

AN-HSI (JANE), CHEN

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RESUME

Materials development is the driving force in advancing quantum technology.

- Proficient in molecular beam epitaxy synthesis for versatile thin films and nanowires growth
- Experienced in materials characterization in regard to crystallinity, surface morphology, electrical properties and magnetism
- Skilled in writing journal papers and beamtime proposals, as well as collaborating with experts from different domains

RESEARCH EXPERIENCE

- Postdoctoral researcher, MSTD, Oak Ridge National Laboratory**, Oak Ridge, USA April 2023 – Present
- Epitaxial growth of hetero thin films using molecular beam epitaxy for the use of quantum information
 - Exploring materials magnetism using polarized neutron reflectivity
 - X-ray diffraction characterization on crystalline structures
 - Characterizing electrical properties using physical property measurement system (PPMS)
- PhD student, Institut Néel, CNRS**, Grenoble, France Oct. 2019 – Dec. 2022
- Developing epitaxial inclined InAs nanowires using molecular beam epitaxy
 - X-ray diffraction characterization of the crystallinity of superconductor thin films
 - Fabricate hybrid nanowire devices through nanofabrication process
 - Using in situ grazing incident x-ray diffraction at ESRF to study crystalline shell of superconductor
 - Construct electrical band structure of super-semiconductor hybrid system using DFT
- Master thesis, Institut Néel, CNRS**, Grenoble, France Feb. 2019 – July 2019
- Discover growth condition of semiconductor nanowires on different substrate orientation
 - Establish low temperature deposition method of metallic superconductor thin film on semiconductor nanowires
- Master 1 internship, LiPhy, CNRS**, Grenoble, France Sep. 2017 – Jun. 2018
- Two-photon polymerization for the 3D texturing of optical surfaces with micropillars
 - Fabrication of anti-fogging texturing by direct laser writing in polymer under optical microscope
- Research assistance, Institute of Applied Mechanics, NTU**, Taipei, Taiwan Sep. 2016 – June. 2017
- Integrate microfluidic engine for Lab-on-a-chip fluid system by two-photons polymerization
- Research intern, Advanced Semiconductor Engineering, Inc., Chung-Li**, Taoyuan, Taiwan Mar. 2016 – Sep. 2016
- Characterize polymer by operating thermal analytical instruments, differential scanning calorimetry, thermogravimetric

EDUCATION

- Université Grenoble Alpes (UGA)**, Grenoble, France Oct. 2019 – Dec. 2022
- Ph.D. in Material Science, École Doctorale de Physique de Grenoble
- Research interest: epitaxial nanostructure growth, nanowire devices fabrication, crystal structure study
- Université Grenoble Alpes (UGA)**, Grenoble, France Sep. 2017 – Jun. 2019
- Master in Nanosciences, Nanotechnologies, Santé
- Research interests: two-photons polymerization, optical microstructure engineering
- National Taiwan University (NTU)**, Taipei, Taiwan Sep. 2012 – Jun. 2016
- Bachelor in Chemical Engineering
- Research interests: fluid dynamics, microfluidics system, lab-on-a-chip technic

TECHNICAL SKILLS

- Computer:** Python, MATLAB, VASP, COMSOL, Microsoft Office, Gwyddion, ImageJ, Vesta, Latex, AutoCAD
- Experimental:** Molecular beam epitaxy (MBE), Scanning electron microscope (SEM), Atomic force microscopy (AFM), X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), Transmission electron microscopy (TEM), Scanning transmission electron microscopy (STEM), Energy-dispersive X-ray spectroscopy (EDS), Atomic layer deposition (ALD), X-ray photoelectron spectroscopy (XPS), E-beam evaporator, Nanofabrication, Optical microscope, Magnetron sputtering, Differential scanning calorimetry (DSC), Thermogravimetric
- Graduate-Level Courses:** Magnetism and Nanosciences, Optics, Quantum Physics, Semiconductor physics, Solid state physics, Surfaces and interfaces, Materials science, Nanofabrication in research laboratories, Quantum Condensed Matter, Numeric tools and methodology for the research
- Languages:** English (fluent) / Mandarin (native speaker) / French (fluent)

AWARDS & HONORS

- Poster session award in North America Molecular Beam Epitaxy conference 2023
- Scholarship of the Joseph Fourier Master funding from the Bureau Français de Taipei 2017-2019
- Drive a project supported by the Ministry of Science and Technology and won the Student Distinguished Award 2016

PUBLICATIONS

- **A.-H. Chen**, Q. Lu, E. Hershkovitz, M. L. Crespillo, A. R. Mazza, T. Smith, T. Z. Ward, G. Eres, S. Gandhi, M. M. Mahfuz, V. Starchenko, K. Hattar, J. S. Lee, H. Kim, R. G. Moore, M. Brahlek, "Interfacially enhanced superconductivity in Fe(Te,Se)/Bi₄Te₃ heterostructures". Adv. Mater., 2401809 (2024)

- A. R. Mazza, J.-Q. Yan, S. Middey, J. S. Gardner, **A.-H. Chen**, M. Brahlek, T. Z. Ward, “Embracing disorder in quantum materials design.” Appl. Phys. Lett., 230501 (2024).
- Ko, W., Kang, S.H., Lapano, J., Chang, H., Teeter, J., Jeon, H., Lu, Q., **Chen, A.-H.**, Brahlek, M., Yoon, M. and Moore, R.G., 2024. Interplay between Topological States and Rashba States as Manifested on Surface Steps at Room Temperature. ACS Nano, 18405-18411 (2024).
- P. Zhang, A. Zarassi, L. Jarjat, V. Van de Sande, M. Pendharkar, J. S. Lee, C. P. Dempsey, A. P. McFadden, S. D. Harrington, J. T. Dong, H. Wu, **A.-H. Chen**, M. Hocevar, C. J. Palmstrøm and S. M. Frolov, “Large second-order Josephson effect in planar superconductor-semiconductor junctions.” SciPost Physics, 16(1), p.030. (2024)
- Jardine, M., Dardzinski, D., Yu, M., Purkayastha, A., **Chen, A.-H.**, Hocevar, M., Frolov, S. and Marom, N. “First Principles Assessment of CdTe as a Tunnel Barrier at the α -Sn/InSb Interface”. ACS applied materials & interfaces 15 (12), 16288-16298 (2023)
- **A.-H. Chen**, C.P. Dempsey, M. Pendharkar, S. Tan, A. Sharma, B. Zhang, S.M. Frolov, C. J. Palmstrom, L. Bellon, E. Bellet-Amalric, and M. H., “Role of a capping layer on the crystalline structure of Sn thin films grown at cryogenic temperatures on InSb substrates”. Nanotechnology 35 (7), 075702 (2023)
- SM Frolov, P Zhang, B Zhang, Y Jiang, S Byard, SR Mudi, J Chen, **A.-H. Chen**, M Hocevar, M Gupta, C Riggert, VS Pribiag, “Smoking gun” signatures of topological milestones in trivial materials by measurement fine-tuning and data postselection”, arXiv preprint arXiv:2309.09368 (2023)
- P. Zhang, A. Zarassi, M. Pendharkar, J.S. Lee, L. Jarjat, V. Van de Sande, B. Zhang, S. Mudi, H. Wu, C.P. Dempsey, A.P. McFadden, S.D. Harrington, **A.-H. Chen**, G. Badawy, S. Gazibegovic, R. Op het Veld, S. Tan, E.P.A.M. Bakkers, M. Hocevar, C.J. Palmstrøm, and S.M. Frolov, “Planar Josephson junctions templated by nanowire shadowing”, arXiv preprint arXiv:2211.04130 (2022).
- P. Zhang, A. Zarassi, M. Pendharkar, J.S. Lee, L. Jarjat, V. Van de Sande, B. Zhang, S. Mudi, H. Wu, C.P. Dempsey, A.P. McFadden, S.D. Harrington, **A.-H. Chen**, G. Badawy, S. Gazibegovic, R. Op het Veld, S. Tan, E.P.A.M. Bakkers, M. Hocevar, C.J. Palmstrøm, and S.M. Frolov, “Missing odd-order Shapiro steps do not uniquely indicate fractional Josephson effect”. arXiv preprint arXiv:2211.08710 (2022)
- Pendharkar, M., B. Zhang, H. Wu, A. Zarassi, P. Zhang, C. P. Dempsey, J. S. Lee, S. D. Harrington, G. Badawy, S. Gazibegovic, R. L. M. Op het Veld, M. Rossi, J. Jung, **A.-H. Chen**, M. A. Verheijen, M. Hocevar, E. P. A. M. Bakkers, C. J. Palmstrøm, and S. M. Frolov. 2021. “Parity-Preserving and Magnetic Field-Resilient Superconductivity in InSb Nanowires with Sn Shells.” Science 372(6541):508–11 (2019).

CONFERENCES & WORKSHOPS

- **[Oral presentation] American Conference on Neutron Scattering, TN, USA** **23-27 June 2024**
A.-H. Chen, Tailoring magnetic anisotropy of $\text{Y}_3\text{Fe}_5\text{O}_{12}$ via helium implantation
- **[Invited talk] Quantum Materials for Emergent Applications in Quantum Science, CO, USA** **14-19 June 2024**
A.-H. Chen, Interface Driven Superconductivity in Topological Insulator/Fe-Based Superconductor Heterostructures
- **[Oral presentation] APS March Meeting, Minneapolis, MN, USA** **3-8 March 2024**
A.-H. Chen, Te-vacancy enhanced superconductivity in hybrid interface $\text{FeTe}_{1-x}\text{Se}_x/\text{Bi}_2\text{Te}_3$ grown by molecular beam epitaxy
- **[Poster] North American Conference on Molecular Beam Epitaxy, Madison, WI, USA** **16-20 Sept. 2023**
A.-H. Chen, Tunable superconductivity in hybrid interface $\text{FeTe}_{1-x}\text{Se}_x/\text{Bi}_2\text{Te}_3$ grown by molecular beam epitaxy
- **[Seminar] Chris Palmstrøm Research Group, University of California, Santa Barbara** **31 May 2022**
A.-H. Chen, Evaluation of the crystalline structure of cryogenic Sn on InSb
- **[Oral presentation] Nanowire week 2021, Chamonix, France** **25 April—29 April 2022**
A.-H. Chen, M. Rossi, T. van Schijndel, M. A. Verheijen, E. P. A. M. Bakkers, B. Sacépé, J. Rubio-Zuazo, J. Eymery, E. Bellet-Amalric, and M. Hocevar, In-situ Structural Study of Sn growth on InSb Nanowires by synchrotron X-Ray Diffraction
- **[Poster] EUROMAT 2021, virtual** **13 Sept.—17 Sept. 2021**
A.-H. Chen, M. Pendharkar, C. P. Dempsey, C. Palmstrøm, B. Zhang, S. Frolov, G. Badawy, M. A. Verheijen, E. Bakkers, J. Eymery, E. Bellet-Amalric, M. Hocevar, Structural Studies of Nanoscale Superconductor/Semiconductor Interfaces
- **[Oral presentation] 17th Condensed Matter days, virtual** **24 Aug.—27 Aug. 2021**
A.-H. Chen, M. Pendharkar, C. P. Dempsey, C. Palmstrøm, B. Zhang, S. Frolov, G. Badawy, M. A. Verheijen, E. Bakkers, J. Eymery, E. Bellet-Amalric, M. Hocevar, Structural Studies of Nanoscale Superconductor/Semiconductor Interfaces
- **[Poster] Interdisciplinaire school in nanoscience and nanotechnologies, Erquy, France** **4 July—9 July 2021**
A.-H. Chen, M. Pendharkar, C. P. Dempsey, C. Palmstrøm, B. Zhang, S. Frolov, G. Badawy, M. A. Verheijen, E. Bakkers, J. Eymery, E. Bellet-Amalric, M. Hocevar, Structural Studies of Nanoscale Superconductor/Semiconductor Interfaces
- **[Seminar] Pousse-café, Grenoble, France** **2 July 2021**
A.-H. Chen, Structural studies of nanoscale superconductor/semiconductor interfaces
- **[Poster] Journées Nationales des Nanofils semiconducteurs, Lyon, France** **13 Nov.—15 Nov. 2019**
A.-H. Chen, M. Pendharkar, C. Palmstrøm, B. Zhang, S. Frolov, M. Hocevar, Superconductor-Semiconductor Hybrid InAs Nanowires
- **[Poster] Workshop of nucleation and growth, Marseille, France** **28 Oct.—30 Oct. 2019**
A.-H. Chen, M. Pendharkar, C. Palmstrøm, B. Zhang, S. Frolov, M. Hocevar, Superconductor-Semiconductor Hybrid InAs Nanowires
- **[Poster] 4th Annual Meeting of the GDR MecaQ, Paris, France** **3 Oct.—4 Oct. 2019**
A.-H. Chen, M. Pendharkar, C. Palmstrøm, B. Zhang, S. Frolov, M. Hocevar, *Superconductor-Semiconductor Hybrid InAs Nanowires*