Charge transfer and orbital excitations in RIXS

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While RIXS at transition metal ion *L* edges has recently become a perfect tool in detecting magnetic excitations, RIXS is also very sensitive to the other types of low energy excitations in these compounds – such as e.g. charge transfer or orbital (*dd*) excitations.

In this talk I will firstly discuss our recent combined experimental and theoretical work which in a unambiguous way shows which types of charge transfer excitations are detected by RIXS at the Cu *L* edge of the copper oxides: while the Zhang-Rice singlet states cannot be seen, one observes the Zhang-Rice *triplet* excitations as well as the charge transfer excitations formed by the (anti)bonding combinations of oxygen and copper orbitals.

In the second part of my talk I will mention how the detection of the orbiton dispersion by RIXS has influenced our understanding of the orbital physics: (i) the survival of the spin-orbital fractionalization in dimensions higher than one [1] and (ii) the Jahn-Teller–induced dispersion of a j=3/2 exciton in the iridium oxides.

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References

[1] V. Bisogni *et al.*, Physical Review Letters **114**, 096402 (2015)

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