

Abstract Submitted  
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**New Measurement of  $^{39}\text{Ar}$  in Underground Argon for Dark Matter Experiments** JINGKE XU, Princeton University, DARKSIDE COLLABORATION — Liquid argon detectors are currently being developed for the direct detection of dark matter WIMPs. Scintillation and ionization signals of argon allow nuclear recoil signals produced by WIMP interactions to be separated from backgrounds due to beta and gamma radiations. However, the low level of radioactive  $^{39}\text{Ar}$  that is produced by cosmic rays in atmospheric argon constrains the size of such detectors to one ton or less. The discovery of sources of underground argon with low levels of  $^{39}\text{Ar}$  makes ton-scale argon detectors a possibility. The first measurements on small samples of underground argon gas showed no sign of  $^{39}\text{Ar}$  with an upper limit of 5% that of atmospheric argon. I will report on the development of a low background liquid argon detector designed to improve the limit on residual  $^{39}\text{Ar}$ . Preliminary measurements made with the detector above ground show no evidence of  $^{39}\text{Ar}$  with higher sensitivity than the initial gas phase measurements

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