

SERVICE DE METROLOGIE NUCLEAIRE

Cyclotron axial inflector optimization

(in collaboration with IBA-group)

N. Pauly (nipauly@ulb.ac.be), Erik Van Der Kraaij (Erik.VanDerKraaij@iba-group.com), C. Hernalsteens (Cedric.Hernalsteens@ulb.be)

Cyclotrons with axial external injection have a vertical incoming beam inserted by an electrostatic inflector into the horizontal median plane. The 6-dimensional phase space of the beam (with positions and momentum of the particles) is altered with couplings between the transversal and longitudinal dimensions. An important property of an inflector is the transmission: the total amount of beam correctly injected in the median plane.

An idea to improve the transmission of the beam is to apply angles to the entrance and/or exit of the electrode faces, to create a more uniform effective length seen by all the particles.

The goal of the study would be to first calculate the theoretical dependence of the beam propagation on the angles. Second, simulation studies in 3D would be performed to validate the theoretical calculations and find the optimum angles for certain IBA cyclotrons.

Supervisor: Erik van der Kraaij