

## Contribution submission to the conference Dortmund 2021

### **Bremsstrahlung Measurements for the LUXE Experiment —**

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While Quantum Electrodynamics has been tested with a superb precision in the perturbative regime, there is a regime of very strong fields where it becomes non-perturbative and which has not yet been explored experimentally. The LUXE (Laser Und European XFEL-) Experiment aims to use the high-quality electron beam of the XFEL accelerator to probe this strong-field regime. Colliding high energy photons produced via bremsstrahlung (photon-photon mode) with a high intensity laser leads to field strengths above the Schwinger limit. This opens up the possibility to measure nonlinear Breit-Wheeler pair production, a process that takes place also in nature, for example around heavy astronomic objects, or in future particle colliders.

To create photon-photon collisions, the electrons from the XFEL beam are converted to high energy photons via bremsstrahlung in a target foil. A good understanding of this process, which has not been studied in detail at the energy scale relevant for LUXE before, is therefore necessary. To achieve this understanding testbeam experiments and simulations thereof are performed. The testbeam experiment presented aims to analyse the properties of a bremsstrahlung photon beam produced at the DESY testbeam.

After a short introduction to the LUXE experiment, this talk focuses on those testbeam experiments conducted to analyse high-energy bremsstrahlung properties.

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