

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Electrically induced changes to optical nuclear polarizations in bulk GaAs¹ PATRICK COLES, ANANT PARAVASTU, JEFFREY REIMER, University of California, Berkeley — The semiconductor crystal contains a spin refrigeration system, which turns on in the presence of near-band-gap laser light. Simultaneous application of a DC electric field to bulk, semi-insulating GaAs was observed to significantly alter the nuclear polarization process. At certain photon energies, the nuclear polarization inverted. Changes to nuclear polarization occurred upon the onset of nonlinear photoconductivity. Polarization in this regime could originate from electron spins that are perturbed first by the light and subsequently by relaxation with their (hot) momentum reservoir, while rapid spin-exchange equilibrates the electron spin reservoirs. The results suggest that a pathway towards localized optical and electric field control of nuclear spin may exist within bulk semiconductors.

¹Supported by National Science Foundation

Patrick Coles
University of California, Berkeley

Date submitted: 02 Dec 2005

Electronic form version 1.4