

Ingrid Hallsteinsen



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Education

- 2016 – 2017 Doctoral fellowship in residence Advanced Light Source (ALS), Lawrence Berkeley National Lab (LBNL)
- Research focus: Emergent magnetic interface properties in oxide heterostructures measured by x-ray absorption
 - Assisting beamline scientist at BL: 4.0.2 and 6.3.1; magnetic spectroscopy
- 2012 – 2017 PhD candidate at Oxide Electronics group, Department of Electronics and Telecommunication, Norwegian University of Science and Technology (NTNU)
- Research focus: studies of how crystal symmetry influences magnetic properties at the interface of oxide thin films. In particular, growth and characterization of perovskites in the pseudo cubic (111)-orientation, which results in interfaces of hexagonal symmetry and enhanced oxygen octahedra connectivity.
 - PhD title: (111)-oriented oxide interfaces
 - PhD courses: Theories of science, Solid-state chemistry, Oxide heterostructures and summer school of Oxide electronics (ISOE2013).
- 2010 – 2011 Exchange year at Master of Nanotechnology, University of Barcelona (UB)
- Additional 20ESC in Catalan and Spanish language.
- 2007 – 2012 Master in Technology with specialization in Nanotechnology at Norwegian University of Science and Technology (NTNU)
- Field of study: Nanomaterials for electronic applications
 - Master thesis: Hallsteinsen, I.; Boschker, J.E.; Tybell, T. Toward growth control of (111)-oriented perovskite thin films, 2012
- 2006 – 2007 Examen philosophicum and Examen facultatum at University of Oslo (UIO)
- 2003 – 2006 High school Trondheim Katedralskole
- General studies with specialization in mathematics, physics and chemistry.

Extra Curricular Related Work

- 2012 – 2015 Supervisor of master students
- 2012 – 2015 Superuser at in-house laboratory facilities

2012 – 2014 Educational assistant:

- Electronic circuits
- Nano electronics.

2010 Internship as research assistant at the Norwegian Defence Research Establishment (FFI)

- Characterization of carbon nanotubes embedded in epoxy through mass spectroscopy

2009 Internship as cleanroom assistant at NanoLab Norwegian University of Science and Technology (NTNU)

- Preparing the NanoLab for opening to external users

2007 – 2010 Member of the executive board of the student organization of nanotechnology (TIMINI) and organizer of educational excursion to China

Technical Skills

- Pulsed Laser Deposition, Scanning Probe Microscopy, Atomic Force Microscopy, X-ray diffraction, Scanning Electron Microscopy, Mass spectroscopy, Vibrating Sample Magnetometry, Clean room training and Lithography.
- X-ray magnetic circular/linear dichroism with photoemission electronic microscopy at Swiss light source, Paul Scherrer Institute and Advanced light source, Lawrence Berkeley National Lab.
- X-ray magnetic circular/linear dichroism spectroscopy at Max Lab, Lund University and Advanced light source, Lawrence Berkeley National Lab.
- Neutron reflectometry at Center for Neutron Research, National Institute of Science and Technology.

Publications

Journal articles

- Hallsteinsen, I.; Moreau, M.; Grutter, A.; Nord, M.; Vullum, P.E.; Gilbert, A.; Bolstad, T.; Grepstad, J.K.; Holmestad, R.; Selbach, S.M.; N'Diaye, A.T.; Kirby, B.J.; Arenholz, E.; Tybell, T. *Concurrent magnetic and structural reconstructions at the interface of (111)-oriented La_{0.7}Sr_{0.3}MnO₃/LaFeO₃*. *Phys. Rev. B*, **94**, 201115 (2016)
- Hallsteinsen, I.; Nord, M.; Bolstad, T.; Vullum, P.E.; Boschker, J.E.; Longo, P.; Takahashi, R.; Holmestad, R.; Lippmaa, M.; Tybell, T. *Effect of polar (111)-oriented SrTiO₃ on initial perovskite growth*, *Cryst. Growth & Des*, **16**, 2537 (2016)
- Hallsteinsen, I.; Folven, E.; Olsen, F.K.; Chopdekar, R.V.; Rzechowski, M.; Eom, C.B.; Grepstad, J.; Tybell, T. *Crystalline symmetry controlled magnetic switching in epitaxial (111) La_{0.7}Sr_{0.3}MnO₃ thin films*. *APL Mat.* **3**, 062501 (2015). <http://dx.doi.org/10.1063/1.4907877>
- Hallsteinsen, I.; Boschker, J.E.; Nord, M. K.; Lee, S.; Rzechowski, M.; Vullum, P.E.; Grepstad, J.; Holmestad, R.; Eom, C.B.; Tybell, T. *Surface stability of epitaxial La_{0.7}Sr_{0.3}MnO₃ thin films on (111)-oriented SrTiO₃*. *J. Appl. Phys.* **113**, 183512 (2013). <http://dx.doi.org/10.1063/1.4804312>
- Christiansen, E.; Nord, M.; Hallsteinsen, I.; Vullum, P.E.; Tybell, T.; Holmestad, R. *Structural investigation of epitaxial LaFeO₃ thin films on (111) oriented SrTiO₃ by transmission electron microscopy*, Submitted to *Journal of Physics: Conference Series*, (2015).

- Nord, M.; Vullum, P.E.; Hallsteinsen, I.; Tybell, T.; Holmestad, R. *Assessing electron beam sensitivity for SrTiO₃ and La_{0.7}Sr_{0.3}MnO₃ using electron energy loss spectroscopy*, *Ultramicroscopy* **169**, 98 (2016)
- Flovik, V.; Macià, F.; Lendínez, S.; Hernández, J. M.; Hallsteinsen, I.; Tybell, T.; Wahlström, E. *Thickness and temperature dependence of the magnetodynamic damping of pulsed laser deposited La_{0.7}Sr_{0.3}MnO₃ on (111)-oriented SrTiO₃*, *J. of Mag. And Mag. Mat.* **420**, 280 (2016).
- I. Hallsteinsen, A. Grutter, M. Moreau, D. Gilbert, B. Kirby, E. Arenholz and T. Tybell, *Thickness dependence of magnetic properties in (111)-oriented La_{0.7}Sr_{0.3}MnO₃/LaFeO₃ epitaxial thin films* (in preparation)
- I. Hallsteinsen, E. Folven, R.V. Chopdekar, E. Christiansen, M. Nord, P-E. Vullum, J. K. Grepstad, R. Holmestad, A. Scholl, E. Arenholz and T. Tybell, *Magnetic domain configuration of (111)-oriented LaFeO₃ epitaxial thin films* (in preparation)

Oral conference contributions

- *Material Research Society*, Boston 2016, Effect of structural reconstructions at the interface of (111)-oriented La_{0.7}Sr_{0.3}MnO₃/LaFeO₃, I. Hallsteinsen et al.
- *Magnetism and Magnetic materials*, New Orleans 2016, Complex magnetic interface interactions at the (111)-oriented La_{0.7}Sr_{0.3}MnO₃/LaFeO₃ interface, I. Hallsteinsen et al.
- *Advanced Light Source user meeting*, Berkeley 2016, Induced ferromagnetism at the interface of complex oxides, I. Hallsteinsen et al.
- *Nano Network Trondheim* 2016,
 - Exploring ferromagnetic/antiferromagnetic coupling through magnetic domain imaging. A. Bang, I. Hallsteinsen et al.
 - Control of magnetism by symmetry and epitaxial stacking. T. Bolstad, I. Hallsteinsen et al.
- *European Materials Research Society (MRS) Lille* 2015, Possible interface magnetism in LSMO/LFO/STO(111), I. Hallsteinsen et al.
- *“To-Be” Cost Action Aveiro* 2015, Magnetic coupling in (111)-oriented LSMO and LFO epitaxial heterostructures, I. Hallsteinsen et al.
- *Electron Microscopy and Microanalysis Group* 2015, Advanced quantitative fine structure analyzes of perovskite oxides using electron energy loss spectroscopy, M. Nord, I. Hallsteinsen et al.
- *Nano Network Oslo* 2015,
 - Induced magnetism in (111)-oriented LSMO/LFO heterostructures, I. Hallsteinsen et al.
 - Structural effects on magnetism: A possible route to novel electromagnetic systems, T. Bolstad, I. Hallsteinsen et al.
 - Octahedral coupling in (111)-oriented oxide interfaces from first principles, M. Moreau, I. Hallsteinsen et al.
 - Analysing the electronic structure of perovskite oxides using Transmission Electron Microscopy, M. Nord, I. Hallsteinsen et al.
- *Nanolab workshop Trondheim* 2014,
 - Magnetic properties of (111)-oriented superlattices of LSMO and LFO, I. Hallsteinsen et al.
 - Comparison of (001) and (111) La_{0.7}Sr_{0.3}MnO₃/SrTiO₃ interface using TEM, M. Nord, I. Hallsteinsen et al.
- *Material Research Society*, San Francisco 2014, Comparison of (001) and (111) LSMO/STO interface using TEM, M. Nord, I. Hallsteinsen et al.

- *Nano Network Tønsberg* 2014, Magnetic properties of (111)-oriented thin films, I. Hallsteinsen et al.
- *Nanolab workshop Trondheim* 2013, Magnetic switching of epitaxial (111)-oriented LSMO/STO thin films
- *STINT Trondheim* 2012, Controlled surfaces of (111)-oriented perovskite thin films, I. Hallsteinsen et al.
- *Material Research Society*, Boston 2012. Surface stability of epitaxial LSMO thin films on STO(111), I. Hallsteinsen et al.
- *Nanolab workshop Trondheim* 2012, Film growth of (111)-oriented perovskite systems, I. Hallsteinsen et al.

Poster conference contributions

- *Advanced Light Source user meeting*, Induced ferromagnetism at the interface of complex oxides, I. Hallsteinsen et al.
- *Nano Network Oslo* 2015, Exchange bias in magnetic LFO/LSMO heterostructures, F.Olsen, I. Hallsteinsen et al.
- *European MRS Lille* 2015, (111)-oriented BaTiO₃/La_{0.7}Sr_{0.3}MnO₃ thin film heterostructures, T.Bolstad, I Hallsteinsen et al.
- *Norwegian Synchrotron and Neutron meeting Stavanger* 2015, Imaging magnetic anisotropy, domain structure, and local reversal mechanisms in magnetic thin films. Hallsteinsen et al.
- *International Workshop on Oxide Electronics* 2014, Control of magnetic domain patterns in complex oxide microstructures, Thomas Tybell, I. Hallsteinsen et al.
- *Conference on Magnetism and Magnetic materials Hawaii* 2014, Orientation-dependent domain states in epitaxial perovskite thin film micromagnets. E. Folven, I. Hallsteinsen et al.
- *Material Research Society San Francisco* 2014, Magnetic properties and exchange mechanisms in epitaxial (111)-oriented magnetic heterostructures, I. Hallsteinsen et al.
- *Material Research Society San Francisco* 2014, Orientation-dependent domain states in epitaxial perovskite thin film micromagnets, E. Folven, I. Hallsteinsen et al.
- *Material Research Society Boston* 2013. Synthesis and magnetic switching of epitaxial (111)-oriented La_{0.7}Sr_{0.3}MnO₃ thin films, I. Hallsteinsen et al.

Awards and grants

- American- Scandinavian foundation; 2016, 10 000\$ to employ science in the United States
- Neville B. Smith Award for 1st place in the ALS Student Poster competition: Induced ferromagnetism at the interface of complex oxides, I. Hallsteinsen et al.
- Best Poster award; (111)-oriented BaTiO₃/La_{0.7}Sr_{0.3}MnO₃ thin film heterostructures, T.Bolstad, I Hallsteinsen et al.
- Best Poster award: Exchange bias in magnetic LFO/LSMO heterostructures, F.Olsen, I. Hallsteinsen et al.

References

ALS supervisors: Elke Arenholz, earenholz@lbl.gov
 PhD supervisors: Thomas Tybell, thomas.tybell@ntnu.no, Jostein Grepstad, jostein.grepstad@ntnu.no
 Master supervisors: Thomas Tybell, thomas.tybell@ntnu.no, Jos Emiel Boschker, boschker@pdi-berlin.de
 Internships: Bernt Johnsen, bernt.johnsen@ffi.no, Hanna Gautun, hanna.gautun@ntnu.no