

Abstract Submitted  
for the APR09 Meeting of  
The American Physical Society

**Determination of Neutrino Mass Hierarchy from the Deep Core Extension of the IceCube data on Atmospheric Neutrinos** SOEBUR RAZZAQUE<sup>1</sup>, U.S. Naval Research Lab, OLGA MENA, Universidad de Valencia, Spain, IRINA MOCIOIU, Penn State University — Measurement of  $\sim 10$  GeV atmospheric neutrinos over a baseline of the Earth's diameter can be used to probe neutrino mass hierarchy dominantly through muon neutrino disappearance channel. An extension of the IceCube array at the South Pole is currently under construction which will form a 5-10 Mega ton volume of densely packed phototubes. Positioned in the bottom center of the full IceCube array, it will make possible for this Deep Core to detect muons with energy as low as  $\sim 5$  GeV and coming from below. The full IceCube array will provide veto to down-going high-energy muons. Theoretical results which are presented here for an exposure of 100 Mt-yr show that the IceCube Deep Core can determine neutrino mass hierarchy if the true value of the currently unknown neutrino mixing parameter  $\theta_{13}$  is close to the present upper bound.

<sup>1</sup>National Research Council Research Associate

Soebur Razzaque  
U.S. Naval Research Lab

Date submitted: 12 Jan 2009

Electronic form version 1.4