

# Stacking plates and wedges: the physics of DNA compaction

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The DNA in eucaryotes is hierarchically folded with the help of proteins into a rather dense complex called chromatin. In my talk I will discuss two of the various levels of that genome compaction. (1) The well-known stacking of the basepairs forming the DNA "ladder" leads to the DNA double helix. I will outline how geometrical details on the basepair level can lead to exotic elastic properties of the helix, e.g. anisotropic bendability. This allows for a second code on top of the well-known genetic code, determining the positions of millions of protein cylinders around which the DNA is wrapped - leading to a string of so-called nucleosomes. (2) This structure folds into a 30nm thick chromatin fiber. I suggest that the geometry of these fibers can be predicted to be the result of the tight packing of the wedge-shaped nucleosomes -- invoking a principle similar to that of the basepair packing in the first part of the talk.