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Photocathode charge map measurements at ARES

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The ARES linac at DESY (Deutsches Elektronen-Synchrotron) is a dedicated accelerator research and development facility for advanced accelerator technologies and applications, including high gradient accelerating schemes, high-resolution diagnostics and medical applications. It provides ultra-short, high quality electron beams with charges between a few femtocoulombs and a few hundred picocoulombs, with energies up to 155 MeV, characterized by high reproducibility and stability.

The electron bunches are generated in a photoinjector comprising a UV laser and a normal conducting S-band gun with an exchangeable cathode material, enabling the required wide charge range and temporal bunch profile. A set of movable mirrors allows to change the position of the laser spot on the cathode, which in combination with bunch charge diagnostics downstream of the gun can be used for measuring the extracted charge as a function of the laser position. With this method the emission homogeneity and changes of the cathode can be studied and different cathode materials can be compared. We present the first results using this technique at ARES, including charge map and quantum efficiency (QE) measurements.

Funding Agency

Footnotes

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Yes

Primary author: DINTER, Hannes (Deutsches Elektronen-Synchrotron)

Co-authors: ASSMANN, Ralph (Deutsches Elektronen-Synchrotron); BURKART, Florian (Deutsches Elektronen-Synchrotron); JASTER-MERZ, Sonja (University of Hamburg); KELLERMEIER, Max Joseph (Deutsches Elektronen-Synchrotron); KUROPKA, Willi (Deutsches Elektronen-Synchrotron); LEDERER, Sven (Deutsches Elektronen-Synchrotron); MAHNKE, Christoph (Deutsches Elektronen-Synchrotron); MAYET, Frank (Deutsches Elektronen-Synchrotron); STACEY, Blae (Deutsches Elektronen-Synchrotron); VIDOLI, Caterina (Deutsches Elektronen-Synchrotron); VINATIER, Thomas (Deutsches Elektronen-Synchrotron); WINKELMANN, Lutz (Deutsches Elektronen-Synchrotron)

Presenter: DINTER, Hannes (Deutsches Elektronen-Synchrotron)

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