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Wed-Mo-Or10-05: TRIUMF new high resolution mass separator magnet design

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TRIUMF is constructing a new facility, ARIEL, for rare isotope beam (RIB) production using the ISOL method. ARIEL will increase the production and enable the delivery of three simultaneous radioactive beams, making it the first multi-user RIB facility worldwide. The selection of such beams will be achieved by means of a new high resolution mass separator system, funded through the CANREB project. The separator is designed to achieve a resolving power of twenty thousand for a transmitted emittance of three micrometer. At the core of the system there are two identical 90 degree dipole magnets with a 1.2 meter radius of curvature, arranged in an optical configuration that minimizes aberration. The magnets are designed and manufactured with an integral field flatness in the order of one part in one hundred thousand to comply with the stringent optical requirements. Additional features are built into the magnet design to correct for high order aberration and guarantee linear behavior over a wide mass range. In this paper we will present the magnetic field study and the engineering considerations that lead to the final design of the dipole.

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