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Correlations in Charge Transfer and Photon Emission by a Double Quantum Dot Connected to High Quality Resonator[1] CANRAN XU, MAXIM VAVILOV, Univ of Wisconsin, Madison — We analyze the full counting statistics of charge transfer and photon emission by a double quantum dot (DQD) coupled to a high-quality microwave resonator by electric dipole interaction. We show that at the resonant condition between the energy splitting of the DQD and the photon energy in the resonator, charge and photon statistics exhibits both a sub-Poissonian distribution and antibunching. In the ideal case, when the system decoherence stems only from photodetection, the photon noise is reduced below one-half of the noise for the Poisson distribution and is consistent with current noise. Our analysis justifies that sub-Poissonian photon noise occurs when the cross-correlation between emitted photons and electrons is strong. We demonstrate that Josephson junction based photomultipliers can be used to experimentally assess statistics of emitted photons.

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