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Cherenkov and scintillation light separation on the TheiaR&D experiment JAVIER CARAVACA, BENJAMIN LAND, UC Berkeley — Identifying by separate the scintillation and Cherenkov light produced in a scintillation medium enables outstanding capabilities for future particle detectors, being the most relevant: allowing particle directionality information in a low energy threshold detector and improved particle identification. The TheiaR&D experiment uses an array of small and fast photomultipliers (PMTs) and state-of-the-art electronics to demonstrate the reconstruction of a Cherenkov ring in a scintillation medium, based on the number of produced photoelectrons and the timing information. A charged particle ionizing a scintillation medium produces a prompt Cherenkov cone and late isotropic scintillation light, typically delayed by <1ns. The fast response of our PMTs and DAQ provides a precision well below the ns level, making possible the time separation. Furthermore, the usage of the new developed water-based liquid scintillators (WBLS) provides a medium with a tunable Cherenkov/Scintillation light yield ratio, enhancing the visibility of the dimer Cherenkov light in presence of the scintillation light. Description of the experiment, details of the analysis and preliminary results of the first months of running will be discussed.

Javier Caravaca
UC Berkeley

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