Abstract Submitted
for the APR16 Meeting of
The American Physical Society

Josephson parametric amplifiers for the ADMX-HF experiment MAXIME MALNOU, DANIEL PALKEN, Univ of Colorado - Boulder, GENE HILTON, LEILA VALE, National Institute of Standards and Technology, KONRAD LEHNERT, Univ of Colorado - Boulder — Dark matter search in the ADMX-HF experiment aims at detecting power generated by the axion-photon conversion, of a few hundred of yoctowatts, in the 4 – 12 GHz band [1]. The sensitivity of detection directly depends on the amplifier noise temperature, and therefore requires state of the art microwave amplifiers. In contrast to amplifiers with dissipation on-chip, superconducting Josephson parametric amplifiers (JPA) reach and even circumvent the quantum limit. Over the past years, we have developed JPAs fabricated with arrays of superconducting quantum interference devices [2,3]. Their gain, bandwidth and tunability are particularly well suited for efficient amplification in the band of interest. In this talk we will present numerical modeling of the behavior of our amplifiers, along with the first results from new designs that cover the 4-12 GHz band. Finally, we will present the ongoing work to increase the gain-bandwidth product and gain stability of our amplifiers. References: [1] T. M. Shokair et al, Int. J. Mod. Phys. A 29, 1443004 (2014) [2] Castellanos-Beltran, M. A., et al. Nature Physics 4.12 (2008): 929-931 [3] Mallet, F., et al. Physical Review Letters 106.22 (2011): 220502

Maxime Malnou
Univ of Colorado - Boulder

Date submitted: 08 Jan 2016 Electronic form version 1.4