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Transport and Noise in Mesoscopic Conductors Coupled to Quantized Electro-Magnetic Fields. A.D. STONE, M.G. VAVILOV, Yale University — Previous analyses of the effects of electro-magnetic (EM) fields on transport through mesoscopic systems have employed a classical treatment of the fields. To describe experiments on circuit electrodynamics [A. Wallraff et al., Nature 431, 162 (2004)] this treatment is no longer applicable. In this talk we discuss how the current and current noise through mesoscopic conductors are modified by the presence of such non-classical EM fields. For example when the EM field corresponds to a thermal state with temperature different from the electron temperature typically a steady-state current will flow through the system at zero bias due to the lack of detailed balance. The magnitude and direction of this current can be used to measure the temperature of the EM field. More generally, this current and its noise will allow measurement of non-classical properties of the EM field coupled to the system.

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