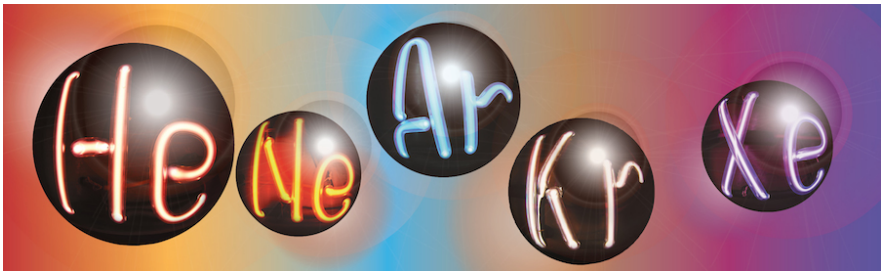

Contribution ID: **18** Type: **Presentation**

Reduction in Light Collection Efficiency Over Time in LUX's Second Science Run

Wednesday, 21 September 2022 14:40 (15 minutes)

Between its first and second WIMP-search runs (Run03 and Run04) the LUX (Large Underground Xenon) detector at SURF (Sanford Underground Research Facility) observed a ~15% sharp drop in its primary scintillation detection efficiency (g1), with an O(5%) further slow drop over the course of the 300+ live-days of Run04. Different possibilities for the cause(s) will be reviewed, including "natural"PMT photocathode degradation over time as well as "scorching"of the VUV-reflective PTFE panels from the inter-runs grid-wire conditioning campaign with the goal of increasing the magnitude of the drift electric field, for better nuclear recoil (NR) signal versus electron recoil (ER) background discrimination. Another focus will be how it was possible to track the changes in g1 as well as g2 (gain factor for the secondary scintillation channel, from ionization) with time in situ not only with mono-energetic sources such as 83mKr but also with spectra continuous in energy, from a D-D neutron calibration source for NR and a novel 14C beta high-energy ER calibration source, comparing the data from these sources to Monte Carlo computer simulations driven by LUXSim (Geant4-based), the precursor to LZ's BACCARAT, as well as NEST (the Noble Element Simulation Technique).

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Session Classification: Long-term light yield stability

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