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A magnetic nanoparticle as an ultimate voltage-controlled nanomagnet[1] IGOR OVCHINNIKOV, E&E Dept. UCLA, KANG WANG, E&E Dept. UCLA, FENA, WIN, CNSI — We argue that when the conduction band edge of a magnetic nanoparticle is pinched between the majority and minority spins' Fermi energies, the capacitively injected carriers go almost entirely into one of the spin groups, thus varying the magnetization value at nearly 100% efficiency. Among the IV-group transition metals, Cobalt and Nickel satisfy this requirement. Our proposition designs a source of strong local voltage-controlled nano-scale magnetic fields, which can be an ultimate alternative to the recent quest for DMS devices, in which the efficiency is limited to the magnetic doping concentration $\lesssim 5\%$. We theoretically support the idea for several transition metals' within the LSDA approach augmented by the kinetic energy functionals, built from the previous ab-initio density of states profiles. Our simulations show that, *e.g.*, for a $N_a = 50$ Nickel atom nanoparticle the original spin polarization $2S \sim 0.66 N_a$ gets completely suppressed at the gate voltage of ≈ 15 Volts.

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