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Magnetic Response of Cobalt–Carbide Nanoparticles with large Magnetocrystalline Anisotropy. PALLABI SUTRADHAR, SHIV N. KHANNA, JAYASIMHA ATULASIMHA, Virginia Commonwealth University — Recent experiments showed that Co_3C particles ˜8 nm diameter can exhibit stable long range ferromagnetic order up to 570 K. First principle theoretical investigation showed that the separation between the cobalt layers induced by the carbon atoms is responsible for large magnetocrystalline anisotropy energy, which gives Co_3C this unique rare earth permanent magnet like characteristics [1]. In this work, we build the Hamiltonian for this system, theoretically study the evolution in its hysteretic magnetic response and compare these predictions against experimental magnetic behavior at various temperatures. [1] Ahmed A. El-Gendy et al., Appl. Phys. Lett. 104, 023111, 2014. Acknowledgement: S.N.K. acknowledges support from U.S. Department of Energy (DOE) through Grant No. DE-FG02-11ER16213.

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