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Laser Focusing and Electron Spectrometer Design of the LUX Beamline

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Within the LAOLA collaboration the University of Hamburg and DESY work closely together to combine university research in the field of plasma-based acceleration with the expertise of a large and well-established accelerator facility. In this poster we will present the design and development of two elements of the future LUX beamline, a dedicated beamline for generation of laser-plasma-driven undulator radiation within the LAOLA framework. The laser focusing system allows for positioning of the focusing mirror in 5 degrees of freedom in order to align the laser beam driver onto the acceleration target. A 4D-beam diagnostic ensures that the laser positioning and angle is kept at its design values, a key requirement for both a high driver focus quality and a semi-automated day-to-day operation. The electron spectrometer, based on a C-shaped permanent dipole magnet, is specifically designed to offer a very large dynamic range (50 to 1200 MeV). This caters nicely to both the experimental nature of the beams in this research field and the high scalability of the LUX beamline. Both designs are developed with the accelerator technology standards in mind.

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