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Frequency-dependent counting statistics in interacting nanoscale conductors RAMON AGUADO, DAVID MARCOS, CSIC, CLIVE EMARY, TOBIAS BRANDES, TU Berlin — Following the considerable success of shot-noise in the understanding of transport through mesoscopic systems, attention is now turning towards the higher-order statistics of electron current. The so-called Full Counting Statistics (FCS) of electron transport yields all moments (or cumulants) of the probability distribution $P(n,t)$ of the number of transferred electrons during time t. The theory of FCS is now well established in the zero-frequency limit. However, this is by no means the full picture, since the higher-order current correlators at finite frequencies contain much more information than their zero-frequency counterparts. In this work [1], we present a formalism to calculate finite-frequency current correlations in interacting nanoscopic conductors. We work within the n-resolved density matrix approach and obtain a multi-time cumulant generating function that provides the fluctuation statistics solely from the spectral decomposition of the Liouvillian. We apply the method to the frequency-dependent third cumulant of the current through a single resonant level and through a double quantum dot. Our results, which show that deviations from Poissonian behaviour strongly depend on frequency, demonstrate the importance of finite-frequency higher-order cumulants in fully characterizing transport. [1] C. Emary, D. Marcos, R. Aguado and T. Brandes, Physical Review B, 76, 161404R, 2007.

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