

Abstract Submitted
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Deuterium Beam Injection For Fast Ion Confinement Studies On The Helically Symmetric Experiment (HSX)¹ ALEXANDER THORNTON, SIMON ANDERSON, KONSTANTIN LIKIN, BENEDIKT GEIGER, University of Wisconsin - Madison, SADAYOSHI MURAKAMI, Kyoto University, AARON BADER, SANTHOSH KUMAR, JAY ANDERSON, DAVID ANDERSON, University of Wisconsin - Madison — Fast ion confinement is of critical importance in advancing the stellarator concept. In order to study fast ions in quasi-helically symmetric fields, a neutral beam injector (1.2ms, 20keV, 40A) and neutron detector have been acquired for use on HSX from the MST group. Initial diagnostic results including beam-on-target D-D neutronics are presented. Computational analyses from GNET and BEAMS3D show that within present experimental constraints, sufficient ionization and confinement of injected neutrals can be observed. The background neutral density in HSX will substantially lower the confinement time of a fast ion population via charge exchange, so efforts to curtail this effect using advanced wall conditioning and strike line protection are discussed. There is an ongoing upgrade to the heating system in HSX which will facilitate lower background neutral density and higher ionization fraction by allowing a factor of three higher plasma density. Changes in the injection geometry will also be investigated as part of this upgrade to improve experimental conditions.

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