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LUXE: A new experiment to study non-perturbative QED in electron-LASER and photon-LASER collisions

Thursday 1 September 2022 11:30 (30 minutes)

The LUXE experiment (LASER Und XFEL Experiment) is a new large-scale experiment in planning at DESY Hamburg. LUXE is intended to study collisions between a high-intensity optical LASER and 16.5 GeV electrons from the XFEL electron beam, as well as collisions between the optical LASER and GeV-scale, high-flux photon beams. The main physics objective of LUXE is to experimentally study processes of Quantum Electrodynamics (QED) in a non-perturbative regime, including quantum radiation reaction and Breit-Wheeler pair production in a strong background field. The proposed experiment will be the first to provide high-precision and high-statistics studies of these iconic phenomena in an unprecedented regime. An overview of the LUXE experimental setup will be given, with a discussion of the foreseen detector systems and their expected performance. Finally, the prospects for experimentally studying physics beyond the standard model will also be discussed.

Scientific topic

Future Facilities

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