Curriculum Vitae

Yu Xiang

Pronouns: he
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Education

August 2014— December 2019
Degree: Doctor of Philosophy in Physics
Where: Rensselaer Polytechnic Institute, Troy, NY
GPA: 3.88 of 4.00
Thesis: Electron diffraction from two dimensional materials
Advisor: Gwo-Ching Wang

September 2010— June 2014
Degree: Bachelor of Science in Physics
Where: Wuhan University, Wuhan, Hubei, China
GPA: 3.43 of 4.00

Employment

May 2021— Present
Position: Applied Scientist
Employer: Amazon
Where: Bellevue, WA
Responsibilities:

- Communicated with the customers to understand the business scope, establish project timeline and reach agreement on the final deliveries.
- Built the forecasting models based on machine learning algorithms and deep learning neural networks, and then tuned the parameters to achieve the optimal performance.

January 2020— February 2021
Position: Seismic Imager
Employer: CGG
Where: Houston, TX
Responsibilities:

- Provided optimal quality control for the input seismic raw data by analyzing the statistics from billions of seismic records using SQL and mapping out key metrics using Hadoop/Spark big-data tools.
- Processed petabytes of seismic data by detecting anomalies using sparse transformation, removing seismic echoes using adaptive subtraction, and imputing missing features with compressed sensing techniques.

Research

July 2018— December 2019

Project: VS_2 Growth and Magnetic Properties
Where: Rensselaer Polytechnic Institute, Troy, NY
Advisor: Gwo-Ching Wang
Contributions:

- Set up the homemade two-zone low pressure chemical vapor deposition (LPCVD) system to synthesize high quality VS_2 nano-flakes for spintronic device applications.
- Experimentally investigated the effect of growth conditions on the morphology, crystal structure and chemical stoichiometry of the VS_2 nano-flakes with the help of theoretical modeling.
- Studied the magnetism in VS_2 using magneto-optical Kerr effect (MOKE) and magnetic force microscopy (MFM).

May 2016— December 2018

Project: RHEED Analysis and Simulation
Where: Rensselaer Polytechnic Institute, Troy, NY
Advisor: Gwo-Ching Wang
Contributions:

- Developed the image processing tool to apply noise reduction to and to extract features from the RHEED patterns in the four-dimensional curvelet domain.
- Invented algorithms to model the stochastic nucleation of microscopic crystal growth based on the Poisson point process and Voronoi tessellation.
- Estimated the probability distributions of the lattice constant, size, and orientation measured from the preconditioned RHEED image sets through Bayesian regression.

December 2015— December 2017

Project: Epitaxial SnS Thin Film Growth and Characterization
Where: Rensselaer Polytechnic Institute, Troy, NY
Advisor: Gwo-Ching Wang
Contributions:

- Systematically studied the structure, morphology, and electrical transport properties of high-quality SnS epitaxial thin films grown by physical vapor deposition (PVD).
- Characterized the vibrational modes and optical property of the SnS film using Raman, Photoluminescence (PL) and UV-Vis spectroscopy.
- Contributed insight on how to achieve better photoelectronic performance in an integrated photovoltaic device by comparing the SnS films grown on polycrystalline and single-crystal graphene substrates.

Teaching

August 2017—May 2018

Course: Physics I, Quantum Physics
Role: Teaching Assistant
Where: Rensselaer Polytechnic Institute, Troy, NY
Responsibilities:

- Held 15-minitue question & answer sessions and demonstrated lab activities during each class.
- Helped students with their homework and exams during weekly office hours.

Publications (22)

- **Xiang, Yu**, Songchun Xie, Zonghuan Lu, Xixing Wen, Jian Shi, Morris Washington, Gwo-Ching Wang, and Toh-Ming Lu. "Domain boundaries in incommensurate epitaxial layers on weakly interacting substrates". In: *Journal of Applied Physics* 130.6 (2021), page 065301. DOI: 10.1063/5.0057417
- **Xiang, Yu**, Xin Sun, Lukas Valdman, Fu Zhang, Tanushree H. Choudhury, Mikhail Chubarov, Joshua A. Robinson, Joan M. Redwing, Mauricio Terrones, Yuan Ma, Lei Gao, Morris A. Washington, Toh-Ming Lu, and Gwo-Ching Wang. "Monolayer MoS_2 on sapphire: an azimuthal reflection high-energy electron diffraction perspective". In: *2D Materials* 8.2 (2020), page 025003. DOI: 10.1088/2053-1583/abce08
- **Xiang, Yu**, Yunbo Yang, Fawen Guo, Xin Sun, Zonghuan Lu, Dibyajyoti Mohanty, Ishwara Bhat, Morris Washington, Toh-Ming Lu, and Gwo-Ching Wang. "van der Waals epitaxy of SnS film on single crystal graphene buffer layer on amorphous SiO_2/Si". In: *Applied Surface Science* 435.Supplement C (2018), pages 759–768. DOI: 10.1016/j.apsusc.2017.11.098
- **Xiang, Y.**, F.-W. Guo, T.-M. Lu, and G.-C. Wang. "Reflection high-energy electron diffraction measurements of reciprocal space structure of 2D materials". In: *Nanotechnology* 27.48 (2016), page 485703. DOI: 10.1088/0957-4484/27/48/485703
- Zhizhong Chen, Rui Xu, Sijie Ma, Yuan Ma, Yang Hu, Lifu Zhang, Yuwei Guo, Zhenhan Huang, Baiwei Wang, Yi-Yang Sun, Jie Jiang, Ryan Hawks, Ru Jia, **Yu Xiang**, Gwo-Ching Wang, Esther A. Wertz, Jisen Tian, Daniel Gall, Xinchun Chen, Vei Wang, Lei Gao, Hanyu Zhu, and Jian Shi. "Searching for Circular Photo Galvanic Effect in Oxyhalide Perovskite Bi_4NbO_8Cl". In: *Advanced Functional Materials* (2022). DOI: 10.1002/adfm.202206343
- Jie Jiang, Lifu Zhang, Chen Ming, Hua Zhou, Pritom Bose, Yuwei Guo, Yang Hu, Baiwei Wang, Zhizhong Chen, Ru Jia, Saloni Pendse, **Yu Xiang**, Yaobiao Xia, Zonghuan Lu, Xixing Wen, Yao Cai, Chengliang Sun, Gwo-Ching Wang, Toh-Ming Lu, Daniel Gall, Yi-Yang Sun, Nikhil Koratkar, Edwin Fohtung, Yunfeng Shi, and Jian Shi. "Giant pyroelectricity in nanomembranes". In: *Nature* 607.7919 (2022), pages 480–485. DOI: 10.1038/s41586-022-04850-7
- Jie Jiang, Zhizhong Chen, Yang Hu, **Xiang, Yu**, Lifu Zhang, Yiping Wang, Gwo-Ching Wang, and Jian Shi. "Flexo-photovoltaic effect in MoS_2". In: *Nature Nanotechnology* (2021). DOI: 10.1038/s41565-021-00919-y

- Xixing Wen, Zonghuan Lu, Xin Sun, **Xiang, Yu**, Zhizhong Chen, Jian Shi, Ishwara Bhat, Gwo-Ching Wang, Morris Washington, and Toh-Ming Lu. "Epitaxial CdTe Thin Films on Mica by Vapor Transport Deposition for Flexible Solar Cells". In: *ACS Applied Energy Materials* 3.5 (2020), pages 4589–4599. DOI: 10.1021/acsaem.0c00265
- Zonghuan Lu, Xin Sun, **Xiang, Yu**, Gwo-Ching Wang, Morris A. Washington, and Toh-Ming Lu. "Large scale epitaxial graphite grown on twin free nickel(111)/spinel substrate". In: *CrystEngComm* 22.1 (2020), pages 119–129. DOI: 10.1039/C9CE01515A
- Lu Li, Zhaodong Li, Anthony Yoshimura, Congli Sun, Tianmeng Wang, Yanwen Chen, Zhizhong Chen, Aaron Littlejohn, **Xiang, Yu**, Prateek Hundekar, Stephen F. Bartolucci, Jian Shi, Su-Fei Shi, Vincent Meunier, Gwo-Ching Wang, and Nikhil Koratkar. "Vanadium disulfide flakes with nanolayered titanium disulfide coating as cathode materials in lithium-ion batteries". In: *Nature Communications* 10.1 (2019), page 1764. DOI: 10.1038/s41467-019-09400-w
- Yaobiao Xia, Timothy Yoo, **Xiang, Yu**, Yanli Zhang, Jiyoon Jessica Kim, Tung-Sheng Kuan, and Gwo-Ching Wang. "Uniaxial magnetic anisotropy in three-bilayer Co/Cu and Co/Al superlattices". In: *Thin Solid Films* 681 (2019), pages 32–40. DOI: 10.1016/j.tsf.2019.04.048
- Dibyajyoti Mohanty, Zonghuan Lu, Xin Sun, **Xiang, Yu**, Lei Gao, Jian Shi, Lihua Zhang, Kim Kisslinger, Morris A. Washington, Gwo-Ching Wang, Toh-Ming Lu, and Ishwara B. Bhat. "Growth of epitaxial CdTe thin films on amorphous substrates using single crystal graphene buffer". In: *Carbon* 144 (2019), pages 519–524. DOI: 10.1016/j.carbon.2018.12.094
- Dibyajyoti Mohanty, Zonghuan Lu, Xin Sun, **Xiang, Yu**, Yiping Wang, Debjit Ghoshal, Jian Shi, Lei Gao, Sufei Shi, Morris Washington, Gwo-Ching Wang, Toh-Ming Lu, and Ishwara Bhat. "Metalorganic vapor phase epitaxy of large size CdTe grains on mica through chemical and van der Waals interactions". In: *Physical Review Materials* 2.11 (2018), page 113402. DOI: 10.1103/PhysRevMaterials.2.113402
- Zhizhong Chen, Yiping Wang, Xin Sun, **Xiang, Yu**, Yang Hu, Jie Jiang, Jing Feng, Yi-Yang Sun, Xi Wang, Gwo-Ching Wang, Toh-Ming Lu, Hanwei Gao, Esther A. Wertz, and Jian Shi. "Remote Phononic Effects in Epitaxial Ruddlesden–Popper Halide Perovskites". In: *The Journal of Physical Chemistry Letters* (2018), pages 6676–6682. DOI: 10.1021/acs.jpclett.8b02763
- Yiping Wang, Lei Gao, Yunbo Yang, **Xiang, Yu**, Zhizhong Chen, Yongqi Dong, Hua Zhou, Zhonghou Cai, Gwo-Ching Wang, and Jian Shi. "Nontrivial strength of van der Waals epitaxial interaction in soft perovskites". In: *Physical Review Materials* 2.7 (2018), page 076002. DOI: 10.1103/PhysRevMaterials.2.076002
- Xin Sun, Zonghuan Lu, **Xiang, Yu**, Yiping Wang, Jian Shi, Gwo-Ching Wang, Morris A. Washington, and Toh-Ming Lu. "van der Waals Epitaxy of Antimony Islands, Sheets, and Thin Films on Single-Crystalline Graphene". In: *ACS Nano* 12.6 (2018), pages 6100–6108. DOI: 10.1021/acsnano.8b02374
- Xiaotian Zhang, Tanushree H. Choudhury, Mikhail Chubarov, **Xiang, Yu**, Bhakti Jariwala, Fu Zhang, Nasim Alem, Gwo-Ching Wang, Joshua A. Robinson, and Joan M. Redwing. "Diffusion-Controlled Epitaxy of Large Area Coalesced WSe_2 Monolayers on Sapphire". In: *Nano Letters* 18.2 (2018), pages 1049–1056. DOI: 10.1021/acs.nanolett.7b04521

- A. J. Littlejohn, **Xiang, Y.**, E. Rauch, T.-M. Lu, and G.-C. Wang. "van der Waals epitaxy of Ge films on mica". In: *Journal of Applied Physics* 122.18 (2017), page 185305. DOI: 10.1063/1.5000502
- Zonghuan Lu, Xin Sun, **Xiang, Yu**, Morris A. Washington, Gwo-Ching Wang, and Toh-Ming Lu. "Revealing the Crystalline Integrity of Wafer-Scale Graphene on SiO_2/Si: An Azimuthal RHEED Approach". In: *ACS Applied Materials & Interfaces* 9.27 (2017), pages 23081–23091. DOI: 10.1021/acsami.7b01370
- Aijun Yang, Jian Gao, Baichang Li, Jiawei Tan, **Yu Xiang**, Tushar Gupta, Lu Li, Shravan Suresh, Juan Carlos Idrobo, Toh-Ming Lu, Mingzhe Rong, and Nikhil Koratkar. "Humidity sensing using vertically oriented arrays of ReS_2 nanosheets deposited on an interdigitated gold electrode". In: *2D Materials* 3.4 (2016), page 045012. DOI: 10.1088/2053-1583/3/4/045012
- Y. B. Yang, J. K. Dash, **Xiang, Y.**, Y. Wang, J. Shi, P. H. Dinolfo, T.-M. Lu, and G.-C. Wang. "Tuning the Phase and Optical Properties of Ultrathin SnS_x Films". In: *The Journal of Physical Chemistry C* 120.24 (2016), pages 13199–13214. DOI: 10.1021/acs.jpcc.6b03529
- Y-B Yang, Jatis Kumar Dash, AJ Littlejohn, **Xiang, Yu**, Yiping Wang, Jian Shi, LH Zhang, Kim Kisslinger, T-M Lu, and G-C Wang. "Large Single Crystal SnS_2 Flakes Synthesized from Coevaporation of Sn and S". in: *Crystal Growth & Design* 16.2 (2016), pages 961–973. DOI: 10.1021/acs.cgd.5b01512

Conferences (6)

- Oral presentation at *CMDIS Fall Symposium*, Troy, NY (December 2018)
- Oral presentation at *2018 NanoScientific Symposium*, Albany, NY (September 2018)
- Poster presentation at *Fall Meeting of Materials Research Society (MRS)*, Boston, MA (November 2017)
- Poster presentation at *Spring Meeting of Hudson Mohawk American Vacuum Society (AVS) Chapter*, Troy, NY (May 2017)
- Poster presentation at *American Physical Society (APS) Fall Meeting*, Troy, NY (November 2016)
- Poster presentation at *38th Symposium on Applied Surface Science*, Albany, NY (August 2016)

Review Activities (13)

- *AIP Advances*
  1. Epitaxial Growth and Polarization Reversal Characteristics of Hybrid Improper Ferroelectric Ca3Ti2O7 Thin Films, ADV21-AR-02988-TR1 (22-Nov-2021)

- *Crystal Growth & Design*
  1. Effects of the size of charged nanoparticles on the crystallinity of SiC films prepared by hot wire chemical vapor deposition, CG-2020-00649Q (26-May-2020)

- *Langmuir*
  1. Surface-Controlled Crystal Alignment of Naphthyl End- Capped Oligothiophene on Graphene: Thin-Film Growth Studied by In Situ X-ray Diffraction, la-2019-03467s (06-Nov-2019)

- *Journal of Applied Physics*
  1. Epitaxial Growth and Polarization Reversal Characteristics of Hybrid Improper Ferroelectric Ca3Ti2O7 Thin Films, JAP21-AR-04914 (28-Sep-2021)
  2. Acceptor-donor concentration dependent polaronic relaxation, pinned electron defect dipole characteristic and colossal permittivity in co-doped rutile (Zn1/3Nb2/3)xTi(1-x)O2 (x = 0.02, 0.04, 0.06 and 0,08) ceramics, JAP21-AR-05371 (20-Nov-2021)
  3. Mist chemical vapor deposition of Al1-xTixOy thin films and their application as high dielectric material, JAP21-AR-05391R1 (07-Feb-2022)
  JAP21-AR-06902 (09-Jan-2022)
  4. Effect of template amounts on the orientation degree and electrical properties of lead-free piezoelectric textured KNN-based ceramics, JAP21-AR-06902R (08-Feb-2022)
  5. Transfer-free graphene-guided high-quality epitaxy of AlN film for deep ultraviolet light-emitting diodes, JAP21-AR-NEFM2022-04115R1 (21-Oct-2021)

- *ACS Applied Materials & Interfaces*
  1. Solid-phase epitaxial growth of an alumina layer having a stacking-mismatched domain structure of the intermediate γ-phase, AM-2018-13818Z (10-Oct-2018)

- *Nanoscience & Nanotechnology-Asia*
  1. Structural and Optical characterization of Cupric Oxide Nanoparticles Synthesized by Facile in-situ Sonochemical method, BMS-NNA-2021-86 (27-Jan-2022)
  2. Nano-Surface Functionality Of Zinc Ferrite: Ascorbic Acid Nanofluid Application in Enhanced Oil Recovery, BMS-NNA-2021-77 (13-Feb-2022)
  3. Fabrication and applications of Raft forming system – An emerging trend in gastroretentive drug delivery system, BMS-NNA-2021-94 (27-Feb-2022)
  4. Developments in Perovskite materials based Solar Cells: In Pursuit of Hysteresis Effect, Stability issues and Lead-Free based perovskite materials, BMS-NNA-2021-90 (15-Feb-2022)

Awards

- *The Karen & Lester Gerhardt Prize in Science and Engineering* at Rensselaer Polytechnic Institute (May 2020)
- *Paul S. Ho '65 Prize in Physics* at Rensselaer Polytechnic Institute (May 2019)
- *Hillard B. Huntington Award (1976)* at Rensselaer Polytechnic Institute (May 2017)
- *Best Poster Award* at American Physical Society (APS) Fall Meeting (November 2016)
- *Presidential Graduate Research Fellowship Award* at Rensselaer Polytechnic Institute (October 2015)