

Abstract Submitted
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Observation on Phase Space Route of Fast Ion Transport during Alfvén Eigenmodes Activities in Toroidal Plasma¹ XIAODI DU, MICHAEL VAN ZEELAND, General Atomics, WILLIAM HEIDBRINK, University of California, Irvine, CAMI COLLINS, General Atomics — The imaging neutral particle analyzer (INPA) in DIII-D tokamak for the first time observes the fast ion transport route in the velocity space during the intense activities of multiple Alfvén eigenmodes (AE). The experiment investigates the maximum achievable signal at each local phase space by scanning the power of relevant neutral beams. It is found that the signals from certain phase space are easily saturated with only single neutral beamline. In other words, any additional power of neutral beam steered into those phase space does not produce any signal expected in neoclassical theory, exhibiting the nature of anomalous transport. The phase space with such character is referred to deficit region. A velocity-space map of the deficit region is obtained and following features are observed: (1) The outermost boundary of the deficit region is correlated to the radial extension of the relevant AE mode. (2) The deficit region connects different resonances of three major types of AE instabilities in velocity space. (3) The deficit region bridges the phase space of 80keV in the core to 65keV in the edge, following a pattern of particle streamline that particle energy is exchanged with toroidal angular momentum with a constant magnetic moment.

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