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An infrared study of electron delocalization in Mn-based relatives of the pnictides KIRK POST, University of California, San Diego, JACK SIMONSON, CARLOS MARQUES, GREG SMITH, Department of Physics and Astronomy, Stony Brook University, OMAR KHATIB, University of California, San Diego, ZHIPING YIN, MARIA PEZZOLI, Department of Physics, Rutgers and Stony Brook University, GABRIEL KOTLIAR, Department of Physics and Astronomy, Rutgers University, DIMITRI BASOV, University of California, San Diego, MEIGAN ARONSON, Department of Physics and Astronomy, Stony Brook University — Current data suggest that the viability of parent compounds to become superconducting is intimately tied to electron correlations.[1,2] Further comparisons between the ground states of the cuprate and pnictide parent compounds indicate that doping across an electron delocalization transition (EDT) may be key to obtaining a higher critical temperature.[3] These insights lead us to study the Mn-based compounds that are isostructural with pnictides and are antiferromagnetic insulators like the cuprates. Specifically, we have explored the effects of doping on $LaMnPO_{1-x}F_x$ and $Ca_{1-x}La_xMn_2Sb_2$ via optical spectroscopy, transport, and magnetic measurements in parallel to theoretical band structure calculations. Our studies show that LaMnPO is highly resistant to electron delocalization. Likewise, in $CaMn_2Sb_2$, full delocalization was not attained even though a shift in the band edge was observed.

[1]M. Quazilbash *et. al.* Nature Physics 5, 647 (July 2009)
[2]P.A. Lee *et. al.* Reviews of Modern Physics 78, 17 (January 2006)
[3]J. Simonson *et. al.* ArXiv:11105938

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