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Experimental realisations of rare events

Title of the dissertation	Statistics of rare events in single-electron devices
Contents of the dissertation	Rare events are infrequent but their consequences can be tremendous. They have been studied in various context, such as financial crises, and natural disaster. In electronics, these studies could be used to determine the accuracy of devices. However, the sporadic nature of rare events makes it difficult to gather sufficient amount of data to carry out the statistical analysis. Fortunately, this limitation is overcome by the single-electron devices, which provide an excellent test bench for such studies. Due to the improved stability of these devices, a huge amount of data can be collected and the less frequent events can be reliably analyzed to understand their statistical properties, with high precision. Moreover, the recent theory results on rare events, such as extreme fluctuations in the entropy produced by a system and the first passage times, have not yet been verified experimentally. The experimental studies of these theoretical concepts using single-electron devices are the focus of this thesis. The thesis presents the validity of the preexisting results along with new approach to understand these events and characterize a system.
Field of the dissertation	Engineering Physics
Doctoral candidate	Shilpi Singh, M.Sc.
Time of the defence	20.02.2019 at 12 noon
Place of the defence	Aalto University School of Science, lecture hall M1, Otakaari 1, Espoo
Opponent	Professor Sergio Ciliberto, Laboratoire de Physique Ecole normale Supérieure de Lyon, France
Custos	Professor Jukka Pekola, Aalto University School of Science, Department of Applied Physics
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