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Searching for neutrinoless double beta decays with nEXO

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Neutrinoless double beta decay ($0\nu\beta\beta$) is a hypothetical nuclear process which, if observed, would have far-reaching implications in particle physics. Being a lepton number violating process, the observation of $0\nu\beta\beta$ is direct evidence for physics beyond the Standard Model. In addition, it would prove that neutrinos are Majorana particles, and contribute to the determination of the neutrino mass scale. nEXO is a proposed next-generation experiment that will search for $0\nu\beta\beta$ of ^{136}Xe. nEXO plans to use a liquid xenon time projection chamber that employs 5 tonnes of xenon, isotopically enriched to 90% in ^{136}Xe. Ionization electrons and scintillation photons will be detected by segmented anode tiles and silicon photomultipliers, respectively. These will enable event-by-event reconstruction of event energy, position, and topology which will be used in a multi-parameter analysis to search for $0\nu\beta\beta$ events. The projected sensitivity of nEXO to the ^{136}Xe $0\nu\beta\beta$ half-life is 1.35\times10^{28}$ years after 10 years of data-taking. The nEXO project is being developed by a collaboration of 34 institutions from 9 countries. In this talk, an overview of nEXO will be presented followed by a description of the conceptual design and an update of the R&D status.

Presenter: TSANG, Raymond (Alabama University, USA)

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