

DR. MARISOL ALCÁNTARA ORTIGOZA

CURRICULUM VITAE

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RESEARCH EXPERIENCE

- **Department of Physics, University of Central Florida**, Orlando, FL, USA
08/2012 – present Research Associate
- **Donostia International Physics Center**, Donostia-San Sebastián, Spain
07/2013 – 08/2012, 12/2014 – 12/2015 Visiting Scientist
- **Institut für Festkörperphysik, Karlsruher Institut für Technologie**, Germany
2005- 2008: summer stays Visiting Scientist
05/2009 – 10/2009
10/2010 – 02/2011
10/2011 – 11/2011
- **Department of Physics, University of Central Florida**, Orlando, FL, USA
10/2007 – 08/2012 Postdoctoral Research Associate
- **Department of Physics, Kansas State University**, Manhattan, KS, USA
08/2002 – 08/2007 Graduate Research Assistant
- **Centro de Ciencias Físicas, Universidad Nacional Autónoma de México**,
Cuernavaca, México
2000 – 2001 Undergraduate Research Assistant

TEACHING EXPERIENCE

- **Department of Physics, University of Central Florida**, Orlando, FL, USA
08/2013 – 05/2014
Experience with both traditional lecture and new Mini-Studio modes.
- **Department of Physics, Kansas State University**, Manhattan, KS, USA
2001 – 2002 Graduate Teaching Assistant
- **Facultad de Ciencias, Universidad Nacional Autónoma de México**, Ciudad de México, México
1999 – 2001 Undergraduate Instructor

EDUCATION

- **Ph.D. in Physics** (Condensed Matter Physics), December 7, 2007
Kansas State University, Physics Department, Manhattan, Kansas, USA
Advisor: Prof. Talat S. Rahman
Thesis: “Theoretical studies of electronic, vibrational, and magnetic properties of chemisorbed surfaces and nanoalloys.”
- **Bachelor in Physics** (Thesis in Atomic Physics), June 2001
Universidad Nacional Autónoma de México, Facultad de Ciencias, Mexico City, Mexico.
Advisor: Prof. Horacio Martínez Valencia
Thesis: “Sección transversal y umbral de energía de la producción de rayos X en colisiones ion-átomo.”

SYNERGISTIC ACTIVITY

- Contributor to the NSF-supported project: “Active Learning Strategies for Algebra-based Introductory Physics at UCF” (Award Number: 1246024) by teaching in the Mini-Studio for non-science, -technology, -engineering, and -math (non-STEM) students and designing worksheets focused on concepts, critical thinking and physics’ broad landscape.
- Chair for the Session on “Quantum Condensed Matter Systems” at the 35th International Nathiagali Summer College on Physics and Contemporary Needs, Nathiagali, Pakistan, June 28-July4, 2010.
- Referee of manuscripts for Physical Chemistry Chemical Physics (PCCP), Journal of Chemical Physics, Journal of Physics: Condensed Matter, and Computational Material Science.

MEMBERSHIPS

- 2005 – present – Member of the American Physics Society
- 2010 – present – Member of the American Vacuum Society
- 2009 – present – Member of the American Harp Society

SELECTED RECENT PUBLICATIONS

For a full list of publications (25) see <http://marisolalcantaraortigoza.info/publications/>.

1. **M. Alcántara Ortigoza** and S. Stolbov; “Lattice perturbation: The missing key to understand gold "nobleness"”; Submitted to the Journal of Chemical Physics, October (2014).
2. S. Stolbov and **M. Alcántara Ortigoza**; “Gold-doped Graphene: a Highly Stable and Active Electro-catalysts for the Oxygen Reduction Reaction”; Revision submitted to Journal of Physical Chemistry C; August (2014).
3. **M. Alcántara Ortigoza**, I. Yu. Sklyadneva, R. Heid, E. V. Chulkov, T. S. Rahman, K.P. Bohnen, and P. M. Echenique; “Ab initio lattice dynamics and electron-phonon coupling of Bi(111)”; Phys. Rev. B **90**, 195438 (2014).
4. **M. Alcántara Ortigoza**, R. Heid, K. P. Bohnen, and T. S. Rahman; “Anomalously Soft and Stiff Modes of Transition-Metal Nanoparticles”; *J. Phys. Chem. C*, **118**, 10335 (2014).

5. S. Stolbov and **M. Alcántara Ortigoza**; "Rational Design of Competitive Electrocatalysts for Hydrogen Fuel Cells", *J. Phys. Chem. Letts.* **3**, 463 (2012).

RECENT INVITED TALKS

For a full list of invited talks (7), see <http://marisolalcantaraortigoza.info/conferences/>.

1. Novel pathways in the rational design of materials: an application to clean energy conversion; XXIII International Materials Research Congress, Cancun, Quintana Roo, August 2014.
2. How "nano" is nanoscience?; NanoMex 2012, Puebla, Mexico, June 14th, 2012.
3. Vibrational dynamics and diffusion of CO on metal surfaces: New answers to old questions using *ab initio* atomistic simulations; European Conference on Surface Science XXVII, Groningen, Netherlands, September 1st, 2010.
4. *Ab initio* vibrational dynamics applied to analyze the CO-metal (Cu,Ag) coupling; 13th Vibrations at Surfaces meeting, Orlando, Florida, USA, March 13, 2010.
5. Modeling and Design of Materials from the Perspective of the Density Functional Theory: Basics and Selected Applications; Session on Quantum Condensed Matter Systems within the 35th International Nathiagali Summer College on Physics and Contemporary Needs, Nathiagali, Pakistan, June 28-July4, 2010.

SELECTED CONTRIBUTED PRESENTATIONS

For a full list of presentations (57), see <http://marisolalcantaraortigoza.info/conferences/>.

1. Novel pathway for the rational design of materials: An application to clean energy conversion: Special Seminar, Instituto de Física, Universidad Nacional Autónoma de México, April 1st, 2014.
2. The unsuspected origin of gold's nobleness: American Physical Society Meeting, Baltimore, Maryland, USA, March 19, 2013.
3. Factors controlling thermodynamic properties at the nanoscale: *Ab initio* study of Pt nanoparticles: American Physical Society Meeting, Boston, Massachusetts, USA, March 1st, 2012.
4. Electronic structure and lattice dynamics of Bi(111): Insights from *ab initio* calculations: Colloquium of the Institut für Festkörperphysik, Karlsruher Institut für Technologie (Campus Süd), Karlsruhe, Germany, November 28, 2011.
5. Insights on the anomalously soft and stiff modes of metal nanoparticles; American Physical Society Meeting, Dallas, Texas, USA, March 24th, 2011.
6. On the transition from bulk to nanoparticles: First-principles vibrational dynamics; Seminar of the Institut für Festkörperphysik, Karlsruher Institut für Technologie (Campus Nord), Eggenstein, Germany, November 4th, 2010.
7. *Ab initio* calculations of pre-exponential factors for the diffusion of CO on Ag(001): importance of the full phonon dispersion; American Vacuum Society 57th Meeting, Albuquerque, New Mexico, USA, October 19th, 2010.
8. Vibrational dynamics and diffusion of CO on metal surfaces: New answers to old questions using *ab initio* atomistic simulations; Colloquium at Karlsruher Institut für Technologie, Karlsruhe, Germany, October 18th, 2010.
9. Vibrational Dynamics of c(2x2) CO overlayer on Cu(100) and Ag(100) from first principles; Seminar at the Max-Planck-Institut für Festkörperforschung, Stuttgart, Germany, July 30, 2009.
10. Diffusion of two-dimensional Cu islets on Ag(111) studied with the Molecular

Dynamics Method; American Physical Society Meeting, Pittsburgh, Pennsylvania, USA, March 17 2009.

11. Insights into the stability of Ag₂₇Cu₇ nanoalloy from first principles calculations of geometric and electronic structure, A mid-time Conference of the COST Action p19: Multiscale Modelling of Materials, Brno, Czech Republic, June 2008.
12. The importance of the dipolar interaction strength in magnetization hysteresis curves of two-dimensional nanomagnet arrays; Denver CO, American Physical Society, March Meeting, 2007.
13. Formation of Pt nano-islands on Ru(0001) surface: insights from *ab initio* calculations, Denver CO; American Physical Society, March Meeting, 2007.
14. The dispersion of surface phonons of CO on Cu(100): insights from first-principles calculations; Vibrations at surfaces 12, XII International Conference, Erice, Italy, July 24th 2007.
15. Effect of the substrate-adsorbate coupling on the dispersion of phonons of CO on Cu(001); American Physical Society, March Meeting, Baltimore MD, 2006.
16. First principles studies of the geometric and electronic structure of nanoalloy Ag₂₇Cu₇; Summer School on Metal Clusters and Surfaces, Pisa, Italy, 2006.
17. First Principles Studies of the Reactivity of Pt Islets on Ru(0001); AVS 53rd International Symposium, San Francisco CA, 2006.

COLLABORATORS:

- Prof. Talat S. Rahman, Department of Physics, University of Central Florida, Orlando, Florida 32816, USA
- Prof. Sergey Stolbov, Department of Physics, University of Central Florida, Orlando, Florida 32816, USA
- Dr. Klaus Peter Bohnen, Institut für Festkörperphysik, Karlsruher Institut für Technologie, Eggenstein-Leopoldshafen 76344, Germany
- Dr. Rolf Heid, Institut für Festkörperphysik, Karlsruher Institut für Technologie, Eggenstein-Leopoldshafen 76344, Germany
- Dr. Christian Ast, Max-Planck-Institute for Solid State Research, Heisenbergstr. 1, D-70569, Stuttgart, Germany
- Prof. Beatriz Roldán Cuenya, Department of Physics, University of Central Florida, Orlando, Florida 32816, USA
- Prof. Richard A. Klemm, Department of Physics, University of Central Florida, Orlando, Florida 32816, USA
- Prof. Jane Hinch, Department of Chemistry and Chemical Biology, Rutgers University, Piscataway, New Jersey 08854, USA
- Dr. Sadar S. Hayat, Department of Physics and Astronomy, Hazara University Mansehran (NWFP), Pakistan.
- Prof. Maki Kawai, Surface Chemistry Laboratory, RIKEN, 2-1 Hirosawa, Wako, Saitama 351-0198, Japan.
- Prof. Yousoo Kim, Surface Chemistry Laboratory, RIKEN, 2-1 Hirosawa, Wako, Saitama 351-0198, Japan.