

Abstract Submitted
for the DNP08 Meeting of
The American Physical Society

TPC Pad Structure and Track Reconstruction for the Muon Capture on Deuterium LUKASZ WOJTASZEK, University of Illinois at Urbana-Champaign, MUSUN COLLABORATION — The MuSun experiment proposes to measure the rate Λ_d for the muon capture on the deuteron to better than 1.5% precision. The measurement will provide the low-energy constant representing the coupling of the axial current to the two-nucleon system necessary in describing weak interaction processes in two-nucleon systems such as solar pp fusion and $\nu + d$ reactions observed by the Sudbury Neutrino Observatory. The desired precision requires a cryogenic Time Projection Chamber (TPC) to be designed and built. A Monte Carlo simulation of muon tracks was used to determine the optimal geometry and size of the TPC pads, taking into account noise and crosstalk. A track reconstruction program was developed to determine the three dimensional path of the muon to within a fraction of the pad size. The drift time of the electrons gives the height above the pad. The energy deposited on the TPC pads, following the Bragg curve, allows determination of the muon stopping position to within a fraction of the pad size. The information will be combined to reconstruct the three dimensional path of the muon in the chamber. Progress on this project will be reported.

Lukasz Wojtaszek
University of Illinois at Urbana-Champaign

Date submitted: 31 Jul 2008

Electronic form version 1.4