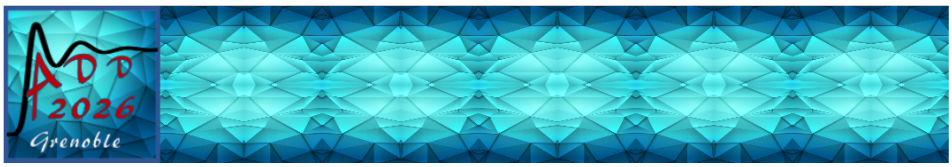

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Magnetism in metallic glasses - a clear need for PDF

Content

Neutron diffuse scattering has long been recognised as a means to study complex magnetism in condensed matter, providing deep insight in fields from critical phase transitions to quantum spin liquids. The studies have frequently used cold neutrons to focus on the scattering at relatively small momentum transfers, encompassing the first few Brillouin zones of crystalline materials, where the magnetic scattering for most elements is strongest. Modern methods like Reverse Monte Carlo can usually analyse the data accurately and rapidly for crystalline materials, even if they are non-stoichiometric, as the positions for the atoms can be fixed and a sufficiently large supercell can be defined to allow for the resolution and chemical composition of the sample.

This is not the case for non-crystalline materials where positional disorder exists in addition to magnetic and, possibly, chemical short-range order. Metallic glasses are archetypical examples of these types of materials, featuring non-collinear ferro- and ferrimagnetic structures that must be correlated to a characterisation of their atomic structures. As will be shown in this presentation, neutron scattering with polarisation analysis will provide the data. Structural and magnetic PDF analysis would provide a full characterisation, and the materials present perhaps the most challenging test for the methods.

This presentation will summarise neutron experiments on magnetic metallic glasses and some efforts to characterise their structures, hopefully initiating discussion on the best way to model them.

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