

Contribution submission to the conference SMuK 2023

Prototype of a Cherenkov detector for the LUXE Experiment — ●ANTONIOS ATHANASSIADIS^{1,2}, LOUIS HELARY¹, RUTH MAGDALENA JACOBS¹, JENNY LIST¹, GUDRID MOORTGAT-PICK^{2,1}, EVAN RANKEN¹, and STEFAN SCHMITT¹ — ¹Deutsches Elektronen-Synchrotron (DESY), Hamburg, Germany — ²Universität Hamburg, Germany

The aim of LUXE (Laser Und XFEL Experiment based at DESY, Hamburg) is to measure strong-field QED effects with high precision. In order to create electric fields stronger than the so-called Schwinger limit, it is planned to collide a high-intensity laser pulse with either high-energy electrons up to 16.5 GeV or high-energy photons.

These two configurations either result in non-linear Compton scattering or Breit-Wheeler interactions which can be studied by measuring rates and kinematics of secondary particles created at the interaction point like high-energy electrons, positrons and photons.

For the detection of electrons, with expected fluxes of the order of 10^4 to 10^9 particles in an area of $15\text{ cm} \times 1\text{ mm}$ per event, a Cherenkov detector in combination with magnetic deflection for high-precision spectrometry will be used.

This contribution will present the simulation-based design of the Cherenkov detector, as well as first operation experience obtained with a prototype. Further optimisation of the various components as well as reconstruction algorithms will be discussed.

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