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Higher-order calculations on a fragment separator layout for RIA
M. HAUSMANN, A.M. AMTHOR, B.M. SHERRILL, A. ZELLER, NSCL, Michigan State University, East Lansing, MI 48824 — The planned Rare Isotope Accelerator (RIA) will provide unprecedented quantities of rare isotopes for basic science and potential applications. A key part of the RIA concept is a large acceptance fragment separator that is intended to efficiently collect and separate the exotic nuclides of interest. A preliminary baseline design of the pre-separator stage has been developed using the ion optical codes GRAPHIC TRANSPORT (by U. Rohrer based on a CERN-SLAC-FERMILAB version by K. L. Brown *et al.*) and GICO (H. Wollnik *et al.*, AIP Conf. Proc. **177**(1988)74), where the latter is used also to optimize higher order corrections. In the present layout all relevant aberrations up to 3^{rd} order are corrected at the pre-separator image plane and most of them also at the central intermediate image. Provisions are included for a beam dump system located slightly downstream of the first dipole magnet at an image location where the beam can be separated from the fragments of interest. Investigations of the preliminary layout with the Monte Carlo code MOCADI (N. Iwasa *et al.* NIM **B126**(1997)284) indicate a transmission af about 60% for ^{134}Sn generated by induced fission of ^{238}U. We will compare different ion optical solutions and present the status of our work. In the future we intend to further optimize the layout, to extend the calculations beyond 3^{rd} order, and to verify the results using alternative codes, e.g. COSY INFINITY (K. Makino, M. Berz, NIM **A427**(1999)338).

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