

# Low-lying thermal excitations on the border of ferromagnetism in the filled skutterudite $\text{NdOs}_4\text{As}_{12}$

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Single crystals of the filled-skutterudite compound  $\text{NdOs}_4\text{As}_{12}$  were grown by mineralization in a molten Cd:As flux. Features related to a ferromagnetic transition at  $\simeq 1.1$  K are observed in both transport and thermodynamic properties. Magnetic entropy considerations combined with magnetization data point at a quartet ground state of the  $\text{Nd}^{3+}$  multiplet being well separated from a first excited state. Unexpectedly, a Schottky anomaly with the maximum at  $\simeq 0.93$  K emerges on the border of the ferromagnetically ordered state. Additionally, a small magnetic field of 0.1 T shifts the Schottky peak above the Curie temperature. Thus, its origin cannot be related to the molecular-field splitting, as frequently observed for other ferromagnets. We attribute the Schottky anomaly with an energy separation  $\Delta/k_{\text{B}} \approx 2.2$  K to a lowering of the  $T_h$  cubic point symmetry of the  $\text{Nd}^{3+}$  ions due to an unusual distortion of the Os cage, as recently proposed for  $\text{PrOs}_4\text{Sb}_{12}$  and  $\text{NdOs}_4\text{Sb}_{12}$  [1].

## References:

[1] T. Keiber *et al.*, Phys. Rev. B **86**, 174106 (2012).