Position-sensitive resonant Schottky cavity

D.Dmytriiev,[1,2] M.S.Sanjari,[1] and Yu. A. Litvinov[1,2]

[1] *GSI Helmholtzzentrum fr Schwerionenforschung, 64291 Darmstadt, Germany*

[2] *Universitt Heidelberg, Germany*

Studying the rapid neutron capture process (r-process) in stellar environments, that leads to the creation of elements heavier than 56-Fe, remains one of the fundamental questions of modern physics and therefore an active field of research within nuclear astrophysics. Apart from other key measurables like neutron capture cross section and decay lifetimes, nuclear masses are of outmost importance for pinpointing the r-process using theoretical and experimental approaches. Exotic nuclides which participate in the r-process due to their low production yield and short half-life can be efficiently investigated in storage rings. In such facilities non-destructive methods of particle detection are often used for in-flight measurements based on frequency analysis. Apart from their applications in the measurements of beam parameters, they can be used in non-destructive in-ring decay studies of radioactive ion beams. Due to the low signal level the detectors should be very sensitive and fast because of short lifetime of the particles. Resonant Schottky cavity pickups fulfill such requirements. In addition, position sensitive Schottky pick-up cavities can enhance precision in the isochronous mass measurement technique. The goal of this work is to design such a position sensitive resonant Schottky cavity pickup based on theoretical calculations and simulations. Keywords: storage rings, Shottky detector, ion beam measurement