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Stabilization of Disruptive Locked Modes at DIII-D by Means of ECCD and Magnetic Perturbations[1] F.A. VOLPE, U. Wisc.-Madison, R.J. LA HAYE, J. LOHR, R. PRATER, E.J. STRAIT, A.S. WELANDER, GA, M.J. LANCTOT, Columbia U. — A new technique for disruption avoidance has been demonstrated at DIII-D. Locked tearing modes that would otherwise cause disruptions were stabilized by applying magnetic perturbations to control the toroidal phase and injecting electron cyclotron current drive (ECCD) in the island O-point. The magnetic perturbation was applied before complete locking and used to force the rotating precursor to lock in the optimum location for stabilizing ECCD. In this way the mode was rapidly stabilized. As expected, ECCD was the most stabilizing at the O-point and destabilizing at the X-point. Further, ECCD was more stabilizing than heating alone. In some cases with high NBI torque the mode unlocked when the size was reduced by the ECCD and began to rotate before eventually being stabilized. The technique made it possible to increase normalized beta to values as high as 2.5 and still suppress the locked mode under conditions where disruptive locked modes were otherwise observed at values around 1.7.

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Francesco Volpe
University of Wisconsin-Madison

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