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Improving Stability and Confinement of Slowly Rotating Tokamak Plasmas Using Static Nonaxisymmetric Magnetic Fields,[*] A.M. Garofalo, K.H. Burrell, T.H. Osborne, M.J. Schaffer, P.B. Snyder, *GA*; W.M. Solomon, *PPPL*; M.J. Lanctot, H. Reimerdes, *Columbia U.*; T.L. Rhodes, L. Schmitz, *UCLA*; G.R. McKee, Z. Yan, *U. Wisc.* — A high-confinement regime without edge localized mode instabilities (QH-mode) has been demonstrated for the first time in tokamak plasmas with near-zero rotation and zero-net neutral beam injected torque. Edge rotation shear required for QH-mode operation is generated by the counter-I_p torque driven, through neoclassical toroidal viscosity, by externally applied static, nonaxisymmetric, nonresonant magnetic fields. In this regime, the nonresonant magnetic fields also provide improved resilience to locked modes. Furthermore, the energy confinement improves with higher plasma pressure and slower rotation. The reduction in energy transport is correlated with a reduction in turbulent fluctuations.

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