Abstract Submitted
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Study of an axisymmetric mirror-based volumetric neutron source[1] J.K. ANDERSON, C.B. FOREST, V.V. MIRNOV, E.E. PETERSON, J. WALLACE, University of Wisconsin - Madison, R. HARVEY, Y. PETROV, CompX — A dedicated neutron source is required to develop and test materials with both a long lifetime and minimal activation when subjected to a high neutron flux. We revisit the long-studied magnetic mirror concept for this application, including recent breakthroughs in both physics (stable high β, high Te plasmas in the GDT) and technology (high fields produced by HTS coils). Stability is achieved by a combination of plasma escaping the mirror into a region of good magnetic curvature, sloshing fast ions, and non-paraxial end cell effects. Plasma heating and fueling is via neutral beam injection at modest energy (25kV); synergistic application of high-harmonic fast waves that damp primarily on the beam ions dramatically increases the fusion neutron yield. Electron temperature is a key parameter in fusion yield; studies of 110GHz ECH show complete absorption of fundamental X mode high field side launch. With the expected 2MW of available power, a large range of Te is available and allows fusion neutron flux exceeding 10^{13} n/s before $\beta = 1$ is reached. A higher field central cell is investigated for achieving materials-testing-relevant fusion flux levels.

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