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Development of a setup for laser-Compton backscattering at the S-DALINAC

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Non-destructive beam diagnostics as well as experiments and light sources that have a low impact on the beam are important for the operation and applications of an Energy-Recovery LINAC (ERL). Compton backscattering can provide a quasi-monochromatic highly polarized X-ray or gamma-ray beam without strongly affecting the electron beam due to the small cross- section of the Compton scattering. Highest energies of the scattered photons are obtained for photon-scattering angles of 180°, i. e., backscattering. A project at TU Darmstadt foresees to synchronize a highly repetitive high-power laser with the electron beam from the Superconducting DArmstadt electron LINear ACcelerator (S-DALINAC). First, the Laser-Compton Bachscattering (LCB) source will be uses as diagnostic tool for determining the electron beam energy and the energy spread. From the results, optimal design considerations for LCB sources under ERL operations will be deduced. An overview over the design concept and the status of the LCB source at the S-DALINAC will be given.

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Footnotes

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