Effect of multiple bands on point contact spectra in iron chalcogenide superconductors 1 CASSANDRA R. HUNT, H.Z. ARHAM, W.K. PARK, L.H. GREENE, University of Illinois at Urbana-Champaign, Z.J. XU, J.S. WEN, Z.W. LIN, Q. LI, G. GU, Brookhaven National Laboratory — We present point-contact spectroscopy (PCS) measurements on single crystal Fe\textsubscript{1+y}Te\textsubscript{1−x}Se\textsubscript{x} using a nanoscale Au tip contact. Analysis of PCS measurements using BTK theory[1] is well-established, and recent work[2] that extends BTK to two-band superconductors with a relative band phase may shed new light on the nature of the SC order parameter (OP) of these iron-based materials. Recent experiments suggests that they have \textit{s}± symmetry, but \textit{d}-wave and anisotropic \textit{s}-wave OPs cannot yet be ruled out[3]. The two-band model predicts that \textit{s}±-wave leads to interference effects between bands that result in conductance profiles distinct from a \textit{d}-wave OP. Preliminary fitting is discussed for the chalcogenides as well as the conventional multi-band \textit{s}++-wave superconductor, MgB\textsubscript{2}. [1] G E Blonder, M Tinkham, T M Klapwijk, PRB 25, 4515 (1982); [2] A A Golubov, et al. PRL 103, 077003 (2009); [3] M V Sadovskii, UFN 178 1243 (2008)

1UIUC: U.S. DOE Award No. DE-AC02-98CH10886 and DE-FG02-07ER46453 (WKP), and NSF Award No. NSF-DMR-0706013 (HZA), and through FSMRL and CMM. BNL: U.S. DOE Award No. DE-AC0298CH10886.