Xingzhuo Chen

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Education

- **Bachelor of Physics** Sept 2015 – June 2019
  Top-Notch Innovative Talent Project, College of Physics
  Sichuan University, China, GPA: 3.66/4.00.
- **Dissertation Defense & Research** Sept 2018 – July 2019
  Chinese Center for Antarctic Astronomy
  Purple Mountain Observatory, China.
- **Ph.D Astronomy** August 2019 – July 2024
  Department of Physics and Astronomy
  Texas A & M University, USA.
- **Postdoc in Data Science** August 2024 – July 2025
  Texas A & M Institute of Data Science (TAMIDS)
  Texas A & M University, USA.

Computer Skills

- **Programming Languages**: Python (PyTorch, keras), C++, R, Julia.
- **Astronomical Software**:
  - **AIAI-SN**: An artificial intelligence to determine the elemental abundance of type Ia supernovae based on TARDIS radiative transfer program. AIAI-SN can estimate the elemental abundances from carbon to nickel elements, a power-law density profile, and a series of simulated spectra, given an observational spectral time sequence. I have **led the development** of AIAI-SN.
  - **SFFT**: An image subtraction program to detect supernova candidates from the sky survey telescopes, using GPU to accelerate the computation. I have **participated in the development** of SFFT.
  - **SNAIL**: An artificial intelligence designed to predict the optical spectrum of type Ia supernovae. I have **participated in the development** of SNAIL.
  - **SEDONA**: A monte carlo radiative transfer program for supernova optical light curve and spectra simulation. I have **contributed to the development of** SEDONA for 3-dimensional time dependent radiative transfer calculations with polarization.
- **Platforms**: TAMU HPRC (7.8 million CPU hours), NERSC Cori (50,000 CPU hours), NERSC Perlmutter (1352 Node hours).

Observing

- **CTIO DECam**: Developed the supernova search and light curve measurement pipeline for the supernova searching programs 2020B-0279, 2021A-0148, 2022A-388025, 2022B-297190, 2023A-881453, 2023B-735801. Totally 50.5 scheduled nights.

Talks & Outreach

2019 Aug	*Deep-Learning on Synthetic Ia Supernovae Spectra* TAMU Astronomy Symposium, USA.
2020 Aug	*Building an Observatory on Antarctica* Astronomy on Tap Bryan College Station, USA.
2021 May	*Finding Supernovae in Big Data* 4th Annual Texas A&M Research Computing Symposium, USA.
2021 Oct	*Using Physics-Informed Neural Network to Calculate Radiative Transfer Problems* TAMIDS SciML workshop, USA.
2022 Mar	*Constraining Type Ia supernova Delay Time With Spatially Resolved Star Formation Histories* Cook's Branch Workshop on Supernovae, USA.
2022 Aug	*Three Dimensional Radiative Transfer Calculation on Supernovae* TAMU Astronomy Symposium, USA.
2024 Jan	*A New Polarisation Spectral Retrieval Techinque for Supernova Radiative Transfer Simulations* 243rd Meeting of the American Astronomical Society, USA, iPoster.
2025 Jan	*GesaRaT: The Gesamtkunstwerk of Radiative Transfer for Supernovae* 245th Meeting of the American Astronomical Society, USA, Oral Talk.

Teaching

2020 – 2022	TAMU ASTR420 *Advanced Astrophysical Research* Teaching Assistant with grading, office hour, telescope observation arrangement. 3 semesters.
2021	TAMU ASTR320 *Astrophysical Research* Teaching Assistant with grading, office hour, program testing. 1 semester.

Peer-Reviewed Publications

- **Xingzhuo Chen**, Danqing Zhang, Xi Zhang, Yong Liu, Xueyan Li, Gang Xiang. *Synthesis and growth mechanism of Mn-doped nanodot embedded silica nanowires.* 2019, Physica B, 571, 10.
- Shihao Kou, **Xingzhuo Chen**, Xuewen Liu. *A New Method to Classify Type IIP/IIL Supernovae Based on Their Spectra.* 2020, ApJ, 890, 177.
- **Xingzhuo Chen**, Lei Hu, Lifan Wang. *Artificial Intelligence-Assisted Inversion (AIAI) of Synthetic Type Ia Supernova Spectra.* 2020, ApJS, 250, 12.
- **Xingzhuo Chen**, Lei Hu, Lifan Wang. *Constraining Type Ia Supernova Delay Time with Spatially Resolved Star Formation Histories.* 2021, ApJ, 922, 15.
- Lei Hu, Lifan Wang, **Xingzhuo Chen**, Jiawen Yang. *Image Subtraction in Fourier Space.* 2022, ApJ, 936, 157.

- Lei Hu, **Xingzhuo Chen**, Lifan Wang. *Spectroscopic Studies of Type Ia Supernovae Using LSTM Neural Networks*. 2022, ApJ, 930, 70.
- Jia Lu, Lifan Wang, **Xingzhuo Chen**, David Rubin, Saul Perlmutter, Dietrich Baade, Jeremy Mould, Jozsef Vinko, Eniko Regos, Anton M. Koekmoer. *Constraints on Cosmological Parameters with a Sample of Type Ia Supernovae from JWST*. 2022, ApJ, 941, 71.
- **Xingzhuo Chen**, Lifan Wang, Lei Hu, Peter J. Brown. *Artificial Intelligence Assisted Inversion (AIAI): Quantifying the Spectral Features of 56Ni of Type Ia Supernovae*. 2024, ApJ, 962, 125. Research Highlighted in AAS Nova https://aasnova.org/2024/03/01/supernova-nickel-and-neural-nets/

Publications In Preparation

- **Xingzhuo Chen**, Lifan Wang, Daniel Kasen. *An Integral-Based Technique (IBT) to Accelerate the Monte-Carlo Radiative Transfer Computation for Supernovae*. 2024, arxiv:2409.07729

Not Peer-Reviewed Publications

- **Xingzhuo Chen**, David J. Jeffery, Ming Zhong, Levi McClenny, Ulisses Braga-Neto, Lifan Wang. *Using Physics Informed Neural Networks for Supernova Radiative Transfer Simulation* . arxiv:2211.05219.