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

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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  $\text{YbAl}_3$  the field induced magnetic moment is well-described by a  $\text{Yb}^{3+}$  free-ion form factor plus a small temperature-independent positive conduction electron polarisation [1]. Similarly, the magnetic moment on the cerium site in the low-charge carrier-density Kondo system  $\text{CeNiSn}$  is well described with  $\text{Ce}^{3+}$  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  $\text{UGa}_3$  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  $\text{PuCoGa}_5$  we observed a form factor significantly different from a conventional  $\text{Pu}^{3+}$  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

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