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Band-selective quantum criticality in iron-pnictide metal $Ba(Fe,Ni,Co)_2As_2$ JOHNPIERRE PAGLIONE, YASUYUKI NAKAJIMA, TRISTIN METZ, CHRISTOPHER ECKBERG, KEVIN KIRSHENBAUM, ALEX HUGHES, RENXIONG WANG, SHANTA SAHA, Univ of Maryland-College Park — Quantum-mechanical fluctuations between competing phases in the vicinity of a quantum critical point induce the breakdown of Landau's Fermi liquid theory. The non Fermi liquid behavior has been believed to be involved in exotic superconductivity observed in the strongly correlated electron systems, such as cuprate and iron pnictide superconductors [1]. Utilizing very low temperature thermodynamic and transport measurements, we reveal non-Fermi liquid behavior in non-superconducting iron-pnictide $Ba(Fe,Ni,Co)_2As_2$ associated with quantum critical instabilities, showing quantum critical scaling between temperature and applied field in the charge transport and thermodynamics. Together with the unusual scaling, we will discuss the emergence of hole-like carrier tuned by both magnetic field and temperature, highlighting the presence of band-selective quantum criticality in the iron pnictide system. [1] T. Shibauchi et al., Annu. Rev. Condens. Matter Phys. 5, 113 (2014).

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