Mirror symmetry breaking beyond critical doping in High T_c cuprate superconductor

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The phase diagram of cuprate High-temperature superconductors features an enigmatic strange metal region in which in-plane resistivity varies linearly with temperature. In this V-shaped region, there is general agreement that T^* or pseudogap temeperature can be defined by deviation from linear resistivity below critical doping. However, there is no consensus on T_{up} or upturn temeperature which is also defined by deviation from linear resistivity beyond critical doping. Here, we present Second harmonic optical anisotropy measurement on (Pb,Bi)2212 beyond critical doping. Taking our symmetry analysis from SHG, as well as resistivity and ARPES measurement, we found this mirror symmetry breaking occurs at T_{up}. This result may suggest T_{up} region beyond critical doping coincides with mirror symmetry breaking order.