Curriculum Vitae

Khaled Aledealat

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Graduate research interest **&** accomplishments

My research has been focused on optimizing and developing InAs quantum well micro-Hall sensors for magnetic bio-detection. Throughout my work and with the collaborations with researchers from physics, chemistry, and biology I was able to employ InAs micro-Hall sensors to detect specific biomolecular interactions such as biotin-streptavidin binding and DNA-DNA interactions using nanometer sized superparamagnetic labels. I was also able to integrate InAs micro-Hall sensors with microfluidic channel and perform dynamic detection of flowing micrometer sized magnetic labels in aqueous solution which is a crucial step toward the goal of making portable low cost sensors for medical applications.

Furthermore, I worked on noise reduction and characterization techniques for InAs micro-Hall sensors; I was able to achieve noise equivalent magnetic moment resolutions of ~10^6 $\mu_B/\mathrm{Hz}^{1/2}$ and ~10^4 $\mu_B/\ \mathrm{Hz}^{1/2}$ at 92Hz and 23 kHz respectively. I also contributed in characterizing single superparamagnetic bead using InAs micro-Hall sensor.

Education

2004-2010 Ph.D. Condensed Matter Physics, Florida State University (FSU)
2003-2005 M.S. Physics, New Mexico State University (NMSU)
1998-2002 B.S. Applied Physics. Jordan University of science & technology, Jordan (JUST)

Professional Experience

2010-Present, Assistant Professor of Physics, Jordan University of Science &Technology
2005-2010, Graduate Research Assistant, Center for Materials Research and Technology (MARTECH) and Department of Physics, Florida State University
2004-2005, Teaching Assistant, Department of Physics, Florida State University
2003-2004, Teaching Assistant, Department of Physics, New Mexico state University

Experimental Skills

Micro- and Nanofabrication: photolithography, soft lithography for microfluidics in PDMS, e-beam lithography, reactive ion etching, thermal evaporation, magnetron sputtering, ultrasonic wire bonder.

Micromanipulation: SM 3.25 Marzhauser micromanipulator

Microscopy: optical, Profilometer, AFM, SEM

Cryogenics: He4 JANIS cryogenic system

Electrical measurements: low-level *dc* and *ac* measurements, noise measurements, magnetotransport measurements at cryogenic temperatures

Magnetic characterization: micro-Hall magnetometry

Data analysis: Origin, Maple

Publications and Preprints

1. N. M. Brunet, G. Mihajlovi´c, K. Aledealat, F. Wang, P. Xiong, S. von Moln´ar, P. B. Chase: Micromechanical Thermal Assays of Ca^{2+} -Regulated Thin-Filament Function and Modulation by Hypertrophic CardiomyopathyMutants of Human Cardiac Troponin, **Journal of Biomedicine and Biotechnology 2012**, 657523 (2011)

2. S. M. Hira, K. Aledealat, K. Chen, M. Field, G. J. Sullivan, P. B. Chase, P. Xiong, S. von Molnár, G. F. Strouse: Detection of Target ssDNA Using a Microfabricated Hall Magnetometer with Correlated Optical Readout, **Journal of Biomedicine and Biotechnology 2012**, 492730 (2011)

3. K. Aledealat, G. Mihajlovic, K.-S. Chen M. Field, G. J. Sullivan, P. Xiong, P. B. Chase, S. von Molnár,: Dynamic micro-Hall detection of biocompatible superparamagnetic beads in a microfluidic channel, **Journal of Magnetism and Magnetic Materials 322,** L69 (2010).

4. P. Manandhar, K.-S. Chen, K. Aledealat, G. Mihajlovic, C. S. Yun, M. Field, G. J. Sullivan, G. F. Strouse, P. B. Chase, S. von Molnár, P. Xiong: The detection of specific biomolecular interactions with micro-Hall magnetic sensors, ***Nanotechnology* 20**, 355501 (2009).

5. G. Mihajlovic, K. Aledealat, P. Xiong, S. von Molnár, M. Field, G. J. Sullivan: Magnetic characterization of a single superparamagnetic bead by phase-sensitive micro-Hall magnetometry, ***Applied Physics Letters* 91**, 172516 (2007).

Conference Abstracts

Presented:

1. K. Aledealat, S. Hira, K. Chen, G. F. Strouse, P. B. Chase, P. Xiong, S. von Molnár, G. Mihajlovic, M. Field, G. J. Sullivan: Label-free detection of DNA hybridization using InAs μ-Hall sensors. **2010 APS March Meeting**, Portland, OR (March, 2010).

2 K. Aledealat, G. Mihajlovic, K. Chen, M. Field, G. J. Sullivan, P. Xiong, S. von Molnár: Quantitative study of signal response of InAs quantum well μ-Hall sensors on magnetic bead position. **11th Joint MMM/Intermag Conference**, Washington, DC (January, 2010).

3. K. Aledealat, K. Chen, G. Mihajlovic, P. Xiong, G. Strouse, P. B. Chase, S. von Molnár, M. Field, G. J. Sullivan: Magnetic detection of biotin-streptavidin binding using InAs quantum well μ-Hall sensor. **2009 APS March Meeting**, Pittsburgh, PA (March, 2009).

4. K. Aledealat, S. Hira, K. Chen, G. Mihajlovic, P. Xiong, G. Strouse, P. B. Chase, S. von Molnár, M. Field, G. J. Sullivan: InAs quantum well μ-Hall sensors for magnetic biosensing. **2008 APS March Meeting**, New Orleans, LA (March, 2008).

5. K. Aledealat, G. Mihajlovic, P. Xiong, S. von Molnár, M. Field, G. J. Sullivan: Noise characteristics of InAs quantum well μ-Hall sensors. **52nd Annual Conference on Magnetism and Magnetic Materials**, Tampa, FL (November, 2007).

Co-authored:

1. S. M. Hira, K. Aledealat, K. Chen, P. Xiong, S. von Molnar, P. B. Chase, G. F. Strouse. “Magnetic and fluorescence detection of hybridized DNA assemblies immobilized onto a Hall device", **54th Annual Meeting of the Biophysical Society**, San Francisco, CA (2010). Published in ***Biophysical Journal*, 98**, 408a (January, 2010).

2. S. M. Hira, K. Aledealat, P. Xiong, S. von Molnar, G. F. Strouse, P. B. Chase “Fluorescence and Magnetic Detection of Hybridized DNA Assemblies on a Micro-Hall Device", **52th Annual Meeting of the Biophysical Society**, Long Beach, CA (2008). Published in ***Biophysical Journal***, **94**, 553-556 (February, 2008).

Membership

2007-2010, American Physical Society

Professional Services

Referee for *Journal of Applied Physics*

Honors

Jordan University of Science & Technology President’s honor list. (2000-2002). (This list is limited for students with GPA of 90% or higher)

Honor certificate form Jordan University of science & technology for having the highest GPA among my colleagues (2002).