

Status of the Photoemission and Mean Transverse Energy Experiment –PhoTE_x

Wednesday 18 September 2024 10:35 (25 minutes)

At Helmholtz-Zentrum Berlin photocathodes are developed as electron source for the SRF-photoinjector of the superconducting RF electron accelerator laboratory (SEALab). Sodium-Potassium-Antimonide (Na-K-Sb) photocathodes are grown and characterized by spectral response and X-ray photoelectron spectroscopy in the photocathode lab, but until now there was no device to analyze the mean transverse energy (MTE) of the photocathodes at HZB, which is also an important figure of merit.

Therefore the Photoemission and Transverse Energy Experiment ‘PhoTE_x’ was developed to study the MTE, quantum efficiency (QE) and lifetime of these photocathodes independent from the preparation chamber. The device was build as a stand-alone drift tube spectrometer. A tunable light source allows the illumination of the cathode in the full visible regime. Simulations showed that the instrument will be able to measure the MTE in the range of 40 meV up to 5 eV with a relative uncertainty of 10 %.

PhoTE_x is fully assembled and ready to measure the first Na-K-Sb photocathode. In this talk the PhoTE_x system is presented in detail.

Primary author: DUBE, Jonas

Co-authors: KÜHN, Julius; KAMPS, Thorsten

Presenter: DUBE, Jonas

Session Classification: Low emittance applications

Track Classification: Paper submitted