

Abstract Submitted
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Analysis of Plasma Contamination via Plasma-Surface Interactions from Neutral Beam Shine-Through¹ MATTHEW PARSONS, HANNA SCHAMIS, Pennsylvania State University — When high-energy neutral beam particles are not fully absorbed by the plasma, they will collide with plasma-facing components (PFCs). This beam shine-through occurs strongly at low plasma densities, which is particularly relevant to the development of non-inductive start-up scenarios, but will also occur to a smaller degree even during normal plasma operation. Typical analysis of the beam shine-through looks only at the thermomechanical impact of the power deposited on the PFCs. In this work, we instead examine the interaction between the beam and the surface of the wall from a particle perspective by using the well-known TRIM software. In particular, we calculate sputtering and reflection coefficients for a range of deuterium beam energies, beam geometries, and PFC materials, and assess the extent to which these processes result in (1) contamination of the main plasma by sputtered impurities and (2) modification of the heating profile due to particle reflection in a variety of realistic operating scenarios.

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