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A quantum phase transition in the monoxides of the first transition series FRANCISCO RIVADULLA, Dpto. Química-Física, Universidad de Santiago de Compostela, JOAQUíN FERNÁNDEZ-ROSSIER, Dpto. Física Aplicada, Universidad de Alicante, MAR GARCíA-HERNÁNDEZ, ICMM, CSIC, Madrid, Spain, JOSÉ RIVAS, Dpto. Física Aplicada, Universidad de Santiago de Compostela, JOHN GOODENOUGH, TMI, University of Texas at Ausin, Austin TX, USA — The monoxides of the 3d metals (MO; M= Ti to Ni) provide an isostructural series (cubic, Fm $\bar{3}$m) in which to study the transition from metallic paramagnetism (TiO) to insulating antiferromagnetism (MnO, FeO, CoO, NiO). But the transition is not smooth, and while CrO has eluded synthesis over the years, the intrinsic properties of VO are under discussion. Here we present strong experimental and computational evidence that VO is a strongly correlated metal with Non-Fermi Liquid low temperature thermodynamics, a pseudogap in the density of states and an unusually strong spin-lattice coupling. All these properties are interpreted as signatures of the proximity to a magnetic quantum phase transition. Interestingly, TiOx displays a superconducting transition with a dome-shape dependence of the superconducting critical temperature with doping in x ($0.8<x<1.2$). The analogies with the phase diagram of the High Tc cuprates and their structural and electronic simplicity makes 3d monoxides ideal candidates to make progress in the understanding of correlated electron systems.

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