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Cherenkov/scintillation separation and performance of water-based liquid scintillator detectors.

Water-based liquid scintillator is a promising scintillation medium that would enable construction of very large scale (tens of kilotonnes) optical detectors and with enhanced separation of Cherenkov and scintillation light. This technology could yield the first large-scale scintillator detector with direction reconstruction capabilities and unprecedented particle identification. This would boost sensitivity to a wide range of physics topics, including $0\nu\beta\beta$ searches and solar neutrinos. In this poster, we present results from the characterization of water-based liquid scintillator. This is used to build a Monte Carlo model in order to predict its performance in large scale detectors. We demonstrate and quantify the separation of Cherenkov and scintillation light using cosmic muons and use it to validate our Monte Carlo model. Using this model, we estimate performance of a large-scale water-based liquid scintillator in the context of low energy neutrino physics.

Mini-abstract

Characterization of water-based liquid scintillator and performance in hybrid optical detectors

Experiment/Collaboration

Primary authors: Dr LAND, Benjamin (University of Pennsylvania); Dr CARAVACA, Javier (UC Berkeley)

Co-authors: Dr ONKEN, Drew (LBNL); Dr BOURRET, Edith (LBNL); Dr MORETTI, Federico (LBNL); Prof. OREBI GANN, Gabriel (UC Berkeley / LBNL); SMILEY, Max (University of California Berkeley); Dr YEH, Minfang (Brookhaven National Laboratory); Dr BAGDASARIAN, Zara (University of California Berkeley)

Presenter: Dr CARAVACA, Javier (UC Berkeley)

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