Contribution ID: **1** Type: **Contributed talks**

A new HIE-ISOLDE Storage Ring

Monday, 28 June 2021 10:15 (20 minutes)

A heavy ion storage ring at the HIE-ISOLDE facility offers the opportunity for the first time to do experiment with stored secondary ion beams. The planned physics program is rich and varied, ranging from the investigations of
nuclear ground state properties to reaction studies with astrophysical relevance. In addition to experiments performed using beams circulating within the ring, electron cooled ion beams can also be extracted and exploited by external spectrometers for high-precision measurements.
The Max-Plank Institute for Nuclear Physics has offered the TSR ring, which was installed at the Max Planck Institute for nuclear physics in Heidelberg, for installation at the HIE-Isolde facility at CERN. The physics case for this has been discussed in various workshops and scientific committees at CERN who have strongly endorsed the scientific case. However, the final decision by the CERN directorate on the TSR @ ISOLDE project has been postponed until the LHC's second upgrade program has been completed. Without the approval of the TSR project by CERN, the Max Planck Institute could no longer hold the storage ring, so the TSR was finally scrapped.
Due to the importance of a storage ring at ISOLDE, which is more suitable for nuclear physics experiments than the TSR, a new storage ring design was created. The design criteria for the new storage ring, called ISR hereafter, are summarized below.
The storage ring should be able to store ions up to ^{238}U and 10 MeV/u with the equilibrium charge state available with the HIE-ISOLDE stripper.
This means that the ring must be designed for a maximum beam rigidity of 1.5 Tm. Daughter nuclei that are created in nuclear reactions with the gas target often have very large transverse momenta and should be focused in the detector positions, so that the spectrometer of the new storage ring must have focal points in the detector planes.
The storage of daughter nuclei, which are created in (p, γ) reactions, should be possible up to a certain rigidity deviation to the main beam so that the daughter nuclei can be separated from stripped ions with the help of electron cooling. Furthermore, it should be possible to extract an ion beam which has the properties of an electron cooled ion beam. Technical details of the new planned ring facility will be discussed.

Primary author: Dr GRIESER, Manfred (Max-Planck-Institut für Kernphysik)

Co-authors: Mr SIESLING, Erwin (CERN); Dr WENANDER, Fredrik (CERN); Prof. BLAUM, Klaus (Max--Planck-Institut für Kernphysik)

Presenter: Dr GRIESER, Manfred (Max-Planck-Institut für Kernphysik)

Session Classification: Introduction 2