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Tunneling rates of electron pumping in the R-SINIS transistor VLADIMIR BUBANJA, Measurement Standards Laboratory of New Zealand, Callaghan Innovation, PO-Box 31-310, Lower Hutt 5040, Wellington, New Zealand — We consider the influence of the electromagnetic fluctuations on the transport properties of a hybrid single electron transistor, consisting of superconducting electrodes and a normal-metal island, when operated as a turnstile. We derive the analytic expressions for the rates near the thresholds of single electron tunneling, Andreev reflection, and Cooper-pair–electron cotunneling processes. These results show that the dissipative on-chip impedance suppresses the rates of the undesirable higher-order tunneling processes much stronger than the single electron tunneling which can therefore be utilized to increase the accuracy of such a device in quantum metrological applications.

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