DESIREE: a unique cryogenic electrostatic storage ring for merged ion-beams studies

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In this poster I will present the design of a novel type of storage device currently under construction at Stockholm University, Sweden. This device will use purely electrostatic focusing and deflection elements and allows ion beams of opposite charge to be confined under extreme high vacuum and cryogenic conditions in separate rings and then merged over a common straight section. The unique construction of this Double ElectroStatic Ion Ring ExpEriment (DESIREE) apparatus allows for studies of interactions between cations and anions at low and well-defined centre-of-mass energies down to 10 meV as achieved in magnetic storage rings between ions and electrons. The heart of DESIREE is shown schematically in Figure 1.

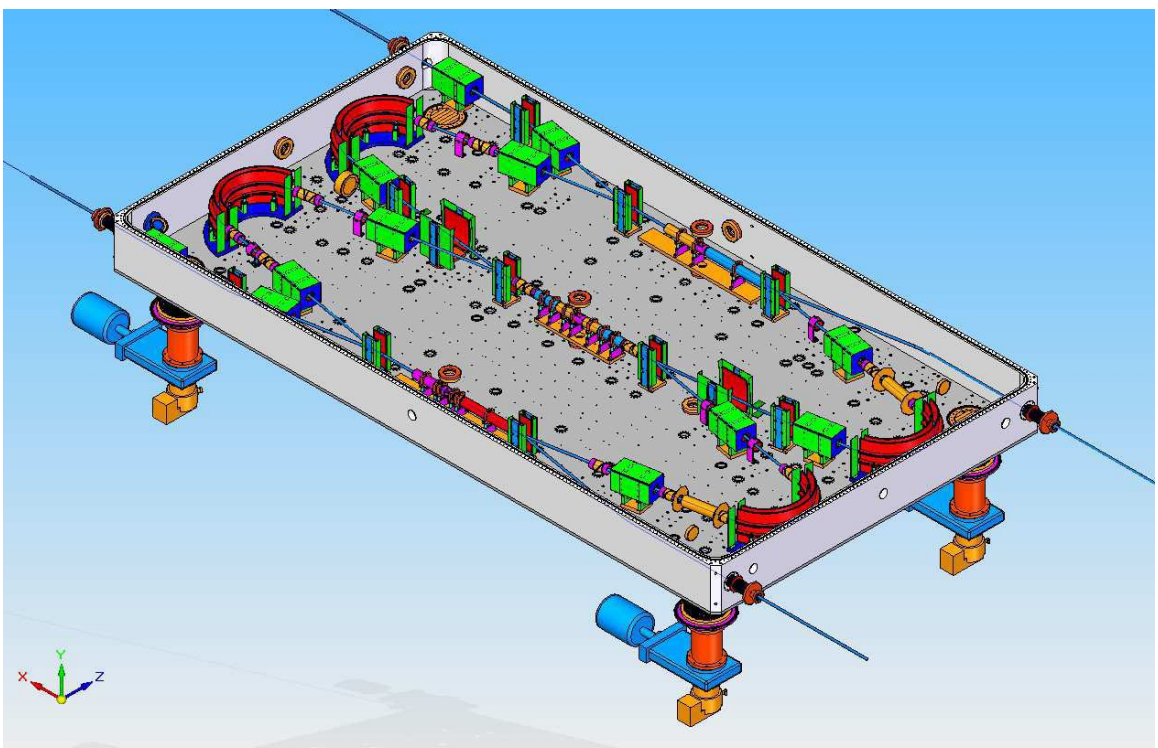

Figure 1. A schematic of DESIREE's heart: the cryogenically cooled rings and merging region.

I will present the current state of the DESIREE facility, and highlight some of the technical issues that have arisen during its development and construction. Finally, the advantages of this design are a boon to fundamental experimental studies, not only in atomic and molecular physics but also in the boundaries of these fields with chemistry and biology, and I will discuss several examples of such potential research.

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