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Improving the Efficiency of Josephson Photomultipliers KONSTANTIN NESTEROV, University of Wisconsin-Madison, MARIUS SCHÖNDORF, Saarland University, ALEXANDER OPREMCAK, IVAN PECHENEZHSKIY, ROBERT MCDERMOTT, University of Wisconsin-Madison, FRANK WILHELM, Saarland University, MAXIM VAVILOV, University of Wisconsin-Madison — We discuss possible strategies to increase the sensitivity of Josephson photomultipliers (JPMs) based on current-biased Josephson junctions connected to microwave transmission lines. These devices were previously proposed for high-fidelity readout [1]. We consider a JPM at the end of a semi-infinite transmission line (TL) and apply the input-output formalism to calculate contrast, which is defined as the difference between the detection probabilities with and without microwave radiation. We compare this contrast calculated for a JPM that is coupled to a TL directly with that achieved for setups with additional matching elements between the JPM and TL. We discuss the dependence of detection efficiency on the parameters of the microwave matching network. [1] Luke C. G. Govia, Emily J. Pritchett, Canran Xu, B. L. T. Plourde, Maxim G. Vavilov, Frank K. Wilhelm, and R. McDermott, Phys. Rev. A **90**, 062307 (2014).

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