



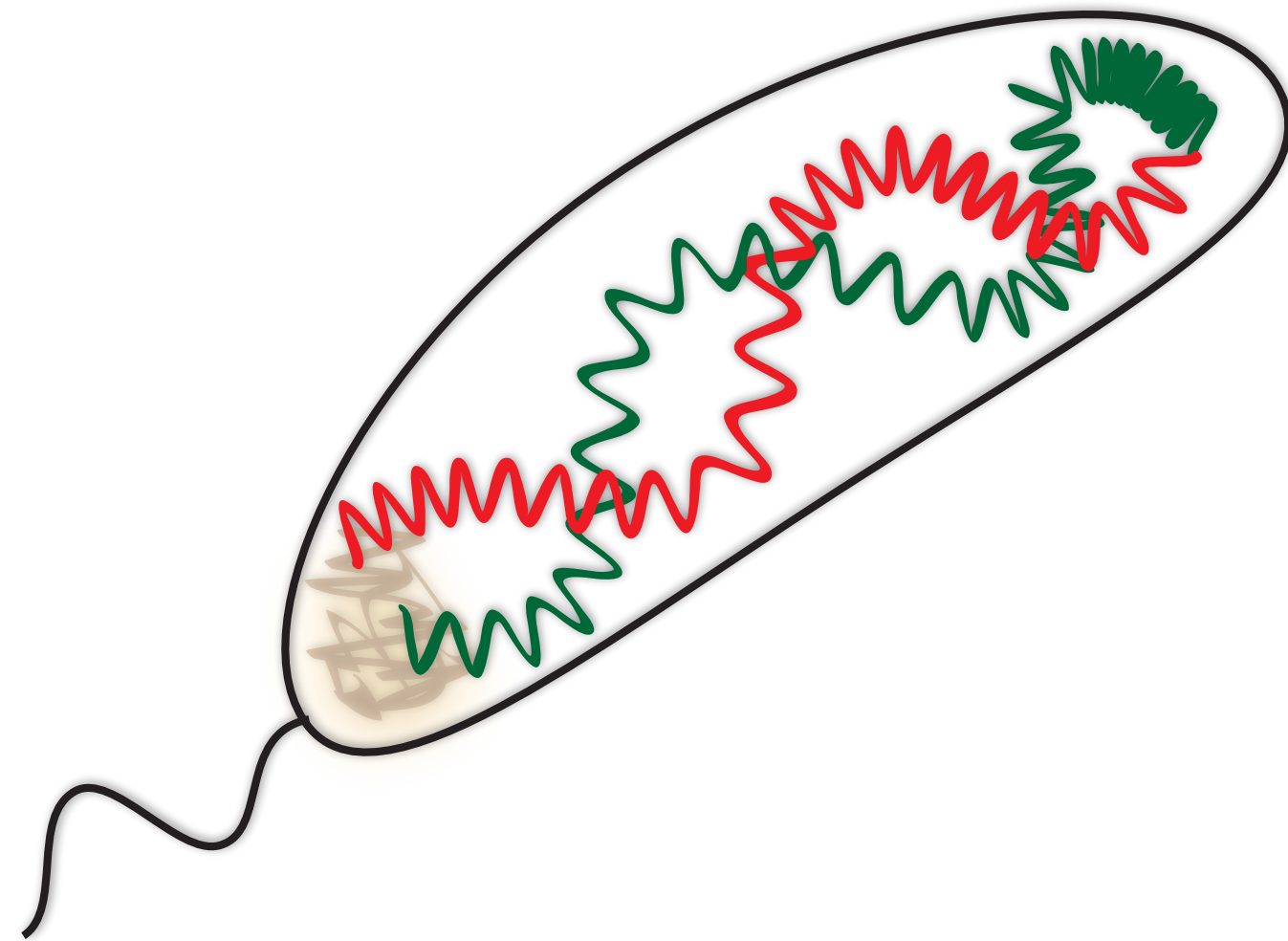
The Three-Dimensional Architecture of a Bacterial Genome and Its Alteration by Genetic Perturbation

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CNAG-CRG · ICREA

<http://marciuslab.org>
<http://3DGenomes.org>
<http://cnag.crg.eu>

cnag CRG[®]  ICREA

Caulobacter crescentus genome



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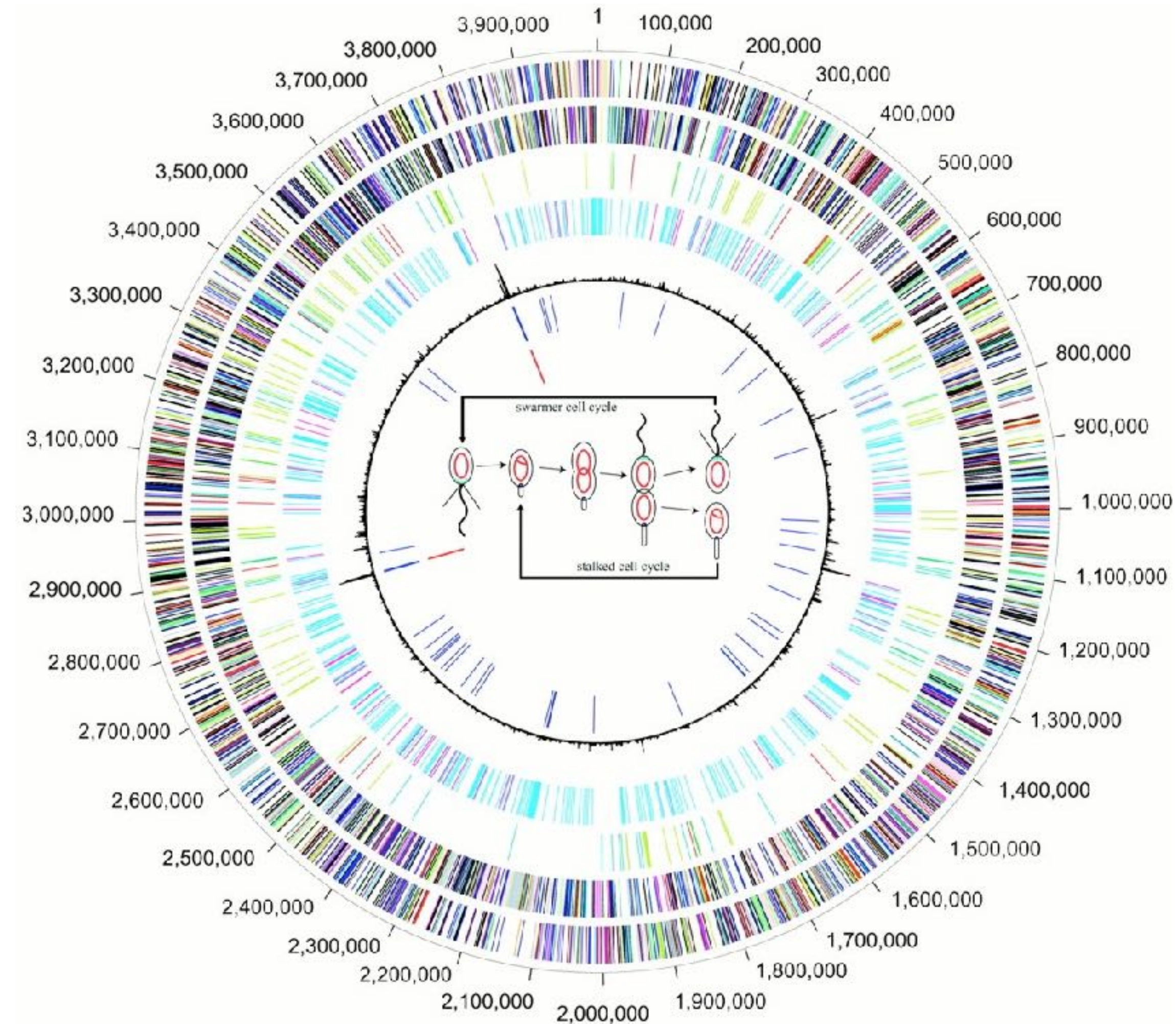
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The 3D architecture of *Caulobacter Crescentus*

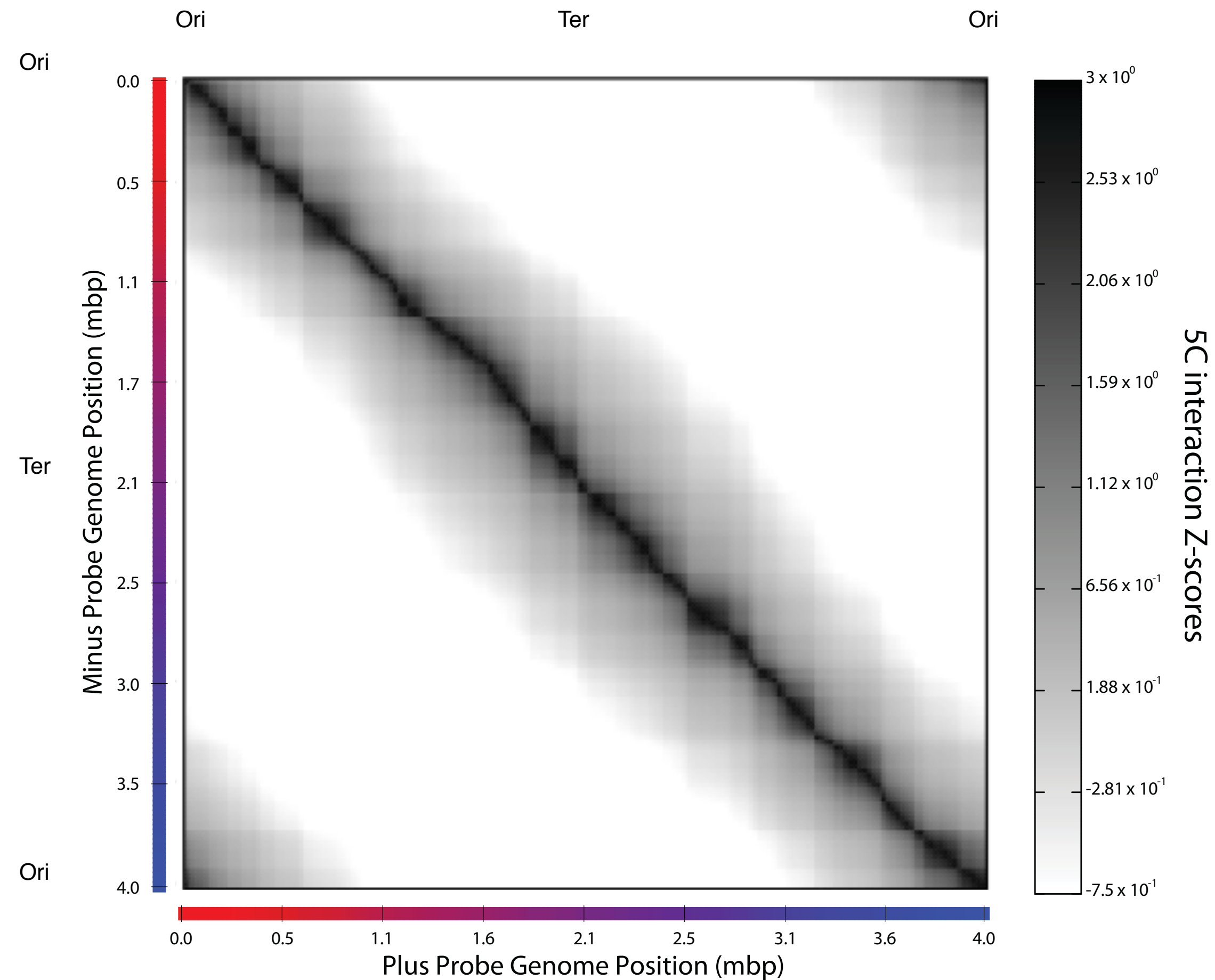
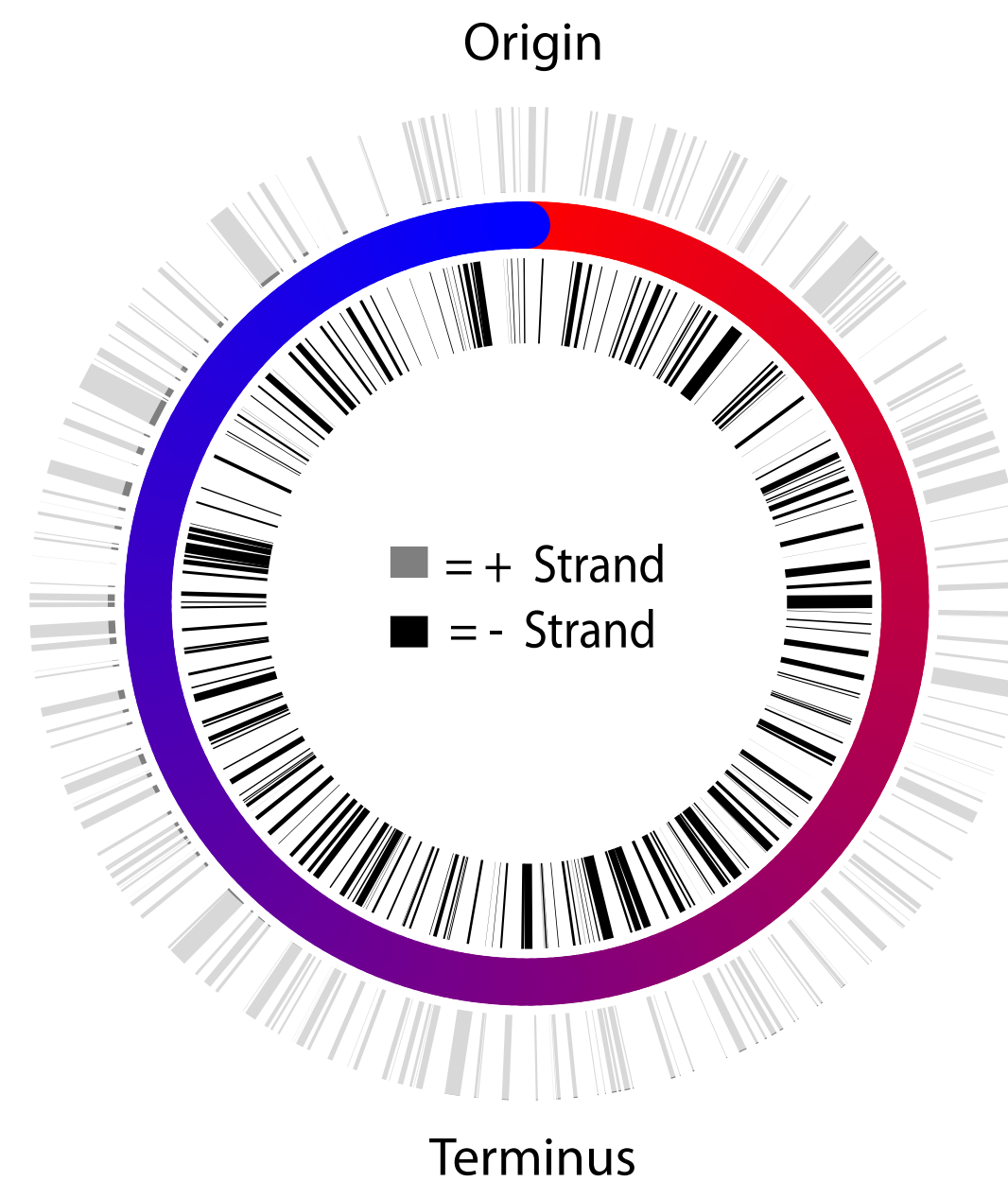
4,016,942 bp & 3,767 genes



Nierman W C et al. PNAS 2001 98:4136-4141

The 3D architecture of *Caulobacter Crescentus*

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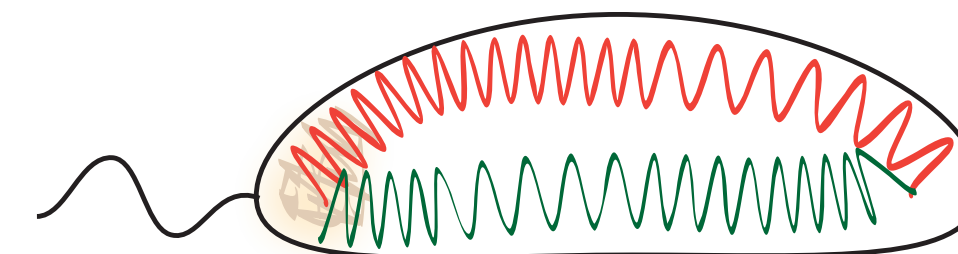
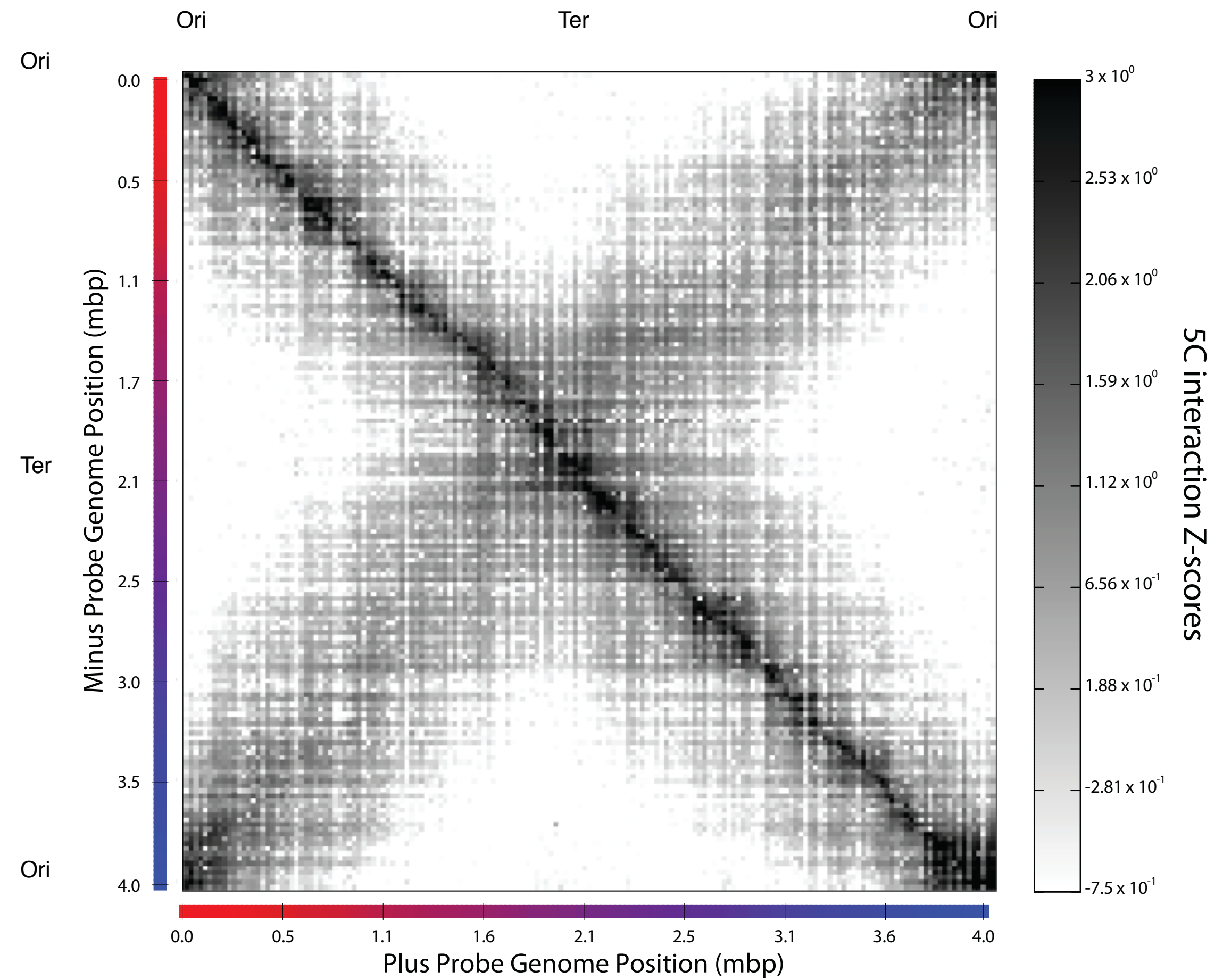
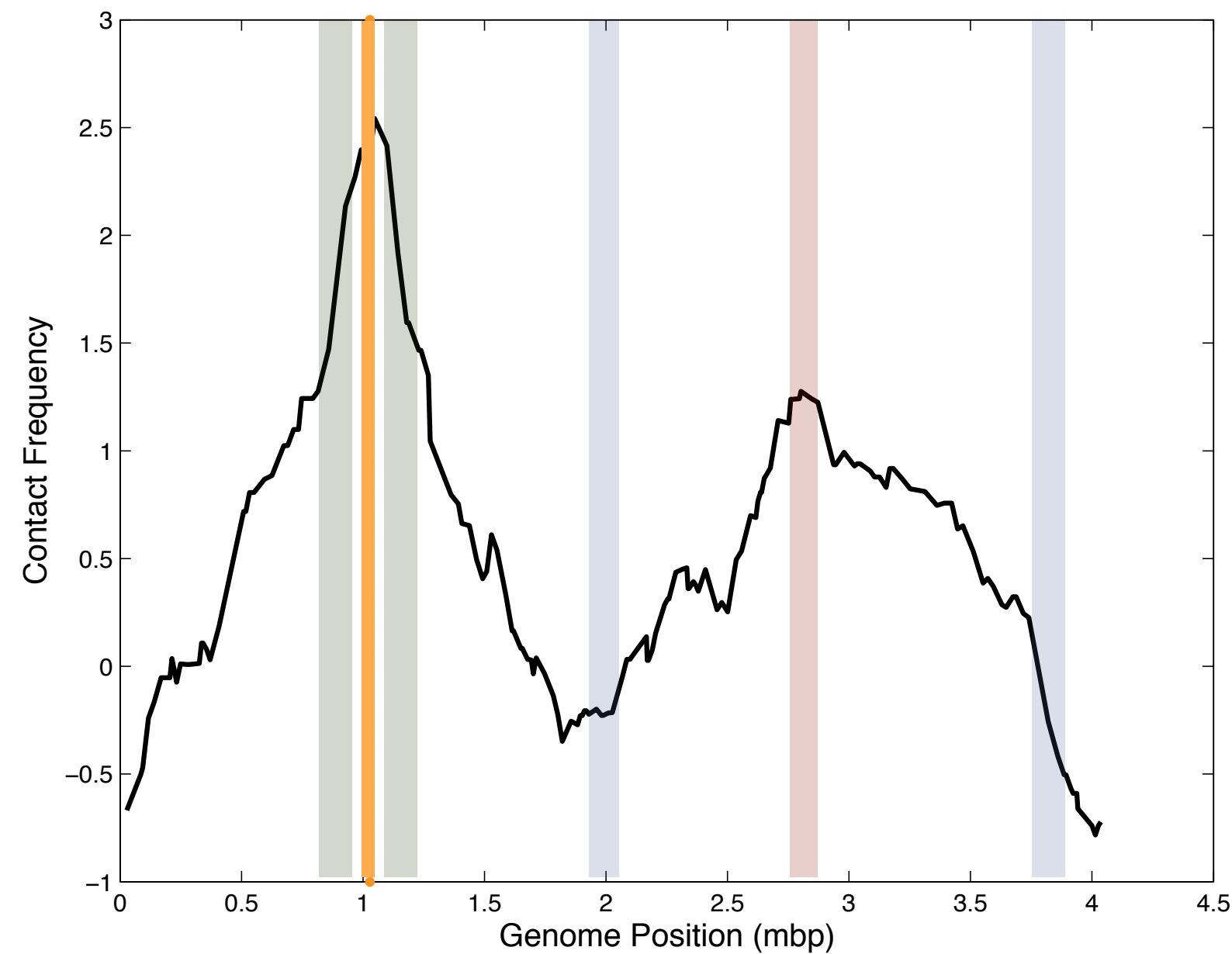
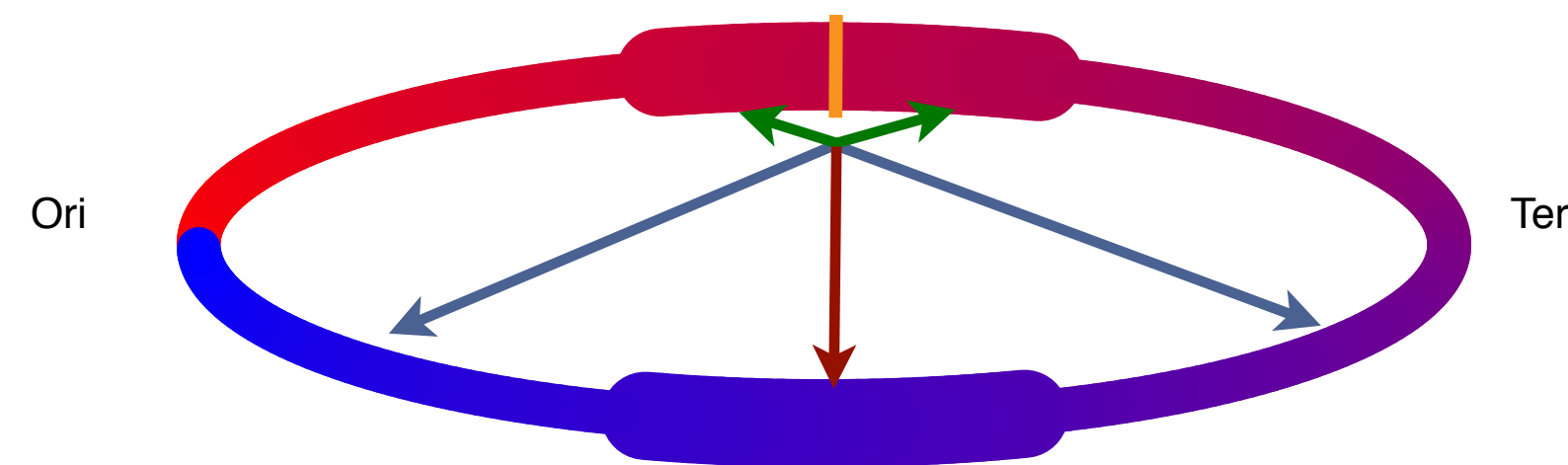


169 5C primers on + strand
170 5C primers on – strand
28,730 chromatin interactions

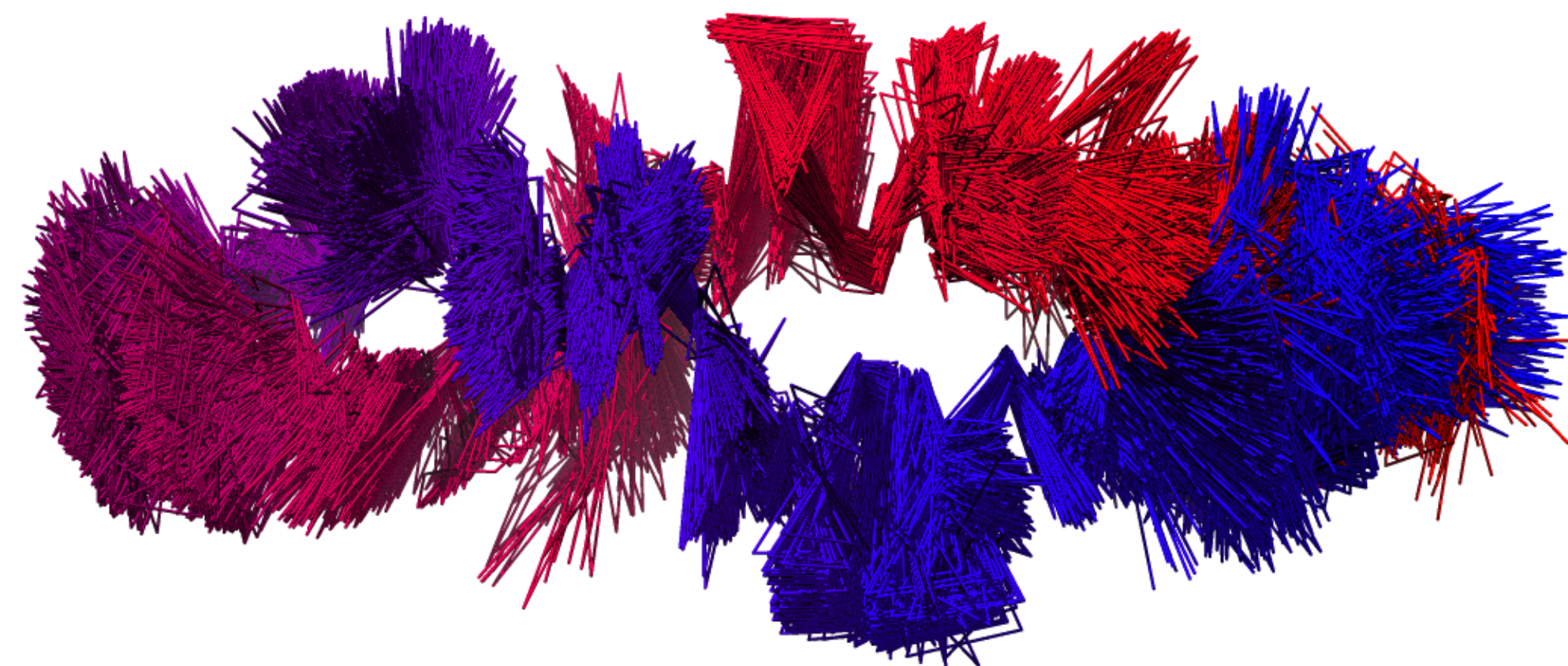
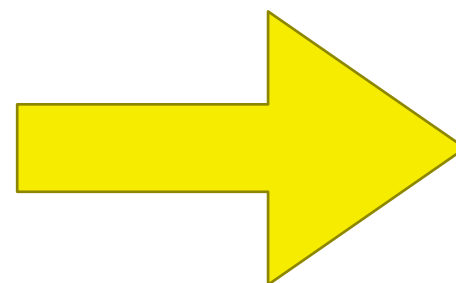
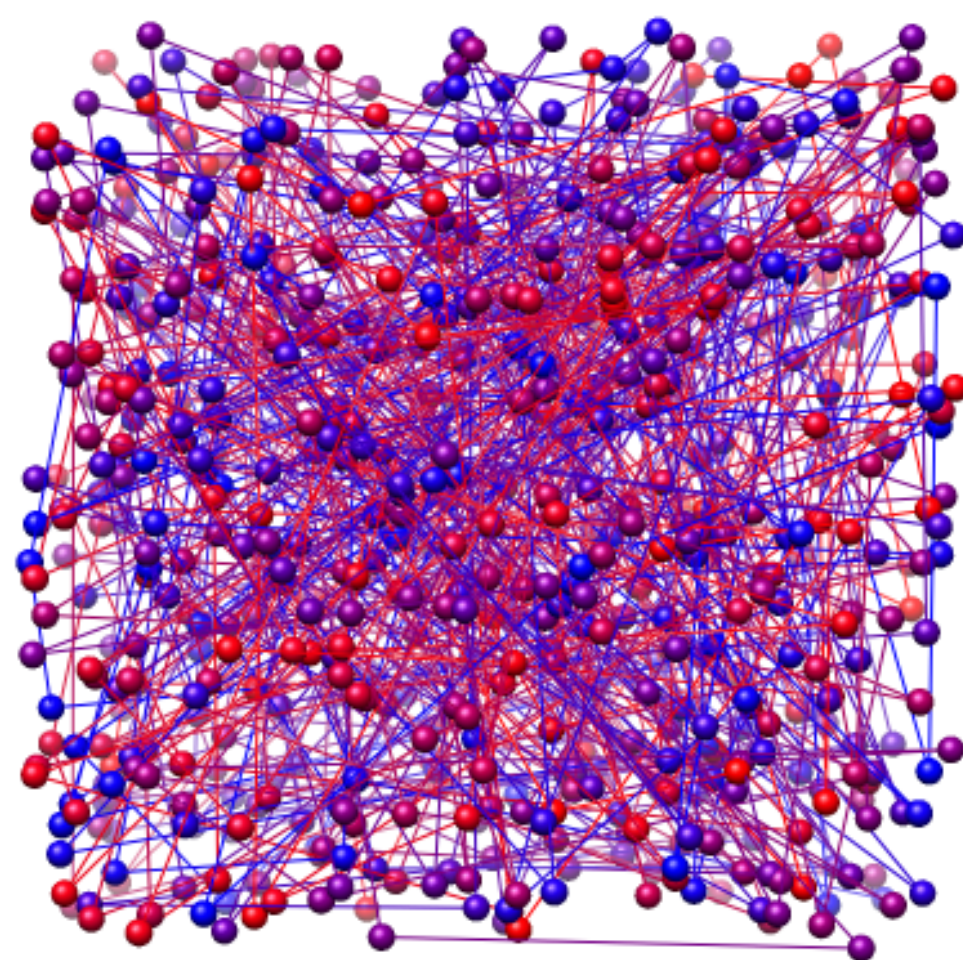
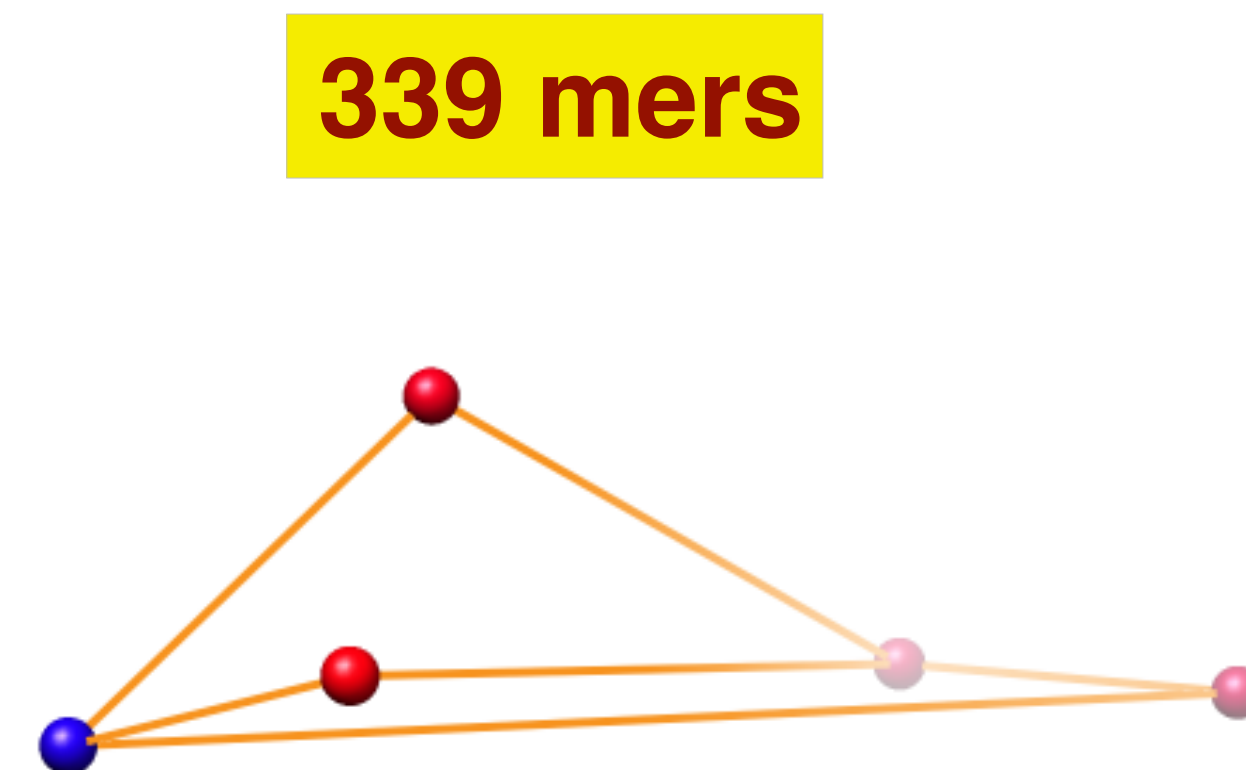
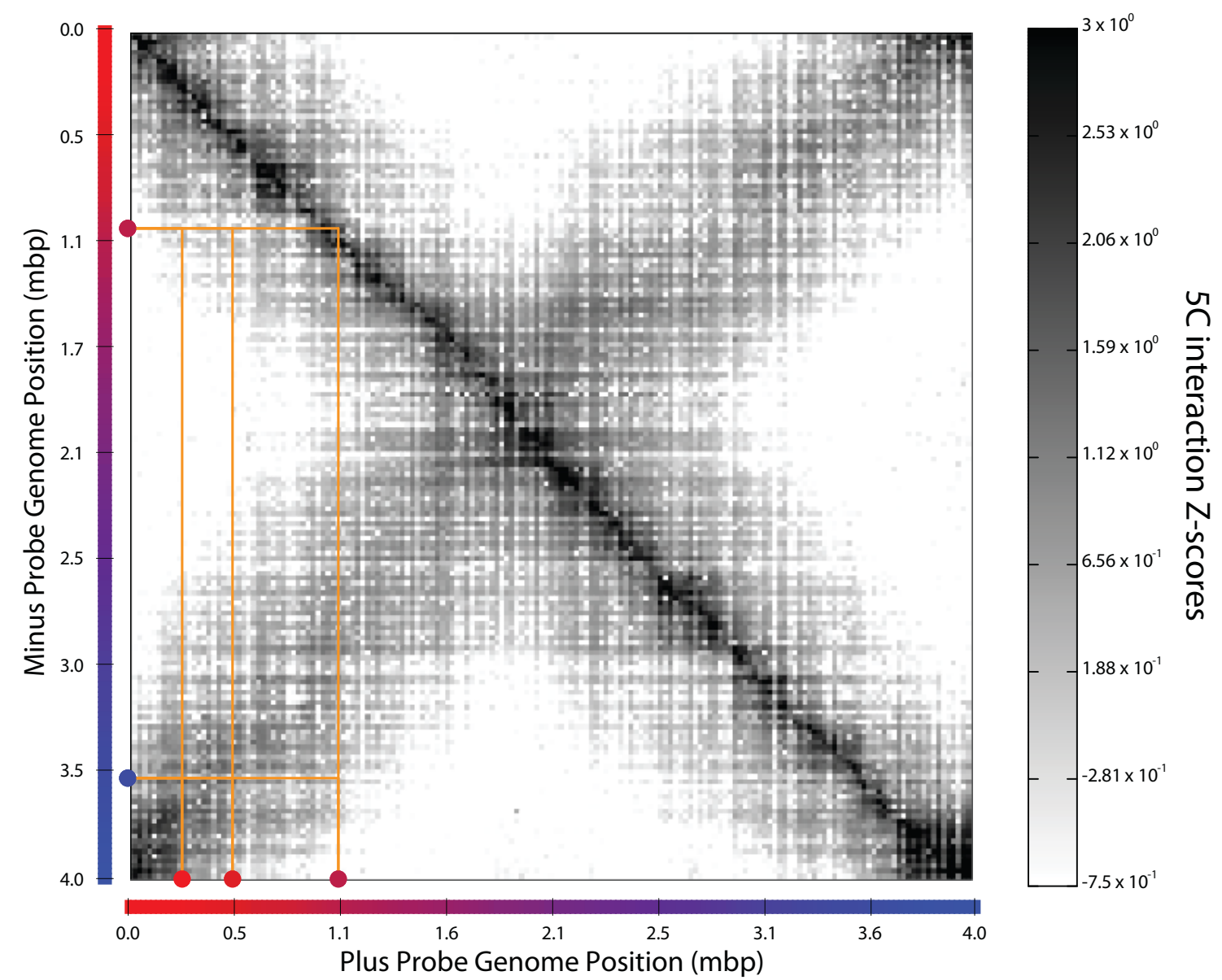
~13Kb

5C interaction matrix

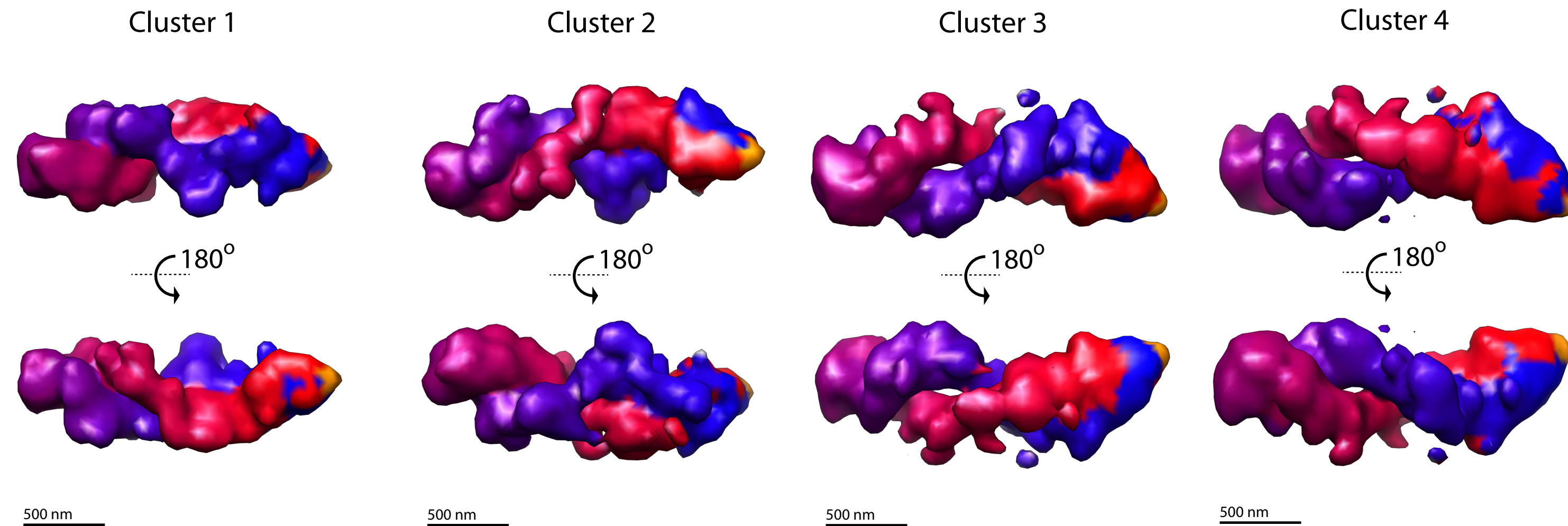
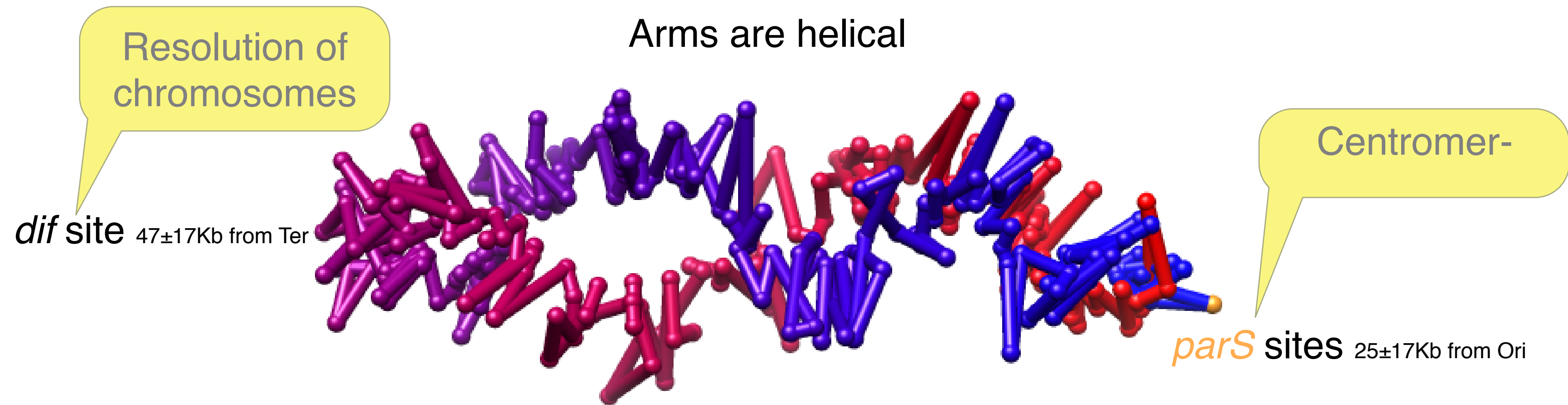
ELLIPSOID for *Caulobacter crescentus*



3D model building with TADbit

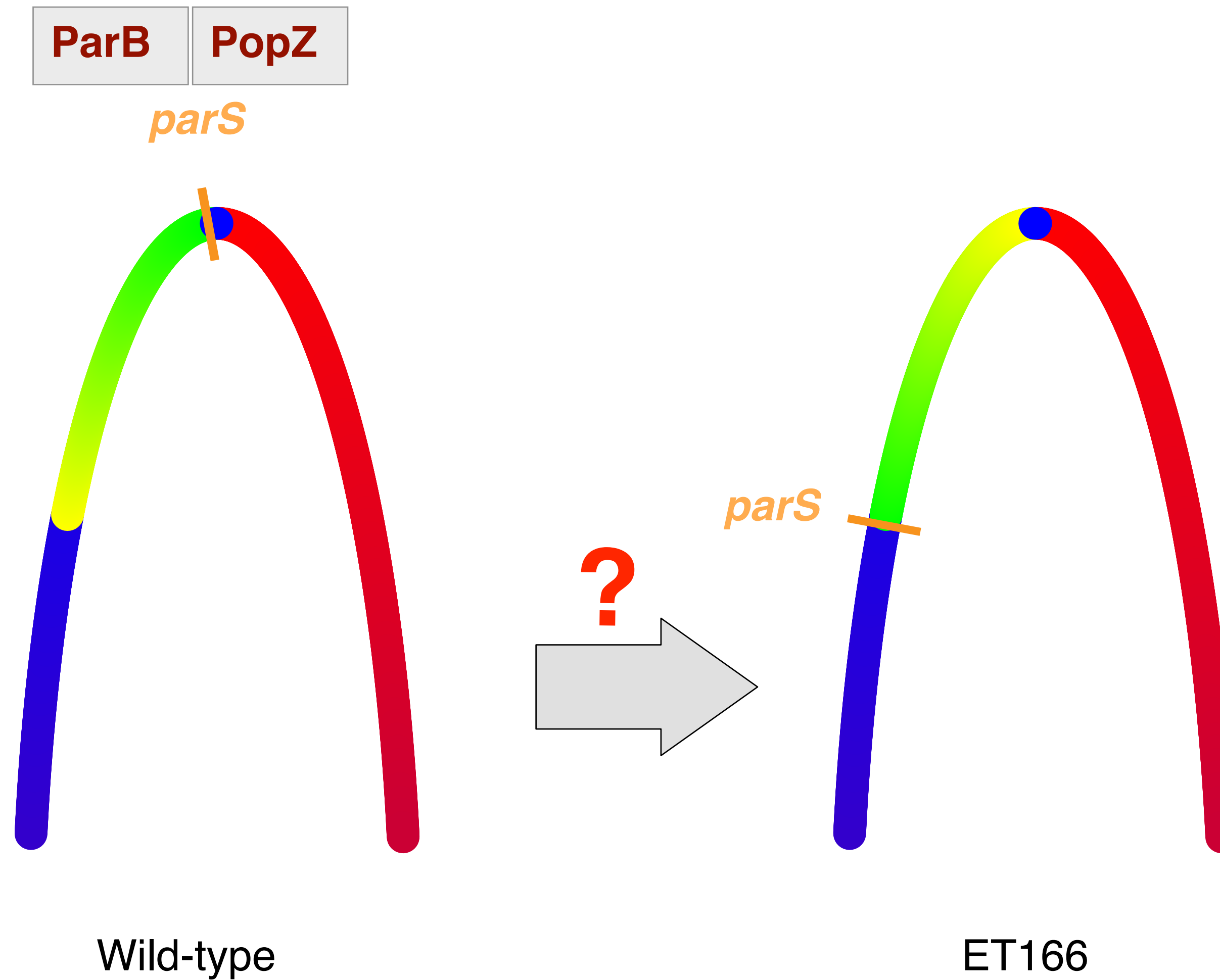


Genome organization in *Caulobacter crescentus*

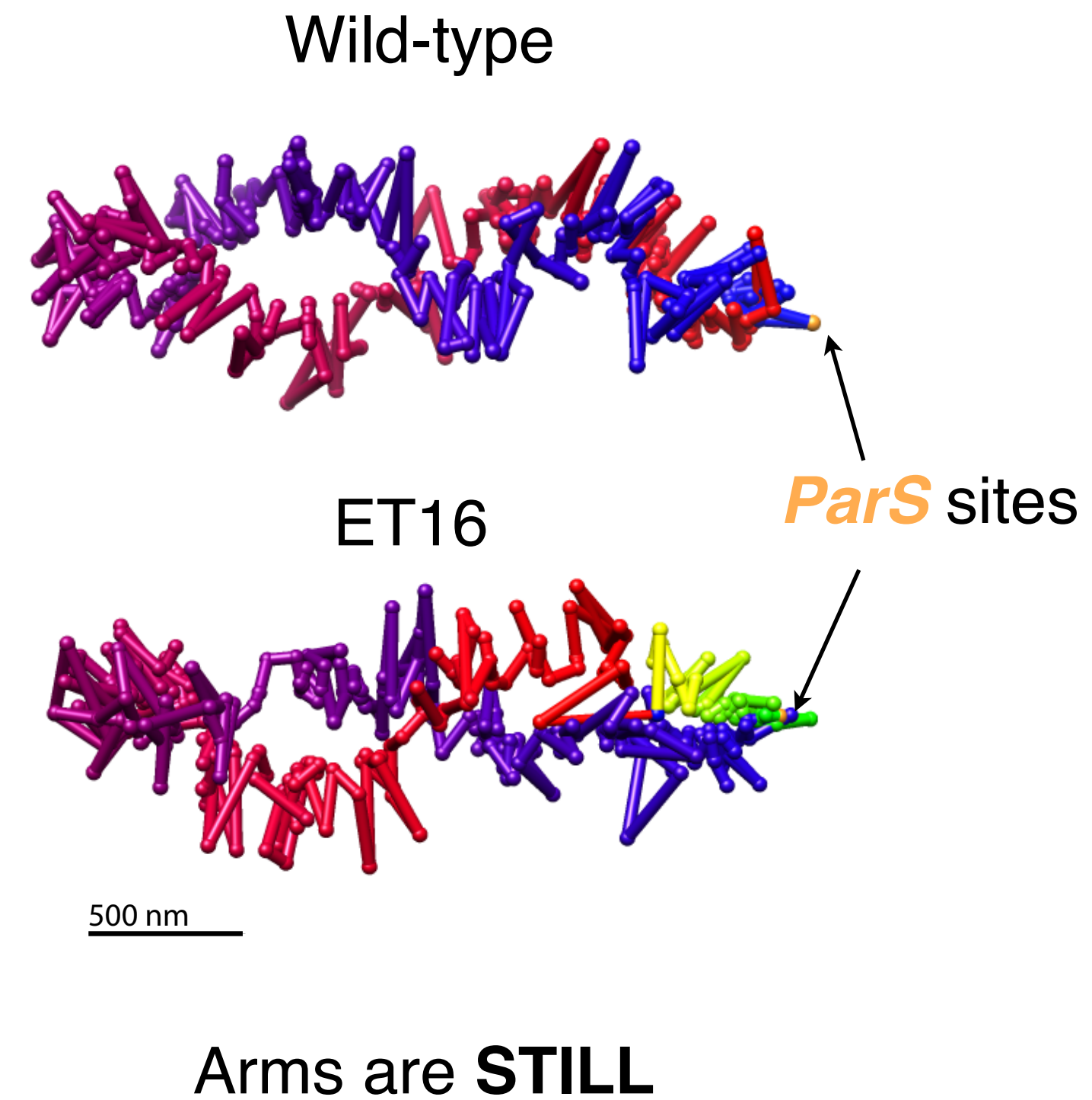
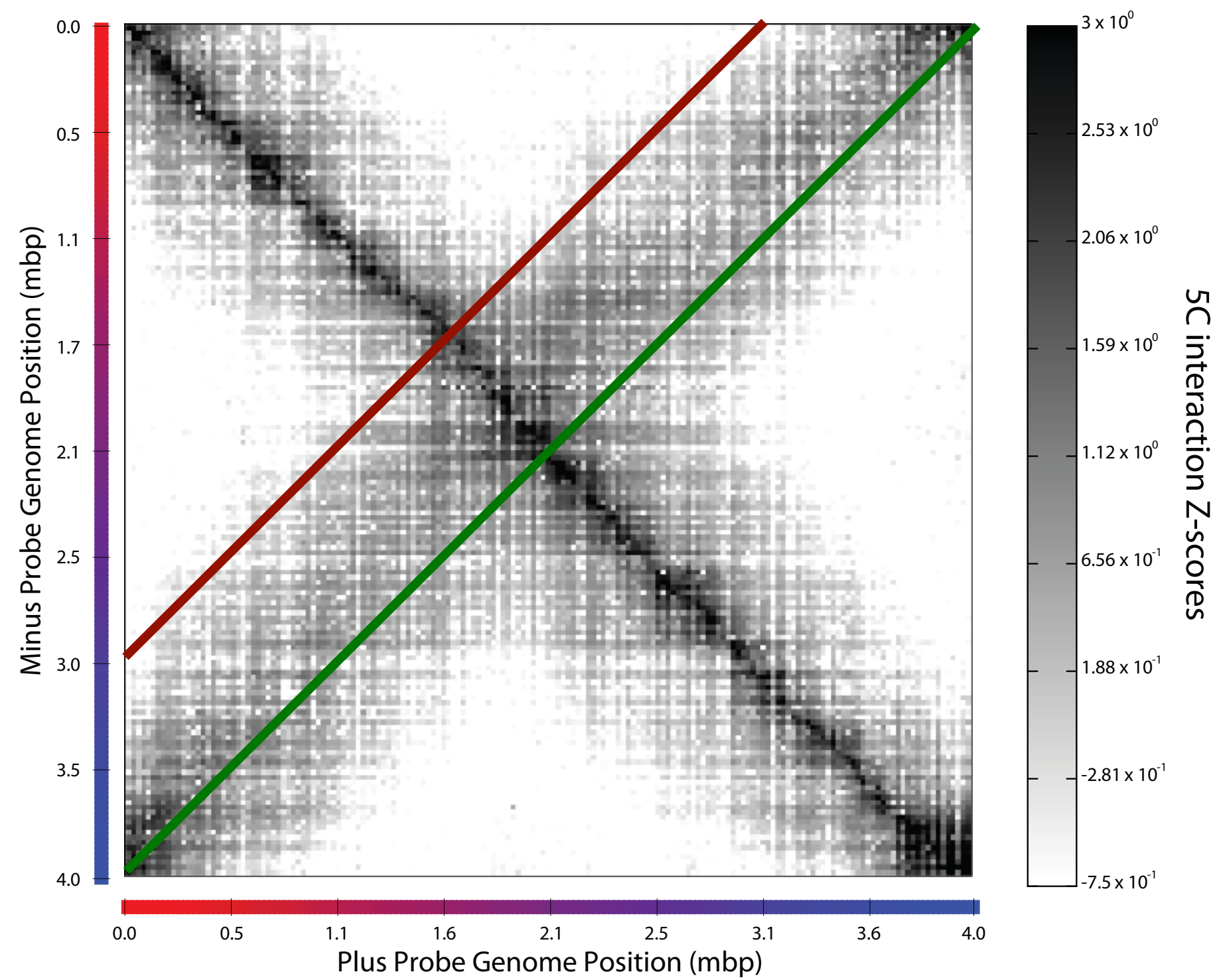


MIRRORS!

Moving the **parS** sites 400 Kb away from Ori

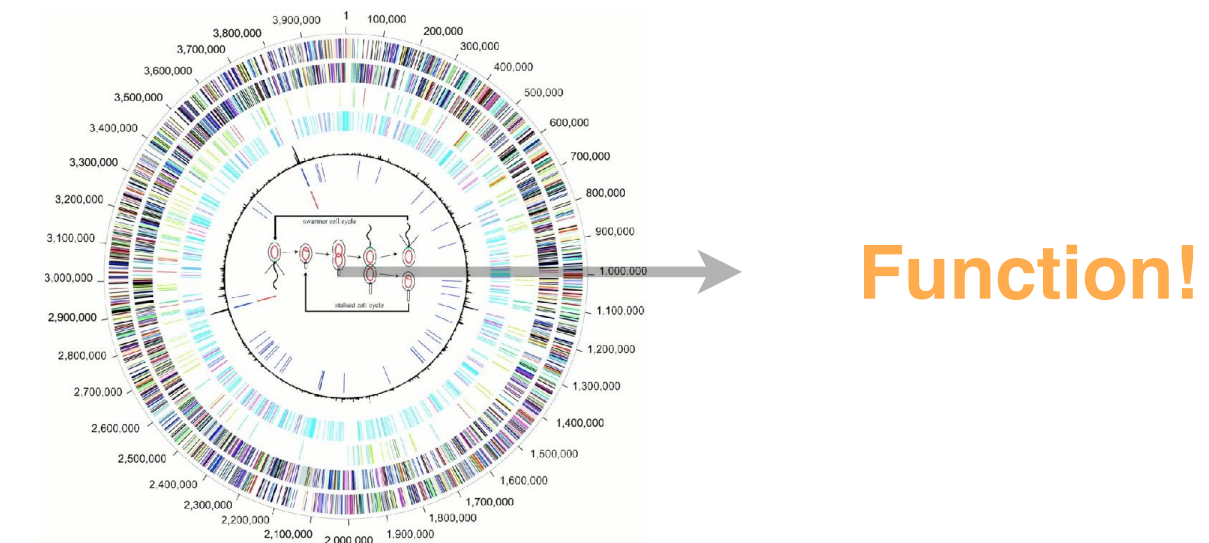
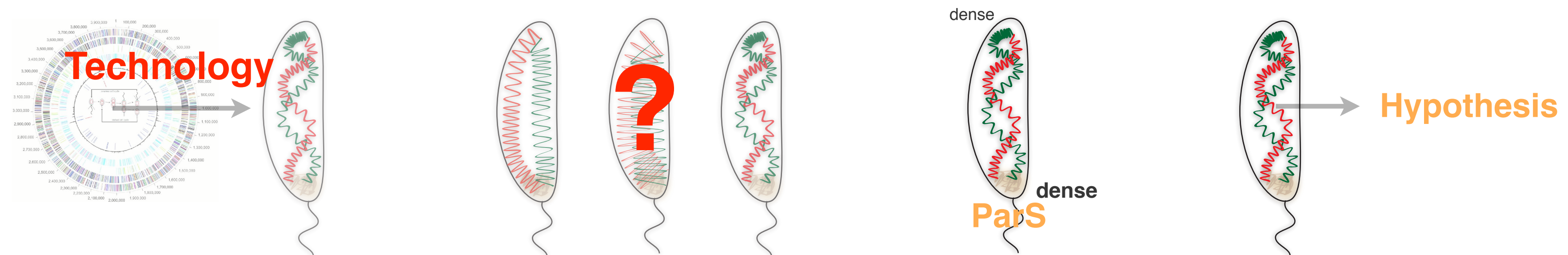
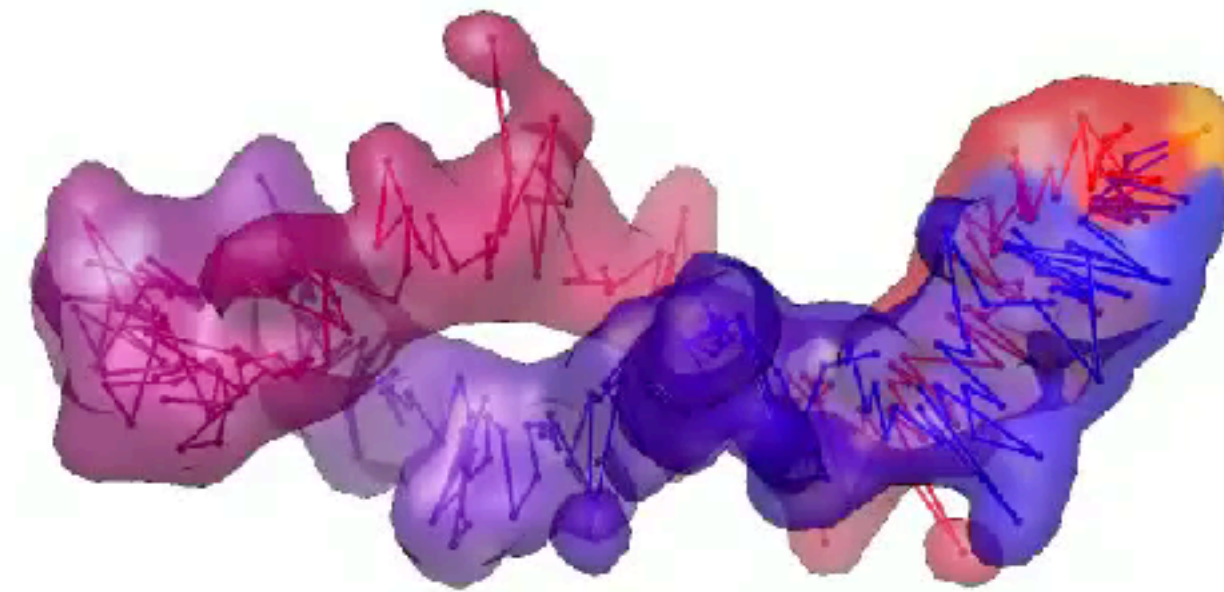


Moving the *parS* sites results in whole genome rotation!



From Sequence to Function

Genome architecture in *Caulobacter*



Bacteria has also TADs (CIDs)

Le, T. B. K., Imakaev, M. V., Mirny, L. A., & Laub, M. T. (2013). High-Resolution Mapping of the Spatial Organization of a Bacterial Chromosome. *Science* (New York, NY), 1242059

