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A Proposed New Measurement of the Superconducting Gap around $\bar{M}$-point in $Bi_2Sr_2CaCu_2O_8$ G. ZHAO, Southern University and A&M College, J. TANG, University of Wyoming — In previous publications, Zhao et al have presented first-principle calculations of the electronic structure, electron-phonon interaction, Tc, and the superconducting energy gaps on the Fermi surfaces of $YBa_2Cu_3O_7$ (YBCO). However, experimental measurements of the superconducting gaps on the Fermi surfaces of YBCO still face some challenges due to surface problems for YBCO samples. Considering the similarities between the crystal structure, electronic properties, and features of the Fermi surfaces of YBCO and those of $Bi_2Sr_2CaCu_2O_8$ (BSCCO), we discuss the need to measure *the superconducting gap on the small sheet of the Fermi surface around the $\bar{M}$-point in BSCCO*. This gap may be similar to the one of YBCO around the S-point. The superconducting gap on this small sheet of the Fermi surface around the $\bar{M}$-point in BSCCO is expected to show minor variations from about 18 meV to 25 meV, as we found on the small sheet of the Fermi surface around the S-point of YBCO. There is no node on the superconducting gap on this small sheet of the Fermi surface around the $\bar{M}$-point of BSCCO. This work is funded in part by NSF (Award No 0754821) and the Air Force Office of Scientific Research (Award No FA9550-09-1-0367).

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