Abstract Submitted
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The Pegasus-Upgrade Experiment[1] R.J. FONCK, M.W. BONGARD, J.L. BARR, H.G. FRERICHS, B.T. LEWICKI, J.A. REUSCH, O. SCHMITZ, G.R. WINZ, University of Wisconsin-Madison — Tokamak operation at near-unity aspect ratio provides access to advanced tokamak physics at modest parameters. High plasma current is accessible at very low toroidal field. This offers H-mode performance at T_e levels that allow use of electrostatic and magnetic probe arrays through the edge pedestal region into the plasma core. An upgrade to the Pegasus ST is planned to exploit these features and pursue unique studies in three areas: local measurements of pedestal and ELM dynamics at Alfvénic timescales; direct measurement of the local plasma response to application of 3D magnetic perturbations with high spectral flexibility; and extension of Local Helicity Injection for nonsolenoidal startup to NSTX-U-relevant confinement and stability regimes. Significant but relatively low-cost upgrades to the facility are proposed: a new centerstack with larger solenoid and 2x the number of toroidal field conductors; a new TF power supply and conversion of the 200 MVA OH power supply to a cascaded multilevel inverter configuration; and installation of an extensive 3D-magnetic perturbation coil system for ELM mitigation and suppression studies. The upgraded facility will provide 0.3 MA plasmas with pulse lengths of 50-100 msec flattop, aspect ratio <1.25, and toroidal field up to 0.4 T. These research activities will be integrated into related efforts on DIII-D and NSTX-U.

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