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Design and Characterization of Permanent Magnetic Solenoids for REGAE

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REGAE is a small electron linear accelerator at DESY. In order to inject short and low charged electron bunches in to laser-driven plasma wakefield permanent magnetic solenoids for the final focus down to 10^{-6} m were designed, assembled and field measurements were done.

Due to a shortage of space close to the operation area an in-vacuum solution has been chosen. Furthermore a two-ring design made of wedges has been preferred in terms of beam dynamic issues. To keep the field quality of a piecewise built magnet still high a sorting algorithm for the wedge arrangement has been developed and used for the construction of the magnets. The magnetic field of these solenoids has been measured with high precision and has been compared to the simulated magnetic field.

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