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Using a High-Q Josephson Resonator as a Non-Dissipative RF-SQUID J.A. STRONG, NIST, Boulder, K.D. OSBORN, A.J. SIROIS, R.W. SIMMONDS — Superconducting Quantum Interference Devices (SQUIDs) have been used for years to measure small magnetic fields. Such devices measure the DC voltage across a Josephson junction as a function of magnetic flux. It is well known, however, that a voltage-biased Josephson junction radiates energy. This is problematic for many superconducting quantum device applications including readout methods for superconducting quantum bits and SET's. Here, we examine a newly developed Josephson junction resonator as a new breed of SQUID, wherein the resonator's resonant frequency (instead of the junction's voltage) is measured as a function of magnetic flux. In this way, the Josephson junction is kept perpetually in the super- current state, with zero DC voltage and therefore no Josephson radiation. We examine issues of sensitivity, noise, and read- out speed.

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