Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Interplay between ferroelastic and metal-insulator domains in quasi-2D VO_2 nanoplatelets[1] A. TSELEV, ORNL, Oak Ridge, TN, E. STRELCOV, Physics Department, SIUC, Carbondale, IL, I.A. LUK'YANCHUK, University of Picardie Jules Verne, Amiens, France, K. JONES, R. PROKSCH, Asylum Research, Santa Barbara, CA, S.V. KALININ, ORNL, Oak Ridge, TN, A. KOLMAKOV, Physics Department, SIUC, Carbondale, IL — Significant effort has been spent to date to investigate behavior of VO_2 nanostructures in the vicinity of the metal-insulator transition (MIT). However, one important aspect of this material—the fact that low temperature VO_2 phase is ferroelastic—has been almost completely left out of consideration. Using variable temperature scanning microwave microscopy (SMM) and polarized-light microscopy, we imaged development of domains of metallic and semiconducting phases during the MIT in single crystalline quasi-2D nanoplatelets and observed non-trivial strain-driven phenomena. Ferroelastic domains in VO_2 nanosystems can significantly affect local strain distributions, and hence couple to the strongly strain-dependent MIT. In contrast to quasi-1D nanobeams, the presence of the second dimension results in emergence of several possible families of ferroelastic domains in NPls, thus allowing systematic studies of strain-controlled transitions in the presence of geometrical frustration.

[1]Research at ORNL's CNMS was sponsored by the Scientific User Facilities Division, Office of Basic Energy Sciences, U.S. DOE.

Alexander Tselev
Oak Ridge National Laboratory, Oak Ridge, TN

Date submitted: 22 Dec 2009 Electronic form version 1.4