ARPES as a tool to Benchmark Many-Body Theory

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An important role played by ARPES in studying electronic correlation is to benchmark theoretical models and computational methods. In this talk, I will discuss the recent breakthrough in doping 1D cuprates with MBE method that revealed the need to augment the Hubbard model to describe cuprates [1,2]. I will also discuss the combined approach of using time-resolved ARPES and time-resolved x-ray scattering to directly quantify the deformation potential with minimal input. This "THz lock-in" method has been used to test the results of dynamic mean-field theory calculation [3]. Recent development and plan at LCLS-II will also be discussed.

[1] Z. Chen et al., Science 373, 1235 (2021)
[2] https://physicstoday.scitation.org/do/10.1063/pt.6.1.20210920a/full/
[3] S. Gerber et al., Science 357, 71-75 (2017)