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Testing for Quantum Criticality in the (Nd,La)NiO_3 phase space by Inelastic Tunneling Electron Spectroscopy (IETS) ANDREW KLEVITCH, University of Alabama, ANKIT DISA, FRED WALKER, Center for Research on Interface Structures and Phenomena and Department of Applied Physics, Yale University, GINA ADAM, Department of Electrical and Computer Engineering, University of California at Santa Barbara, JAMES ALLEN, Department of Physics, University of California, CHARLES AHN, Center for Research on Interface Structures and Phenomena and Department of Applied Physics, Yale University, ADAM HAUSER, University of Alabama — Continuous (2^{nd} order) T=0K Mott transitions are highly sought after because they are predicted to produce interesting quantum critical phenomena at higher temperatures such as quantum spin liquid states and marginal Fermi behavior. The rare earth nickelate system has generated significant interest for understanding charge and spin ordering phenomena in correlated materials and for potential application in novel switching devices. We will present Inelastic Electron Tunneling Spectroscopy (IETS) measurements from a series of films across the (Nd,La)NiO_3 compositional system, yielding the single particle density of states at and across the quantum phase transition. Previous work has shown that pure $NdNiO_3$ thin films have a characteristic bandgap, and pure $LaNiO_3$ films have a characteristic pseudo-gap, satisfying a major requirement for a quantum critical transition point. Accordingly, our films undergo a metal-to-insulator transition upon cooling for high Nd content, while remaining metallic at all temperatures for high La content.

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