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Transport of Fast Ions Modulated by Shear Alfvén Waves[1] YANG ZHANG, HEINZ BOEHMER, WILLIAM HEIDBRINK, ROGER MCWILLIAMS, UC Irvine, TROY CARTER, DAVID LENEMAN, STEPHEN VINCENA, BRIAN BRUGMAN, WALTER GEKELMAN, UCLA, UC IRVINE TEAM, UCLA COLLABORATION — The interaction of fast particles with Alfvén instabilities is important in magnetic fusion devices and natural plasmas. In this experiment, shear Alfvén waves (SAW) modulate fast ion transport through Doppler shifted cyclotron resonance, in addition to the classical collisional diffusion. A Li^+ ion source is inserted in the LArge Plasma Device (LAPD) with ion energy up to ∼2000 eV, detected by a collimated fast ion energy analyzer. RF antennas launch waves with amplitude of \delta B/B ∼ 0.1% that propagate along the machine axis. When launched in (out of) phase with the perpendicular wave electric field, fast ions gain (lose) energy from (to) the wave. A ∼10% increase in the beam radial width and beam signal modulation at SAW frequency are observed. These fast ion transport phenomena peak near the predicted resonance condition. ($\omega_{Alfv\acute{e}n} - k_z v_z = \omega_{fast-ion}$)

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