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Optimizations of a combined RFQ cooler prototype for exotic ion beams

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Cooling of secondary beams is often critical to accelerator based nuclear and sub-nuclear physics, with beams ranging from positrons e^+ to muons μ^{\pm} to hadrons (for the respective collider facilities) to exotic nuclei ions (like $^{132}\text{Sn}^{1+}$) as in the SPES (Selective Production of Exotic Species) project at LNL. A prototype of a radiofrequency quadrupole (RFQ) cooler (RFQC) was developed at LNL and is under test in the Eltrap facility at Milan University; Eltrap provides a solenoidal magnetic field. Typical limits of RFQC and high resolution mass spectrometer (HRMS) performances are discussed, and relevant formulas are implemented in easy reference tools; HRMS requires less than 1 eV energy spread. The necessary collisional data are reviewed, in particular for Cs^+ against He gas, whose pressure ranges from 2 to 9 Pa; status of Milan test bench is updated, with radiofrequency multiplexer and matching box details; the energy analyzer concepts are discussed. Practical consideration on gas pumping are also included.

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Footnotes

Please note that Prof. M. Romé is among paper authors, but the Indico system does not give any possibility to add missing names, from this abstract submission page.

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