

Abstract Submitted  
for the APR09 Meeting of  
The American Physical Society

**Depleted Argon as a Dark Matter Detector at DUSEL<sup>1</sup>** JASON SPAANS, DONGMING MEI, CHRISTINA KELLER, YONGCHEN SUN, University of South Dakota, ANDREW HIME, Los Alamos National Laboratory, RICHARD FORD, SNOLAB, CRISTIANO GALBIATI, Princeton University, DEAP/CLEAN COLLABORATION, DARTPC COLLABORATION — The purpose of this project is to provide argon depleted from  $^{39}\text{Ar}$  either by collection from underground sources or by isotopic separation. The depleted argon can then be used as a target material for next generation dark matter detectors at DUSEL. The Princeton group has demonstrated the existence of depleted argon in underground gas fields. This project aims at the characterization of  $^{39}\text{Ar}$  in underground water sources, kept in isolation from the atmosphere for thousands of years. To do so, we have built a gas extracting system and extracted gas from a water well at Wall, SD. This paper will present the preliminary results of our research. A second approach under investigation relies on isotopic separation by hot-wire thermal diffusion. We built a hot-wire thermal diffusion column, composed of a tungsten wire, a copper column, and a water cooling bath at USD. This paper will illustrate the current status of the effort.

<sup>1</sup>This project is supported by NSF-PHY-0758120, the BOR of South Dakota, NASA, the Office of Research at USD, and the LANL Directed Research and Development Program.

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Date submitted: 09 Jan 2009

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