

Cathode for mA high current

Tuesday 17 September 2024 12:10 (25 minutes)

High-brightness electron sources are crucial for applications like X-ray free electron lasers (XFEL), ultrafast electron diffraction (UED), and electron ion colliders (EIC), etc. At Peking University, the DC-SRF gun operates reliably at a low emittance mode of 0.54 mm·mrad(normalized) with 100 pC bunch charge at 1 MHz repetition rate, and a high current mode of 37 pC at 81.25 MHz (3 mA). The K₂CsSb photocathode is illuminated by a 515 nm green laser, achieving a quantum efficiency (QE) of 6-8%, which drops to around 1% in the cold gun electrode at ~30 K. The photocathode maintains its efficacy for up to a month during experiments, delivering 0.1~3 mA during a 16-hour continuous-wave (CW) test. Additionally, the response time and intrinsic emittance of the bialkali photocathode were also evaluated.

Primary author: Dr XIE, Huamu

Presenter: Dr XIE, Huamu

Session Classification: Photocathode performance in accelerator applications

Track Classification: Paper submitted