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Experimental study of Alfvénic instabilities driven by runaway electrons during the current quench in DIII-D[1] A. LVOVSKIY, C. PAZ-SOLDAN, N.W. EIDIETIS, GA, A. DAL MOLIN, U of Milano-Bicocca, G. DE-GRANDCHAMP, UCI, X.D. DU, GA, E.M. HOLLMANN, UCSD, C. LIU, PPPL, M. NOCENTE, U of Milano-Bicocca, D. SHIRAKI, ORNL — Suppressed formation of post-disruption runaway electron (RE) beams in DIII-D correlates with increased RE loss and presence of MHz-range kinetic instabilities driven by REs during the current quench. The frequency of these instabilities decreases with decreasing toroidal magnetic field while the failure rate of the RE beam formation increases. The magnetic structure of proposed compressional Alfvén waves is accessed using an upgraded set of high-frequency magnetic antennas. Analysis of the RE energy reconstructed from hard X-ray bremsstrahlung measurements shows that the instabilities are driven by REs with energy of a few MeV. The energy of REs, thus the presence of the instabilities, can be controlled via actuation of plasma and impurity injection parameters. It is found that hot (about 10 keV) pre-disruption plasma leads to formation of RE beams with higher RE current but lower maximum RE energy (sub-MeV) and no observable kinetic instabilities. An opposite phenomena is observed for cold (about 1–2 keV) pre-disruption plasmas. Argon massive gas injection (MGI) in amounts greater than 150 torr·l is found to reduce the energy of REs and increase the rate of RE beam formation. No such effect is observed for D_2 and Ne MGI.

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