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Effect of neutral beam injection on sawtooth stability in DIII-D negative triangularity plasmas[1] D. LIU, W. W. HEIDBRINK, UC Irvine, Y. Q. LIU, M. A. VAN ZEELAND, GA, L. N. ZHOU, Dalian Maritime Univ., M. E. AUSTIN, Univ. of Texas-Austin, A. MARINONI, MIT — Recent energetic particle experiments in DIII-D show that sawtooth stability can be strongly affected by injected neutral beam geometry in negative triangularity plasmas. It was observed that when the central safety factor q0 drops below unity, sawteeth are destabilized in negative triangularity plasmas with co-current neutral beam injection (NBI), while they are stabilized in negative triangularity plasmas with similar q0 but counter-current NBI. A significant variation in sawtooth period and sawtooth precursor was also observed depending on the plasma triangularity and injection beam geometry and power. The sawtooth induced fast-ion transport in these cases is relatively weak, as there is no measurable neutron reduction at each sawtooth crash. Non-perturbative and perturbative simulations with the magnetohydrodynamic-kinetic hybrid stability code MARS-K are being carried out to investigate the kinetic effect of energetic particles with different distribution on the n=1 kink mode stability as well as the effect of plasma shape and toroidal rotation/shear. The simulation results will be compared with experimental observations with the goals of validating the sawtooth theory and utilizing NBI and electron cyclotron waves to control sawtooth.

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