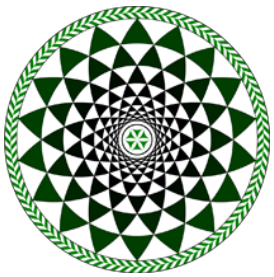

Contribution ID: **14** Type: **oral presentation**

Highly ordered arrays of $Fe_{60}Al_{40}$ nanomagnets embedded within flat paramagnetic matrix

Tuesday, 4 July 2017 16:40 (20 minutes)

Large-scale periodic arrays of trigonal ferromagnetic islands embedded in a paramagnetic matrix have been fabricated by ion irradiation of 40 nm thick B2-$Fe_{60}Al_{40}$ thin films through the mask of polystyrene nanospheres with size of 200 nm, 400 nm and 800 nm. The irradiation was performed with 20 keV Ne^{+} ions at 6 x 1014 cm^{-2} fluence, which induced chemical disorder and thus a ferromagnetic phase in the uncovered $Fe_{60}Al_{40}$.

Using SQUID and Kerr magnetometry, changes in coercive field, saturation magnetization, and magnetic anisotropy constant have been determined in a temperature range of 5 K –350 K and correlated with the radiation damage distribution obtained from simulations of the ion stopping and range. The domain shapes and sizes together with the switching behaviour were studied by scanning magnetoresistive microscopy in variable external field. The results demonstrated that the proposed approach can be effectively used to produce large-area magnetic arrays embedded within a topographically flat surface with magnetic properties tuneable by temperature and patterning period.

This work was supported by The German Academic Exchange Service (DAAD) with contract No. PPP-PL 57214850.

Primary author: Dr KRUPIŃSKI, Michał (Institute of Nuclear Physics, Polish Academy of Sciences)

Co-authors: Dr SEMISALOVA, Anna (Helmholtz-Zentrum Dresden-Rossendorf); Dr ZARZYCKI, Arkadiusz (Institute of Nuclear Physics, Polish Academy of Sciences); Dr MITIN, Dmitriy (Institute of Physics, University of Augsburg); Dr POTZGER, Kay (Helmholtz-Zentrum Dresden-Rossendorf); Prof. ALBRECHT, Manfred (Institute of Physics, University of Augsburg); Prof. WOLNY-MARSZAŁEK, Marta (Institute of Nuclear Physics, Polish Academy of Sciences); Dr BALI, Rantej (Helmholtz-Zentrum Dresden-Rossendorf)

Presenter: Dr KRUPIŃSKI, Michał (Institute of Nuclear Physics, Polish Academy of Sciences)

Session Classification: Surfaces & Interfaces

Track Classification: Surfaces and interfaces