



Contribution ID: 522 Contribution code: THPG04

Type: **Poster Presentation**

RF and multipactor analysis for the CARIE RF photoinjector with a photocathode insert

Thursday, 23 May 2024 16:00 (2 hours)

At Los Alamos National Laboratory (LANL), we developed a 1.6-cell C-band RF photoinjector for the Cathodes And Radiofrequency Interactions in Extremes (CARIE) project. The injector will be used to study the behavior of advanced photocathode materials under very high RF gradients. The photocathodes will be prepared with an INFN-style photocathode plug, compatible with the plugs used by other institutions. This presentation will report the RF design of the photoinjector with distributed coupling and RF field symmetrization. Beam physics simulations show that symmetrized RF fields in the vicinity of the beam axis are essential for achieving normalized emittances below 100 nm for a 250-pC electron bunch. We will also present the design for the photocathode insertion and the analysis of the challenges related to reducing the peak electric fields, multipactor suppression, and resonant frequency tuning by fine adjustment of the plug position.

Footnotes

Funding Agency

This research was funded by the U.S. Department of Energy through the Laboratory Directed Research and Development program of the Los Alamos National Laboratory, under project number 20230011DR.

Paper preparation format

Region represented

North America

Primary author: XU, Haoran (Los Alamos National Laboratory)

Co-authors: ALEXANDER, Anna (Los Alamos National Laboratory); SIMAKOV, Evgenya (Los Alamos National Laboratory); ANISIMOV, Petr (Los Alamos National Laboratory); GRUMSTRUP, Torben (Los Alamos National Laboratory); BARKLEY, Walter (Los Alamos National Laboratory)

Presenter: XU, Haoran (Los Alamos National Laboratory)

Session Classification: Thursday Poster Session

Track Classification: MC2: Photon Sources and Electron Accelerators: MC2.T12 Beam Injection/Extraction and Transport