Abstract Submitted
for the DNP06 Meeting of
The American Physical Society

Future Techniques for WIMP Astronomy[1] C.J. MARTOFF, MICHAEL HOSACK, JAN MASOUH, Temple University, DEPT. OF PHYSICS, TEMPLE UNIVERSITY TEAM — This miniconference title appropriately focusses attention on the crucial problem of *identification* of dark matter; how to associate signals in direct detection experiments with galactic halo WIMPs. Spergel, Freese and others long ago pointed out the strong directional anisotropy of WIMP recoils which provides an unambiguous identification signature. Such anisotropy (present in almost any halo model) will rotate in the lab at the sidereal rate, distinguishing it from all terrestrial backgrounds. The author's Negative Ion TPC (NITPC) method allows low-pressure, high field TPC's to be built with 100's of kg of active gas target, and with the high spatial resolution to measure WIMP recoil tracks directionally. DRIFT I, in which the author was a principal investigator, was the first example. Further developments toward practical construction of 100 kg and larger NITPC will be presented here. Topics will include: proven, low channel-count readouts allowing 3-D tracking in these low-occupancy experiments; reconstruction algorithms and simulations of response to several halo models; and work in progress on alternative negative ion formation agents and on new veto detection media. Finally, a fieldable design for an NITPC array made of modules each having ∼10 kg active mass will be discussed.

[1]Supported by the National Science Foundation and by Temple University.

C. J. Martoff
Temple University

Date submitted: 30 Jun 2006 Electronic form version 1.4