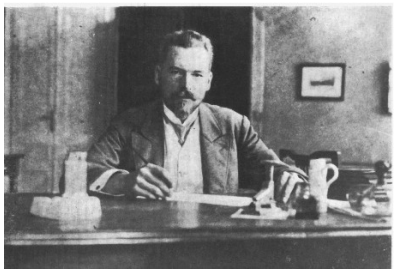

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Dynamical phase transition in the fluctuations of occupation fraction of N non-crossing Brownian particles

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The study of the dynamics of occupation time has a variety of applications. For example, it has been used to analyze the morphological dynamics of interfaces, analysis of the fluorescence intermittency emitting from colloidal semiconductor dots, optical imaging etc to name a few. The occupation time dynamics have been studied for numerous problems in the context of non-equilibrium systems. In this work we study the large deviation statistics of occupation fraction of N non-crossing Brownian particles in a certain interval. Using the extension of the Donsker-Varadhan formalism we solve this problem by mapping it to N non-interacting spinless fermions trapped in a square well potential. We study the behaviour of the large deviation function for all $N \geq 1$. For $N = 1$, the single Brownian motion in presence of a drift is known to exhibit dynamical phase transition of first order where the large deviation function shows singularity. For any $N \geq 2$, we interestingly find that the system undergoes multiple dynamical phase transitions of second order. This phenomenon is entirely different from what is found for a single Brownian motion occupation fraction. Here each transition denotes different numbers of particle occupations near the vicinity of the interval.

Primary authors: MUKHERJEE, Soheli (Ben Gurion University of the Negev, Israel); Dr SMITH, Naftali R (Ben Gurion University of the Negev, Israel)

Presenter: MUKHERJEE, Soheli (Ben Gurion University of the Negev, Israel)

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