

# Lucas Vázquez Besteiro

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## POSITIONS

### Ohio University, Athens, Ohio, USA

- Postdoctoral researcher Aug 2014 – Present
  - Theoretical research in the fields of nanophotonics and plasmonics, using a variety of computational resources to model systems of fundamental and technological interest. I was involved in projects on nano-optical systems, plasmonic hot electron generation and hybrid chiral systems, among others. The position included some teaching opportunities.
  - Adviser: Prof. Alexander Govorov

## EDUCATION

### Universidad de Santiago de Compostela, Santiago de Compostela, Spain

- PhD in Material Science Oct 2009 – Jul 2014
  - Thesis: Influence of Dimensionality on Structural and Electronic Properties of Semiconductor Nanomaterials: Quantum Dots, Nanowires and Nanotubes
  - Advisers: Prof. Manuel M.G. Alemany and Prof. Luis J. Gallego
  - Description: A study, through *ab initio* calculations, on III-V semiconductor materials, focusing on the effects of quantum confinement in nanostructures with different dimensionality
- MS in Material Science Oct 2008 – Jul 2009
  - Thesis: Efficient *n*-type doping of semiconductor nanocrystals with crystalline nucleus of zinc-blende structure
  - Description: Postgraduate degree oriented towards doctoral studies
- Extended BS in Physics Oct 2002 – Sep 2008
  - Description: Generalist five-year degree on Physics (*Licenciatura*), with the last two years centered upon theoretical and particle Physics

### Universidad Nacional de Educación a Distancia, Madrid, Spain

- MS in Physics of Complex Systems Oct 2012 – Sep 2015
  - Thesis: Simple Recommendation Model as a Mechanism for Idea Transmission
  - Description: Posgraduate distance education degree with a focus on social and neural networks.

## PUBLICATIONS

### JOURNALS

- [16] A. Ceconello, [L.V. Besteiro](#), A.O. Govorov and I. Wilner, “Chiroplasmonic DNA-Based Nanostructures,” *Nature Reviews Materials*, doi:10.1038/natrevmats.2017.39 (2017)
- [15] G. Hartland, [L.V. Besteiro](#), P. Johns and A.O. Govorov, “What’s Hot about Electrons in Metal Nanoparticles?,” *ACS Energy Letters*, doi:10.1021/acseenergylett.7b00333 (2017)
- [14] Z. Xu, M.G. Kibria, B. AlOtaibi, P.N. Duchesne, Z. Mi, P. Zhang, L. Mai, [L.V. Besteiro](#), A.O. Govorov, M. Chaker and D. Ma, “Towards enhancing photocatalytic hydrogen generation: which is more important, alloy synergistic effect or plasmonic effect?,” submitted to *Adv. Funct. Mater.*
- [13] E.-M. Roller\*, [L.V. Besteiro](#)\*, C. Pupp, L.K. Khorasad, A.O. Govorov and T. Liedl, “Hot Spot-Mediated non-Dissipative and Ultrafast Plasmon Passage,” *Nature Phys.*, doi:10.1038/nphys4120 (2017)  
\* Authors contributed equally
- [12] [L.V. Besteiro](#), H. Zhang, J. Plain, G. Markovich, Z. Wang and A.O. Govorov, “Aluminum nanoparticles with Hot Spots for Plasmon-Induced Circular Dichroism of Chiral Molecules in the UV Spectral Interval,” *Adv. Opt. Mater.*, DOI: 10.1002/adom.201700069 (2017)
- [11] A. Naldoni, U. Guler, Z. Wang, M. Marelli, F. Malara, X. Meng, [L.V. Besteiro](#), A.O. Govorov, A.V. Kildishev, A. Boltasseva and V.M. Shalaev, “Broadband Hot Electron Collection for Solar Water Splitting with Plasmonic Titanium Nitride,” *Adv. Opt. Mater.*, DOI: 10.1002/adom.201601031/full (2017)
- [10] [L.V. Besteiro](#), K. Gungor, H.V. Demir and A.O. Govorov, “Simple and Complex Metafluids and Metastructures with Sharp Spectral Features in a Broad Extinction Spectrum: Particle-Particle Interactions and Testing the Limits of the Beer-Lambert Law,” *J. Phys. Chem. C*, **121**, 2987 (2017)
- [9] [L.V. Besteiro](#) and A.O. Govorov, “Amplified Generation of Hot Electrons and Quantum Surface Effects in Nanoparticle Dimers with Plasmonic Hot Spots,” *J. Phys. Chem. C*, **120**, 19329 (2016)

- [8] M.R. Kim, H.A. Hafez, X. Chai, L.V. Besteiro, L. Tan, T. Ozaki, A.O. Govorov, R. Izquierdo and D. Ma, "Covellite CuS Nanocrystals: Realizing Rapid Microwave-assisted Synthesis in Air and Unravelling the Disappearance of their Plasmon Resonance after Coupling with Carbon Nanotubes," *Nanoscale*, **8**, 12946 (2016)
- [7] L.K. Khorasad, L.V. Besteiro, Z. Wang, J. Valentine and A.O. Govorov, "Localization of Excess Temperature Using Plasmonic Hot Spots in Metal Nanostructures: Combining Nano-Optical Antennas with the Fano Effect," *J. Phys. Chem. C*, **120**, 13215 (2016)
- [6] J. Yang, N.J. Kramer, K.S. Schramke, L.M. Wheeler, L.V. Besteiro, C.J. Hogan Jr., A.O. Govorov and U.R. Kortshagen, "Broadband Absorbing Exciton-Plasmon Metafluids with Narrow Transparency Windows," *Nano Lett.*, **16**, 1472 (2016)
- [5] W. Li, Z.J. Coppens, L.V. Besteiro, W. Wang, A.O. Govorov and J. Valentine, "Circularly Polarized Light Detection with Hot Electrons in Chiral Plasmonic Metamaterials," *Nat. Commun.*, **6**, 8379 (2015)
- [4] H. Harutyunyan, A.B.F. Martinson, D. Rosenmann, L.K. Khorashad, L.V. Besteiro, A.O. Govorov and G.P. Wiederrecht, "Anomalous Ultrafast Dynamics of Hot Plasmonic Electrons in Nanostructures with Hot Spots," *Nat. Nanotechnol.*, **10**, 770 (2015)
- [3] L.V. Besteiro, L. Tortajada, J. Souto, L.J. Gallego, J.R. Chelikowsky and M.M.G. Alemany, "Doping Efficiency in *n*-type InP Nanowires," *Phys. Rev. B*, **88**, 115310 (2013)
- [2] L. Tortajada, L.V. Besteiro, M.L. Tiago, L.J. Gallego, J.R. Chelikowsky and M.M.G. Alemany, "Multidimensional Nanoscale Materials from Fused Quantum Dots," *Phys. Rev. B*, **84**, 205326 (2011)
- [1] L.V. Besteiro, L. Tortajada, M.L. Tiago, L.J. Gallego, J.R. Chelikowsky and M.M.G. Alemany, "*n*-type Doping via Avoiding the Stabilization of *DX* Centers in InP Quantum Dots," *Phys. Rev. B*, **81**, 121307 (2010)

#### PRESENTATIONS

- [12] Oral and Poster Presentations at Ohio University Postdoctoral Symposium, Athens, Ohio, USA 2017
- [11] Oral Presentation at APS March Meeting, New Orleans, Louisiana, USA 2017
- [10] Seminar at CMSS Colloquium, Athens, Ohio, USA 2016
- [9] Poster Presentation at Statussymposium on Functional Macroscopic Systems, Hannover, Germany 2016
- [8] Oral Presentation at APS March Meeting, Baltimore, Maryland, USA 2016
- [7] Poster Presentation at NANOSA, Dresden, Germany 2015
- [6] Oral Presentation at APS March Meeting, San Antonio, Texas, USA 2015
- [5] Oral Presentation at ANM, Aveiro, Portugal 2014
- [4] Oral Presentation at APS March Meeting, Denver, Colorado, USA 2014
- [3] Oral Presentation at APS March Meeting, Portland, Oregon, USA 2010
- [2] Oral Presentation at ICPS, Graz, Austria 2010
- [1] Oral Presentation at ICPS, Split, Croatia 2009

**TEACHING****Ohio University, Athens, Ohio, USA**

Teaching:

- *Graduate* - PHYS 6031: Electrodynamics (**Substitute Lecturer**, 2 weeks) Spring 2016  
Textbook: J. D. Jackson, Classical Electrodynamics 3<sup>rd</sup> Ed.
- *Graduate* - PHYS 6031: Electrodynamics (**Substitute Lecturer**, 2 weeks) Spring 2015  
Textbook: J. D. Jackson, Classical Electrodynamics 3<sup>rd</sup> Ed.
- *Undergraduate* - PHYS 3011, 5011: Thermal Physics (**Substitute Lecturer**, 2 weeks) Spring 2016  
Textbook: Daniel V. Schroeder, Introduction to Thermal Physics
- *Undergraduate* - PHYS 3011, 5011: Thermal Physics (**Substitute Lecturer**, 2 weeks) Spring 2015  
Textbook: Daniel V. Schroeder, Introduction to Thermal Physics

Additional experience:

- *Prof. Development - Participation* on Seminar PHYS 8101: Teaching College Physics. Overview of evidence-based Physics education and Active Learning. Spring 2017
- *Outreach* - Science demonstrations and activities at a variety of Family Science Events, Department's Open Houses and Regional Science Fairs Spring 2017

**CAMPUS  
ACTIVITIES****Postdoctoral Association, Ohio University**

- Coordinator Oct 2016 – Present
  - Organization of mentoring sessions for postdoctoral scholars
  - Organization of Postdoctoral Symposium

**Student Expo, Ohio University**

- Judge Apr 2017

**PROFESSIONAL  
AFFILIATIONS****American Physical Society,**  
College Park, Maryland, USA

- Member 2010 – Present

**National Postdoctoral Association,**  
Rockville, Maryland, USA

- Member 2016 – Present

**LANGUAGES**

- English: Fluent (reading, speaking, writing). C1 certificate. Three years living in the USA.
- Spanish: Native language
- Portuguese: Intermediate (reading); beginner (speaking, writing).
- German: Beginner (reading, speaking, writing).

**SOFTWARE SKILLS**

- *Basic*  
Octopus TDDFT · DDSCAT · Mathematica · Stata · C/C++ · R · Maple · Netlogo · HTML5  
JavaScript · OpenMP · MPI · CUDA
- *Advanced*  
PARSEC DFT · COMSOL Multiphysics · Lumerical FDTD · Python · Fortran · MATLAB/Octave  
Origin Pro · L<sup>A</sup>T<sub>E</sub>X

**INTERESTS**

- *Other fields*  
Complex Networks · Neural Networks · Neuroscience · Logic · Philosophy of Science · Ethics  
Psychology · Game Theory · Finance · 3D Modeling · Game Design
- *Other activities*  
English – Spanish Translator · Volunteer in Fair Trade Cooperative

**REFERENCES**

- **Prof. Alexander O. Govorov**  
Distinguished Professor in the Department of Physics and Astronomy  
Ohio University  
Clippinger Research Labs 251B, Athens OH 45701  
govorov@ohio.edu
- **Prof. Manuel M.G. Alemany**  
Professor in Department of Particle Physics, Condensed Matter  
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