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Metal-insulator transition at 180-degree orientational domain walls in VO_2[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, V. MEUNIER, W. SHELTON JR, ORNL, Oak Ridge, TN, K. JONES, R. PROKSCH, Asylum Research, Santa Barbara, CA, A. KOLMAKOV, Physics Department, SIUC, Carbondale, IL, S.V. KALININ, ORNL, Oak Ridge, TN — Appearance of unusual phenomena at interfaces of different materials due to symmetry breaking and atomic, electronic, or spin reconstructions is well established area of intensive research. However, domain walls in ferroic materials can also show unusual behavior. Here, using scanning microwave microscopy we study metal-insulator transitions in a plane-parallel structure of 180-degree orientational domains in quasi-2D nanocrystalline VO_2 nanoplatelets. The results strongly suggest that domain walls in this structure are in metastable metallic state at temperatures below T_{MIT}, which is supported by phenomenological considerations based on Landau-Ginzburg approach. Remarkably, *ab initio* density functional calculations indicate that ferroelastic domain walls of this type possess metallic character at low temperatures, which should be ascribed to elevated structural symmetry of the domain walls.

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