Poster session 4 – Friday 8 July

P4.063 **Informing nEXO R&D through simulations**

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on behalf of nEXO collaboration

The next-generation Enriched Xenon Observatory is a proposed experiment to search for neutrinoless double beta decay of ^{136}Xe. The detector consists of a 5-tonne liquid Xenon time projection chamber that balances proven technology from the successful EXO-200 experiment with novel design choices meant to address the increase in size and further improve the sensitivity reach. Options for upgrades like the tagging of the ^{136}Xe $\beta\beta0\nu$ daughter nucleus are also kept open. The sensitivity goal of the experiment is to cover the inverted mass hierarchy and start probing the normal hierarchy.

The nEXO collaboration has been working on a detailed Monte Carlo simulation to guide and optimize the detector design as well as inform the R&D efforts.

This work will provide a description of the current nEXO conceptual design as implemented in the Monte Carlo geometry, highlighting optimization of some of the design components like the water shield and the HFE volume to reduce backgrounds. nEXO relies on both the scintillation and ionization channel to reconstruct the event energy and topology. We will therefore include a discussion of the key elements of the simulation work on both the ionization and scintillation readout and their relationship with the ongoing experimental R&D on photosensors and charge-sensing tiles. We present the results of recent simulation efforts in these areas and discuss the impact of experimental and design parameters on the background discrimination capabilities of nEXO.