

Abstract for an Invited Paper
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Collinear Laser Spectroscopy Studies of Rare Isotopes at NSCL¹

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The BEam COoler and LAsEr spectroscopy (BECOLA) facility² is being installed at National Superconducting Cyclotron Laboratory at Michigan State University. BECOLA will make use of low-energy beams generated via projectile-fragmentation reactions and subsequent gas stopping,³ complementing laser spectroscopy studies for charge radii and nuclear moments at ISOL facilities.⁴ Low-energy beams with a maximum energy of 60 keV/q will be transported to a new-generation beam cooler and buncher under development, and then to the collinear laser beam line. The ion beams can be neutralized in a charge exchange cell (CEC) using reactions with alkali vapor. The ion/atom beam will be collinearly overlapped with laser light and fluorescence will be detected in coincidence with the beam bunches to increase the detection sensitivity.⁵ The installation of the collinear laser beam line is complete and commissioning tests are underway using stable beams from an offline ion source. On-line operation of BECOLA is foreseen to start in 2012. The earlier science program will start with charge radii measurements of the neutron-deficient K, where the new data are important for revealing single-particle evolution in the pf shell.⁶

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²<http://groups.nscl.msu.edu/becola/>

³L. Weissman et al., NIM A 540, 245 (2005).

⁴H. -J. Kluge and W. Nörtershäuser, Spectrochimica Acta B 58, 1031 (2003).

⁵A. Nieminen et al., PRL 88, 094801 (2002).

⁶Z. C. Gao et al., PRC 80, 034325 (2009).