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CLOUD: the first reactor antineutrino experiment using the novel LiquidO detection technology

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The CLOUD collaboration is pioneering the first fundamental research reactor antineutrino experiment using the novel LiquidO technology for event-wise antimatter tagging. CLOUD's program is the byproduct of the AntiMatter-OTech EIC/UKRI-funded project focusing on industrial reactor innovation. The experimental setup consists of an up to 10 tonne detector, filled with an opaque scintillator and crossed by a dense grid of wavelength-shifting fibres. The detector will be located at EDF-Chooz's new "ultra-near"site, ~35 m from the core of one of the most powerful European nuclear plants, with minimal overburden. In this poster we will introduce the scientific goals of the experiment divided into three main phases. CLOUD-I aims for the highest precision of the absolute reactor antineutrino flux, along with explorations beyond the Standard Model, detecting of order 10,000 antineutrinos daily and with a high (≥100) signal-to-background discrimination. CLOUD-II and CLOUD-III will exploit several metal-doped opaque scintillators to showcase further detection capabilities, including the first attempt at surface detection of solar neutrinos and the experimental feasibility of a novel approach for potassium geoneutrino detection, respectively.

Poster prize

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