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Development of Superconducting Quantum Interference Device DC Magnetometer for High Magnetic Field and Dilution Refrigerator Applications[1] J.-H. PARK, T.P. MURPHY, S.W. TOZER, E.C. PALM, National High Magnetic Field Laboratory, FSU, Tallahassee, FL. — A commercially available SQUID (Superconducting Quantum Interference Device) DC magnetometer is often limited by its relatively high temperature ($\geq$ 1.9 K) and low magnetic field ($\leq$ 7 T) operating environment. The need for the lower temperature and higher field DC magnetization measurements keeps growing as more materials show interesting physical phenomena whose energy scales are relevant to low temperatures ($\sim$ mK). To meet these needs we have developed a probe for a top loading dilution refrigerator in which all the DC magnetometer components including SQUID electronics, detection coil, and sample motion shaft are placed together. The probe was tested in a top loading dilution refrigerator and the results show that the base temperature at 25 mK increased $\sim$ 1.6 % when the sample displacement was 3.2 cm with a speed of 3 cm/min. The moment of the test sample was successfully detected down to 50 mK. Improvement in coil balancing and shielding of the detection coil are planned.

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