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Universal d wave gap shape in the entire doping range of the cuprate High Temperature Superconductors UTPAL CHATTERJEE, Argonne National Laboratory, AMIT KANIGEL, Technion-Israel Institute of Technology, STEPHAN ROSENKRANZ, MIKE NORMAN, Argonne National Laboratory, MOHIT RANDEIRA, Ohio State University, JUAN CARLOS CAMPUZANO, University of Illinois at Chicago — We performed detailed Angle Resolved Photoemission Spectroscopy (ARPES) measurements on Bi2212 high temperature superconductors over extensive doping range starting from non-superconducting insulating samples to highly doped superconducting ones. We observe that there are sharp quasiparticles all around the underlying Fermi surface in the superconducting state for all doping values. The superconducting gap anisotropy follows a simple d-wave form for all doping values. In non-superconducting samples although there are no sharp coherence peaks at any point on the underlying Fermi surface, there is a clearly discernable *low energy* gap. Quite remarkably, this low energy gap has the same d wave shape just like the superconducting one.

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