

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Current-induced dynamic nuclear polarization in GaAs W.G. MOULTON, JUN LU, M.J.R. HOCH, P.L. KUHNS, A.P. REYES, National High Magnetic Field Laboratory — Dynamic nuclear polarization (DNP) in GaAs is of interest because of possible applications in spintronics and quantum computing. Recent experiments by other workers (1,2) have demonstrated that nuclear spin polarization can be achieved in this system by optical pumping and spin injection through ferromagnetic contacts. We have found that DNP is induced in just-insulating bulk GaAs at low temperatures by applying a DC electric field with associated current. This Feher effect, previously observed in InSb by Clark et al, has been attributed to hot electrons. The behavior found in GaAs appears to be somewhat different to the InSb case. A model involving localized states interacting with carriers in the conduction band has been used to analyze the GaAs results. Possible mechanisms for the current induced polarization of the conduction electrons will be discussed. 1.Y. K. Kato, R. C. Myers, A. C. Gossard, and D. D. Awschalom, Phys. Rev. Lett. 93, 176601 (2004). 2.J. Strand, B. D. Schultz, A. F. Isakovic, C. J. Palmstrm, and P. A. Crowell, Phys. Rev. Lett. 91, 36602 (2003). Support by DARPA SPINS program gratefully acknowledged

William Moulton
FSU-NHMFL

Date submitted: 22 Nov 2004

Electronic form version 1.4