

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Realization of a closed-cycle dilution refrigerator for nanoscale magnetometry RAVI NAIK, ANIRUDH NARLA, YU-DONG SUN, NATANIA ANTLER, IRFAN SIDDIQI, QNL, UC Berkeley — We present the implementation of a mechanical pump-free, dilution refrigerator with an automatic cool-down protocol. The cooling process utilizes a liquid nitrogen pre-cool circuit, a pulse tube cooler, and a custom internal dilution unit manufactured by Chase Cryogenics. The dilution unit employs charcoal sorption pumps and electronic heat switches to regulate the condensation and subsequent evaporative cooling of ^3He , ^4He , and a mash of both in three separate chambers. We achieve a base temperature of 85 mK with a 10-15 hour hold time. The unit presents a simple, compact, low vibration platform for conducting a wide spectrum of low temperature transport experiments. As an example, we present microwave frequency SQUID magnetometry data collected in this unit.

Ravi Naik
QNL, UC Berkeley

Date submitted: 18 Nov 2010

Electronic form version 1.4