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Beam Trajectory influence on dispersion and uniform beams at NASA Space Radiation Laboratory's beam line

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The Booster synchrotron at Brookhaven National Laboratory delivers slowly extracted beams to the NASA Space Radiation Laboratory (NSRL). Experimenters at NSRL require uniformly distributed radiation dose to simulate the space radiation environment. The NSRL facility generates uniform beam distribution of various ion species at the location of the target using a pair of octupole magnets in the beam-transport line. The beamline is designed to be achromatic through the octupoles and to the target. However, the dispersion function depends on the trajectory of the beam as it is transported out of the booster and into the beamline. The dependence on this trajectory has not been previously studied. In this report we describe a new model we have developed to study this effect and show measurements to compare to our simulations.

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