Electron waiting times in mesoscopic transport

Christian Flindt[*1]

[1]University of Geneva – Suisse

Résumé

Investigations of electrical noise and fluctuations in mesoscopic conductors have traditionally involved measurements of the shot noise and the full counting statistics of transferred charge. Recently, the distribution of waiting times between consecutive electrons has been promoted as another useful and complementary characterization of stochastic quantum transport [1-3]. In this talk, I provide an overview of our Geneva efforts to describe and evaluate the electronic waiting time distributions for several types of quantum conductors. For driven single-electron emitters described by quasi-classical master equations, the electronic waiting time distribution provides us with a simple and intuitive picture of the charge transport. For fully phase-coherent conductors, we have formulated a compact determinant formula based on scattering theory that predicts a crossover in the waiting time distribution for a quantum point contact from Wigner-Dyson statistics at full transmission to Poisson statistics close to pinch-off. I conclude with an outlook on future work and identify possible avenues for further developments. The work was done together with M. Albert, K. H. Thomas, G. Haack, and M. B'uttiker.

M. Albert, C. Flindt, and M. B'uttiker, Phys. Rev. Lett. 107, 086805 (2011)

M. Albert, G. Haack, C. Flindt, and M. B'uttiker, Phys. Rev. Lett. 108, 186806 (2012)

K. H. Thomas and C. Flindt, Phys. Rev. B 87, 121405(R) (2013)

[*]Intervenant