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E61 Status and Sensitivity Studies

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E61 is a proposed intermediate water Cherenkov detector (IWCD) for the future Hyper-Kamiokande (Hyper-K) long baseline neutrino experiment. The detector can be raised/lowered to span a continuous 1-4 degree off-axis range, relative to the neutrino beam centre, in order to make a novel measurement of the interaction rate as a function of neutrino energy. In this way E61 will constrain the neutrino interaction model, which is the dominant uncertainty for Hyper-K; also by having the same interaction medium as the far detector we will also reduce the dependence of our analysis on the neutrino interaction model. Gadolinium doping may also be used to measure neutron emissions from neutrino interactions, enabling a statistical separation of neutrino and antineutrino events and reduction in wrong-sign background.

This talk will describe the detector design, R&D, and progress towards construction. The sensitivity of the detector to different physics measurements will be demonstrated, in particular the ability to constrain energy bias due to incorrect modelling, the electron neutrino cross-section which is critical to the measurement of CP violation, and the resultant sensitivity for a CP violation measurement at Hyper-K.

Author: WALKER, John (University of Winnipeg)

Presenter: WALKER, John (University of Winnipeg)

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