

Plasma source development at LUX

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The development of plasma sources that enable the reliable and reproducible generation of high quality beams is key to moving closer to our goal of powering real-world applications with laser-plasma accelerators. An ideal design must feature a robust injection method with precise control over the trapped phase space, allow for tunability of the subsequent acceleration process through density tailoring, and support high-repetition rate operation. Supported by simulations and selected experimental results, this talk reviews our continuous efforts to implement this rich set of features into the plasma source at LUX. We motivate the principles guiding our development process, discuss the evolution of the design over recent years and provide a brief outlook on transferring the concept to MAGMA, the first plasma accelerator that will be driven by the high-average power laser KALDERA that is developed by our group at DESY.

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