

Joonho JANG

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EDUCATION

Ph.D. in Physics, University of Illinois at Urbana-Champaign, USA	2012
M.S. in Physics, University of Illinois at Urbana-Champaign, USA	2005
B.S., <i>Summa cum Laude</i> , in Physics, Seoul National University, Korea	2004

RESEARCH EXPERIENCE

- Postdoctoral Fellow, Massachusetts Institute of Technology 2012-present
- Major research topic: Study of exotic QH phases using pulsed tunneling spectroscopy, PI: Prof. Ray Ashoori
- Successfully built and tested a newly designed cryogenic broadband (DC-GHz) time-resolved tunneling measurement system, with 8 mK sample stage base temperature and actual electron temperature of 20 mK.
- Observed tunneling resonance, for the first time ever, from the vibrations of an electronic Wigner crystal in a GaAs QW in high magnetic fields. (Published in *Nature Physics*)
- Developed the Momentum-Energy-Resolved Tunneling Spectroscopy, and measured the full spectral function of an interacting 2D electron system in a semiconductor quantum well. (Published in *Science*)
- Realized Exciton condensation in a 2D-2D double layer utilizing an electrically-isolated design (in preparation).
- Graduate Research Assistant, University of Illinois at Urbana-Champaign 2005-2012
- Major research topic: Investigation of unconventional superconductivity in Sr_2RuO_4 , PI: Prof. Raffi Budakian
- Built and tested a continuous flow He-3 cryostat with Magnetic Resonance Force Microscope (MRFM - originally designed by D. Rugar at IBM) and a laser-interferometry-based mechanical sensing system for ultra-sensitive magnetometry. (Published in *APL*)
- Observed half quantum vortex/fluxoid states in a spin-triplet superconductor Sr_2RuO_4 . (Published in *Science*)
- Other topics include:
- Light-matter interaction: magneto-optical cooling of a mechanical oscillator using a superconducting particle.
 - Search for chiral edge current in mesoscopic superconducting Sr_2RuO_4 samples.
 - Focused Ion Beam fabrication of weak-links of a triplet superconductor Sr_2RuO_4
 - Investigation of pseudo-gap magnetism of high Tc superconducting BSCCO and YBCO.

AWARDS AND HONORS

Moore Foundation Fellowship

Gordon and Betty Moore Foundation

2012-2017

<i>John Bardeen Award</i>	University of Illinois at Urbana-Champaign “For outstanding work by a graduate student in condensed matter physics and the physics of electronic devices”	2011
<i>Samsung Scholarship</i>	The Samsung Scholarship Foundation	2006-2010
<i>University Excellence Fellowship</i>	Seoul National University	2002-2004
<i>Army Commendation Medal</i>	Military service, Korean Augmentees to the US Army stationed in Korea	2002

PUBLICATIONS

Joonho Jang[†], H. M. Yoo, Loren Pfeiffer, Kenneth West, K. Baldwin, Raymond Ashoori[†], “*Full Momentum and Energy Resolved Spectral Function of a 2D Electronic System*” **Science** **358**, 901 (2017) doi:10.1126/science.aam7073

News coverage: [MIT news](#)

[†]corresponding author

Joonho Jang[†], Benjamin Hunt, Loren Pfeiffer, Kenneth West, Raymond Ashoori[†], “*Sharp Tunneling Resonance from the Vibrations of an Electronic Wigner Crystal*” **Nature Physics** **13**, 340–344, Advance Online Publication (12 Dec 2016) doi:10.1038/nphys3979

News coverage: [Science: Editors' choice](#), [MIT news](#)

[†] corresponding author

V. Vakaryuk, K. Roberts, D.G. Ferguson, Joonho Jang, R. Budakian, S.B. Chung, “*Comment on "Quantum oscillations in nanofabricated rings of spin-triplet superconductor Sr₂RuO₄"*”, *arXiv*:1203.5771 (2012)

Joonho Jang, Raffi Budakian, Yoshiteru Maeno, “*Phase-locked cantilever magnetometry*” **Appl. Phys. Lett.** **98**, 132510 (2011) doi:10.1063/1.3572026

Joonho Jang, D. G. Ferguson, V. Vakaryuk, P.G. Goldbart, R. Budakian, S.B. Chung, Y. Maeno, “*Observation of half-height magnetization steps in Sr₂RuO₄*” **Science** **331**, 186 (2011) doi:10.1126/science.1193839

News coverage: [Physics Today](#), [CMJ Commentary by Chandra Varma](#)

PRESENTATIONS

“*ARPES-like tunneling spectroscopy: Wigner crystal resonance and Momentum Resolution*”, EP2DS conference, Penn state university, PA (**Invited**, Aug 2017)

“*Spectroscopic observation of Wigner crystallization of 2d electrons*”, Chez-Pierre Seminar, MIT, Cambridge, MA (**Invited**, Sep 2015)

“*Spectroscopic observation of Wigner crystallization of 2d electrons*”, EP-2DS, Sendai, Japan (Jul 2015)

“*Spectroscopic observation of Wigner crystallization of 2d electrons*”, APS March meeting, San Antonio, TX (Mar 2015)

“*Spectroscopic observation of Wigner crystallization of 2d electrons*”, Seoul National University, Seoul, Korea (**Invited**, Dec 2014)

“*Unconventional superconductivity in Sr_2RuO_4* ”, Samsung Advanced Institute of Technology, Korea (**Invited**, Apr 2012)

“*Half-quantized fluxoid state in spin triplet superconductor, Sr_2RuO_4* ”, Chez-Pierre Seminar, MIT, Cambridge, USA (**Invited**, Jan 2012)

“*Measurement of current-phase relationship and fabrication of a weak-link junction in a Sr_2RuO_4 Ring*”, APS March meeting (Mar 2011)

“*Phase-locked cantilever magnetometry*”, APS March meeting (Mar 2010)

“*Magneto-optical cooling of a mechanical oscillator using a superconducting particle*”, APS March meeting (Mar 2009)

“*Torque magnetometry of Sr_2RuO_4 : Search for chiral domains*”, DOE Quantum Materials Cluster Meeting (Apr 2008)

REFERENCES

Raymond Ashoori, Professor of Physics
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Patrick A. Lee, William & Emma Rogers Professor of Physics
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Raffi Budakian, Professor
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