

## Talbot A. Knighton

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**GOALS AND INTERESTS** I enjoy challenging projects that require creative problem solving. I am self-motivated and work well independently or in groups. My background includes extensive experimental and theoretical physics with experience in mathematics and engineering. I would like to branch out from my dissertation work in electron-electron interactions and to use my technical expertise and research methodology in other fields of interest.

**EDUCATION** Ph.D. Physics **2012 to May 2017 (anticipated graduation date)**  
Wayne State University (WSU)  
Tsinghua University, Beijing : Research project in summer 2016

B.S. Physics and Mathematics Minor, *summa cum laude* **2008 to 2012**  
Taylor University (TU)

**WORK EXPERIENCE** Graduate Research Assistant – Quantum Transport Group, WSU **2012 to Present**

Research Internships  
WSU – Set up instruments and utilities for class 100 cleanroom **summer 2011**  
TU – Theoretical particle physics research **summer 2010**

Teacher’s Assistant/Tutor – WSU, TU **2010 to Present**  
Classes : Optics, Modern Physics, Mathematical Methods  
University Physics I, II, Calculus I, II, III, College Chemistry I, II

**TECHNICAL SKILLS AND EXPERIENCE** **Computers and Programming** – C++; PYTHON (matplotlib, numpy, and pandas packages); JAVA; HTML; MATLAB; MATHEMATICA used extensively for both experimental and theoretical research; LABVIEW used extensively for measurement automation; ADOBE CREATIVE SUITE used to create animated diagrams and presentations; L<sup>A</sup>T<sub>E</sub>X; ORIGINLAB; MATHCAD; ORCAD PSPICE; MULTISIM; AUTOCAD; MICROSOFT OFFICE; HTML; CSS.

**Electronics** – Device physics, gating, and characterization; Measurement design and low-level sensing; Small signal electrometer level DC methods; AC and AC+DC lock-in techniques; Capacitance measurement; Noise measurement; Shielding, grounding, and wiring considerations.

**Cryogenics, Machining, and Gas Handling Systems** – Operation of closed-cycle dry fridge by Leiden Cryogenics; PPMS operation; Design and fabrication of related parts for heatsinking and sample cooling; Lathe and mill operation; Knowledge of vacuum chambers, pumps, gas handling systems, etc.

**Sample Fabrication** – Worked with GaAs/AlGaAs crystals, graphene, and rare-earth thin-films performing photolithography, thermal evaporation, contact annealing, etc. in a class 100 cleanroom.

**Lab Management** – Responsible for coordinating instrument installation, trouble shooting and maintaining existing equipment (gas handling system for dilution refrigerator, chemical hoods, thermal evaporator, water and air utilities for cleanroom, etc.), and purchasing various lab supplies and chemicals.

**CONTACT INFORMATION** Wayne State University *Phone: 571-643-8530*  
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Troy, MI 48085

## PUBLICATIONS

*Pinning and Melting of a Quantum Wigner Crystal*

Talbot Knighton, Alessandro Serafin, Vinicio Tarquini, Zhe Wu, Jian Huang, J. S. Xia, Edward Sullivan, Loren Pfeiffer and Ken West, In preparation

*Controlled Spatial Distribution of Bulk Current in the Quantum Hall Regime*

Vinicio Tarquini, Talbot Knighton, Zhe Wu, Jian Huang, Loren Pfeiffer and Ken West, In preparation

*Polycrystalline VO<sub>2</sub> Film Characterization by Quantum Capacitance Measurement*

Zhe Wu, Talbot Knighton, Vinicio Tarquini, David Torres, Tongyu Wang, Nelson Sepulveda, and Jian Huang, Applied Phys. Lett. 107, 104101 (2015)

*Reentrant Insulating Phases in the Integer Quantum Hall Regime*

Talbot Knighton, Zhe Wu, Vinicio Tarquini, Jian Huang, L. N. Pfeiffer, and K. W. West, Phys. Rev. B 90, 165117 (2014)

*Large Intrinsic Inductance in Strongly Correlated GaAs Two-Dimensional Holes in the Integer Quantum Hall Regime*

Talbot Knighton, Vinicio Tarquini, Zhe Wu, Jian Huang, Loren Pfeiffer, and Ken West, Appl. Phys. Lett. 104, 193109 (2014)

*Degeneracy and effective mass in the valence band of two-dimensional (100)-GaAs quantum well systems*

Vinicio Tarquini, Talbot Knighton, Zhe Wu, Jian Huang, Loren Pfeiffer and Ken West, Appl. Phys. Lett. 104, 092102 (2014)

*Using  $t \rightarrow b\bar{b}c$  to Search for New Physics*

Ken Kiers, Tal Knighton, David London, Matthew Russell, Alejandro Szykman, and Kari Webster, Phys. Rev. D 84, 074018-1 to 074018-13 (2011)

## PRESENTATIONS

American Physical Society March Meeting (upcoming)

**March 2017**

Presentation: *Pinning and Melting of a Quantum Wigner Crystal*

American Physical Society March Meeting

**March 2016**

Presentation: *Insulating States in the Integer Quantum Hall Regime*

American Physical Society March Meeting

**March 2014**

Presentation: *Anomalous Insulating States in Landau Levels  $N \geq 1$*

Indiana Academy of Science 126<sup>th</sup> Annual Meeting

**March 2011**

Poster session: *Using  $t \rightarrow b\bar{b}c$  to Search for New Physics*

23<sup>rd</sup> Butler Undergraduate Research Conference

**April 2011**

Poster session: *Using  $t \rightarrow b\bar{b}c$  to Search for New Physics*

Taylor University Summer Research Seminar

**August 2010**

Presentation: *Using  $t \rightarrow b\bar{b}c$  to Search for New Physics*

## AWARDS AND POSITIONS

Wayne State University:

- Frank Knoller Physics Fellowship, Fall 2016
- Summer Dissertation Fellowship, 2016
- First Place Poster in departmental Graduate Research Day, 2015
- Daniel Gustafson Teaching Award, 2015
- Thomas C. Rumble Fellowship, 2012–2013

Taylor University:

- Nominated voting student member for the Curriculum Management Committee of the School of Natural and Applied Sciences, 2011
- SRTP Summer Research Mini-Grant (Offered as matching funds for the Discovery Research Grant listed below), 2010
- President’s Scholarship, 2008–2012
- Dean’s List, 2008–2012
- Who’s Who Among Students, 2012

Indiana Space Grant Consortium:

- Discovery Research Grant, 2010

#### REFERENCES

**Dr. Jian Huang** (e-mail: jianhuang@wayne.edu; phone: 313-577-0564)

- Associate Professor, Department of Physics and Astronomy, Wayne State University
- Physics Building Office 385, 666 West Hancock, Detroit, MI 48201

**Dr. Ken Kiers** (e-mail: knkiers@taylor.edu; phone: 765-998-4689)

- Professor and Chair, Department of Physics and Astronomy, Taylor University
- 236 West Reade Ave., Upland, IN 46989

**Dr. Gil Paz** (e-mail: gilpaz@wayne.edu; phone: 313-577-2756)

- Assistant Professor, Department of Physics and Astronomy, Wayne State University
- Physics Building Office 360, 666 West Hancock, Detroit, MI 48201

**Dr. James Payson** (e-mail: payson@wayne.edu; phone: 313-577-3280)

- Academic Services Officer, Department of Physics and Astronomy, Wayne State University
- Physics Building Office 360, 666 West Hancock, Detroit, MI 48201