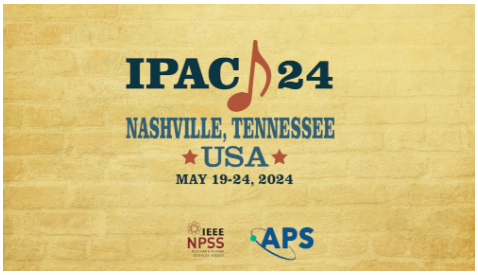

Contribution ID: **1190** Contribution code: **WEPC58** Type: **Poster Presentation**

Monte-Carlo photoemission model for thin film semiconductors under high fields

Wednesday, 22 May 2024 16:00 (2 hours)

Monte-Carlo models have been successfully used to model bulk semiconductor photocathodes, such as GaAs and others. Here we present a Monte-Carlo model under development for the photoemission from semiconductor thin films, such as Cs2Te, under high acceleration field gradient. Thin films and heterostructures, as well as high photocathode gun operating gradient and cyro-cooling, are both beneficial to high brightness electron sources. Our model employs electronic, phonon, dielectric and optical properties directly from Density Functional Theory (DFT) calculation. Furthermore, a photo excitation model based on the light interference effect in thin films is also being implemented, where our previous work indicates that such effect plays an important role in the photoemission from semiconductor thin films. Effects of the high field gradient on the semiconductor photocathode on the quality of the emitted electron beams will be discussed and used to inform a theoretical transport model based on the moment method and the cathode development for the CARIE project at LANL.

Footnotes

Funding Agency

Work supported by the LDRD program at LANL.

Paper preparation format

LaTeX

Region represented

North America

Primary author: HUANG, Chengkun (Los Alamos National Laboratory)

Co-authors: DIMITROV, Dimitre (Los Alamos National Laboratory); ALEXANDER, Anna (Los Alamos National Laboratory); WANG, Gaoxue (Los Alamos National Laboratory); PEREZ, Danny (Los Alamos National Laboratory); BAGCHI, Soumendu (Los Alamos National Laboratory); SHINOHARA, Ryo (Los Alamos National Laboratory); SIMAKOV, Evgenya (Los Alamos National Laboratory)

Presenter: HUANG, Chengkun (Los Alamos National Laboratory)

Session Classification: Wednesday Poster Session

Track Classification: MC2: Photon Sources and Electron Accelerators: MC2.T02 Electron Sources