

Abstract Submitted
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Cooperation of multiple copies of noisy genes ALEKSANDRA WALCZAK, Princeton University, PETER WOLYNES, UCSD — The regulation of gene expression is influenced by the small numbers of protein and gene copies present in the cell. Noise properties arising from single copies of the gene are well known. In this talk we consider the case when a few copies of the same gene are present and actively transcribed in the cell. We use mathematical models which treat both the DNA and protein degrees of freedom stochastically. We study how the switching of one gene influences the switching behaviour of another gene, to which it is coupled by a mutual protein environment. We show that the genes loose properties defined by their individual parameters and take on the characteristics of a group to reach a new steady state. We show that system with multiple gene copies can be used to reduce noise or to modify the cooperativity of the regulatory characteristics of the circuit. These results can be useful for interpreting and designing bioengineering experiments in which there can be multiple copies of a gene.

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