

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Magnetic and Structural Properties of  $\text{Mn}_5\text{Ge}_3$  Nanoparticles<sup>1</sup>**

ONUR TOSUN, MOHAMMAD SALEHI-FASHAMI, GEORGE C. HADJIPANAYIS, Univ of Delaware, DAVID J. SELLMYER, BALAMURUGAN BALASUBRAMANIAN, Univ of Nebraska-Lincoln, UNIV OF DELAWARE TEAM, UNIV OF NEBRASKA-LINCOLN COLLABORATION — Magnetic nanoparticles have unique and interesting properties which are scientifically important and attractive for numerous advanced technologies. In this work, we have used the cluster-beam deposition technique to synthesize  $\text{Mn}_5\text{Ge}_3$  nanoparticles with different size. The composition, crystal structure and magnetic properties of the nanoparticles have been characterized by energy dispersive x-ray spectroscopy (EDS), X-ray diffraction, high-resolution transmission electron microscopy (HR-TEM) and magnetometry, respectively. Particles made with 1.7 Torr Argon pressure, and power of 80 W had an average size of 14 nm. Selected area electron diffraction showed that the particles had a hexagonal  $\text{Mn}_5\text{Si}_3$ -type structure with space group P63/mcm which is the same as in bulk. Magnetic measurements showed that the nanoparticles are ferromagnetic with a Curie temperature near room temperature. The effects of particle size and temperature on the magnetic properties are currently being studied and the results will be reported and discussed.

<sup>1</sup>DOE-BES-DE-FG02-04ER4612 and DE-FG02-04ER46152

Onur Tosun  
Univ of Delaware

Date submitted: 05 Nov 2015

Electronic form version 1.4