

## **Case Studies of Elementary Excitations in Cuprates using Soft X-ray RIXS**

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Characterizing elementary excitations associated with lattice, spin, charge, and orbital degrees of freedom is a crucial approach to understand the complex phenomena exhibited in the strongly correlated materials. Thanks to the rapid improvement of instrumental resolution, RIXS has emerged to be a powerful tool to study elementary excitations in the energy-momentum space. In this talk, I will highlight some of our investigations about the phonon, orbital, magnetic, and other excitations in cuprates using soft x-ray RIXS. In particular, ultrahigh resolution RIXS data taken at the newly commissioned ERIXS instrument at the ESRF will also be discussed. Finally, I will also remark some exciting opportunities for a next generation RIXS instruments at the LCLS-II.