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Seoul 02792**ORCID**[0000-0002-1382-7088](https://orcid.org/0000-0002-1382-7088)**Google Scholar**[fiR8d68AAAAJ](https://scholar.google.com/citations?user=fiR8d68AAAAJ)**ResearcherID**[E-5582-2015](https://pubs.acs.org/doi/10.26434/chemrxiv-2015-e-5582)**Homepage**<https://sites.google.com/view/kwk-kist/>**Office**

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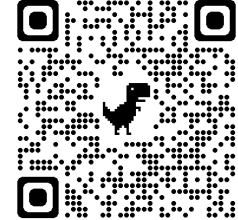
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## General Information

<b>Name</b>	Kyoung-Whan Kim
<b>Date of Birth</b>	January 18, 1988
<b>Nationality</b>	Korea
<b>Research Institute</b>	Post-silicon Semiconductor Institute (PSI) Korea Institute of Science and Technology (KIST)
<b>Ph. D. Obtained</b>	February 15, 2013



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## Academic Experience

11/2018 – Present	<b>Senior Research Scientist</b> Center for Spintronics, KIST, Korea
09/2016 – 10/2018	<b>Postdoctoral Researcher</b> Institute of Physics, JGU Mainz, Germany
09/2016 – 09/2016	<b>Guest Researcher</b> Institute of Physics, JGU Mainz, Germany
03/2015 – 08/2016	<b>Postdoctoral Researcher</b> Center for Nanoscale Science and Technology, NIST, USA
02/2015 – 08/2016	<b>Postdoctoral Researcher</b> Institute for Research in Electronics and Applied Physics, UMD, USA
08/2014 – 02/2015	<b>Guest Researcher</b> Center for Nanoscale Science and Technology, NIST, USA
02/2013 – 02/2015	<b>Postdoctoral Researcher</b> Basic Science Research Institute, POSTECH, Korea
03/2009 – 02/2013	<b>Research Assistant</b> Department of Physics, POSTECH, Korea
03/2009 – 06/2010	<b>Teaching Assistant</b> Department of Physics, POSTECH, Korea
08/2008 – 12/2008	<b>Grading Assistant</b> Department of Physics, POSTECH, Korea

## Research Interests

**Electronic transport theory in quantum materials**

- Berry curvature physics, anomalous transport phenomena, transport of quantum superposition
- Topological electronic states and their transport properties
- Dynamics of quasiparticles coupling with electrons in solids

**Dynamic phenomena in low-dimensional materials**

- Modeling electronic structure of low-dimensional materials
- Transport properties in low-dimensional materials
- Magnetization dynamics in low-dimensional magnets and its applications

**Spin-orbit interaction in condensed matters**

- Roles of spin-orbit interaction in equilibrium properties:  
Rasha-Dresselhaus effects, magnetic anisotropy, chiral magnets, magnetic skyrmions
- Roles of spin-orbit interaction in non-equilibrium properties:  
Spin/orbital dynamics, spin/orbital Hall effect, spin-orbit torque

**Spintronics applications**

- Spin transport theory in heterostructures
- Magnetization dynamics driven by electrons/magnons
- Memory and non-memory applications of spintronic devices

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## Education

- 03/2009 – 02/2013 **Ph. D in Physics**  
**Institute** Pohang University of Science and Technology (POSTECH), Korea  
**Thesis** *Magnetization Dynamics in Rashba Spin-Orbit Coupling Systems*  
**Adviser** Prof. Hyun-Woo Lee  
**Research Group** Theoretical Nanoscale Transport Lab  
**Grade** 4.20 / 4.30  
**Remarks** Thesis awarded at graduation
- 03/2005 – 02/2009 **B. S. in Physics (Major) and Mathematics (Minor)**  
**Institute** Pohang University of Science and Technology (POSTECH), Korea  
**Thesis** *Theoretical Analysis of Current-Induced Domain Wall Motion in a Ferromagnetic Nanowire*  
**Adviser** Prof. Jae-Mo Park (Campus Life), Prof. Hyun-Woo Lee (Thesis)  
**Grade** 4.18 / 4.30 (*Summa cum laude*)  
**Remarks** Thesis awarded at graduation  
Highest grade in all Departments in Science (Math, Physics, Chemistry, Life Science)  
Second highest grade in the entire university
- 03/2003 – 02/2005 **High School Diploma**  
**Institute** Hansung Science High School  
**Thesis** *Primality-test Algorithm for Great Numbers*  
**Adviser** Young-Il Kim  
**Remarks** Participated in *Research & Education Program* with Prof. Han Hyuk Cho,  
Department of Mathematics Education, Seoul National University

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## Awards (after 2020)

- 11/2023 **Outstanding Young Researcher Award**, by Korean Magnetics Society  
10/2022 **Hyun-Dang Physics Award**, Korean Physical Society  
09/2022 **AUMS Young Researcher Award**, Asian Union of Magnetics Societies

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## Academic Activities

### Program Committee & Professional Memberships

- 12/2023 **Vice Secretary**, Program Committee, ICAMD 2023, Jeju  
10/2023 **Session Organizer**, Focus Session: *Magnon Spintronics*  
in 2023 KPS Fall Meeting, Changwon  
07/2023 **Local Committee Member**, MML 2023, Seoul  
04/2023 **Session Organizer**, Focus Session: *Angular Momentum Dynamics of Elementary  
Excitations in Solids* in 2023 KPS Spring Meeting, Daejeon  
10/2022 **Session Organizer**, Focus Session: *Young Researchers for Spintronics in Low  
Dimensions* in KPS 70th Anniversary and 2022 Fall Meeting, Busan  
07/2018 **Workshop Organizer**, *Young Research Leaders Group Workshop: Collective  
phenomena in driven quantum systems*, Mainz
- 2023 – 2024 **Editorial Assistant**, Korean Magnetics Society  
2022 – present **Committee Member**, Applied Physics Division (Spin), Korean Physical Society  
2019 – 2020 **Committee Member**, Applied Physics Division (Spin), Korean Physical Society  
2023 – 2024 **Fellow**, Korean Magnetics Society  
2011 – present **Regular Member**, Korean Magnetics Society  
2008 – 2016 **Regular Member**, American Physical Society  
2010 – present **Student/Regular Member**, Korean Physical Society

**Presentations** Full list of presentations at <https://sites.google.com/view/kwk-kist/presentations>

## Publications

### Overview

- **64 Publications including**
  - 34 publications contributed as a first/corresponding author
  - Nature Materials, Nature Nanotechnology, 4 Nature Communications (one as a first author), 11 Physical Review Letters (six as a first/corresponding author), 2 Advanced Materials (one as a corresponding author), 2 Nano Letters (one as a first author), 2 ACS Nano (one as a corresponding author), Physics Reports, Advanced Science
  - Two News & Views articles in Nature Physics, Nature Materials (both as a first author)
- **Highly cited papers (citation indices from Google Scholar)**
  - 1 paper cited 450+ times
  - 1 more paper cited 350+ times
  - 1 more paper cited 250+ times (first author)
  - 1 more paper cited 200+ times (first author)
  - 3 more papers cited 100+ times (two as a first author)
  - 7 more papers cited 50+ times (four as a first author)
- **Highlighted articles**
  - 4 papers highlighted in Physics Plaza, Physics & High Technology
  - 3 papers selected as Cover
  - 1 paper highlighted as News & Views
  - 1 paper selected as 100 Remarkable Achievements of National Research & Development
  - 1 paper highlighted as Top 10 News in Science and Technology in 2016
  - 1 paper Altmetric Attention Score 55+ (< Top 5%)
- **Patents**
  - Two Korean patents in spintronic devices registered (Highest contribution for both)
  - Two US patents in spintronic devices registered (Highest contribution for both)
- **Citations:** 2700+ times cited in total (h-index 23)

Full list of publications at <https://sites.google.com/view/kwk-kist/publications/list-of-publications>

### Selected Publications

† : equal contributions  
c : corresponding author(s)

- [15] **Field-free switching of perpendicular magnetization by two-dimensional PtTe<sub>2</sub>/WTe<sub>2</sub> van der Waals heterostructures with high spin Hall conductivity**  
F. Wang<sup>†</sup>, G. Shi<sup>†</sup>, **K.-W. Kim<sup>†</sup>**, H.-J. Park, J. G. Jang, H. R. Tan, M. Lin, Y. Liu, T. Kim, D. Yang, S. Zhao, K. Lee, S. Yang, A. Soumyanarayanan, K.-J. Lee<sup>c</sup>, and H. Yang<sup>c</sup>  
Accepted for publication
- [14] **Optoelectronic manifestation of the orbital angular momentum driven by chiral hopping in helical Se chains**  
B. Kim<sup>†</sup>, D. Shin<sup>†</sup>, S. Namgung, N. Park, **K.-W. Kim<sup>c</sup>**, and J. Kim<sup>c</sup>  
ACS Nano **17**, 18873 (2023)
- [13] **Universal hopping motion protected by structural topology**  
M. Song<sup>†</sup>, M. You<sup>†</sup>, S. Yang, T.-S. Ju, K.-W. Moon, C. Hwang, **K.-W. Kim<sup>c</sup>**, A. M. G. Park<sup>c</sup>, and K.-J. Kim<sup>c</sup>  
Adv. Mater. **34**, 2203275 (2022)  
**Selected as Cover**
- [12] **Spin Swapping Effect of Band-Structure Origin in Centrosymmetric Ferromagnets**  
H.-J. Park, H.-W. Ko, G. Go, J. H. Oh, **K.-W. Kim<sup>c</sup>**, and K.-J. Lee<sup>c</sup>  
Phys. Rev. Lett. **129**, 037202 (2022)  
**Highlighted in Physics Plaza, Physics & High Technology, Oct (2022)**

- [11] **Orbital Dynamics in Centrosymmetric Systems**  
S. Han, H.-W. Lee<sup>c</sup>, and **K.-W. Kim<sup>c</sup>**  
Phys. Rev. Lett. **128**, 176601 (2022)  
**Highlighted in Physics Plaza, Physics & High Technology July-Aug (2022)**
- [10] **Generalized Spin Drift-Diffusion Formalism in Presence of Spin-Orbit Interaction of Ferromagnets**  
**K.-W. Kim<sup>c</sup>** and K.-J. Lee<sup>c</sup>  
Phys. Rev. Lett. **125**, 207205 (2020)  
**Altmetric Attention Score 55+ (< Top 5%)**
- [9] **Exploitable magnetic anisotropy of the two-dimensional magnet CrI<sub>3</sub>**  
J. Kim<sup>†</sup>, **K.-W. Kim<sup>†</sup>**, B. Kim, C.-J. Kang, D. Shin, S.-H. Lee, B.-C. Min, and N. Park<sup>c</sup>  
Nano Lett. **20**, 929-935 (2020)  
**Cited 50+ times**
- [8] **Prediction of ferroelectricity-driven Berry curvature enabling charge- and spin-controllable photocurrent in tin telluride monolayers**  
J. Kim<sup>†</sup>, **K.-W. Kim<sup>†</sup>**, D. Shin, S.-H. Lee, J. Sinova, N. Park, and H. Jin<sup>c</sup>  
Nat. Commun. **10**, 3965 (2019)
- [7] **Unidirectional Magnon-Driven Domain Wall Motion due to Interfacial Dzyaloshinskii-Moriya Interaction**  
**K.-W. Kim<sup>†</sup>**, S.-W. Lee<sup>†</sup>, J.-H. Moon, G. Go, A. Manchon, H.-W. Lee, K. Everschor-Sitte, and K.-J. Lee<sup>c</sup>  
Phys. Rev. Lett. **112**, 147202 (2019)
- [6] **Spintronics: Chiral Damping**  
**K.-W. Kim<sup>c</sup>** and H.-W. Lee<sup>c</sup>  
Nature Mater. **15**, 253-254 (2016)
- [5] **Spintronics: SHE's electric**  
**K.-W. Kim<sup>c</sup>** and Hyun-Woo Lee<sup>c</sup>  
Nature Phys. **10**, 549-550 (2014)
- [4] **Chirality from interfacial spin-orbit coupling effects in magnetic bilayers**  
**K.-W. Kim**, H.-W. Lee<sup>c</sup>, K.-J. Lee, and M. D. Stiles  
Phys. Rev. Lett. **111**, 216601 (2013)  
**Cited 200+ times**  
**Highlighted in Physics Plaza, Physics & High Technology, Mar (2014)**
- [3] **Current-induced motion of a transverse magnetic domain wall in the presence of spin Hall effect**  
S.-M. Seo<sup>†</sup>, **K.-W. Kim<sup>†</sup>**, J. Ryu, H.-W. Lee<sup>c</sup>, and K.-J. Lee<sup>c</sup>  
Appl. Phys. Lett. **101** (02), 022405 (2012)  
**Cited 100+ times**
- [2] **Prediction of giant spin motive force due to Rashba spin-orbit coupling**  
**K.-W. Kim**, J.-H. Moon, K.-J. Lee, and H.-W. Lee<sup>c</sup>  
Phys. Rev. Lett. **108**, 217202 (2012)  
**Cited 100+ times**  
**Highlighted in Physics Plaza, Physics & High Technology, Nov (2012)**
- [1] **Magnetization dynamics induced by in-plane currents in ultrathin magnetic nanostructures with Rashba spin-orbit coupling**  
**K.-W. Kim**, S.-M. Seo, J. Ryu, K.-J. Lee<sup>c</sup>, and H.-W. Lee<sup>c</sup>  
Phys. Rev. B **85**, 180404(R) (2012)  
**Cited 250+ times**