

# ACCELERATOR SEMINAR

**Mariusz Sapinski**

GSI Helmholtzzentrum für Schwerionenforschung GmbH

**Thursday, 16<sup>th</sup> August at 4 p.m.**

**KBW lecture hall**

Planckstraße 1, 64291 Darmstadt

## **“Application of Machine Learning for the IPM-based beam profile measurement”**

Ionization Profile Monitor (IPM) is one of the most reliable devices to measure the transverse beam profile in hadron machines. This type of monitor can work in two main modes: collecting electrons or ions. Typically, for lower intensity beams, the ions produced by ionization of the residual gas are extracted towards a position-sensitive detector. Ion trajectories follow the external electric field lines, however the field of the beam itself also affects their movement leading to a deformation of the observed beam profile. Correction methods for this case are known. For high brightness beams, IPM configuration in which electrons are measured, is typically used. In such mode, an external magnetic field is usually applied in order to confine the transverse movement of electrons. However, for extreme beams, the distortion of the measured beam profile can occur. The dynamics of electron movement is more complex than in case of ions, therefore the correction of the profile distortion is more challenging. Investigation of this problem using a dedicated simulation tool and machine learning algorithms lead to a beam profile correction methods for electron-collecting IPMs.



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