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L-H Transition Dynamics in ITER-Similar D, He, and H Plasmas L. SCHMITZ, T.L. RHODES, T. NEISER, L. ZENG, UCLA, Los Angeles, CA, Z. YAN, G.R. MCKEE, UWisc, Madison, WI, P. GOHIL, L. BARDOCZI, D. ELDON, C.C. PETTY, General Atomics, San Diego, CA, B. GRIERSON, PPPL, Princeton, NJ — Recent work at DIII-D has revealed important differences in L-H transition trigger dynamics between deuterium (D), helium (He) and hydrogen (H) plasmas. The ion flux/polarization current induced by the Reynolds stress is shown to be decisive for the fast time evolution of the edge electric field across the L-H transition at intermediate and low plasma density in the plateau collisionality regime, in D and He plasmas. As the corresponding  $j \times B$  torque increases, concomitant turbulence suppression occurs within 100-200  $\mu$ s of the peak Reynolds stress gradient. Hplasmas show lower Reynolds stress and torque, and reduced toroidal correlation, of the self-organized edge flow layer, and longer transition times concomitantly with substantially higher required L-H transition threshold power. In H-plasmas, the Reynolds force is comparable in magnitude to the neoclassical bulk ion viscosity and the force due to thermal ion orbit loss, potentially explaining the increased power threshold. Supported by the U.S. DOE under DE-FC02-04ER54698, DE-FG02-08ER54984, DE-AC02-09CH11466 and DE-FG02-08ER54999.

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