Abstract Submitted
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Time-resolved measurements of equilibrium profiles in MST[1] B.H. DENG, D.L. BROWER, W.X. DING, T.F. YATES, UCLA, J.K. ANDERSON, K. CASPARY, K.J. MCCOLLAM, S.C. PRAGER, J.A. REUSCH, J.S. SARFF, UW Madison, D. CRAIG, Wheaton College — Based on the high-speed, three-wave, far-infrared polarimeter-interferometer measurement of B_{pol} profiles and external coil measurements of B_{tave} and B_{tw}, a new method is developed to derive B_{tor} and other equilibrium profiles ($J_{//}$ and q) with high time resolution. Using Faraday's law, the inductive electric field ($E_{//}$) profile is also deduced from the temporal derivatives of the time-resolved magnetic field profiles. The derived $B(0)$ values have excellent agreement with direct measurements using a Motional Stark Effect (MSE) diagnostic. Evolution of equilibrium profiles during single sawtooth events in MST, both the slow linear ramp and crash phases, are presented. Profile scaling with plasma current I_p and reversal parameter F is also explored. MHD stability is tested from the spatial gradients of the $J_{//}$ and q profiles, and correlation with fluctuation mode amplitude is investigated. Future improvements to equilibrium reconstruction are expected by measuring B_{tor}(r,t) directly via Cotton-Mouton interferometry.

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