

Inelastic Spectroscopy

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Abstract. Inelastic spectroscopy is a powerful tool to probe both ground and excited states of all kind of material, including unconventional electronic states. This lecture will be divided into two parts. The first part will consist in an introduction to different spectroscopic techniques using either photon-matter or neutron-matter interaction. We will discuss both neutron [1] and photons [2] scattering and the absorption process and associated emission in the particular case of X-rays. The aim is to provide an overview of the physic involved in theses techniques and what information can be extracted from it (electronic structure, electronic dd excitations, phonons, magnons etc...). We will focus on some mainstream examples relevant in this thematic school of unconventional electronic states. The second part of this lecture will deal specifically with magnetism. As we will see, inelastic measurements can provide crucial information on classical or exotic magnetic ground sates and their associated excitations, namely cristal field, magnon [3], electromagnon [4]... We will see how photon and neutron spectroscopy are complementary (with emphasis on Raman spectroscopy [5], neutron scattering [1] or Resonant Inelastic X-ray Scattering (RIXS) [6]) and will provide a state of the art overview of these experimental techniques.

References

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