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Maxwell Stress Measurement by Laser Faraday Rotation in High Temperature Plasmas W.X. DING, D.L. BROWER, B.H. DENG, T. YATES, University of California, Los Angeles, D. CRAIG, G. FIKSEL, V. MIRNOV, V. SVIDZINSKI, S.C. PRAGER, J.S. SARFF, University of Wisconsin, Madison — The cross product of current density and magnetic field fluctuations, commonly referred to as the Maxwell stress, has been measured in the high-temperature core of Reversed Field Pinch (RFP) plasmas by using a fast laser Faraday rotation system. Both parallel and perpendicular components of the Maxwell stress show a significant increase during magnetic reconnection events such as the sawtooth crash. Spatially, the Maxwell stress peaks near tearing mode resonant surfaces due to the localized current density fluctuations and global magnetic field fluctuations. The surge of Maxwell stress at reconnection is associated with nonlinear tearing mode coupling. Measurement details and implications for current transport and zonal flow formation are presented. Work supported by US DOE and NSF.

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