

## Chris Orban

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**RESEARCH INTERESTS**      Computational Physics, Laboratory and Astrophysical Plasmas, Physics Education Research, Large-Scale Structure of the Universe

**EDUCATION**      **The Ohio State University**, Columbus, OH, USA  
Ph.D. Physics, March 2011

**University of Illinois**, Urbana-Champaign, IL, USA  
B.S. Physics with Honors, December 2004

**ACADEMIC AND WORK EXPERIENCE**      **The Ohio State University**  
*Assistant Professor of Physics, Teaching Campus: Marion*      **2014-present**

**Air Force Research Laboratory, Dayton, OH**  
*Consultant to Extreme Light research group*      **2013-present**

**Capital University, Columbus, OH**  
*Adjunct Professor for Astronomy Course*      **Spring 2014**

**The Ohio State University, High Energy Density Physics Research Group**  
*Postdoctoral Researcher and Ugrad Research Advisor*      **2011 - 2013**

**The Ohio State University, Department of Astronomy**  
*Lecturer for Astro 1142: Black Holes*      **Spring, Summer 2013**

**The Ohio State University, Department of Physics**  
*Teaching Assistant (Grad-level Computational Physics)*      **Wi. Qtrs 2010-2012**  
*Teaching Assistant (introductory level)*      **Winter & Spring 2007, Fall 2009**

**The Ohio State University, Center for Cosmology and Astroparticle Physics**  
*Graduate Research Fellow*      **Summer 2007 - Fall 2010**

**University of Illinois, Urbana-Champaign, IL, USA**  
*Teaching Assistant*      **August 2002 - June 2004**  
*Undergraduate Research Student*      **January 2004 - December 2004**  
*Laser Facility Lab Assistant*      **June 2001 - December 2002**

**HONORS AND AWARDS**      **Meggers Project Award** from the American Institute of Physics to fund projects for the improvement of high school physics teaching (\$25k)

**Principal Investigator for STEMcoding @ OSU**, A project funded by OSU extension's Connect & Collaborate grant (\$40k)

**Co-Creator of BuckeyeVR: Smartphone-based Virtual Reality Simulations for STEM classrooms**, A STEAM-powered project at OSU (\$12k)

**Battelle Engineering, Technology and Human Affairs grant**, Principal Investigator for “The Revolution in Cosmology and Fr. Georges Lemaitre’s Hidden God” (\$25k)

**Air Force Office of Science Research (AFOSR) Summer Faculty Program.** Summer 2016 & 2017. Project site: the Extreme Light research group at Wright-Patterson Air Force Base.

**Department of Defense High Performance Computing Internship Program.** Project title: *Developing Advanced Simulation and Analysis Capabilities for Investigations of “Extreme Light” Phenomena.* (Summer 2014, Summer 2015, Summer 2016, Summer 2017)

**9th International Conference on High Energy Density Laboratory Astrophysics** Session Chair: Solar & Stellar Physics, Tallahassee, FL, May 2012

**Ohio-Region APS Meeting** Session Chair: Gravitation & Fields, Columbus, OH, April 2012

**University Fellowship**, The Ohio State University, 2006

## PAPERS

**Orban, C.**, Porter, C. D., Smith, J. R. H., Britt, C. A., Harper, K. A. “A Game-centered, Interactive Approach for Using Programming Exercises in Introductory Physics” (submitted, available at <https://arxiv.org/abs/1701.01867>)

Morrison, J. T., Feister, S. F., Frische, K. D., Austin, D. R., Ngirmang, G. K., Murphy, N. R., **Orban, C.**, Chowdhury, E. A. “MeV proton acceleration at kHz repetition rate from ultra-intense laser liquid interaction” 2018, *New Journal of Physics*, 20, 022001

Smith, J. R., Byrum, A., McCormick, T. M., Young, N., **Orban, C.**, Porter, C. D. “A controlled study of stereoscopic virtual reality in freshman electrostatics” (accepted to PERC 2017, available at <https://arxiv.org/abs/1707.01544>)

**Orban, C.**, Porter, C. D., Brecht, N. K., Teeling-Smith, R. M., Harper, K. A. “A novel approach for using programming exercises in electromagnetism coursework” (Accepted to PERC 2017, available at <https://arxiv.org/abs/1707.00185>)

Ngirmang, G. K., **Orban, C.**, Feister, S., Morrison, J. T., Chowdhury, E. A., Roquemore, W. M. “Particle-in-Cell Simulations of Electron Beam Production from Mid-Infrared Ultra-Intense Laser Interactions” (accepted to *Physics of Plasmas*, available at <https://arxiv.org/abs/1704.08118>)

Feister, S., Austin, D. R., Morrison, J. T., Frische, K. D., **Orban, C.**, Ngirmang, G., Handler, A., Smith, J. R., Schillaci, M., Chowdhury, E. A., Freeman, R. R., Roquemore, W. M. “Relativistic Electron Acceleration by mJ class kHz laser normally incident on liquid targets” 2017, *Optics Express*, 25, 16, 18736-18750

Ngirmang, G. K., **Orban, C.**, Feister, S., Morrison, J. T., Chowdhury, E. A., Frische, K. D., Roquemore, W. M. “3D PIC simulations of electron beams created via reflection of intense laser light from a water target” 2016, *Phys. Plasmas*, 23, 043111

Morrison, J. T., Chowdhury, E. A., Frische, K. D., Feister, S., Ovchinnikov, V. M., Nees, J. A., **Orban, C.**, Freeman, R.R., and Roquemore, W.M. “Backward-propagating MeV electrons from  $10^{18}$  W/cm<sup>2</sup> laser interactions with water” 2015, *Phys.*

Plasmas, 22, 043101

**Orban, C.**, Morrison, J.T., Chowdhury, E. D., Nees, J. A., Frische, K., Roquemore, W. M. “Backward-Propagating MeV Electrons in Ultra-Intense Laser Interactions: Standing Wave Acceleration and Coupling to the Reflected Laser Pulse” 2015, Phys. Plasmas, 22, 023110

Bailey, J. E., Nagayama, T., Loisel, G., Rochau, G. A., Blancard, C., Colgan, J., Cosse, P., Faussurier, G., Fontes, C.J., Gilleron, F., Golovkin, I., Hansen, S. B., Iglesias, C. A., Kilcrease, D. P., MacFarlane, J. J., Mancini, R. C., **Orban, C.** et al. “A Higher-than-Predicted Measurement of Iron Opacity at Solar Interior Temperatures”, 2015, Nature, 517, 56-59

Feister, S., Nees, J. A., Morrison, J. T., Frische, K. D., **Orban, C.**, Chowdhury, E., and Roquemore, W. M. “A Novel Femtosecond-Gated, High-Resolution, Frequency-Shifted Shearing Interferometry Technique for Probing Pre-Plasma Expansion in Ultra-Intense Laser Experiments” 2014, Rev. of Sci. Inst., 85, 11D602

**Orban, C.** “Cosmological Perturbation Theory as a Tool for Estimating Box-Scale Effects in  $N$ -body Simulations” 2014, Phys. Rev. D, 90, 023509

Storm, M., Eichman, B., **Orban, C.**, Jiang, S. *et al.* “X-ray Imaging of Laser-Irradiated, Limited-Mass Zirconium Foils” 2014, Phys. Plasmas, 21, 072704

Storm, M., Jiang, S., Wertpny, D., **Orban, C.**, *et al.* “Fast Neutron Production from Li Converters and Laser-driven Protons” 2013, Phys. Plasmas, 20, 5

**Orban, C.** “Keeping it Real: Revisiting a Novel Approach to Running Ensembles of Cosmological  $N$ -body Simulations”, 2013, JCAP, 5, 32

Akli, K.U., **Orban, C.**, Schumacher, D., Storm, M., Fatenejad, M., Lamb, D., Freeman, R.R. “Coupling of High Intensity Laser Light to Fast Electrons in Cone-guided Fast Ignition” 2012, Phys. Rev. E, 86, 065402

**Orban, C.**, Weinberg, D.H., “Self-similar Bumps and Wiggles: Isolating the Evolution of the BAO peak with Power-Law Initial Conditions” 2011, Phys. Rev. D., 84, 063501

**Orban, C.**, Gnedin, O. Y., Weisz, D. R., Skillman, E. D., Dolphin, A. E., & Holtzman, J. A. “Delving Deeper into the Tumultuous Lives of Galactic Dwarfs” ApJ, 2008, 686, 1030

Li, H., Shengtai, L., Koller, J., Wendroff, B.B., Liska, R., **Orban, C.**, Liang, E.P.T., and Lin, D.N.C., ”Potential Vorticity Evolution Produced by an Embedded Protoplanet,” 2005, ApJ, 624, 1003.

**PRESS/MEDIA** Featured article: *OSUM professor opens door to supercomputing*. Marion Star (April 6, 2015). Available at <http://www.marionstar.com/story/news/local/2015/04/05/osum-professor-opens-door-supercomputing/25344199/>

Interviewed for *Ohio Supercomputer Center Still Evolving*. Columbus Dispatch (April 7, 2013). Available at <http://www.dispatch.com/content/stories/science/2013/04/07/2-ohio-supercomputer-center-still-evolving.html>

Ohio Supercomputer Center. (March 2013). Press Release. *Simulations uncover ob-*

*stacle to harnessing laser-driven fusion.* Available at <https://www.osc.edu/press/simulations-uncover-obstacle-to-harnessing-laser-driven-fusion>

Ohio Supercomputer Center. (July 2011). Press Release. *Scientists model physics of key dark-energy probe.* Available at <http://www.osc.edu/press/releases/2011/orban.shtml>

**OTHER  
ACTIVITIES**

Associate Editor for High-School Physics Content (PICUP collaboration)	2017-
History of Cosmology speaker for Astronomy on Tap Columbus	2016-2017
Science Member of Ohio Standards Revision Working Group	2017-
Led physics prep. for OSU diversity enhancement program (YSP)	2016
Reviewer for NSF/DOE Partnership in Basic Plasma Science and Engineering	2016
Reviewer for Ohio Supercomputer Center (OSC) Allocations Committee	2015-2016
“Physics of Video Games” project leader for OSC summer program	2015-2017
Reviewer for Nature physics	2014-2017
Science Fair Judge	2009-2016
Perkins Observatory New Vistas in Astronomy Guest Speaker	July 2013
Reviewer for Canadian Journal of Physics	2012
Reviewer for High Energy Density Physics	2012-2015
Reviewer for Open Access Journal of Photoenergy	2017-2018
Reviewer for Computers and Mathematics with Applications	2018