## Abstract Submitted for the MAR09 Meeting of The American Physical Society

Mn-implanted GeC: An Amorphous Ferromagnetic Material<sup>1</sup> SAMARESH GUCHHAIT, M. JAMIL, D. FERRER, E. TUTUC, J. MARKERT, S. BANERJEE, The University of Texas at Austin, A. LI-FATOU, L. COLOMBO, Texas Instruments Incorporated — High energy (20 keV) Mn ions were implanted in two samples: 1) bulk Ge (100) and 2) a 250 nm thick epitaxial GeC film, grown on a Si (100) wafer. The GeC thin film was grown by UHV chemical vapor deposition using a mixture of germane (GeH<sub>4</sub>) and methylgermane (CH<sub>3</sub>GeH<sub>3</sub>) gases and contains about 1% carbon. The Mn implant dose was  $1.1 \times 10^{16} / \text{cm}^2$  at a temperature of 300°C for both samples. A SQUID magnetometer study shows ferromagnetism in both samples. The Curie temperature of the first samples is about 150 K, while that of the second sample is about 170 K. The in-plane saturated magnetic moment for the first sample is about  $2.2 \times 10^{-5}$  emu/cm<sup>2</sup> and that for the second sample is about  $3.0 \times 10^{-5}$  emu/cm<sup>2</sup>. These results show clear enhancement of magnetic properties of the Mn-implanted GeC thin film over the identically implanted Ge layer due to the presence of a small amount of carbon. Further, high-resolution transmission electron microscopy showed that Mn implanted region is amorphous, without any precipitates. It is believed that it is this amorphous phase that is responsible for ferromagnetism.

<sup>1</sup>This work was supported by SWAN and NSF DMR 0605828.

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Date submitted: 21 Nov 2008 Electronic form version 1.4