Test of the 90-degree Achromatic Bend Prototype for NorthStar’s Mo-99 Production Facility

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ABSTRACT

Argonne is funded by the National Nuclear Security Administration’s (NNSA) Office of Material Management and Minimization (M3) to assist NorthStar Medical Radioisotopes in developing an electron-accelerator-based system that produces $^{99}$Mo by a (γ,n) reaction on a $^{100}$Mo target. This production facility will be composed of multiple pairs of linear accelerators, each pair irradiating the initial target material from the opposite direction for better efficiency and uniformity of $^{99}$Mo production. To protect the accelerator components from the intense bremsstrahlung radiation coming from the opposite beam, the use of a 90-degree achromatic bend was proposed. The achromatic 90-degree bend is composed of two 45-degree bending magnets and two quadrupole magnets for chromaticity compensation. A prototype of the 90-degree achromatic bend was designed and assembled at Argonne. Test runs were performed to check the reliability of this approach. The results of these tests are presented in this report.

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