Magnetic fluctuations induced insulator-to-metal transition in Ca(Ir\(_x\)Ru\(_{1-x}\))O\(_3\) DEEPAK SINGH, JAGATH GUNASEKERA, ASHUTOSH DAHAL, University of Missouri, Columbia, LELAND HARRIGER, National Institute of Standards and Technology, Gaithersburg, THOMAS HEITMANN, University of Missouri Research Reactor, Columbia — The Fermi liquid theory dictates the metal-insulator transition in a continuous fashion via the divergence of the quasiparticle mass m*. However, the metallic phase near the Mott insulator in the metal-insulator phase diagram based on the Hubbard model is dominated by the fluctuations of spin, charge and orbital correlations; often termed as the anomalous metallic phase. In this presentation, experimental results manifesting the magnetic fluctuations induced insulator-to-metal transition in Ca(Ir\(_x\)Ru\(_{1-x}\))O\(_3\) will be discussed in the framework of the Hubbard model. For x = 1, the compound CaIrO\(_3\) is a Mott insulator with antiferromagnetic order below T \(\sim\) 110 K. A gradual substitution of Ir by Ru results in the onset of anomalous metallic behavior as a function of the tuning parameter x. At x = 0, the compound CaRuO\(_3\) is a non-Fermi liquid metal with no apparent magnetic order. While the orthorhombic structural integrity is maintained throughout the group, strong magnetic fluctuations is detected below x = 0.8. The role of magnetic fluctuations in the metallic transition is further confirmed by first principle theoretical calculation.