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Exploring New Physics with the Optical Dump at LUXE and Prospects for Future Facilities

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The planned LUXE experiment at DESY in Hamburg (Germany) stands at the forefront of the investigation into strong-field quantum electrodynamics with high precision. The interaction between electrons or photons and a high-intensity laser generates new electrons, positrons, and photons. The phenomena under examination include non-linear Compton scattering, non-linear Breit-Wheeler pair production, and the trident process. LUXE's primary objective is to measure the dependence of the matter-antimatter pair production rate on laser intensity. Furthermore, the Compton photons generated in the primary interaction offer an avenue for exploring new physics through a beam-dump-type experiment. Such a concept can also be applied for future colliders.

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