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Research examples from the inelastic scattering endstation of the REIXS beamline at CLS

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The outer electrons in matter govern nearly all properties of materials including bonding, structure, magnetism, band gap, heat-, electrical- and superconductivity, and optical properties to name a few. The binding energies of these outer electrons reside in the soft X-ray range. Tuning the energy of synchrotron radiation to specific orbitals allows accessing these outer electrons and hence studying all these parameters.

The techniques available at the REIXS beamline at CLS to probe the electronic structure of new materials are soft X-ray absorption (XAS), X-ray emission (XES), Resonant inelastic X-ray scattering (RIXS), and X-ray excited optical luminescence (XEOL).

This talk will present an overview the large variety of very different questions and sample systems that can be explored with these soft X-ray spectroscopy techniques.

The topics will include low dimensional materials (Graphene, Silicene), LED materials, diluted magnetic semiconductors. Aside from the obvious parameters like electronic structure and band gap, we will show examples of how to study less obvious questions concerning defects and magnetism.

The list of examples is not intended to be complete but rather showcase the capabilities of the REIXS beamline.

Keyword-1

soft X-ray spectroscopy

Keyword-2

density of states

Keyword-3

synchrotron radiation

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