Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

A tunable microstrip SQUID amplifier for the Axion Dark Matter eXperiment (ADMX) SEAN O'KELLEY, ELAN WEINGARTEN, UC Berkeley, MICHAEL MUECK, None, JORN HANSEN, Technical University of Denmark, JOHN CLARKE, UC Berkeley — We present a microstrip SQUID amplifier (MSA) with an octave of tunability for use in the ADMX collaboration. The axion dark matter candidate is detected via conversion to a microwave photon stimulated by an apparatus consisting of an 8 tesla magnet and a cryogenically cooled high-Q tunable microwave cavity. The microwave photon frequency is a function of the unknown axion mass, so the detector must scan over a broad frequency range. An MSA is constructed by flux-coupling a resonant microstrip to a resistively-shunted SQUID biased into the voltage state. We demonstrate a gain exceeding 20 dB with a tunability of nearly one octave from 415 MHz to 800 MHz. Tunability is achieved by terminating the microstrip with a low inductance GaAs varactor that operates at cryogenic temperatures, allowing a variable reflected phase of nearly 0 to π at the end of the microstrip, and thus a standing wave tunable from nearly $\lambda/2$ to $\lambda/4$.

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Date submitted: 15 Nov 2013 Electronic form version 1.4