

Enhanced Localized Energetic Ion Losses Resulting From Single-pass Interactions with Alfvén Eigenmodes

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Abstract. We report the first observation of prompt neutral beam-ion losses due to non-resonant scattering induced by toroidal and reversed shear Alfvén eigenmodes in the DIII-D tokamak. The coherent losses are of full energy beam ions expelled from the plasma on their first poloidal orbit. The first orbit loss mechanism causes enhanced, concentrated losses on the first wall exceeding nominal levels of prompt losses. The loss amplitude scales linearly with the mode amplitude. The data provide a novel and direct measure of the radial excursion/scatter of particles induced by individual modes and may shed light on mechanism for the scattering of energetic particles in interstellar medium.