



Contribution ID: 1641 Contribution code: MOPR78

Type: **Poster Presentation**

## Photocathode epitaxy and beam experiments laboratory at Cornell: current status and future work

*Monday, 20 May 2024 16:00 (2 hours)*

High-efficiency alkali antimonide photocathodes degrade with little oxidation, making them hard to characterize and test outside their growth chamber. In this proceeding, we report on the design and performance of the PHOTocathode Epitaxy and BeamExperiments (PHOEBE) laboratory at Cornell University, where the growth, characterization, and testing of photocathodes in vacuum has been successfully integrated. The growth of photocathodes is characterized in-situ by measuring the QE and by looking at the photocathode's reflection high energy electron diffraction (RHEED) pattern. Once the desired photocathode is obtained, it is moved to a storage chamber to collect complete spectral response data, after which it is moved to the Cryo-MTE-Meter DC gun and characterization beamline via a vacuum suitcase. Utilizing a rapid cathode exchange system in the Cryo-MTE-Meter, alkali-antimonide photocathodes can be efficiently transferred to beamline operation with little QE loss. Using the Cryo-MTE-Meter, the mean transverse energy of the photocathode can be continuously measured across photoexcitation wavelengths in the visible-UV spectrum and sample temperatures between 20 and 300 K.

### Footnotes

### Funding Agency

This work was supported by the U.S. National Science Foundation under Award PHY-1549132, the Center for Bright Beams

### Paper preparation format

LaTeX

### Region represented

North America

**Primary author:** GALDI, Alice (Università degli Studi di Salerno)

**Co-authors:** FLINT, Abigail (Cornell University (CLASSE)); BARTNIK, Adam (Cornell University (CLASSE)); PENNINGTON, Chad (Cornell University (CLASSE)); ZHANG, Charles (Cornell University (CLASSE)); PIERCE, Christopher (Cornell University (CLASSE)); ECHEVERRIA, Elena (Cornell University (CLASSE)); BAZAROV, Ivan (Cornell University (CLASSE)); MAXSON, Jared (Cornell University); LI, William (Brookhaven National Laboratory)

**Presenter:** ECHEVERRIA, Elena (Cornell University (CLASSE))

**Session Classification:** Monday Poster Session

**Track Classification:** MC3: Novel Particle Sources and Acceleration Techniques: MC3.T02 Electron Sources