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Reviewing the success of radioactive-ion manipulation with RFQ traps and recalling the contributions from McGill

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Ion cooling and trapping techniques have opened new vistas in the physics associated with exotic (short-lived) nuclides and helped cure the ills of isobaric contamination. The ability of condensing ion-beam phase space using soothing cold buffer gas accompanied by electromagnetic confinement has created a new paradigm: beam preparation. The main player in this field is the so-called RFQ cooler-buncher, a segmented linear Paul trap that can capture exotic nuclides hot off the target, reducing emittance by grouping ions into a tight bunch.

Inspired by a 1982 sabbatical leave in Mainz with the group of H.-J. Kluge developing Penning traps for ISOLDE, the late R.B. Moore initiated the first ion-catching developments at McGill with many of details elaborated (at the bar) in Thomson House, the SMI2019 conference venue.

Bunchers are now used for mass measurements and collinear laser spectroscopy of exotic nuclides. Further evolutions have them preceeding dipole mass separators to increase resolving power and even inside ISOL target modules combined with laser ionization for beam purification. RFQ bunchers are also necessary preparatory devices for the fabulous multi-reflection time of flight (MRToF) mass spectrometers that are now pervading the radioactive-ion scene.

In this presentation, the (local) history will be briefly told and the rich evolution of cooler-bunchers will be illustrated as exhaustively as time will permit.

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