

Observation of the Dependence of Scintillation from Nuclear Recoils in Liquid Argon on Drift Field

Monday 9 September 2013 16:20 (20 minutes)

We have exposed a dual-phase Liquid Argon Time Projection Chamber (LAr-TPC) to a low energy pulsed narrowband neutron beam, produced at the Notre Dame Institute for Structure and Nuclear Astrophysics to study the scintillation light yield of recoiling nuclei in a LAr-TPC. A liquid scintillation counter was arranged to detect and identify neutrons scattered in the LAr-TPC target and to select the energy of the recoiling nuclei. We report the observation of a significant dependence on drift field of liquid argon scintillation from nuclear recoils of 11keV. This observation is important because, to date, estimates of the sensitivity of noble liquid TPC dark matter searches are based on the assumption that electric field has only a small effect on the light yield from nuclear recoils.

Authors: Prof. COCCO, Alfredo (Universita degli Studi Federico II and INFN, Napoli); Mr WATSON, Andrew (Temple University); Dr LOER, Ben (Fermi National Accelerator Laboratory); Dr ROSSI, Biagio (Universita degli Studi Federico II and INFN, Napoli); Prof. MARTOFF, C. Jeff (Temple University); Mr KENDZIORA, Cary (Fermi National Accelerator Laboratory); Prof. GHAG, Chamkaur (University College London); Dr LOVE, Christina (Temple University); Prof. GALBIATI, Cristian (Princeton University); Mr OLVITT, Daniel (Temple University); Mr MONTANARI, David (Fermi National Accelerator Laboratory); Dr DEJONGH, Fritz (Fermi National Accelerator Laboratory); Prof. FIORILLO, Giuliana (Universita degli Studi Federico II and INFN, Napoli); Prof. WANG, Hanguo (University of California, Los Angeles); Dr BACK, Henning (Princeton University); Mr CAO, Huajie (Princeton University); Dr LIPPINCOTT, Hugh (Fermi National Accelerator Laboratory); Mr TATAROWICZ, John (Temple University); Dr YOO, Jong Hee (Fermi National Accelerator Laboratory); Ms MANENTI, Laura (University College London); Prof. GRANDI, Luca (University of Chicago); Mr MOSTEIRO, Pablo J. (Princeton University); Mr HAO, Qian (Princeton University); Dr SALDANHA, Richard N. (Princeton University); Mr WESTERDALE, Shawn (Princeton University); Dr PORDES, Stephen H (Fermi National Accelerator Laboratory); Ms WALKER, Susan (Temple University); Mr ALEXANDER, Thomas (University of Massachusetts, Amherst); Prof. TAN, Wanpeng (University of Notre Dame); Mr MENG, Yixiong (University of California, Los Angeles)

Presenter: Mr CAO, Huajie (Princeton University)

Session Classification: Dark Matter II

Track Classification: Dark Matter