

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Strain and magnetism in epitaxial MnSi thin films T.L. MONCHESKY, E.A. KARHU, Dalhousie University, M.D. ROBERTSON, Acadia University, DALHOUSIE UNIVERSITY, HALIFAX, NS, CANADA TEAM, ACADIA UNIVERSITY, WOLFVILLE, NS, CANADA TEAM — Epitaxial MnSi grown on Si(111) provides new opportunities to explore spin-dependent transport in helical magnets. We investigated the influence of strain on the Curie temperature, T_C , in MnSi thin films grown by MBE and solid phase epitaxy. The substrate introduced a positive volume strain in the MnSi(111) film, as determined by x-ray diffraction and TEM. The strain can be controlled by a combination of growth temperature and film thickness and leads to an enhanced Curie temperature that is 50% larger than bulk. This volume strain is correlated with T_C measurements and is found to deviate from that expected for bulk MnSi. The magnetic properties measured by SQUID magnetometry also show departures from bulk behavior. The helical magnetic order was expected to create a remanent magnetization, M_r , which oscillates as a function of the thickness with a wavelength equal to that of the helix. Instead a single peak in M_r was observed at a thickness of 7.5nm. Departures from Curie Weiss behavior are also observed above T_C .

T.L. Monchesky
Dalhousie University

Date submitted: 07 Dec 2009

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