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Mutual interaction of 2m long electron plasma ensembles with an ion beam in MeV range

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Gabor-lens 2000 (GL2000) is an hadron optic device which confines a 2m long electron cloud. This opens up new possibilities in research with very long confined static electron ensembles. Due to the optimization of technical design it was possible to successfully complete the conditioning process creating a stable confinement of electrons. Also, the diagnostic tools were extended and the control and measurements was automated. This made it possible to scan a large parameter space with varying the external confinement parameters magnetic field, potential and residual gas pressure. In addition, numerical models of GL2000 confinement parameters were simulated to derive the operation function for different production and loss mechanisms at different potential and magnetic field settings. This should make it possible to adjust the particle ensemble within the Gabor-lens (GL) in a way, that the plasma state is defined. For applications of GLs in transport channels, particle accelerators or final focus sections it is than possible to create a perfect linear mapping of the beam and therefore a smooth focusing with space charge compensation. Using the TraceWin tool, simulations were made for beam transport through high energy beam transport lines. In addition, GL2000 was implemented to the Van-de-Graaf beamline at IKF*, to be able to investigate beam-cloud interactions and perform first transport measurements.

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Footnotes

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