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# All-optical, self-aligned Compton source using a PW-scale laser-wakefield accelerator and a plasma mirror

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We will report on an experimental campaign to explore inverse Compton scattering using the 1PW experimental area E5 at ELI-NP. Laser pulses containing up to 20 J were focused into a gas jet to accelerate electrons beams to GeV energies via laser wakefield acceleration. The residual laser exiting the plasma accelerator was then back-reflected onto the electron beam using a tape-based plasma mirror to drive inverse Compton scattering. This all-optical geometry using a single laser pulse yielded successful collisions on every shot due to the self-alignment of the wakefield electrons and the driving laser pulse also acting as scattering beam. The process was diagnosed through measurements of the profile and spectrum of the generated electron and gamma beams. We will present details of the experimental setup and a preliminary analysis of the results.

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