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Strain Degradation Study of In Situ MgB2 Wire NATHANIEL GLASER, Texas A&M Univ — Accelerator-driven subcritical fission in a molten salt core (ADSMS) offers a double-edged solution to both the nation's diminishing energy resources and accumulation of nuclear waste. The design for this next step in energy and environmental sustainability implements a strong focusing cyclotron (SFC) and, in the scope of this project, a quadrupole component. For the SFC quadrupole to appropriately focus the clusters of accelerated particles, a certain current density must travel through a coiled conductor of a specific geometry. However, the characteristics of the focusing depend largely on the conductor. To generate the appropriate magnetic field gradient and to comply with the geometric constraints of the SFC quadrupole, MgB2 wire was selected as the potential candidate that would best optimize the operational parameters (light cryogenic load, high current density, and degree of structural flexibility). This project developed the testing procedures for the viability of in situ (wind and react) MgB2 within the design constraints of the quadrupole. Methods by which to apply controlled degrees of strain across lengths of wire and methods by which the degradation mechanism of the wire segments could be analyzed through visual and performance metrics were developed.

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