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Lattice-Symmetry-Driven Phase Competition in Vanadium Dioxide[1] ALEXANDER TSELEV, Oak Ridge National Laboratory, Oak Ridge, TN, USA, IGOR A. LUK'YANCHUK, University of Picardie Jules Verne, Amiens, France, ILIA N. IVANOV, JOHN D. BUDAI, JONATHAN Z. TISCHLER, Oak Ridge National Laboratory, Oak Ridge, TN, USA, EVGHENI STRELCOV, ANDREI KOLMAKOV, Southern Illinois University Carbondale, Carbondale, IL, USA, SERGEI V. KALININ, Oak Ridge National Laboratory, Oak Ridge, TN, USA — We performed group-theoretical analysis of the symmetry relationships between lattice structures of R, M1, M2, and T phases of vanadium dioxide in the frameworks of the general Ginzburg-Landau phase transition theory. The analysis leads to a conclusion that the competition between the lower-symmetry phases M1, M2, and T in the metal-insulator transition is pure symmetry driven, since all the three phases correspond to different directions of the same multi-component structural order parameter. Therefore, the lower-symmetry phases can be stabilized in respect to each other by small perturbations such as doping or stress.

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