

Abstract of graduation paper: «Statistical approach to the formation of surface-bonded chiral quasi-periodic nanostructures by DNA-origami method»

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The formation and study of various DNA structures on a surface is one of the rapidly developing areas of modern science and technology. One of the aims is to create structures with non-trivial optical properties. A preliminary theoretical model that allows to describe the statistical properties of a periodic polymer chain deformed due to the influence of thermal fluctuations was constructed. We used the mathematical tool of the theory of pulse processes depending on the spatial argument as a substitute of the time one. When temperature or solution properties change, the probability distribution parameters for the intervals between the point of the connection with the surface change as well. It is possible to select such a pattern frequency that corresponds to the either maximum or minimum connection depending on environmental parameters. Then it is possible to switch the structure from one state to another, thus changing the chirality of the built surface.