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Two-dimensional metal-insulator transition in RuO_2 films MICHAEL OSOFSKY, CLIFFORD KROWNE, HEUNGSOO KIM, KRISTIN CHARIPAR, ALBERTO PIQUE, KONRAD BUSSMANN, CHRISTOPHER CHERVIN, JEFFREY LONG, IRINA PALA[1], DEBRA ROLISON, Naval Research Laboratory — The complex chemical and structural nature of oxide materials make them highly susceptible to disorder. This disorder strongly influences the transport properties of these systems. By systematically varying the disorder and/or carrier concentration, many oxides can be driven through the metal–insulator transition (MIT). We have performed temperature dependant magneto-transport measurements (1.75K<T<300K and 0<B<8T) on 10-30 nm thick films of RuO_2 as they were driven through the MIT through calcination. The results reveal an unexpected 2-d insulator to metal transition as a function of decreasing disorder. The presentation will include an introduction to the concepts of localization in disordered materials, an overview of the thin-film sample preparation and characterization, a comparison with a 3-d oxide system (In_2O_3), and a discussion of the results in the context of a localization model.

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