

SANG HYUN PARK

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EDUCATION

University of Minnesota (Minneapolis, MN, USA)

Sep 2020 -

PhD, Electrical Engineering (GPA: 3.95)

Advisor: Tony Low

Thesis: Engineering two-dimensional plasmons via quantum interactions

University of Oxford (Oxford, UK)

Oct 2013 - July 2017

MPhys (Integrated Bachelor's/Master's degree), Physics, *first class honours*

Advisor: Ian Walmsley, Benjamin Brecht

Thesis: Complex temporal shaping and characterization of laser pulses for quantum memories

PUBLICATIONS

- [8] **Park, S. H.**, Sammon, M., Mele, E. J. & Low, T. Helical boundary modes from synthetic spin in a plasmonic lattice. *Phys. Rev. B* **109**, L161301 (2024).
- [7] Lee, S. [†], Seo, D. [†], **Park, S. H.**, Izquierdo, N., Lee, E. H., Younas, R., Zhou, G., Palei, M., Hoffman, A. J., Jang, M. S., Hinkle, C. L., Koester, S. J. & Low, T. Achieving near-perfect light absorption in atomically thin transition metal dichalcogenides through band nesting. *Nat. Commun.* **14**, 3889 (2023).
- [6] Baek, S. [†], **Park, S. H.** [†], Oh, D. [†], Lee, K., Lee, S., Lim, H., Ha, T., Park, H. S., Zhang, S., Yang, L., Min, B. & Kim, T.-T. Non-Hermitian chiral degeneracy of gated graphene metasurfaces. *Light Sci. Appl.* **12**, 87 (2023).
- [5] **Park, S. H.**, Sammon, M., Mele, E. & Low, T. Plasmonic gain in current biased tilted Dirac nodes. *Nat. Commun.* **13**, 7667 (2022).
- [4] Ha, T., Yoo, D., Heo, C., Vidal-Codina, F., Nguyen, N.-c., Sim, K. I., **Park, S. H.**, Cha, W., Park, S., Peraire, J., Kim, T.-t., Lee, Y. H. & Oh, S.-H. Subwavelength Terahertz Resonance Imaging (STRING) for Molecular Fingerprinting. *Nano Lett.* **22**, 10200–102007 (2022).
- [3] Huang, T. [†], Tu, X. [†], Shen, C., Zheng, B., Wang, J., Wang, H., Khaliqi, K., **Park, S. H.**, Liu, Z., Yang, T., Zhang, Z., Shao, L., Li, X., Low, T., Shi, Y. & Wang, X. Observation of chiral and slow plasmons in twisted bilayer graphene. *Nature* **605**, 63–68 (2022).
- [2] **Park, S. H.**, Xia, S., Oh, S.-h., Avouris, P. & Low, T. Accessing the Exceptional Points in a Graphene Plasmon–Vibrational Mode Coupled System. *ACS Photonics* **8**, 3241–3248 (2021).
- [1] **Park, S. H.** [†], Lee, S. G. [†], Baek, S., Ha, T., Lee, S., Min, B., Zhang, S., Lawrence, M. & Kim, T. T. Observation of an exceptional point in a non-Hermitian metasurface. *Nanophotonics* **9**, 1031–1039 (2020).

RESEARCH EXPERIENCE

University of Minnesota (Minneapolis, MN, USA)

Sep 2020 - (May 2025, expected)

Research Assistant

- Working on engineering plasmonic properties of two-dimensional materials using quantum interactions
- Calculated optical properties of two-dimensional materials using in-house Python/MATLAB code
- Performed electromagnetic simulations of patterned two-dimensional materials using COMSOL
- Led multiple projects resulting in 3 first-authored publications (ACS Photonics, Nature Communications, Physical Review B)
- Collaboration with experimental groups leading to 1 second-authored publication (Nature Communications) and 1 co-authored publication (Nature)

Center for Integrated Nanostructure Physics (Suwon, South Korea)

Aug 2017 - Aug 2020

Researcher, Full time

- Performed simulations on scattering properties of non-Hermitian metasurfaces using CST Microwave Studio
- Experimental verification of simulations using nano-fabrication techniques and terahertz spectroscopy
- Led project on non-Hermitian metasurfaces resulting in 2 first-authored publications (Nanophotonics, Light:Science & Applications)
- Operator for the scanning electron microscope and transmission electron microscope
- Mandatory military service as research agent (3 years)

INDUSTRY EXPERIENCE

Seagate Technology (Bloomington, MN, USA)

May 2023 - Aug 2023, June 2022 - Sep 2022

Summer intern

- Developed a generative model to achieve freeform optimization of the plasmonic near field transducer
- Generated datasets by running COMSOL simulations on HPC systems
- Trained conditional GANs and VAEs using simulation data from COMSOL
- Extensive use of PyTorch, COMSOL, and Linux cluster computing systems with GPUs

ACADEMIC SERVICES

- **Reviewer** for Light: Science & Applications, Advanced Functional Materials, Journal of Applied Physics, Scientific Reports

SKILLS

Programming Languages

- Python, MATLAB: Numerical calculation of electromagnetic material properties. Data visualization.

Software & Tools

- COMSOL: Simulation of electromagnetic properties of graphene and other two-dimensional materials
- CST Microwave Studio: Simulation of metasurfaces comprised of split ring resonators
- Tensorflow, PyTorch: Training of deep neural networks
- L^AT_EX: Writing of manuscripts and notes