

# GFA Accelerator Seminar

## Simulation of space-charge compensation of proton beams in low-energy beam transport

**Monday, 23 July 2018, 16.00 h, WBGB/019**

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For the transport of low energy, high intensity beams, space charge forces play a dominating role causing emittance growth either by redistribution of the beam or by a combination of large beam sizes and non-linear focussing in the transport line. For magnetostatic systems, accumulation of oppositely charged particles within the beam potential helps to mitigate these effects. Thus, most high intensity hadron accelerators rely on the presence of space charge compensation in their Low-Energy Beam Transport Sections (LEBT). One possibility to model the influence of space charge compensation is to include residual gas ionisation in a Particle-in-Cell model. Simulations for a model system consisting of a drift section closed by repeller electrodes will be presented. It will be shown how the results of the simulation can be reproduced with a simple theoretical model and how these are linked to the presence of numerical heating.

In a second part, measurements of beam matching from the ion source to the RFQ of Linac 4 - the new injector to CERN's chain of accelerators - will be presented.

For more details contact Rudolf Dölling

