

Abstract Submitted
for the MAS14 Meeting of
The American Physical Society

Characterizing Hardware Requirements for the Digital Optical Modules of PINGU, Using Current Experience from IceCube FEIFEI HUANG, Department of Physics, The Pennsylvania State University, ICECUBE-PINGU COLLABORATION — The Precision IceCube Next Generation Upgrade (PINGU) is a proposed low energy extension to the IceCube Neutrino Observatory, with the primary scientific goal of determining the neutrino mass hierarchy. Neutrinos interacting in the ice will produce secondary charged particles which emit Cherenkov radiation, which is then detected by photomultiplier tubes within the Digital Optical Modules (DOMs) of IceCube. We will present results of our investigations related to the redesign of the IceCube DOMs for deployment in PINGU. First, we investigated the dynamic range of the DOMs by characterizing the signal in the current IceCube data. Second, we studied the impact of two hardware design parameters, the DOM-to-DOM timing difference and the ADC sampling rate, on zenith and neutrino energy resolutions. Thirdly, we investigated the optimal DOM buffer length for PINGU by using the most energetic IceCube neutrino events. These studies will also be used in re-designing the DOMs for the high energy extension of IceCube which has the goal of improving the understanding of the recently discovered astrophysical neutrinos.

Feifei Huang
Department of Physics, The Pennsylvania State University

Date submitted: 29 Aug 2014

Electronic form version 1.4