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Examining multiple spectroscopic techniques with multiband Eliashberg theory in $BaCo_xFe_{2-x}As_2$[1] STEVEN JOHNSTON, IFW Dresden, E. VAN HEUMEN, University of Amsterdam, K. KOEPERNIK, IFW Dresden, MASSEE FREEK, J. KAAS, J.B. GOEDKOOP, University of Amsterdam, J. VAN DEN BRINK, IFW Dresden, M.S. GOLDEN, University of Amsterdam — A wealth of experimental data from multiple probes are available for the newly-discovered pnictide superconductors. Here, we exploit this fact and examine a multi-band Eliashberg model for optimal doped $BaCo_xFe_{2-x}As_2$ assuming a broad spin-fluctuation boson spectrum and retaining the full 3D bandstructure. Our focus is on comparing the model directly with data collected by our group from ARPES, STM and optics experiments performed on samples from the same growth batch. We find that the model captures all of the important aspects of the three probes including the behavior of the gap structure in the dI/dV characteristics and contributions from low-energy interband transitions in the optical conductivity. Our results also indicate the role of matrix elements in establishing the strong particle-hole asymmetry observed in the dI/dV spectra.

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[X] Prefer Oral Session
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