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Hard-X-Ray Profile Measurements of Quasi-Single-Helicity Plasmas on MST D.J. CLAYTON, R. O'CONNELL, B.E. CHAPMAN, J.A. GOETZ, M.C. KAUFMAN, M.A. THOMAS, Dept. of Physics, UW-Madison, R.W. HARVEY — Hard x rays (HXR) with energies up to 100 keV, indicating the presence of well-confined high-energy electrons, have been observed for the first time during quasi-single-helicity (QSH) plasmas in an RFP. The MST HXR diagnostic has been expanded to a radial array of 16 CdZnTe detectors, measuring an energy range from 10-300 keV. Measured HXR spectra can now be input into the CQL3D Fokker-Planck code to calculate the electron diffusion coefficient as a function of radius as well as velocity. HXR measurements are now being used to study QSH plasmas, where one mode dominates the core tearing mode spectrum. Soft-x-ray tomography measurements on RFX and MST and temperature measurements on RFX indicate that an island associated with the dominant mode is hotter than the surrounding plasma. Simulations predict closed flux surfaces, and hence improved confinement, within the island. Time-resolved HXR profile measurements during QSH in MST should determine if this is indeed the case. Work supported by the USDOE.

Daniel Clayton
Dept. of Physics, UW-Madison

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