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Full-counting statistics and phase transition in an open quantum system of non-interacting electrons MARIYA MEDVEDYEVA, STEFAN KEHREIN, Goettingen University — We develop a method for calculating the full-counting statistics for a non-interacting fermionic system coupled to memory-less reservoirs. The evolution of the system is described by the Lindblad equation. We introduce the counting field in the Lindblad equation which yields the generating function and allows us to obtain all cumulants of the charge transport. In a uniform system the cumulants of order k are independent of the system size for systems longer than k+1 sites. The counting statistics from the Lindblad approach does not take into account the interference in the reservoirs which gives a decreased value of noise in comparison to the Green function approach which describes phase coherent leads. The two methods yield the same value for the current, which is due to current conservation. The Fano factors are different (and linearly related) and allow us to distinguish between memory-less and phase coherent reservoirs. We also consider the influence of dissipation along the chain allowing for both tunneling into and out of the chain along its length. Infinitesimally small dissipation along the chain induces a quantum phase transition which manifests itself as a discontinuity in transport properties and entropy.

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