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Improvement of detection efficiency by reducing shunt resistance of SSPDs

*Kyotaro Ono[1], Issei Kurokawa[1], Kento Sakai[1], Kou Ohnishi[2], Wakako Nakano[2], Daisuke Sakai[1], Hiroyuki Shibata[1]

Kitami Institute of Technology, Hokkaido, Japan[1]
Hokkaido University, Hokkaido, Japan[2]

Superconducting single-photon detectors (SSPDs) are based on nano-scaled width strips. This is because it has been empirically known that SSPDs can't detect single-photons with the wider strips. Even if it's possible, the detection efficiency is low. Recently, it has been reported that when a bias current (I_{bias}) is applied close to the depairing current (I_{dep}), it can detect single-photons even with the micron-scaled bridges [1]. Here, we report our results using the micron-scaled bridges as well as the nano-scaled stripes with various shunt resistances (R_{sh}). We found that the single-photon detection is possible even with a micron-scaled bridges by applying R_{sh}, and the system detection efficiency (η_S) of the micron-scaled bridges increases by reducing R_{sh}. We also report the improvement of η_S with nano-scaled strips by further reducing R_{sh}.
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References
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