

## More surprises in f-electron magnetism

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### ABSTRACT

Surface supported single magnetic atoms, the so-called "single-atom magnets", open new opportunities in a quest for the ultimate size limit of magnetic information storage. Initially, the research mainly focused on 3d-atoms on surfaces. Recently, the attention was turned to the 4f-atoms, culminating in the experimental discovery of magnetically stable Ho atom on MgO(001) substrate, and Dy atom on graphene/Ir(111).

I address the electronic and magnetic character of 4f-atoms on metal and Graphene substrate making use of a combination of the DFT+U with the exact diagonalization of Anderson impurity model (DFT+U+ED). The spin and orbital magnetic moments of Dy@Ir(111) and Dy/Graphene/Ir(111) are evaluated and compared with experimental XMCD data. The magnetic anisotropy energy is estimated, and the magnetic stability is discussed. The role of 5d-4f interorbital exchange polarization in modification of the 4f-shell energy spectrum is emphasized.