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Characterization of RF Carpets with Variable Frequency for use in RIB Measurements[1] SHANE RYAN, Univ of Notre Dame, ALEC HAMAKER, REU Summer Intern, MAXIME BRODEUR, Univ of Notre Dame — The recent, worldwide development of radioactive ion beam (RIB) facilities has dramatically increased potential for answering pressing nuclear science questions, ranging from mechanisms involved in creation of heavy nuclei to the structure of exotic nuclei. The chemistry-independent nature of in-flight production of RIBs allows for a broad range of nuclei - however, the high energy and momentum spread of these beams are at odds with requirements for low energy experiments, which consequently implement gas cells to thermalize the RIB. Many such gas cells include radio-frequency (RF) carpets, which are sets of concentric electric rings carrying superimposed electric signals to rapidly vary a repulsion force with both time and position. This enables and facilitates active transport towards an extraction orifice in the center as opposed to passive diffusion, increasing both experimental accuracy and efficiency. The growing use of RF carpet technology prompted us to investigate the behavior of the repelling force as a function of various experimental parameters, including gas pressure, RF amplitude, and opposing electric field strength. We also developed novel circuitry for use in an RF carpet that allows for variable signal frequency.

[1]Characterization of RF Carpets with Variable Frequency for use in RIB Experiments

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