**Citation:**
B.A. Ruzicka and Hui Zhao, *Power dependence of pure spin current injection by quantum interference.* Physical Review B 79, 155204 (2009).

**Published version:**
Published version: http://link.aps.org/doi/10.1103/PhysRevB.79.155204

**Other sources:**
ArXiv: http://arxiv.org/abs/1003.1974

**Key words:**
Materials Science
Mesoscale and Nanoscale Physics
Optics

**Abstract:**
We investigate the power dependence of pure spin current injection in GaAs bulk and quantumwell samples by a quantum interference and control technique. Spin separation is measured as a function of the relative strength of the two transition pathways driven by two laser pulses. By keeping the relaxation time of the current unchanged, we are able to relate the spin separation to the injected average velocity. We find that the average velocity is determined by the relative strength of the two transitions in the same way as in classical interference. Based on this, we conclude that the density of injected pure spin current increases monotonically with the excitation laser intensities. The experimental results are consistent with theoretical calculations based on Fermi's golden rule.