

Eugene Wigner Colloquium

joint event of GRK 1558 and SFB 910



Prof. Alexey Zaikin

University College London, UK

“Noise and Intelligence in intracellular gene-regulatory networks”

I will discuss results of theoretical modelling in very multi-disciplinary area between Systems Medicine, Synthetic Biology, Artificial Intelligence and Applied Mathematics. Multicellular systems, e.g. neural networks of a living brain, can learn and be intelligent. Some of the principles of this intelligence have been mathematically formulated in the study of Artificial Intelligence (AI), starting from the basic Rosenblatt's and associative Hebbian perceptrons and resulting in modern artificial neural networks with multilayer structure and recurrence. In some sense AI has mimicked the function of natural neural networks. However, relatively simple systems as cells are also able to perform tasks such as decision making and learning by utilizing their genetic regulatory frameworks. Intracellular genetic networks can be more intelligent than was first assumed due to their ability to learn. Such learning includes classification of several inputs or, the manifestations of this intelligence is the ability to learn associations of two stimuli within gene regulating circuitry: Hebbian type learning within the cellular life. However, gene expression is an intrinsically noisy process, hence, we investigate the effect of intrinsic and extrinsic noise on this kind of intracellular intelligence. During the talk I will also include brief introductions/tutorials about Synthetic Biology, modelling of genetic networks and noise-induced ordering.

Thursday, 18.12.14 · 16:15h · EW 202

Technische Universität Berlin · Institut für Theoretische Physik · Hardenbergstraße 36 · 10623 Berlin

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