Poster-2-3

Uncovering novel properties in RECo5 permanent magnets

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Rare-earth (RE) permanent magnets gain the excellent magnetic properties from the interaction between localized f-electrons and itinerant conduction electrons. However, the search for the underlying mechanisms that account for the interactions between electrons in this class of materials continues to challenge the community of magnetism.
In this work, we will present new trends that advance on the understanding of low-lying energy scales in the family of compounds RECo5 (RE= Nd, Sm and Y). In a first case study, the role that crystal electric field (CEF) plays in both magnetic anisotropy and spin reorientation of the single crystal NdCo5 is investigated by inelastic neutron scattering (INS) and theoretical calculations [1]. In a second case study, we discuss a systematic study of Sm substitution in YCo5, namely, the polycrystal SmxY1-xCo5 (x = 0 to 1) [2]. Combining bulk physical properties (electrical transport, magnetization and specific heat) and x-ray spectroscopies (XRD, XPS and XAS) we uncover how the tuning of f-electrons influences on different magnetic, electronic and valence states leading to a rich variety of phase transitions, electronic correlations and energy excitations which create new routes for the realization of hard magnets.
Acknowledgements: J.L.J., V. M and F. A. P acknowledge FAPESP-Young Investigator Grants 2018/08845-3, 2018/19420-3 and 2019/24711-0. J. L. J acknowledges CNPq 31005/2021-6.

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