CURRICULUM VITAE

PERSONAL INFORMATION:

Name: Xinhang Xu
Date of Birth: 06/11/1993
Address: 2900 Spafford St. Davis, CA, 95618, U.S.
Phone: (530)979-3691
Email: xihxu@ucdavis.edu, xinhangxu2024@gmail.com

EDUCATION:

Postdoc Researcher, University of California, Davis, California (03/2024 – present)

- [Fusion Plasma Diagnostics] Designed and developed the far infrared tangential interferometer/polarimeter diagnostic (FIReTIP) and Terahertz high-k scattering system on the National Spherical Torus Experiment-Upgrade (NSTX-U), Princeton Plasma Physics Laboratory; Designed the RF board for the CT system of the BEST Tokamak.

Ph.D. degree (2016 - 2023) , University of Science and Technology of China, Hefei, China

- [Computational Plasma Modeling] Numerical study of the kinetic evolution of non-thermal electrons in Tokamak and its influence on cyclotron radiation
- [Fusion Plasma Diagnostics] Operate and upgrade millimeter-wave diagnostics (Electron Cyclotron Emission Imaging) on the Experimental Advanced Superconducting Tokamak (EAST), Hefei city, Anhui, China

Bachelor's degree (2012 – 2016), **Anhui University of Science and Technology (AUST), Huainan, China**

- [Computational] Dynamics of a Particle Moving Along a Curvilinear Path

RESEARCH ACTIVITIES:

- Fusion plasma diagnostics [Laser-aided diagnostics, millimeter-wave, terahertz]

  As a research scientist in non-invasive fusion plasma diagnostics, I possess extensive expertise in the end-to-end design and development of systems including laser-aided scattering, laser/millimeter-wave interferometry, and terahertz/millimeter-wave spectroscopy, with over 9 years' experience. My research activity focuses on demonstrated by spearheading the development and implementation of the NSTX-U High-k Collective Scattering System at PPPL for measuring electron density fluctuations and contributing significantly to the NSTX-U Far-Infrared Tangential Interferometry and Polarimetry (FIReTIP) System for density measurement and feedback control. Furthermore, I bring 7 years of advanced experience in millimeter-wave/terahertz spectroscopy, highlighted by the design and deployment of Electron Cyclotron Emission Imaging (ECEI) systems on the EAST tokamaks.

  This hands-on project work has cultivated a deep mastery of diagnostic principles, from the performance evaluation of key components to the development of custom devices. My proficiency encompasses optical ray-tracing simulation (Code V), custom circuit design and debugging (KiCad), automation and control programming (LabVIEW combined with Python), and 3D modeling (CATIA), supported by extensive experience in experimental installation, commissioning, and application. With seven years of direct tokamak experimental experience on EAST and formal fusion safety training, I am adept at leading experimental campaigns and excel in collaboration, effectively making the bridge between physicists and engineers to achieve project goals.

My work extends into data analysis and physics research, where I have led the development of custom data interpretation programs in MATLAB and Python for diagnostic calibration, physics studies, and theoretical model validation. I have also applied my skills to the thermal management of diagnostic equipment, performing heat dissipation simulation and analysis using COMSOL Multiphysics.

Software: Code V, Catia, KiCad. HFSS, COMSOL Multiphysics, LabVIEW, Python, MATLAB

- Computational plasma modeling [kinetic dynamics modeling, synthetic diagnostics modeling]

  I developed a novel kinetic simulation program that synergistically combines the computational efficiency of the spectral method (from the CODE program) with the modular, object-oriented architecture of the NORSE program. This hybrid solver is designed to compute the full temporal evolution of the electron distribution function in 0D2P (zero spatial dimensions and two momentum dimensions) phase space under time-varying background parameters, such as plasma density and loop voltage. It self-consistently incorporates key physical processes—including electric field acceleration, test-particle collisions, synchrotron radiation damping, and the complete runaway electron avalanche source term—enabling the investigation of non-thermal electron dynamics in evolving discharge conditions. By moving beyond the limitations of previous steady-state solvers, this algorithm achieves significant gains in computational performance while maintaining high accuracy. The object-oriented framework ensures the code is both extensible and adaptable, facilitating the future integration of additional physics or its application to more complex scenarios.

Collaborative Work

- **Key Collaborator** on fusion diagnostics projects with a 24+ member team from General Atomics, Princeton Plasma Physics Lab (PPPL), and UC Davis, comprising senior leadership (4 professors, 6 scientists) and technical staff (4 engineers, 10+ postdocs/graduate students).
- **Contributed to the full project lifecycle**, including diagnostic design & development, experimental campaign execution, data acquisition, simulation/data interpretation, and theory validation, leading to peer-reviewed publications and presentations.
- **Valued for exceptional interdisciplinary communication**, effectively mediating between scientific needs and engineering limitations to adapt designs, propose viable solutions, and define strategic optimization plans.

Professional reference

Jinlin Xie
Associate Dean
School of Nuclear Science and Technology
University of Science and Technology of China
Email: jlxie@ustc.edu.cn