Abstract Submitted
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MHD stability constraints on divertor heat flux width in DIII-D[1] A.W. LEONARD, General Atomics - San Diego, A.E. JAERVINEN, A.G. MCLEAN, F. SCOTTI, LLNL, S.R. HASSKEY, PPPL — The radial width of heat flux flowing into the DIII-D divertor is found to expand at high input power and plasma density, exceeding existing empirical scaling but consistent with MHD stability limits. At low heating power the SOL width remains consistent with empirical scaling dependent only on the midplane poloidal field, even for high density divertor detachment. At high heating power a higher separatrix density and pressure, are required to achieve divertor detachment. For separatrix density approaching half of the Greenwald density limit the separatrix pressure gradient saturates at a level near the MHD limit. However, any increased transport associated with SOL broadening does not excessively propagate inward to degrade the edge pedestal pressure and overall core plasma performance if excessive detachment is avoided. The components of the midplane pressure profile are measured with Thomson scattering and CER for main ion and CVI ion temperature and density. The separatrix normalized pressure stability limit is evaluated with the ideal MHD code BALOO and found to be relatively constant across the data set. The sensitivity of this analysis to edge profile fitting is also explored. The implications for divertor heat flux dissipation in future devices are assessed.

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