WAITING TIME DISTRIBUTION OF A PERIODICALLY DRIVEN SINGLE-ELECTRON TURNSTILE

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The distribution of waiting times between tunneling events is a useful statistical tool to characterize quantum transport. Waiting time distributions (WTD) complement zero-frequency observables such as the mean current and the shot noise, for example by revealing the regularity of single electrons emitted from dynamically driven devices, Fig. 1.

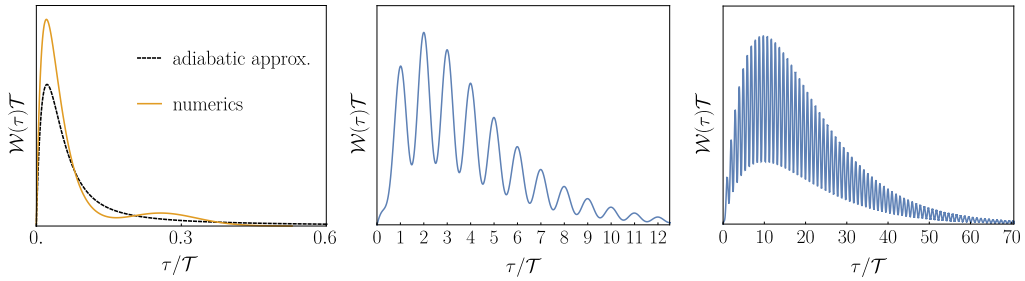

Figure 1: WTDs of a single-electron turnstile driven by a sinusoidal protocol for three different driving frequencies (increasing from left to right) [6].

In recent years, WTDs have been investigated for a variety of quantum transport setups, including quantun dots [1], dynamic single-electron emitters [2], mesoscopic conductors [3, 4] as well as superconducting devices [5]. In this contribution, we present a general theory for calculating the WTD of a periodically driven single-electron device [6]. Our approach is applicable for any periodic driving protocol and leads to analytic expressions for the WTDs. Our results can be directly compared with future measurements of WTDs based on a charge detector that couples capacitively to a dynamic single-electron turnstile.

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[2] M. Albert, C. Flindt, and M. Büttiker, *"Distributions of Waiting Times of Dynamic Single-Electron Emitters,"* Phys. Rev. Lett. **107**, 086805 (2011)

[3] M. Albert, C. Flindt, G. Haack, and M. Büttiker, *"Electron Waiting Times in Mesoscopic Conductors,"* Phys. Rev. Lett. **108**, 186806 (2012)

[4] D. Dasenbrook, C. Flindt, and M. Büttiker, *"Floquet Theory of Electron Waiting Times in Quantum-Coherent Conductors,"* Phys. Rev. Lett. **112**, 146801 (2014)

[5] L Rajabi, C. Pöltl, and M. Governale, *"Waiting Time Distributions for the Transport through a Quantum-Dot Tunnel Coupled to One Normal and One Superconducting Lead,"* Phys. Rev. Lett. **111**, 067002 (2013)

[6] E. Potanina and C. Flindt, in preparation (2017)