DAEGEUN JO

Postdoctoral Researcher
Department of Physics and Astronomy, Uppsala University

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EDUCATION

Ph.D. in Physics

Department of Physics, Pohang University of Science and Technology

Aug. 2023 Pohang, Republic of Korea

Thesis: Generation, Detection, and Application of Orbital Dynamics
Supervisor: Prof. Hyun-Woo Lee

B.S. in Physics

Department of Physics, Hanyang University

Feb. 2017 Seoul, Republic of Korea

RESEARCH EXPERIENCE

Postdoctoral Researcher

Department of Physics and Astronomy, Uppsala University

Sep. 1. 2023 — current Uppsala, Sweden

- PI: Prof. Peter Oppeneer

Guest Scientist

Peter Grünberg Institut and Institute for Advanced Simulation, Forschungszentrum Jülich

Apr. 18. 2022 — Jul. 16. 2022 Jülich, Germany

- Prof. Yuriy Mokrousov's group. Invited by Dr. Dongwook Go

SKILLS

Theoretical calculation for orbitronics and spintronics

- Current-induced orbital and spin responses
- Orbital torque and spin-orbit torque in magnetic heterostructures

Tools

- Linear response theory
- Tight-binding model
- First-principles calculations (Quantum ESPRESSO, FLEUR) with Wannier90 code
- Programming languages: Python and Fortran
- High-performance computing with MPI

Languages

- Korean (native), English

OTHER EXPERIENCE

Teaching Assistant

Pohang University of Science and Technology

2017 – 2018 | Pohang, Republic of Korea

- 2018. Analytical Mechanics for graduate students
- 2017. General Physics II for undergraduate students
- 2017. General Physics Lab. I for undergraduate students

Compulsory Military Service

Weather Group of Republic of Korea Air Force

2012 – 2014 | Republic of Korea

- Discharged at the rank of sergeant

AWARDS & HONORS

- 2021. Silver Prize at the 27th Samsung Humantech Paper Award
- 2018. Best presentation award (poster) at 2018 Korean Physical Society Fall Meeting
- 2018–2023. Global Ph.D. Fellowship (funded by National Research Foundation)
- 2011. National Science & Technology Scholarship (funded by Korea Student Aid Foundation)

PUBLICATIONS

- Y.-G. Choi†, **D. Jo**†, K.-H. Ko†, D. Go, K.-H. Kim, H. G. Park, C. Kim, B.-C. Min, G.-M. Choi, and H.-W. Lee, "Observation of the orbital Hall effect in a light metal Ti", Nature **619**, 52–56 (2023).
- D. Go, **D. Jo**, K.-W. Kim, S. Lee, M.-G. Kang, B.-G. Park, S. Blügel, H.-W. Lee, and Y. Mokrousov, "Long-Range Orbital Torque by Momentum-Space Hotspots", Phys. Rev. Lett. **130**, 246701 (2023).
- H. Hayashi, **D. Jo**, D. Go, Y. Mokrousov, H.-W. Lee, and K. Ando, "Observation of long-range orbital transport and giant orbital torque", Communications Physics **6**, 32 (2023).
- J. Kim, J. Uzuhashi, D. Go, **D. Jo**, T. Ohkubo, S. Mitani, H.-W. Lee, and Y. Otani, "Emerging effects of oxygen accumulation on orbital torque", preprint available at Research Square, `https://doi.org/10.21203/rs.3.rs-2451981/v1` (2023).
- D. Lee, D. Go, H.-J. Park, W. Jeong, H.-W. Ko, D. Yun, **D. Jo**, S. Lee, G. Go, J. H. Oh, K.-J. Kim, B.-G. Park, B.-C. Min, H. C. Koo, H.-W. Lee, O. Lee, and K.-J. Lee, "Orbital torque in magnetic bilayers", Nature Communications **12**, 6710 (2021).
- D. Go, **D. Jo**, H.-W. Lee, M. Kläui, and Y. Mokrousov, "Orbitronics: Orbital currents in solids", EPL (Europhysics Letters) **135**, 37001 (2021).
- D. Go, **D. Jo**, T. Gao, K. Ando, S. Blügel, H.-W. Lee, and Y. Mokrousov, "Orbital Rashba effect in a surface-oxidized Cu film", Phys. Rev. B **103**, L121113 (2021).
- K. Zhang, S. Han, Y. Lee, M. J. Coak, J. Kim, I. Hwang, S. Son, J. Shin, M. Lim, **D. Jo**, K. Kim, D. Kim, H.-W. Lee, and J.-G. Park, "Gigantic Current Control of Coercive Field and Magnetic Memory Based on Nanometer-Thin Ferromagnetic van der Waals Fe3GeTe2", Advanced Materials **33**, 2004110 (2021).
- J. Kim, D. Go, H. Tsai, **D. Jo**, K. Kondou, H.-W. Lee, and Y. Otani, "Nontrivial torque generation by orbital angular momentum injection in ferromagnetic-metal/Cu/Al2O3 trilayers", Phys. Rev. B **103**, L020407 (2021).
- Z. C. Zheng, Q. X. Guo, **D. Jo**, D. Go, L. H. Wang, H. C. Chen, W. Yin, X. M. Wang, G. H. Yu, W. He, H.-W. Lee, J. Teng, and T. Zhu, "Magnetization switching driven by current-induced torque from weakly spin-orbit coupled Zr", Phys. Rev. Research **2**, 013127 (2020).
- **D. Jo**, D. Go, and H.-W. Lee, "Gigantic intrinsic orbital Hall effects in weakly spin-orbit coupled metals", Phys. Rev. B **98**, 214405 (2018).
- D. Go, **D. Jo**, C. Kim, and H.-W. Lee, "Intrinsic Spin and Orbital Hall Effects from Orbital Texture", Phys. Rev. Lett. **121**, 086602 (2018).

PRESENTATIONS

Oral

- "Theoretical calculations of the magneto-optical Kerr effect by the orbital Hall effect", Seminar PGI-1/IAS-1, Jülich, Germany, May. 25, 2022
- "Giant intrinsic orbital Hall effects in weakly spin-orbit coupled metals", American Physical Society March Meeting 2019, Boston, USA, Mar. 4-8, 2019
- "Intrinsic Orbital Hall Effects in Elemental Solids", 11th BK21+ Young Physicists Workshop, Pohang, Korea, Feb. 14-15, 2019

Poster

- "Current-Induced Orbital and Spin Accumulations in Metallic Layers", 11th International Symposium on Metallic Multilayers (MML 2023), Seoul, Korea, July. 24-28, 2023
- "Theoretical calculations of the magneto-optical Kerr effect by the orbital Hall effect", Orbitronics from topological matter to next level electronics (SPICE workshop), Ingelheim, Germany, Jul. 19-22, 2022
- "Orbital Hall effect and orbital torque in weakly spin-orbit coupled materials", Samsung Global Research Symposium, Seoul, Korea, Nov. 22-23, 2019
- "Giant Intrinsic Orbital Hall Effects in Light Metals", 15th SRC Winter Workshop on Topological Matter, Pohang, Korea, Jan. 30-31, 2019
- "Gigantic intrinsic orbital Hall effects in weakly spin-orbit coupled materials", International School on Spintronics and Korea-Japan Spintronics Workshop, Nagoya, Japan, Jan. 21-22, 2019
- "Giant intrinsic orbital Hall effects in weakly spin-orbit coupled systmes", 2018 Korean Physical Society Fall Meeting, Changwon, Korea, Oct. 24-26, 2018