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## Orbital and magnetic excitations in the weakly coupled spin chain system $\text{CaCu}_2\text{O}_3$

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Recently, resonant inelastic X-ray scattering (RIXS) on the 1D spin chain system  $\text{Sr}_2\text{CuO}_3$  has revealed an unprecedented dispersion of d-d excitations [1]. This result has been understood as an effect of strong interaction between spin and orbital degrees-of-freedom taking place within a single chain. In this talk we report on Cu L3 RIXS in quasi 1D  $\text{CaCu}_2\text{O}_3$  consisting of two coupled spin chains. Due to its buckled geometry, the inter-chain interaction of this system is one order of magnitude smaller than the in-chain interaction. Therefore,  $\text{Ca-Cu}_2\text{O}_3$  is an ideal model system to study the effect of a weak inter-chain interaction on both, the low (spin excitation) and the high (d-d excitations) energy scale. Although the dispersion of the spinon continuum can largely be accounted for by neglecting the presence of the inter-chain interaction, surprisingly no dispersion has been found for the d-d excitations. This raises the question if the dispersion of orbital excitations is effectively being quenched as soon as two chains are connected to each other. The important role played by inter-chain interactions for the magnetic and orbital excitations in this class of compounds will be discussed in this context.

[1] J. Schlappa, K. Wohlfeld, J. van den Brink, T. Schmitt et al., private communication.

### Please specify the session

RIXS

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Talk

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