

ENHANCING THE MAGNETIC ANISOTROPY AND ANISOTROPIC MAGNETORESISTANCE OF ATOMIC CLUSTERS, CHAINS AND MOLECULAR MAGNETS

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The ability to enhance and tailor the magnetic anisotropy and magneto-resistance of atomic-sized magnetic bits and junctions will determine whether nanospintronics will be a viable technology. Atomic structures made of cobalt and other 3d elements have recently been shown to have large magnetic anisotropies due to the enhanced role of the Spin-Orbit interaction[1,2]. Furthermore, several recent theoretical predictions have pointed out that atomic clusters and chains made of 4d elements should have even higher magnetic anisotropy barriers than Co chains[3,4,5]. We will discuss here a way to overcome the superparamagnetic limit problem, using 5d atoms like Ir or Pt as the heart of atomic or molecular spin nanostructures. Some of these nanostructures also show significant magnetoresistive ratios[6,7,8].

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