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X-ray edge singularity in the visibility of the Aharonov-Bohm oscillations in a quantum Hall interferometer IURII CHERNII, IVAN LEVKIVSKYI, EUGENE SUKHORUKOV, University if Geneva — We consider a quantum dot strongly interacting with several quantum Hall edge channels. One of the channels is an arm of an electronic Mach Zender interferometer, and another one is coupled to the dot via weak tunneling. Fluctuations of the charge in the quantum dot lead to dephasing of the interfering electrons. Such processes have been studied extensively, however the effects of backaction were either not considered at all, or taken into account perturbatively in the interaction strength. We show that there are regimes where tunneling itself is mainly induced by the non-equilibrium noise in the interferometer at finite bias. Importantly, this backaction effect is non-perturbative and can not be neglected. The problem of tunneling induced by the non-equilibrium noise demonstrates equivalence to the X-Ray edge singularity problem, and the tunneling rates are found to be a power-low functions of the detuning between the dot energy level and the Fermi energy. Consequently, the visibility of the interference pattern shows a crossover between the two lorentzian-type functions with different effective temperatures at small and large energies. The two temperatures are proportional to the noise temperature with a coefficients depending on the interaction strength.

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