

Abstract Submitted
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An advanced ion beam cooler and buncher for laser spectroscopy of rare isotopes at NSCL BRADLEY BARQUEST, Michigan State University Dept of Physics and Astronomy and NSCL, GEORG BOLLEN, Michigan State University Dept of Physics and Astronomy, NSCL and FRIB, MAXIME BRODEUR, Michigan State University, NSCL, KORTNEY COOPER, JEFFREY KWARSICK, Michigan State University Dept of Chemistry and NSCL, RYAN RINGLE, STEFAN SCHWARZ, Michigan State University, NSCL, DAVID SKUTT, Michigan State University Dept of Chemistry and NSCL, CHANDANA SUMITHRARACHCHI, Michigan State University, NSCL — An advanced beam cooler and buncher based on a gas-filled RF ion guide and trap is under development at MSU. The device will provide high-quality pulsed beams for collinear laser spectroscopy measurements of rare isotopes at the BECOLA facility at NSCL. A small transverse emittance allows for better overlap of the ion beam with laser light, and small longitudinal emittance bunches enhance the sensitivity of collinear laser spectroscopy measurements. Numerical simulations indicate the required cooler acceptance of 75π mm mrad @ 60 keV, and the extraction of ion bunches with longitudinal and transverse emittances of $2 \text{ eV}\cdot\mu\text{s}$ and 1π mm-mrad @ 60 keV are attainable. Design for the BECOLA cooler and buncher is complete, and construction is underway. A new electrode design and RF coupling scheme simplify mechanical design and operation. A number of the design features of the advanced beam cooler and buncher are being validated in a similar but separate RF ion guide device. Characterization of this ion guide and progress on the BECOLA cooler and buncher will be presented.

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