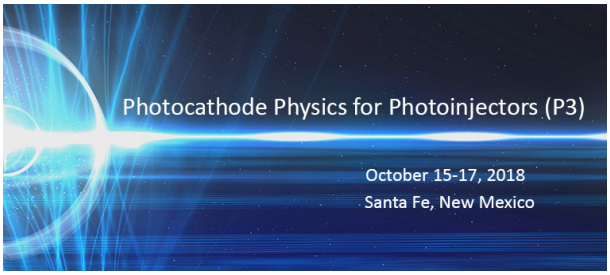

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Manufacturing and Packaging of Reliable Bialkali Photocathodes via Sputtering

Tuesday, 16 October 2018 09:35 (15 minutes)

The future upgrade at Relativistic Heavy Ion Collider (RHIC) calls for the implementation of electron cooling strategies, where ultra-cold electron beams will be generated by photoinjectors. To meet this requirement, the photocathode in the injector is required to deliver a high average current of 50 mA. Bialkali cathodes can deliver the required current, however owing to their short lifetime, they have to be replaced daily. Hence, there is a need for manufacturing process where photocathodes can be produced reliable and supplied in sufficient quantity to cater to the RHIC needs.
This challenge is being addressed by adopting two key strategies- first, by sputter deposition, a new method to grow bialkali cathodes using a pre-fabricated bulk target; and second, by in vacuo sealing and unsealing of the cathodes that lends to a "packaged"cathode-in-a-cartridge. Recent results demonstrate the growth of more than 20 photocathodes from a pre-fabricated K2CsSb sputter targets measuring 2"in diameter and these cathodes exhibit a reproducible QE of ˜20% at 220 nm and ˜3% at 530 nm. The cathode sealing and unsealing techniques have been demonstrated
The sputter-growth permit facile, reliable and economic production of cathodes, which can be stockpiled for the frequent use at RHIC operation.

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