Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**Magnetic and Structural Properties of $Mn_3Ge$ Nanoparticles**[1]

ONUR TOSUN, Department of PhysicsAstronomy, University of Delaware, BALAMURUGAN BALASUBRAMANIAN, RALPH SKOMSKI, DAVID J. SELLMYER, Department of PhysicsAstronomy, University of Nebraska, Lincoln, GEORGE C. HADJIPANAYIS, Department of PhysicsAstronomy, University of Delaware, DEPARTMENT OF PHYSICSASTRONOMY, UNIVERSITY OF DELAWARE TEAM, DEPARTMENT OF PHYSICSASTRONOMY, UNIVERSITY OF NEBRASKA, LINCOLN TEAM — In this work, we have investigated the magnetic and structural properties of $Mn_3Ge$ nanoparticles prepared by the cluster-beam deposition technique. The composition, crystal structure and magnetic properties of the nanoparticles have been characterized by energy dispersive x-ray spectroscopy (EDS), X-ray diffraction (XRD), high-resolution transmission electron microscopy (HR-TEM) and magnetometry measurements with the PPMS. Particles made with 1.5 Torr Argon pressure and power of 60 W have an average size of 13 nm and a highly disordered crystal structure. However, after a short annealing at 700 °C, the particle's structure is transformed to the hexagonal $Ni_3Sn$-type structure with space group $P6_3/mmc(194)$ which is the same as in bulk. Hysteresis loop measurements showed that the annealed particles are ferromagnetic at room temperature showing a coercivity of 0.3 kOe at 50 K. The effects of particle size and temperature on the magnetic and structural properties are currently being studied and the results will be reported and discussed.

[1]Work supported by DOE BES- FG02-90ER45413

Onur Tosun
Department of Physics
Astronomy, University of Delaware

Date submitted: 11 Nov 2016 Electronic form version 1.4