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T-linear scattering rate in optimally doped K- and P-Ba122 iron-pnictides[1] Y.M. DAI, C.C. HOMES, Brookhaven Natl Lab, Upton, USA, R.P.S.M. LOBO, LPEM ESPCI CNRS UPMC Paris France, B. XU, B. SHEN, H. XIAO, X.G. QIU, IOP CAS Beijing China, H.H. WEN, Nanjing University Nanjing China — The optical properties of $Ba_{0.6}K_{0.4}Fe_2As_2$ reveal two groups of carriers with different scattering rates ($1/\tau$), described by two Drude components in the optical conductivity. A "broad" Drude component results in an incoherent background with a T-independent $1/\tau_b$, while a "narrow" Drude component reveals a T-linear scattering rate $1/\tau_n$ resulting in a resistivity $\rho_n \equiv 1/\sigma_{1n}(\omega \rightarrow 0)$ also linear in temperature. This fact explains the T-linear ρ at low temperatures and the tendency to saturation at room temperature observed by transport measurements in $Ba_{0.6}K_{0.4}Fe_2As_2$. The low frequency spectral weight increases with decreasing T, following an arctan(T) dependence, which is also strong evidence for a T-linear scattering rate. A comparison to other materials with similar behavior suggests that the T-linear $1/\tau_n$ and ρ_n in $Ba_{0.6}K_{0.4}Fe_2As_2$ may arise out of scattering from spin fluctuations due to the proximity to a quantum critical point (QCP). Similar behaviors are found in the optimally doped $BaFe_2(As_{0.7}P_{0.3})_2$.

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