Contribution ID: **818** Type: **Oral (Student, Not in Competition) / Orale (Étudiant(e), pas dans la compétition)**

Torque Magnetometry of an Individual Aggregate of ˜350 Nanoparticles

Thursday 18 June 2015 16:30 (15 minutes)

Magnetic properties for isolated and small-scale assemblies of nanoparticles are generally derived from measurements of bulk nanoparticle systems. To complement this, we aim to investigate these properties for individual assemblies of single-domain magnetite nanoparticles.
Nanoparticles, ˜ 50 nm in size and harvested from magnetotactic bacteria, were deposited by Nano eNnabler (BioForce Nanosciences TM) on a 100 nm thick, high stress Si3N4 membrane 40 × 200 µm in size. The nanoparticles form diverse patterns on the membrane, including aggregates influenced by dipolar coupling. To capture select structures for measurement, nanomechanical torsional resonators are fabricated in the membrane by direct writing with a focused ion beam. Magnetic measurements are obtained by nanomechanical torque magnetometry, a sensitive method to probe the quasi-static magnetization response.
The observations are compared to micromagnetic modeling of the hysteresis of a specific measured cluster of ˜ 350 nanoparticles, and to numerical simulations of the mechanical modes.

Author: FIRDOUS, Tayyaba (Department of Physics, University of Alberta, T6G 2E1, Canada)

Co-authors: MCDERMOTT, Aidan (Department of Physics, University of Alberta, T6G 2E1, Canada); POTTER, David (Department of Physics, University of Alberta, T6G 2E1, Canada); BAZYLINSKI, Dennis (School of Life Sciences, University of Nevada at Las Vegas, NV 89154, USA); VICK, Doug (National Institute of Nanotechnology, T6G 2M9, Canada); FANI SANI, Fatemeh (Department of Physics, University of Alberta, T6G 2E1, Canada); LOSBY, Joe (Department of Physics, University of Alberta, T6G 2E1, Canada); FREEMAN, Mark (Department of Physics, University of Alberta, T6G 2E1, Canada); BELOV, Miroslav (National Institute of Nanotechnology, T6G 2M9, Canada); PROZOROV, Tanya (US DOE Ames Laboratory, Ames, IA 50011, USA)

Presenter: FIRDOUS, Tayyaba (Department of Physics, University of Alberta, T6G 2E1, Canada)

Session Classification: R3-1 Light-Matter Interactions (DAMOPC-DCMMP) / Interactions entre la lumière et la matière (DPAMPC-DPMCM)

Track Classification: Condensed Matter and Materials Physics / Physique de la matière condensée et matériaux (DCMMP-DPMCM)