

# XMCD-Signatures of Kondo and Heavy Fermion Behaviour in the Surface Intermetallic CePt<sub>5</sub>/Pt(111)

C. Praetorius,<sup>1</sup> M. Zinner,<sup>1</sup> and K. Fauth<sup>1</sup>

<sup>1</sup>*Physikalisches Institut, Universität Würzburg,  
Am Hubland, D-97074 Würzburg*

We explore the detection of magnetic signatures of Kondo and heavy fermion physics by x-ray spectroscopy and study the anisotropic paramagnetic Ce-4f response in CePt<sub>5</sub>, prepared on Pt(111). Qualitatively, the magnetic behaviour above  $T \gtrsim 20$  K is readily understood in terms of interacting, considerably screened Ce-4f moments in a hexagonal crystal field (CF). A quantitative description necessitates distinct CF parameters for "inner" and "surface" atomic layers (supported by electron diffraction). Yet, treating both CF and Kondo physics at the NCA level [1] proved unsatisfactory.

The paramagnetic response displays a remarkable anomaly ( $T^* \approx 18$  K), which we shall discuss as signalling the transition towards the coherent heavy fermion state. Well below  $T^*$  we find Ce-4f saturation moments much smaller than the free ion values. Their occurrence, too, can be understood to be characteristic of the coherent state and associated with a Lifshitz transition as predicted theoretically [2].

## References:

- [1] G. Zwicknagl, V. Zevin and P. Fulde, *Z. Phys. B* **79**, 365 (1990)
- [2] K. S. D. Beach and F. F. Assaad, *Phys. Rev. B* **77**, 205123 (2005)