

Abstract Submitted
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Compact high resolution isobar separator for study of exotic decays V. SHCHEPUNOV, A. PIECHACZEK, H.K. CARTER, J.C. BATCHELDER, ORAU, E.F. ZGANJAR, LSU — A compact isobar separator, based on the Multi-Pass-Time-of-Flight (MTOF) principle, is developed. A mass resolving power (MRP) of 110,000 (FWHM) is achieved as spectrometer with a transmission of 50 - 80%. The transverse beam acceptance and the energy acceptance are 42π mm mrad and about $\pm 2.5\%$. Operated as a separator, molecules of N_2 and CO with $\Delta M/M = 1/2500$ or 10.433 MeV were separated with a Bradbury Nielsen gate. In that mode of operation, the MRP (FWHM) is about 40,000 after 120 laps. To inject radioactive ion beams into the separator, and to further improve its MRP, cooler and buncher RF quadrupoles were designed¹ and tested. A bunch width of 30 ns at 1% of the peak height (FWHM = 9 ns) and a transmission in DC mode of 75 – 80 % were achieved. With such bunch parameters, MRPs of $\sim 400,000$ (FWHM) are expected for the MTOF separator. At HRIBF, it will provide pure samples of exotic nuclides around ^{100}Sn , of neutron deficient rare-earth nuclei and of neutron-rich nuclei. Incidental measurements of mass differences will determine Q_β values with accuracies of $\sim 1\%$. ¹ V. Shchepunov and V. Kozlovskiy *et al.*, to be published

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