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Phenomenological study of the normal state angle resolved photoelectron spectroscopy line shapes of high temperature superconducting cuprates KAZUE MATSUYAMA, UC Santa Cruz, ROHIT DILIP, Irvington High School, G.-H. GWEON, UC Santa Cruz — Understanding the normal state properties of high temperature (high-T_c) superconducting cuprates remains a central mystery in the high-T_c problem. Standing out among those mysterious properties are the anomalous angle resolved photoelectron spectroscopy (ARPES) line shapes. The extremely correlated Fermi liquid (ECFL) theory recently introduced by Shastry has renewed interest in quantitatively understanding ARPES line shapes. In this talk, we combine certain phenomenological considerations with the ECFL framework in order to describe the ARPES data. Our phenomenological models have the property of preserving the universal property of the original ECFL theory, while introducing phenomenological changes in a non-universal property. Our models describe, with unprecedented fidelity, the key aspects of the dichotomy between momentum distribution curves (MDCs) and energy distribution curves (EDCs) of high-T_c ARPES data. Therefore, our study goes well beyond the prevailing studies that discuss only MDCs and EDCs.

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