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DC SQUID RF magnetometer with 200 MHz bandwidth<sup>1</sup> VLADIMIR TALANOV, NESCO LETTSOME, ANTONIO OROZCO, Neocera, LLC, Beltsville, MD 20705, ALFRED CAWTHORNE, Trevecca Nazarene University, Nashville, TN 37210, VALERY BORZENETS, SLAC National Accelerator Laboratory, Menlo Park, CA 94025 — Because of periodic flux-to-voltage transfer function, Superconducting QUantum Interference Device (SQUID) magnetometers operate in a closed-loop regime [1], which linearizes the response, and increases the dynamic range and sensitivity. However, a transmission line delay between the SQUID and electronics fundamentally limits the closed-loop bandwidth at 20 MHz [1], although the intrinsic bandwidth of SQUIDs is in gigahertz range. We designed a DC SQUID based RF magnetometer capable of wideband sensing coherent magnetic fields up to 200 MHz. To overcome the closed-loop bandwidth limitation, we utilized a low-frequency flux-modulated closed-loop to simultaneously lock the quasi-static magnetic flux and provide AC bias for the RF flux. The SQUID RF voltage is processed by RF electronics based on a double lock-in technique. This yields a signal proportional to the amplitude and phase of the RF magnetic flux, with more than four decades of a linear response. For YBaCuO SQUID on bi-crystal SrTiO substrate at 77 K we achieved a flux noise density of 4  $\mu \Phi_0 / \sqrt{\text{Hz}}$  at 190 MHz, which is similar to that measured at kHz frequencies with conventional flux-locked loop. [1] D. Drung, et al., Supercond. Sci. Technol. 19, S235 (2006).

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