

Momentum Achromat for Radioactive Ion Experiments

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The development of RIB facilities is actively pursued worldwide due to the strong interest in the physics with accelerated short-lived nuclei. Alternatively, low intensity (and low energy) radioactive beams can be produced following fusion, transfer, break-up reactions or fission in-flight (for heavy beams) and can be separated with a suitable spectrometer. Reactions in inverse kinematics result in forward focused products with relatively smaller angular and momentum widths, which is useful for efficient collection of the reaction products. It has been demonstrated that high precision experiments can yield good results even with low intensity beams. A momentum achromatic separator (MARIE) is under development to produce low energy RIB using light ion beams from LINAC in inverse kinematics. We have chosen a symmetric configuration, namely, Q1-Q2-D-Q3-Q3-D-Q2-Q1, with large solid angle ($d\Omega_{\text{geom}} \sim 25 \text{ msr}$) and momentum acceptance ($\Delta P/P \sim 5 \%$). For light ion beams the change in q is quite significant and will be used for primary separation of the products. This facility can be used for addressing a variety of research problems.