Poster session 1 - Monday 4 July

P1.018 **Probing the Cherenkov and scintillation light separation for next-generation neutrino detectors**

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The ability to separate Cherenkov and scintillation signals in liquid scintillator would enable out-standing background rejection in next-generation neutrino detectors. Reconstruction of directional information, ring imaging, and sub-Cherenkov threshold detection all have the potential to substantially improve particle and event identification. The Cherenkov-Scintillation Separation (CheSS) experiment uses an array of small, fast photomultipliers (PMTs) and state-of-the-art electronics to demonstrate the reconstruction of a Cherenkov ring in a scintillation medium based on photon hit times and detected charge. This setup has been used to characterize the ability to detect Cherenkov light in a range of target media including pure organic scintillator (LAB), scintillator with a secondary fluor (LAB+PPO), and the newly developed water-based liquid scintillator, a medium with a higher Cherenkov/Scintillation light yield ratio than conventional pure liquid scintillators, enhancing the visibility of the less abundant Cherenkov light in the presence of scintillation light. These results can inform the development of future large-scale detectors, such as the proposed Theia experiment, or other large detectors at underground laboratories such as the far-site of the new Long Baseline Neutrino Facility at the Sanford Underground Research Facility. CheSS detector calibrations and commissioning will be discussed, and the latest results will be presented.