Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Voltage Induced Torsional Strain in Tantalum Trisulfide in its CDW State[1] J. NICHOLS, JUN ZHOU, L. LADINO, J.W. BRILL, University of Kentucky — In 2007, Pokrovskii et al [Phys. Rev. Lett. 98, 206404 (2007)] reported that crystals of tantalum trisulfide spontaneously twist when a voltage near the CDW depinning threshold is applied. The direction of twist reverses when the voltage is reversed, so that the twist angle describes a characteristic hysteresis loop as a function of applied voltage or current. We have studied this effect by placing the sample inside a resonant RF cavity so that the twisting sample modulates the resonant frequency of the cavity. A magnetic wire is attached to the sample so that magnetic torque can also be applied to the sample. We have reproduced the "Pokrovskii effect" and also observed the complement: application of torque induces an additional voltage when the sample is biased above threshold. We have also found that the onset of the torsional strain occurs at a voltage slightly below that at which the shear modulus of the sample softens.

[1]This research was supported by NSF-DMR Grants 0801764 and 0400938.

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Date submitted: 13 Nov 2008 Electronic form version 1.4