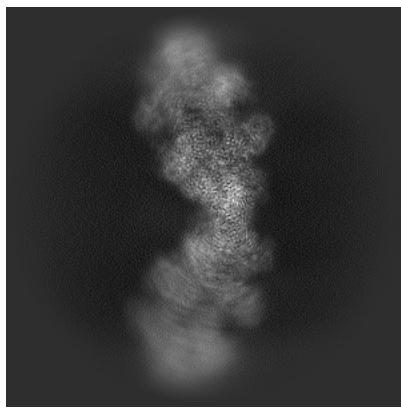
## 6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-65406. These allow visual inspection of the internal detail of the map and identification of artifacts.

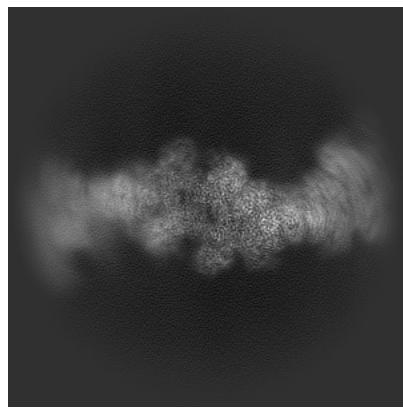
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections (i)

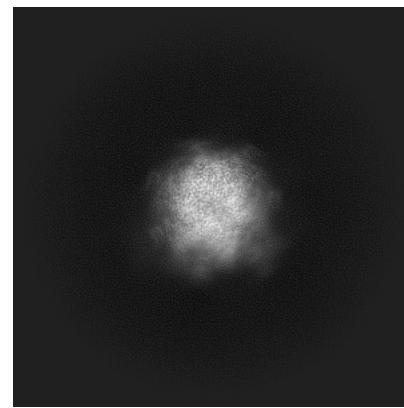
#### 6.1.1 Primary map



X

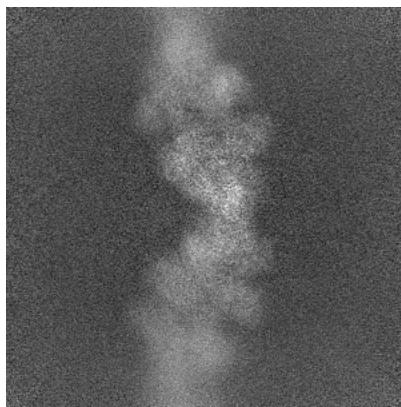


Y

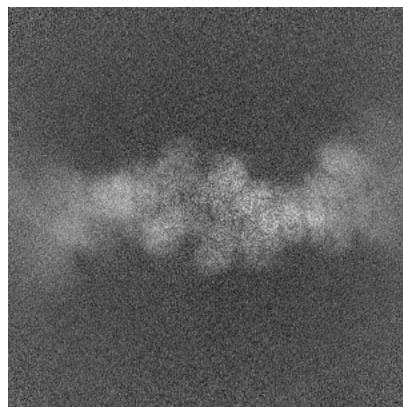


Z

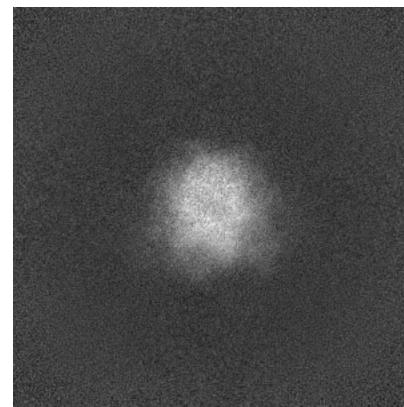
#### 6.1.2 Raw map



X



Y

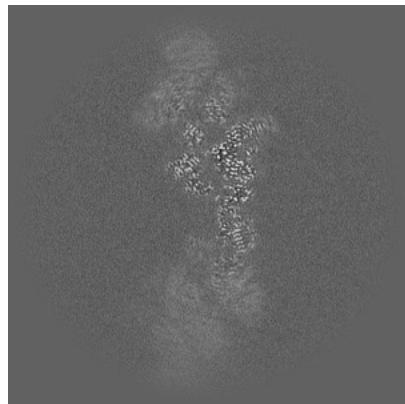


Z

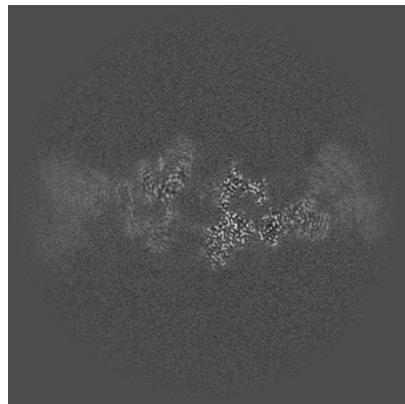
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [\(i\)](#)

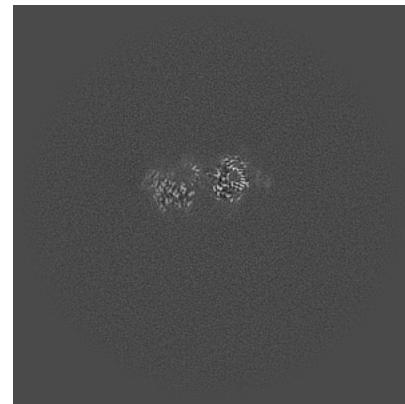
### 6.2.1 Primary map



X Index: 360

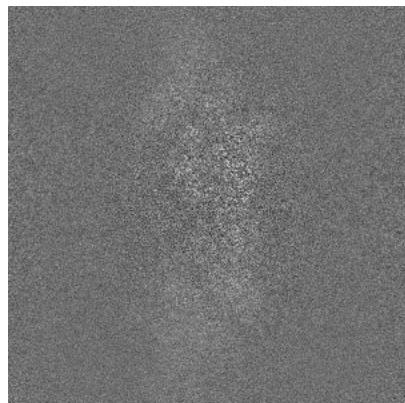


Y Index: 360

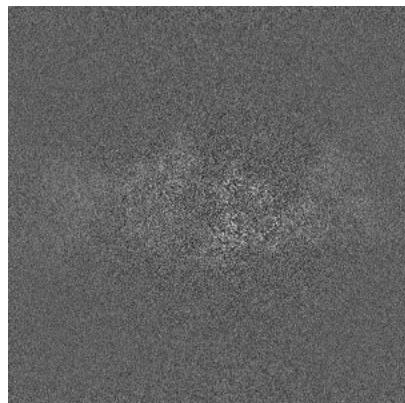


Z Index: 360

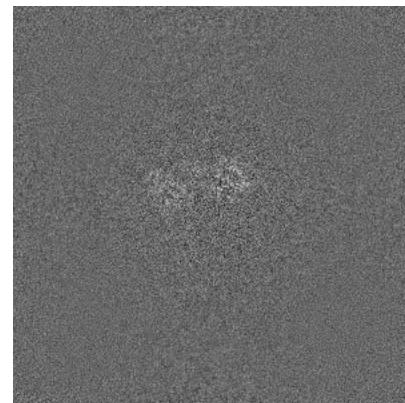
### 6.2.2 Raw map



X Index: 360



Y Index: 360

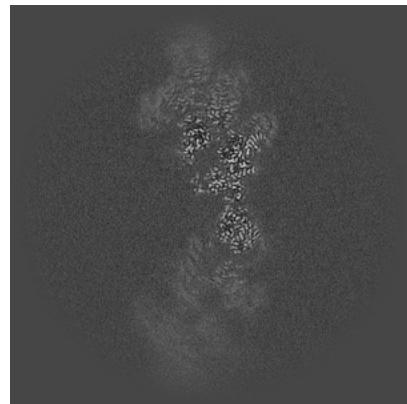


Z Index: 360

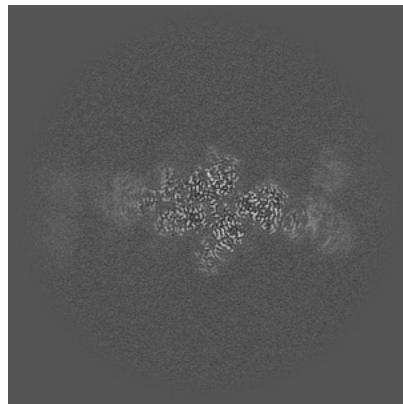
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [\(i\)](#)

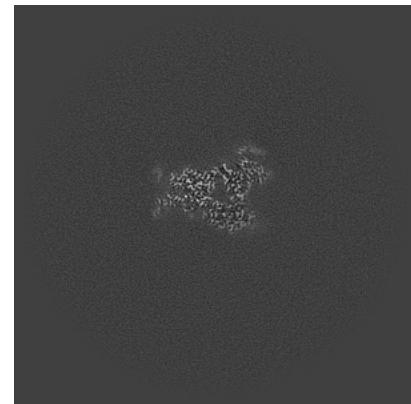
### 6.3.1 Primary map



X Index: 345

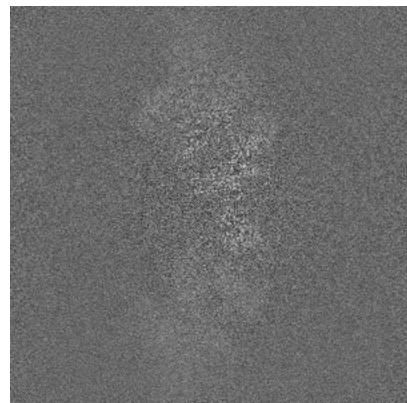


Y Index: 400

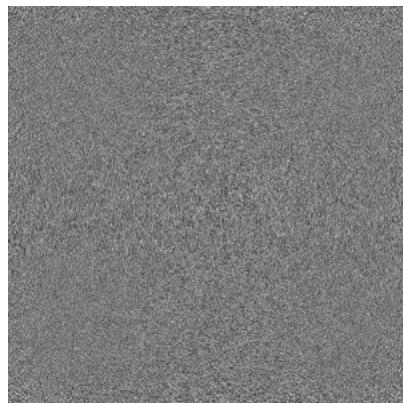


Z Index: 393

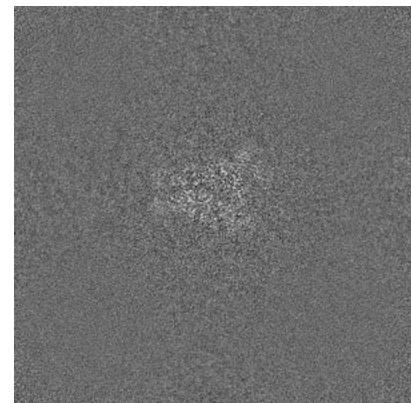
### 6.3.2 Raw map



X Index: 345



Y Index: 0

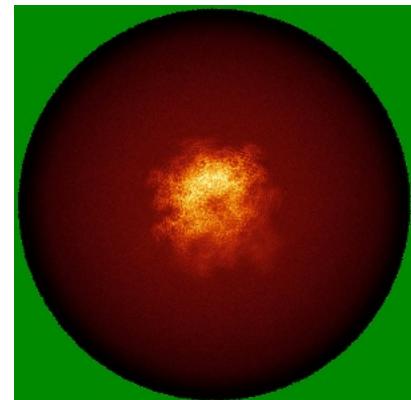
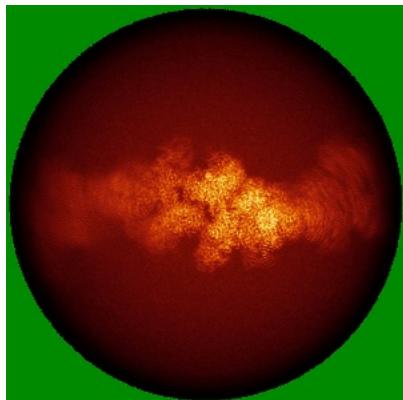
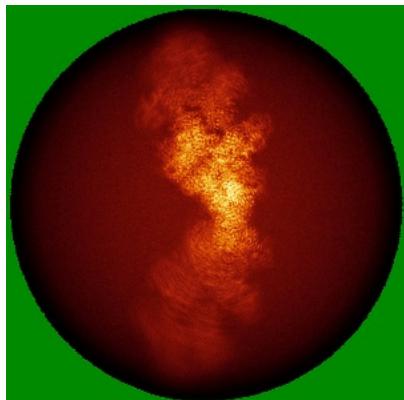


Z Index: 388

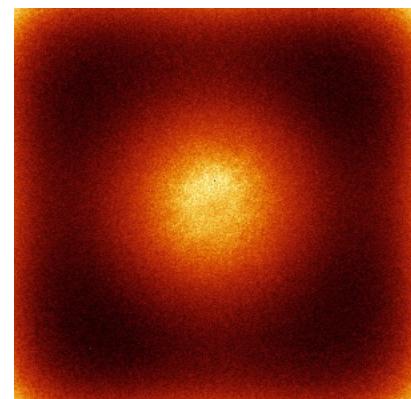
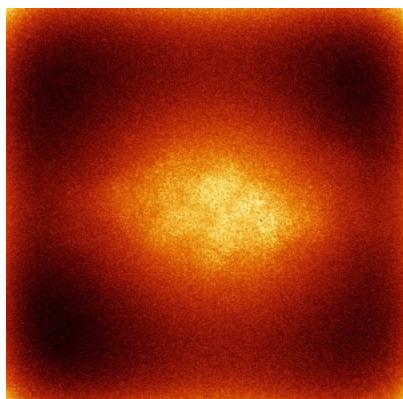
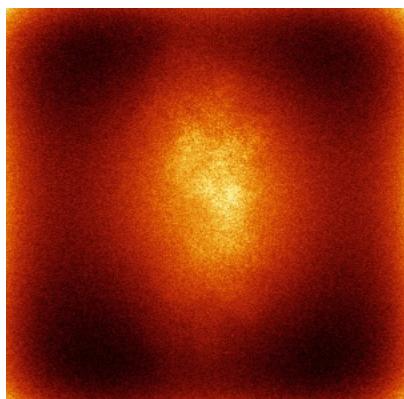
The images above show the largest variance slices of the map in three orthogonal directions.

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

### 6.4.1 Primary map



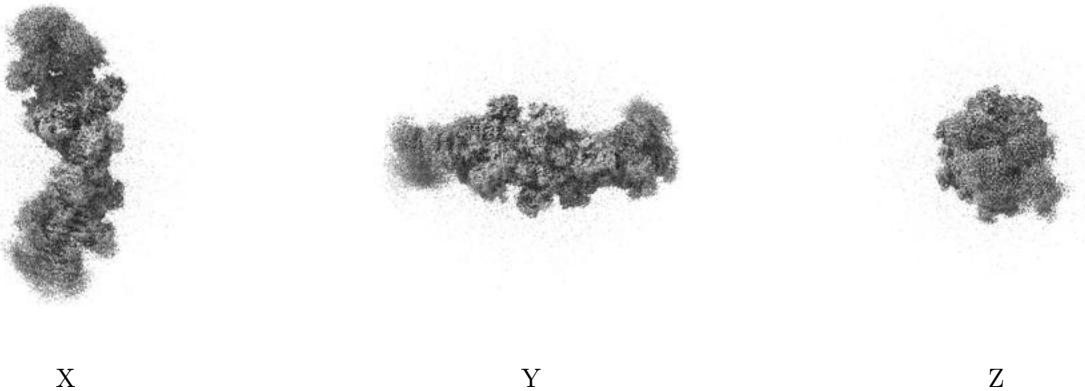
### 6.4.2 Raw map



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

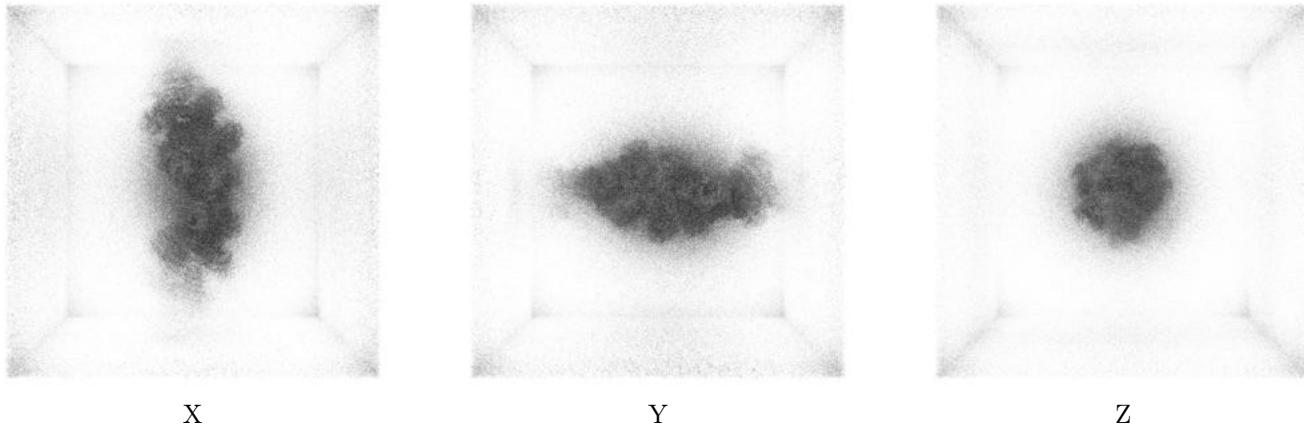
## 6.5 Orthogonal surface views [\(i\)](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.095. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

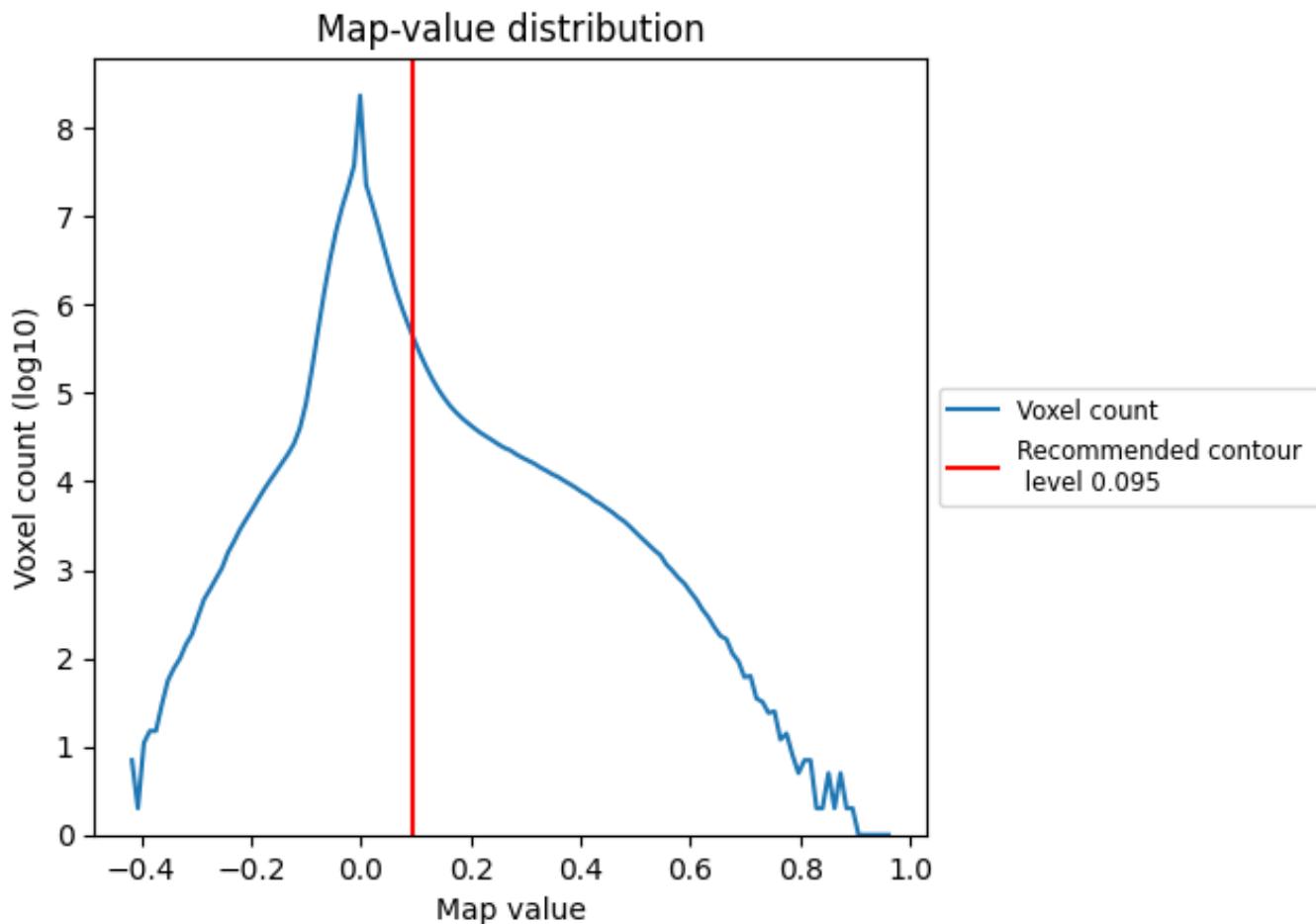
## 6.6 Mask visualisation [\(i\)](#)

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

## 7 Map analysis (i)

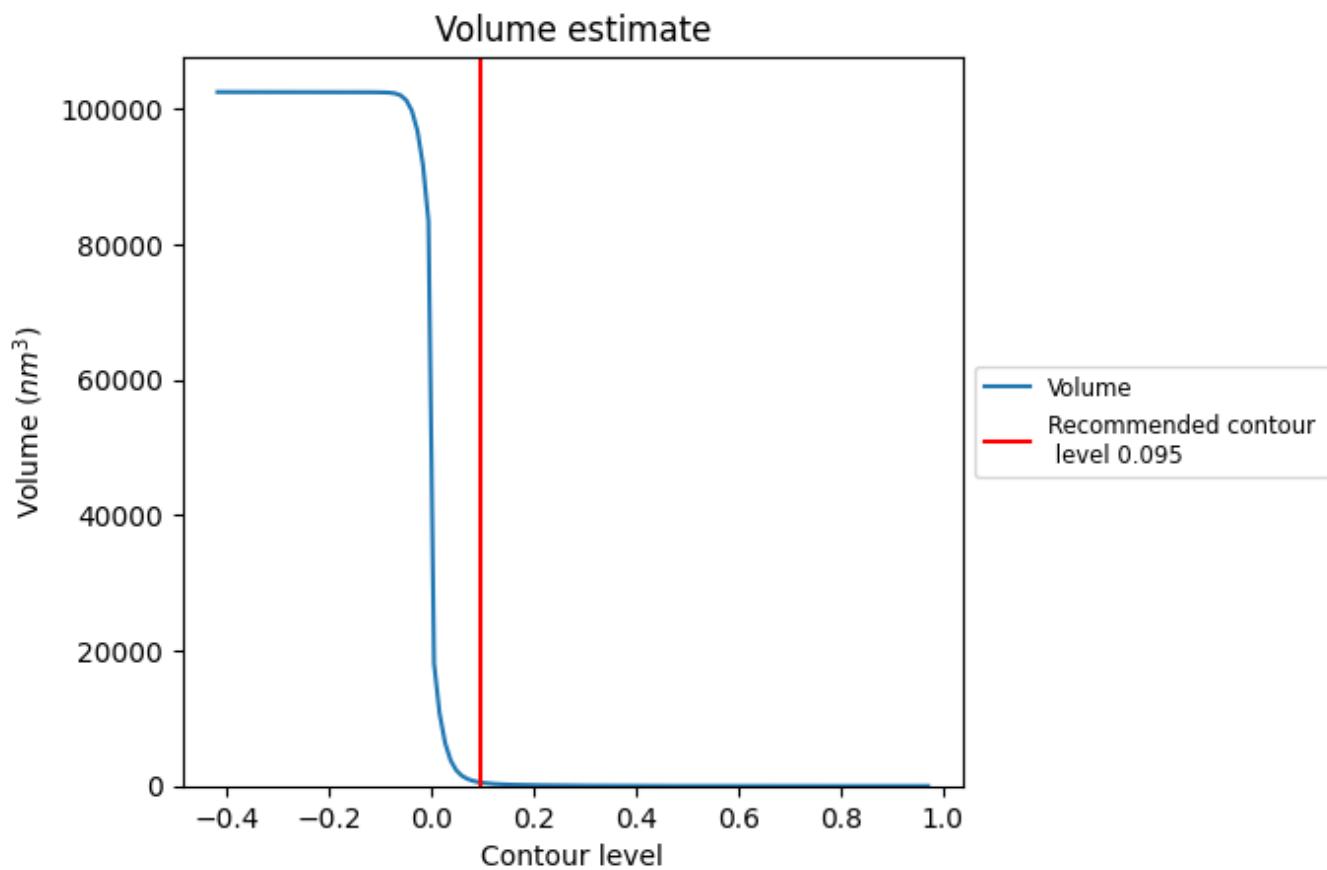
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution (i)



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

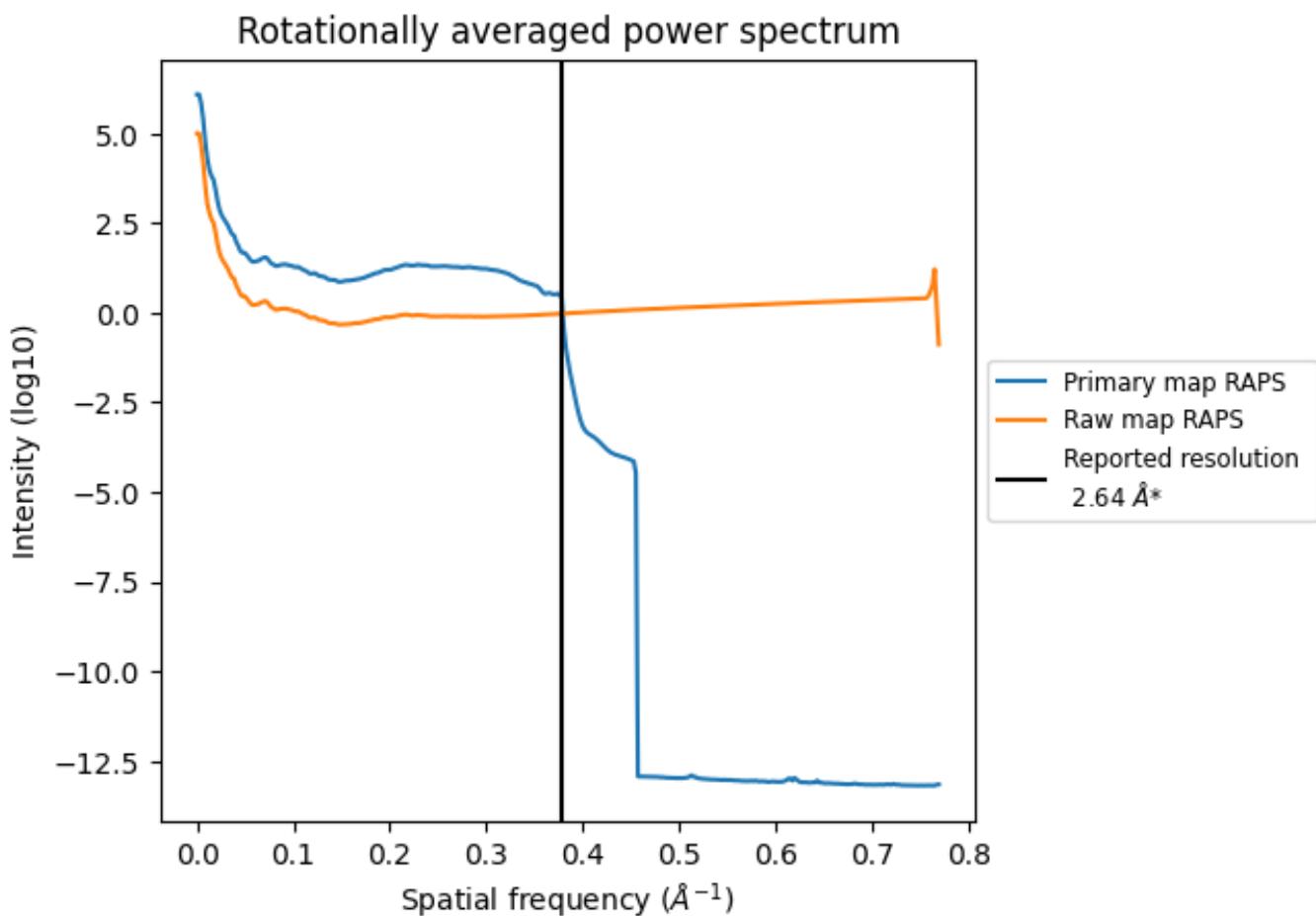
## 7.2 Volume estimate (i)



The volume at the recommended contour level is  $542 \text{ nm}^3$ ; this corresponds to an approximate mass of 490 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)

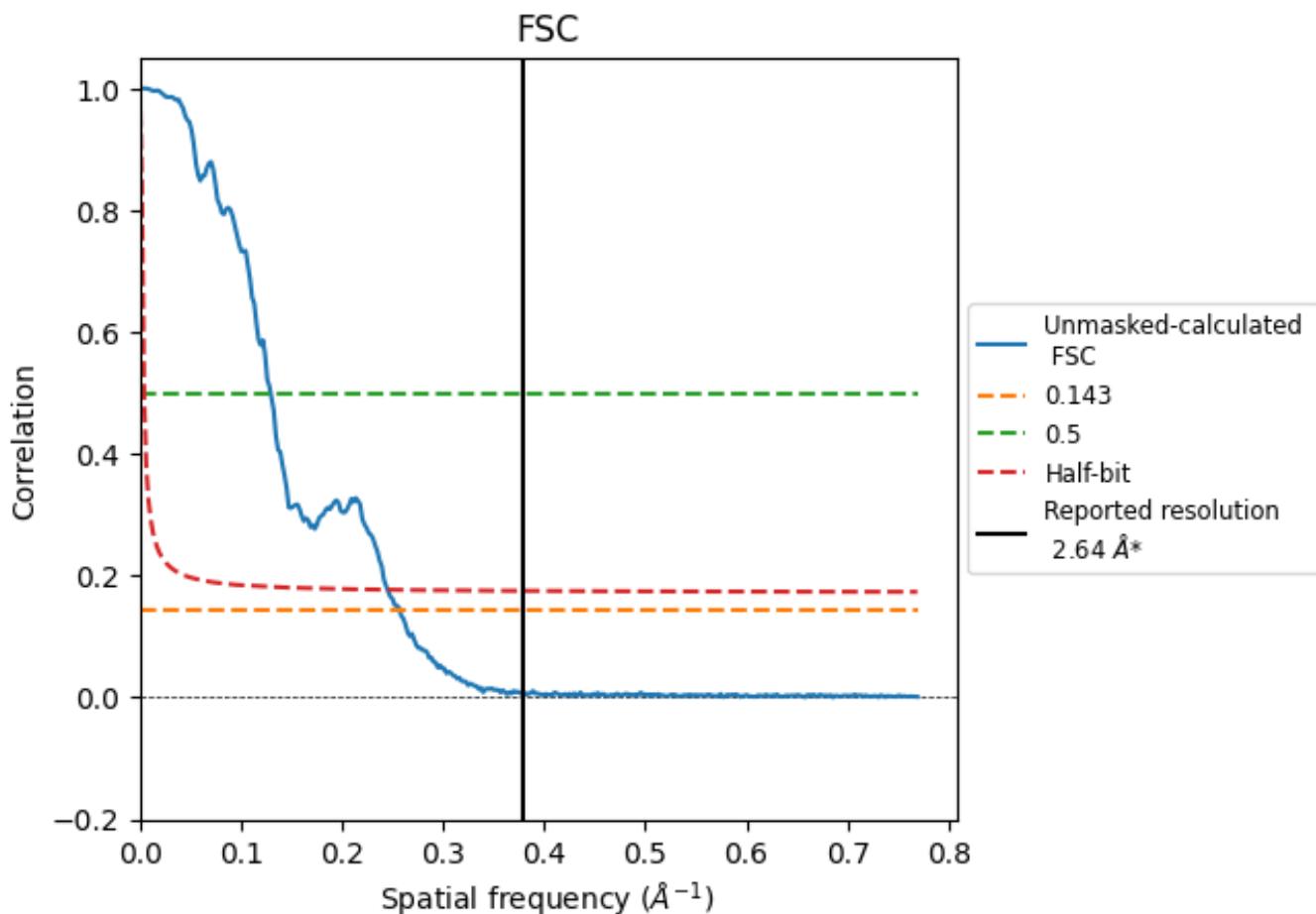


\*Reported resolution corresponds to spatial frequency of 0.379 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [\(i\)](#)

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

### 8.1 FSC [\(i\)](#)



\*Reported resolution corresponds to spatial frequency of 0.379 Å<sup>-1</sup>

## 8.2 Resolution estimates [\(i\)](#)

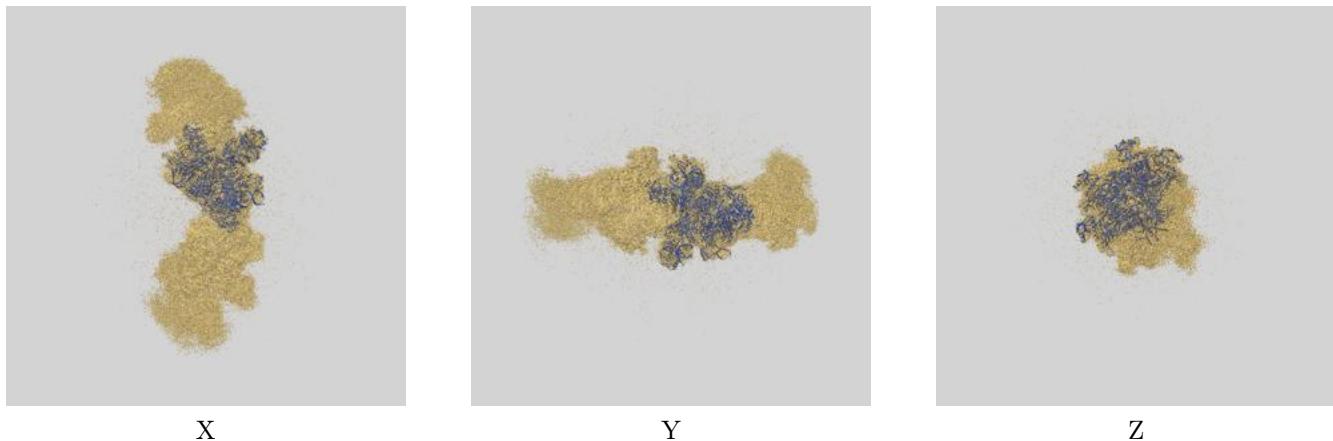
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.64	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.89	7.73	4.08

\*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 3.89 differs from the reported value 2.64 by more than 10 %

## 9 Map-model fit i

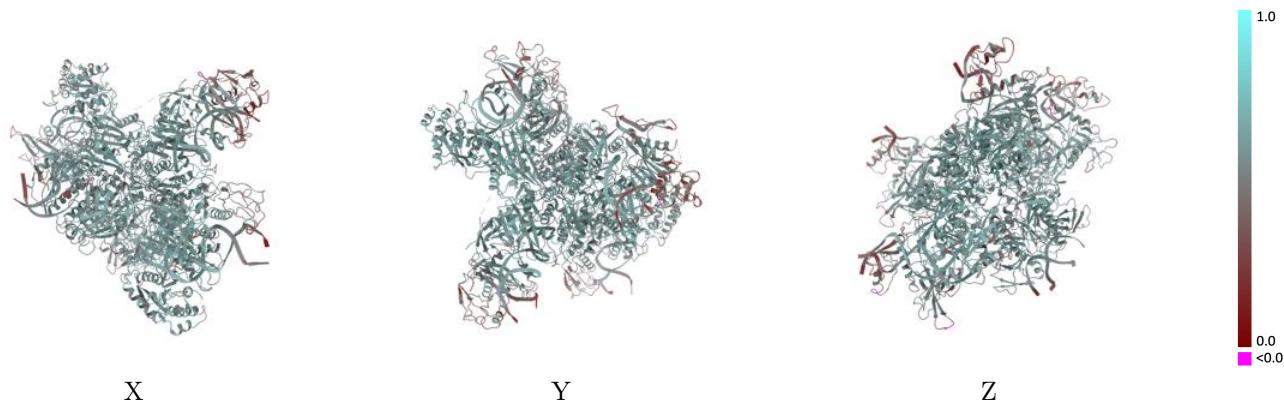
This section contains information regarding the fit between EMDB map EMD-65406 and PDB model 9VX6. Per-residue inclusion information can be found in section 3 on page 6.

### 9.1 Map-model overlay i



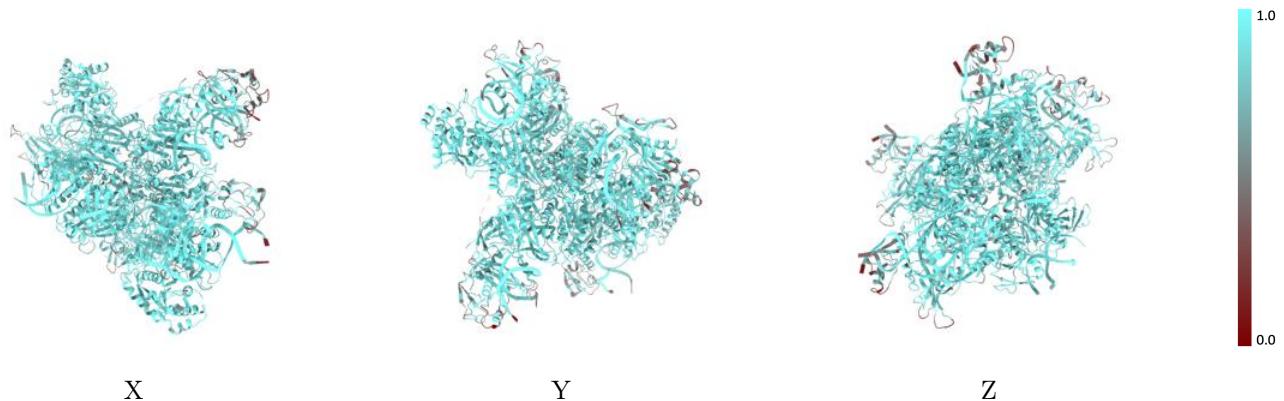
The images above show the 3D surface view of the map at the recommended contour level 0.095 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



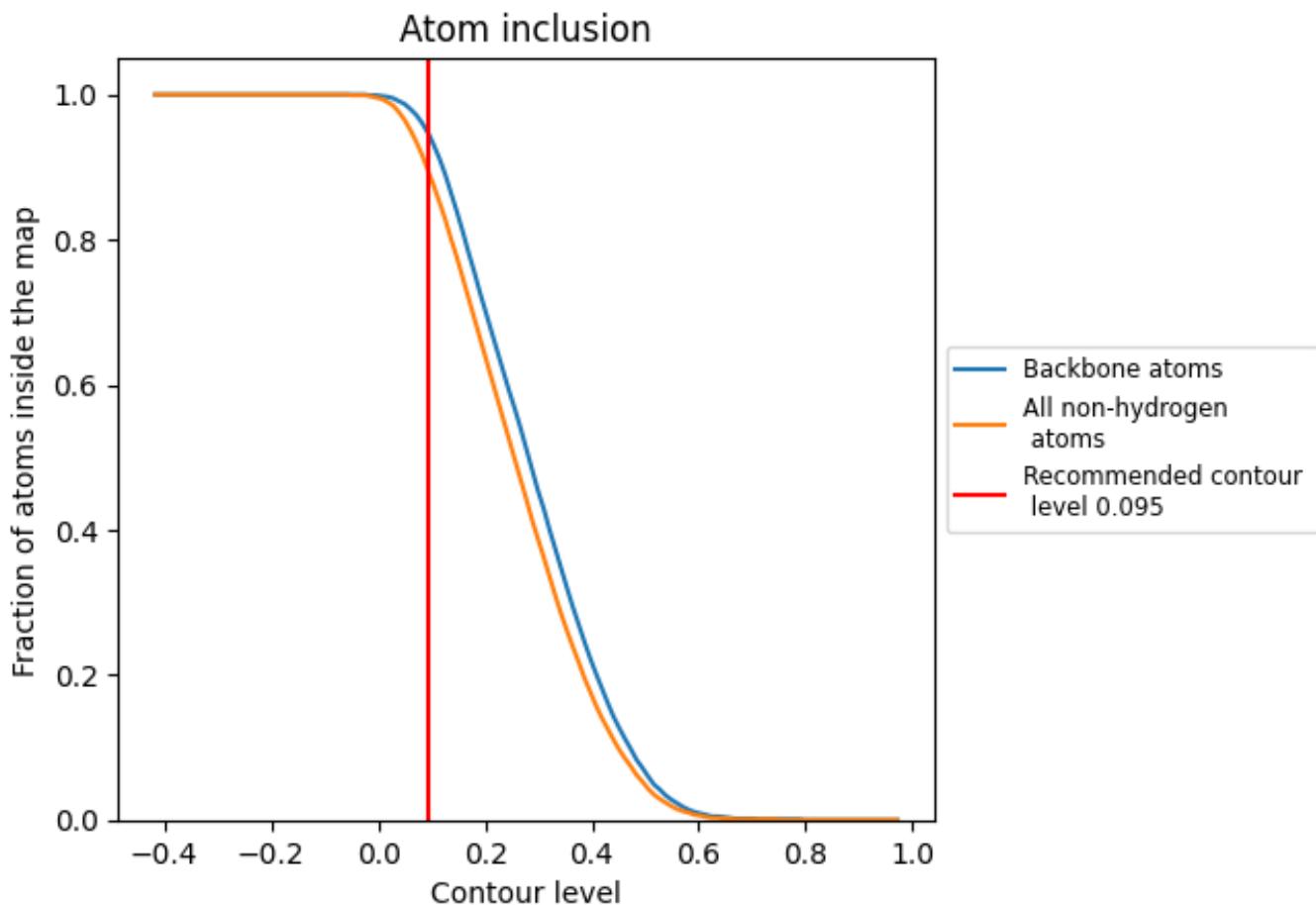
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

## 9.3 Atom inclusion mapped to coordinate model [\(i\)](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.095).

## 9.4 Atom inclusion [\(i\)](#)



At the recommended contour level, 94% of all backbone atoms, 89% 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 (0.095) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8920	0.5570
E	0.8760	0.5230
F	0.8990	0.5550
I	0.9000	0.5380
J	0.9200	0.5680
L	0.8950	0.5480
M	0.9200	0.5010
N	0.8840	0.4680
O	0.9420	0.6030
P	0.8050	0.4830
Q	0.9050	0.5660
R	0.9150	0.5640
S	0.9310	0.5900
T	0.8260	0.5030
U	0.9480	0.6070
V	0.9150	0.5570
W	0.9490	0.6050
X	0.8300	0.5160
Y	0.8630	0.5350

