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Quasiparticle lifetime in Optimally Doped $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ by Angle Resolved Photoemission Spectroscopy DAI XIANG MOU, TAKESHI KONDO, ADAM KAMINSKI, Ames Laboratory, Ames, Iowa — Quasiparticle lifetime of optimally doped $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ has been systematically investigated by state-of-the-art angle resolved photoemission spectroscopy with energy, momentum and temperature resolution. In the normal state, Momentum Distribution Curve (MDC) width shows linear temperature dependence in all momentum and energy range, consistent with Marginal Fermi Liquid picture. In the superconducting state, the temperature dependent MDC width is strongly energy and momentum dependent. It shows a rapid drop below T_C . The drop is observed on the whole Fermi surface but more obvious in antinodal region. A sharp peak structure is revealed in energy dependent MDC width in antinodal region, which is a result of strong electron - boson mode coupling. The peak intensity has similar temperature dependence with spin resonance mode measured by neutron scattering. Detailed comparison between our ARPES results and theory calculation will be discussed.

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