Quantum spin torque in quantum dot coupled to ferromagnetic leads.

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Spin manipulation requires applying a torque. This can be done with use of magnetic fields. We use, for this purpose, a single wall carbon nanotube (SWCN) quantum dot connected to leads (PdNi) with non-collinear magnetizations. We have studied an electron transport through this device, which acts like a spin-valve with a finite tunnelling magnetoresistance effect. Depending on system parameters a non-equilibrium spin accumulation on the quantum dot can be generated. We predicted that the interplay of spin-dependent tunnelling and Coulomb interactions in quantum-dot spin valves gives rise to an interaction driven spin precession, describable in terms of an internal exchange and external magnetic field in the limit of weak dot-lead coupling. This opens the potential of a controlled manipulation of the quantum dot spin, detectable in transport.