

APS March Meeting, March 3-6, 2003

Session X34 - Quantum Fluids and Solids.

ORAL session, Thursday afternoon, March 06

Room 2, Austin Convention Center

[X34.011] Design of "Zero Magneto-Resistance"
Ge Thin Film Thermometers

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Germanium films deposited on GaAs substrates are a promising technology for use as cryogenic resistance thermometers, especially in applications involving magnetic fields [1]. The small size (final sensor dimensions < 1.2mm radius) and low cost make them ideal for many laboratory and industrial applications. Their resistance and sensitivity properties have been studied at temperatures from 250mK to 300K and in magnetic fields up to 30T for various heat treatments, which affect the dopant types and levels. Various conduction mechanisms are presented and used to explain the changes in resistance and sensitivity as a function of temperature and magnetic field. The calibration reproducibility with production and thermal cycling are also examined.

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[1] V. Mitin, J. McFarland, G.G. Ihas, V.K. Dugaev, Ge film thermometers at ultralow temperatures in high magnetic fields, *Physica B*284-288, 1996-1997 (2000).