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Novel LiquidO Neutrino Detection Technology

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Upon the neutrino discovery by Reines & Cowan (1956), they also paved the ground behind much of today's neutrino detection technology. Large instrumented volumes for neutrino detection have been achieved via a key (implicit) principle: detection medium transparency and/or high purity. Much of that technology has yielded historical success, including several Nobel prizes, where the discovery of the neutrino oscillation phenomenon is the latest example. Despite the stunning success, the “transparent technology” like the pioneering liquid scintillator detectors are known to suffer from key limitations such as little (or no) topological particle identification (PID) ability, typically enabling active background rejection. Solving this while keeping the detector scalability has long remained one of the main challenges in the field. Still today, many of those otherwise overwhelming backgrounds can only be reduced via an expensive passive shielding strategy, including the advent for deep underground laboratories. In this talk, we will introduce the novel LiquidO technology (released since mid-2019 by an international proto-collaboration and still under active R&D) whose rationale exploits detection medium extreme opacity, thus breaking with the need for transparency, to yield unprecedented event-wise PID which may reduce dramatically the need for passive shielding.

Collaboration name

LiquidO

Primary author: Dr CABRERA, Anatael (CNRS IJCLab / LNCA)

Presenter: Dr CABRERA, Anatael (CNRS IJCLab / LNCA)

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