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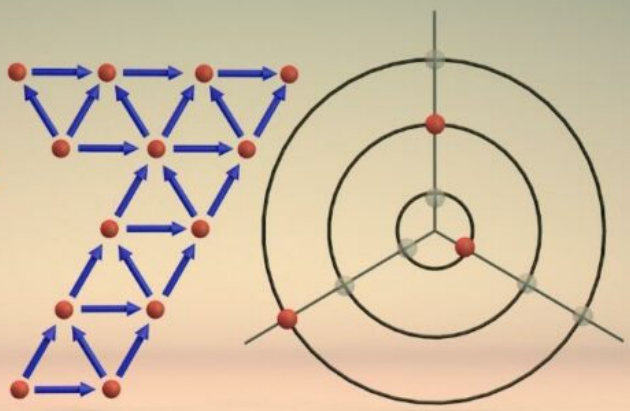
São Carlos Institute of Physics

Brazilian School and Workshop on Statistical Mechanics – Recent Developments

São Carlos - January 23 to 27, 2023



The Coqblin-Schrieffer interaction and the magnetic proprieties of cerium-based compounds

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Cerium-based compounds exhibit important magnetic properties like a high magnetic anisotropy and diversity of magnetic orderings. These features result from the moderate localization of their f-state and its strong electronic correlation, in addition, to the crucial spin-orbit interaction [1]. In this direction, the Coqblin-Schrieffer formalism has been used to describe some of these magnetic properties since it incorporates the strong correlation and the spin-orbit interaction on the same foot to obtain an effective interaction energy between two neighbouring f-states [2]. This interaction has been successfully considered, with other sources of anisotropy, like christal-field
effects, to predict the magnetic behaviours of cerium monopnictides and monochalcogenides[1]. However, recent developments have observed and corrected some limitations and inconsistencies of this formalism, like the limitation for ions very far apart and the unphysical absence of the ionic
interchange symmetry [2]. With this new and corrected interaction energy, we have calculated the magnetic properties of some cerium compounds, mainly cerium monopnictides. We could predict the behaviour of the localized magnetic moments and their well-known phase transitions observed
experimentally, reducing the number of parameters required besides the ones already taken into account by the Coqblin-Schrieffer procedure.

[1] Bernard R. Cooper, Robert Siemann, David Yang, Pradeep Thayamballi and Aitava Banerjea, Handbook on the Physics and Chemistry of the Actinides, edited by A. J. Freeman and G. H. Lander, 1985.
[2] F. D. Picoli and V. L. Líbero, JMMM **550**, 169062 (2022).