Abstract Submitted
for the APR14 Meeting of
The American Physical Society

**Design considerations for extending ADMX to temperatures below 1K**[1] MIGUEL GONZALEZ, University of Florida, ADMX COLLABORATION, ADMX-HF COLLABORATION — Phase II of the ADMX experiment is a large-scale upgrade with the objective of integrating the state-of-the-art in microwave detection and in cryogenic technologies. From its initial operations with pumped liquid $^4$He at $\sim$1.5K, a further reduction in physical temperature to the targeted 100 mK would improve its sensitivity more than twentyfold, extending the search below the DFSZ limit. But the cooling of a large microwave cavity to millikelvin temperatures in a high magnetic field poses some new challenges with no turnkey solutions from commercial cryogenic technologies. In this talk, we address the issue of incorporating current commercial technologies within our custom made insert to construct a dilution refrigeration system with a cooling power of 800 $\mu$W at 100 mK. Additionally, we describe a separate homemade pumped liquid $^3$He system with a 2-3 mW cooling power at 0.5K, which will be used as a bridge between the current $^4$He system at 1.5K and the planned 100 mK dilution system.

[1]Supported by DOE Grants DE-FG02-97ER41029, DE-FG02-96ER40956, DE-AC52-07NA27344, DE-AC03-76SF00098, NSF grants PHY-1067242 and PHY-1306729, and the Livermore LDRD program.

Miguel Gonzalez
University of Florida

Date submitted: 09 Jan 2014 Electronic form version 1.4