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Experimental Test of Momentum Compression in an Achromatic Fragment Separator

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The efficient collection of projectile fragments and fission fragments with in-flight separators in many cases requires a large momentum acceptance. For example, the planned Advanced Rare Isotope Separator (ARIS) [1] at the future Facility for Rare Isotope Beams at Michigan State University has a 10% momentum acceptance. Such broad momentum distributions can be compressed using appropriately shaped energy degraders [2], and these energy degraders can be used to generate mass-separation at the same time [3]. Here we report on an experimental test of this momentum-compression scheme using the A1900 fragment separator [4] at the National Superconducting Cyclotron Laboratory with dedicated wedge-shaped energy degraders and a matching beam optics setting. The energy distribution of the beam after momentum compression was measured with a stack of semiconductor detectors.

References

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[4] D. J. Morrissey, et al., Commissioning of the A1900 projectile fragment separator, Nuclear Instruments and Methods in Physics Research B 204 (2003) 90.

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