

# Theory of spin dynamics and anisotropy on the atomic scale

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I will show how the anisotropy of spins both in bulk materials and at surface sites can be understood through a combination of (i) first-principles density functional calculations, (ii) the building of suitable model Hamiltonians. In order to understand also the physics of probing the spin properties one needs to include also (iii) the theory of open quantum systems and (iv) the physics of nanoscale electron transport. Examples of this combined approach applied to electron paramagnetic resonance (EPR) and scanning tunneling microscopy (STM) will be discussed.