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LUXE: A new experiment to study non-perturbative QED in e^- -laser and γ -laser collisions.

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The LUXE experiment (Laser Und XFEL Experiment) is a new experiment in planning at DESY Hamburg using the electron beam of the European XFEL. At LUXE, the aim is to study collisions between a high-intensity optical laser and up to 16.5 GeV electrons from the EuXFEL electron beam, or, alternatively, high-energy secondary photons. The physics objectives of LUXE are to measure processes of Quantum Electrodynamics (QED) at the strong-field frontier, where QED is non-perturbative. This manifests itself in the creation of physical electron-positron pairs from the QED vacuum. LUXE intends to measure the positron production rate in a new physics regime at an unprecedented laser intensity. Additionally, the high-intensity Compton photon beam of LUXE can be used to search for physics beyond the Standard Model.

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