



## Poster session 3 – Wednesday 6 July

### P3.003 The CHIPS R&D Program: reconstruction

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*on behalf of the CHIPS collaboration*

CHIPS (CHerenkov detectors In mine PitS) is an R&D project aiming to develop novel cost-effective neutrino detectors, focused on measuring the CP-violating neutrino mixing phase ( $\delta_{CP}$ ). A single detector module would contain an enclosed volume of purified water submerged in an existing lake, located in a neutrino beam. A staged approach is proposed with first detectors deployed in a flooded mine pit in Northern Minnesota, 7 mrad off-axis from the existing NuMI beam. A small proof-of-principle model (CHIPS-M) has already been deployed and the first stage of a fully functional 10 kton module (CHIPS-10) is planned for 2018. Innovation is needed in every area to reduce the costs to the target \$300k/kt.

The proposed CHIPS water Cherenkov detector faces some unique design challenges that arise from the aim to reduce the cost by two orders of magnitude compared to previous water Cherenkov detectors. Reconstruction algorithms have been developed using charge and time information from all PMTs. The charge component is based on a technique used by MiniBooNE whereas the time component has been written from first principles. The simulated detector performance has been studied for different choices of PMT size, PMT layout within the detector and water clarity. Furthermore, the relative merits of the charge and time components have been studied to determine whether PMTs with excellent charge or timing resolution would provide the optimal design in terms of both cost and physics reach. This poster will report those findings.