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## **Towards Tests of a Combined RFQ Cooler with Axial Magnetic Field**

In mass spectrometry of exotic ion beams a cold ion beam is required, to achieve a mass resolution goal of 1:20000, which is a typical requirement for nuclear physics studies of isobaric ions. In the radiofrequency (rf) quadrupole cooler (RFQC), which is a kind of linear ion trap, rf fields and ion-gas collisions may give considerable increase or decrease of the beam transverse emittance and its energy spread, depending on a delicate tuning of heating and cooling effects; an equivalent pseudo equilibrium temperature may be introduced, dominated by ion beam energy and balance of collisions and confinement forces (not by equipment temperature as discussed, also with comparison to cryogenic traps). An extra confinement may be added by a solenoidal magnetic field, as in the RFQC prototype installed in the Eltrap machine, which are briefly described. This provides a versatile test bench (separated from a closed accelerator installation) for detailed studies of cooling dynamics in several regimes (ballistic or diffusive), and of several RFQC technical optimizations, including differential gas pumping and rf voltage distribution to RFQC electrodes. First commissioning of the gas pumping system is reported. Also characterization of the rf matching box and electrode multiplexer systems are described.

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### **Email Address**

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