



Contribution ID: 251 Contribution code: WEP42

Type: Contributed Poster

Development of a Photoelectron Spectrometer for Hard X-Ray Photon Diagnostics at the European XFEL

Wednesday, 24 August 2022 17:10 (20 minutes)

Development and characterization of an angle-resolved photo-electron spectrometer, based on the electron Time-of-Flight concept, designed for hard X-ray photon diagnostics at the European free-electron laser is described. The objective with the instrument is to provide beamline users and operators with pulse resolved, non-invasive spectral distribution diagnostics, which in the hard X-ray regime is a challenge due to the poor cross-section and often very high kinetic energy of photo electrons for the available target gases. In this contribution we describe development of the device, including electron trajectory simulations, and first tests with hard X-rays at the PETRA III synchrotron where we have characterized the performance and optimized the voltage settings for resolution and electron detection efficiency. We demonstrate a resolving power of better than 5 eV up to at least 20 keV photon energy.

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Yes

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