FLIPPER 2024
11 - 13 December Grenoble, France

Contribution ID: **41** Type: **Contributed talk**

On the unusual microscopic magnetisation of some rare-earth and actinide based intermetallic compounds

Friday, 13 December 2024 09:30 (20 minutes)

To identify commonalities and differences we will compare the unusual microscopic magnetisation of some rare-earth- and actinide-based intermetallic compounds with exotic electronic quantum properties. To this end, we revisited previous results obtained from polarised neutron diffraction for Flipper 2024.

For the intermediate valance compound YbAl3 the field induced magnetic moment is well-described by a Yb3+ free-ion form factor plus a small temperature-independant positive conduction electron polarisation [1]. Similarly, the magnetic moment on the cerium site in the low-charge carrier-density Kondo system CeNiSn is well described with Ce3+ free ion form factor but here a small magnetic moment on the nickel site needs to be added [2]. The situation changes in the itinerant antiferromagnetic system UGa3 in which the orbital contribution to the magnetic moment changes on entering the antiferromagnetically ordered state [3]. Similarly in the normal state of the plutonium-based superconductor PuCoGa5 we observed a form factor significantly different from a conventional Pu3+ ion [4].

Our results demonstrate that not a single theoretical model is applicable to all such intermetallic systems. The microscopic information obtained by polarised neutron diffraction remains invaluable to understand the magnetic ground state of such compounds which is at the origin of a large spectrum of electronic quantum phenomena.

References

[1] A. Hiess, J. X. Boucherle, F. Givord, J. Schweizer, E. Lelièvre-Berna, F. Tasset, B. Gillon, P.C. Canfield; Journal of Physics: Condensed Matter 12 (2000) 6, 829 - 840.
[2] A. Hiess, I. Zobkalo, M. Bonnet, J. Schweizer, E. Lelièvre-Berna, F. Tasset, Y. Isikawa, G. H. Lander; Journal of Physics: Condensed Matter 9 (1997) 9321-9332
[3] A. Hiess, F. Bourdarot, S. Coad, P. J. Brown, P. Burlet, G. H. Lander, M. S. S. Brooks, D. Kaczorowski, A. Czopnik, R. Troc;⊠Europhysics letters 55 (2001) 267-272.
[4] A. Hiess, A. Stunault, E. Colineau, J. Rebizant, F. Wastin, R. Caciuffo, G. H. Lander; Physical Review Letters 100 (2008) 076403

Primary author: HIESS, Arno (ILL and ESS)

Co-authors: STUNAULT, Anne (ILL); LELIEVRE-BERNA, Eddy (ILL); BOURDAROT, Frederic (CEA-Grenoble); LANDER, Gerard (ILL and Univ. Bristol)

Presenter: HIESS, Arno (ILL and ESS)

Session Classification: Multipolar order/moments

Track Classification: Multipolar order/moments