Abstract Submitted
for the TSF16 Meeting of
The American Physical Society

Ultrasensitive Phonon-Mediated Detectors for Dark Matter Searches[1] FEDJA KADRIBASIC, Graduate Student, CRYOGENIC DARK MATTER SEARCH COLLABORATION — Astrophysical observations indicate that over 80% of the mass in the Universe is made of nonbaryonic, dark matter. Further measurements have shown that the most likely candidates for this matter are exotic, as yet undiscovered, particles that only interact weakly with ordinary matter. Experiments such as the SuperCDMS (Cryogenic Dark Matter Search) have been pioneers in the effort to detect these elusive particles. However, the lack of experimental evidence for high-mass dark matter particles combined with the recent emergence of theoretical models that favor low-mass dark matter underscores the need to develop detectors with low energy threshold capability to probe these low masses. One approach to address this is to use Luke-Neganov amplification to measure phonons produced during nuclear recoils in high-purity semiconductor detectors to very high precision. I will outline this approach and how it applies to CDMS high-purity semiconductor detectors and summarize recent developments in this field, including steps to address the leakage current that is its main limiting factor.

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Date submitted: 27 Sep 2016 Electronic form version 1.4