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Direct Test of the Role of $E \times B$ Shear in Improved Confinement with Neon Injection Using Magnetic Braking[1]

D.R. ERNST, PPPL, M. MURAKAMI, ORNL, R.J. LA HAYE, G.L. JACKSON, K.H. BURRELL, T.E. EVANS, C.M. GREENFIELD, W.P. WEST, General Atomics, G.R. MCKEE, U. Wisconsin, C.L. RETTIG, UCLA — We have conducted experiments using magnetic braking to independently control $E_r \simeq V_{\rm tor} B_p$ in L-mode plasmas with neon injection. These experiments directly test the theory [D.R. Ernst, IAEA 1998, v. 2 p. 741.] that $E \times B$ shear, together with the suppression of turbulence by impurities, gives rise to strong improvements observed in the ion-channel, which more than double the ion temperature. Previous DIII-D experiments have measured reduced fluctuation levels with neon injection together with increased $E \times B$ shear [G.R. McKee, Phys. Plasmas **7**, 1870 (2000)]. Our results show specifically that as magnetic braking independently slows toroidal rotation, ion temperature and total stored energy decrease monotonically with the braking torque, with no effect on density or MHD activity. The braking has little effect without neon, apart from perhaps delaying H-mode onset.

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[X] Prefer Oral Session
[ ] Prefer Poster Session

Special instructions: 9th Oral presentation in DIII-D Session (following Kinsey)

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