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Locally Improved Particle Confinement in QSH Plasmas D.J. CLAYTON, B.E. CHAPMAN, R. O'CONNELL, D.R. BURKE, J.A. GOETZ, M.C. KAUFMAN, UW-Madison, F. BONOMO, M. GOBBIN, L. MARRELLI, P. MARTIN, P. PIOVESAN, Consorzio RFX — A multichord array of CdZnTe detectors is used on MST to infer electron particle diffusion in improved confinement plasmas by measuring hard-x-ray (HXR) flux emitted by runaway electrons. In quasi-single-helicity (QSH) plasmas, where one mode dominates the core tearing mode spectrum and forms an island on its resonant surface, we expect closed flux surfaces to appear inside the island and improve confinement. HXRs are observed when an island emerges, as detected by a SXR diagnostic and the HXR flux oscillates in phase with the rotation of this island. While HXR energies measured during QSH reach those of improved confinement, pulsed parallel current drive (PPCD) plasmas, other diagnostics show a smaller improvement in global confinement, indicating that regions of improved confinement are localized. Modeling with the ORBIT code shows that runaway electrons are better confined inside the island than in the exterior stochastic region. Work supported by the USDOE.

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