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Quantum optical theory of electronic noise in coherent conductors FARZAD QASSEMI, BERTRAND REULET, ALEXANDRE BLAIS, Université de Sherbrooke — We investigate the quantum properties of radiated electromagnetic field from a quantum conductor, i.e., a conductor where the electron transport is governed by quantum mechanics. In particular, using tools borrowed from quantum optics such as input-output theory and Lindblad master equations, we demonstrate how the electron shot noise in the conductor tailors the properties of radiated field, leading to nonclassical electromagnetic radiation. Our results allow us to calculate the outcome of any measurement on the electromagnetic field in terms of the statistical properties of the current in the conductor. As an example, we explain the existence of squeezing, recently observed by G. Gasse et al [1].

[1] G. Gasse et al Phys. Rev. Lett. 111, 136601 (2013)

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