Development and Experimental Qualification of Novel Disruption Prevention Techniques on DIII-D

•

•

NATIONAL FUSION FACIL

D3D184251 (efitrt1) @ t=2.8318s 1.0 * Adjusted **DIII-D Disruption Free Protocol:** lp ₩ 0.75 _a 0.5 + Original Initiative for qualifying comprehensive disruption 0.25 Prox. 0.5 prevention tools in DIII-D Enable Limit 1000 0.5 Novel real-time proximity-to-Instability Y_{VDE} [rad/s] 0 00 controller for avoidance of stability limits Thresh μ Applied for robust VDE prevention 1.5 2.5 2 0 1 2 3 Prox OFF R [m] Time [s] Novel soft-landing technique generates (blue) warm, helical core after thermal quench Significantly slow current quench TS, 121 **Rigorously qualifying emergency** ECE, 81º 🌈 shutdown for disruption avoidance Transitioning to limited for emergency shutdown significantly improves chances of success



J. Barr/ITER FEC 2020/May 14th, 2021