MATTER AND TECHNOLOGIES

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Detector Challenges of the Strong-field QED Experiment LUXE at the European XFEL

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The LUXE experiment is an experiment, still in the planning stage, which aims to observe then characterise strong-field quantum electrodynamics interactions by colliding the high-quality high-energy EU.XFEL electron beam with a powerful LASER. Colliding LASER pulses with bunches of 1.5 × 10^9 electrons / 1 × 10^8 photons at 1Hz, this high-statistics environment presents an opportunity to probe rare interactions in new parameter-space of a novel regime. To do this requires a unique array of detectors to measure three types of particles, at highly varying fluxes dependent on LASER interaction parameters. The detectors measure electrons, positrons, or photons, and balance sensitivity with high dynamic range and hardness to radiation damage. The technologies, design, and reconstruction methods of each of these detectors are presented in this poster.

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