

# Physics and Applications of High Brightness Beams



Contribution ID: 33

Type: Poster

## A high-field X-band photoinjector for low-emittance electron-beam generation

A path to producing bright electron beams consists of low mean-transverse-energy photocathodes subjected to a high electric field. Such an approach is currently being explored at the AWA facility where a proof-of-principle experiment recently demonstrated the reliable operation of an X-band radiofrequency (XRF) gun with  $\sim 0.4$ -GV/m electric field on the photocathode surface. *This paper discusses the short term activities to fully characterize the physics associated with photoemission from a copper photocathode in a high-field regime. We also describe the development and optimization of an integrated photoinjector coupling the available XRF gun to a compact X-band booster linac. Simulations of the beam dynamics and expected performances are presented along with the opportunities enabled by introducing low-MTE photocathodes in the XRF gun.* W.H. Tan et al., Phys. Rev. Accel. Beams 25, 083402 (2022).

**Primary authors:** FRAME, Emily; CHEN, Gongxiaohui; Mr DORAN, Scott (Argonne National Lab); KUZIKOV, Sergey (Euclid Techlabs, LLC); JING, Chunguang; PIOT, Philippe; POWER, John; Dr WISNIEWSKI, Eric (Argonne National Lab)

**Presenter:** FRAME, Emily

**Session Classification:** Poster