Abstract Submitted
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Multi-Device Dimensionless Scaling of Neoclassical Tearing Mode Beta Limit[1] R.J. LA HAYE, General Atomics, R.J. BUTTERY, H.R. WILSON, Euratom/UKAEA Fusion Association Culham, S. GUENTER, MPI f. Plasmaphysik, G.T.A HUYSMANS, Jet Joint Undertaking (now at CEA, Cadarache) — To extrapolate the neoclassical tearing mode (NTM) beta limit to reactor grade tokamaks, a multi-device database has been compiled from Asdex-Upgrade, DIII-D, and JET. The key issue in predicting the NTM beta limit is the relative scaling of the "seed" island w_s to the threshold island w_{th}. For sawtooth induced $m/n = 3/2$ NTM, the relative threshold island width is taken from the polarization/inertial model[2] as $w_{th}/r \propto \rho_{i*} g^{1/2}(\epsilon, \nu)$ where g is a function of collisionality $\nu = \nu_i/\epsilon\omega_{e*}$ that increases from 1 at low ν to $\epsilon^{-3/2} \gg 1$ at high ν. The relative seed island scaling, allowing for the dynamics of geometrically coupled perturbations as a function of magnetic Reynolds number S,[3] is taken as $w_s/r \propto \beta_\theta^\gamma S^{-\alpha} \propto \rho_{i*}^{3\alpha}\nu^\alpha$ for $\gamma \equiv \alpha/2$. Thus the scaling of $w_s/w_{th} \propto \rho_{i*}^{3\alpha-1}\nu^\alpha$ with ρ_{i*} depends critically on whether $\alpha \lessgtr 1/3$. Best fits of experimental data will be presented.

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[2]H.R. Wilson *et al.*, Phys. Plasmas **3** (1996) 248.
[3]C.C. Hegna *et al.*, Phys. Plasmas **6** (1999) 130.

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[X] Prefer Oral Session
[ ] Prefer Poster Session

Special instructions: DIII-D Contributed Oral Session, immediately following M Okabayashi

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