

## Studies of Photoelectricity and Multi-Photon Ionization in Gaseous and Liquid Xenon

We are investigating novel in-situ laser-driven techniques to enhance calibration and monitoring of transport properties of charge clusters in nEXO. One approach is to study electron drift properties in a small liquid xenon TPC using photoelectricity. The charged clusters are generated by driving a semi-transparent gold photocathode in transmission mode with a pulsed ultraviolet laser. Systematic measurements of drift velocities, temperature coefficients and longitudinal diffusion coefficients of both liquid and gaseous xenon at various drift fields were made. In a second approach, liquid xenon purity was studied in a dedicated cell by observing 2- and 3-photon ionization at four different wavelengths. The ionization cross-sections at two different wavelengths were extracted. The behavior of multi-photon ionization and gold photoelectricity in a xenon environment will help in designing appropriate calibration schemes for future large scale noble liquid detectors.

### Authorship annotation

for the nEXO collaboration

### Session and Location

Monday Session, Poster Wall #62 (Auditorium Gallery Right)

### Poster included in proceedings:

yes

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**Track Classification:** Poster (not participating in poster prize competition)