

HAOTIAN SONG

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🌐 Personal Web: <https://haotian-song.github.io/>

EDUCATION

University of Manchester, Manchester, UK	Jan 2021 - Jul 2021
Texas A&M University, Texas, USA	Aug 2020 - Dec 2020
Xi'an Jiaotong University, Xi'an Shaanxi, China	Sep 2017 - Jun 2021
Tsien Hsue-shen Talented Program (top 10%), Bachelor of Science in Physics (Honors)	
GPA: 89.37/100	
Peking University, Beijing, China	Jul 2020 - Aug 2020
Visiting student, Summer school program	

HONORS & AWARDS

• Outstanding Graduate Thesis Award (Top 1%), Xi'an Jiaotong University	Jun 2021
• Everest Scholarship, Xi'an Jiaotong University	Jun 2021
• Tsien Hsue-shen Academic Research Award	May 2021
• Academic Research Award, Xi'an Jiaotong University	Nov 2020
• Provincial Award for China Undergraduates Innovation and Entrepreneurship Competition	2020
• First Prize of the 5th Chinese Undergraduate Physics Experiment Competition	Jul 2019
• Outstanding Student Cadre, Xi'an Jiaotong University	Nov 2019
• Third-Class Scholarship, Xi'an Jiaotong University	Nov 2019
• First Prize of the Contemporary Undergraduate Mathematical Contest in Modeling	Dec 2018
• Outstanding Student, Xi'an Jiaotong University	Nov 2018
• Second-Class Scholarship, Xi'an Jiaotong University	Nov 2018
• Everest Scholarship, Xi'an Jiaotong University	Oct 2018

RESEARCH EXPERIENCES

I. X-ray Astronomy Aug 2018 - Present

Advisor: Zhaoyu Zuo, Professor, Xi'an Jiaotong University

- Won one provincial award out of 200 teams as a team leader.
- Statistical work on super-fast X-ray transients observation and illuminated their possible mechanism and relations with high-mass X-ray binaries.
- Proposed an idea of correlation in radiation angle of Ultra-luminous X-ray Sources, which significantly improve the fitness of simulation.
- Programmed wind Roche-lobe overflow mechanism in population synthesis code and MESA.
- Obtained the detailed statistic data of Ultra-luminous X-ray sources' progenitor neutron star via population synthesis and contribute to several discussions in evolution path. [1]
- Simulated the Ultra-luminous sources via both wind overflow and Roche-lobe overflow in Ring galaxies, compared with X-ray observation, and wrote a first-hand manuscript of paper. [2]

II. Quantum Optics, Correlation Imaging & Spectroscopy Aug 2019 - Present

Advisor: Marlan O. Scully, Professor, Texas A&M University

- Conceived an idea of sub-Nyquist (0.8%) imaging via Deep Learning (DL), designed a CNN framework, performed DL programming under CNN framework; helped experimental part at TAMU.[3]
- Claimed a universally applicable DL-based convoluted speckle generation process; used this technique to retrieve complicated objects in a lower sample rate.[4]

III. Atom, Molecule and Optics

Aug 2020 - Present

Advisor: Zhedong Zhang, Assistant Professor, City University of Hong Kong

- Programmed workflow for deep-learning process and contributed to the idea of the structure of Deep-Learned Time-Resolved Coherent Raman Spectroscopy.
- Solved the Raman spectroscopic signal equation using the Liouville space approach.

IV. Other Research Area

Sep 2019 - Oct 2020

Advisor: Lei Zhang, Professor, Xi'an Jiaotong University

- Conducted experiment on quartz crystal microbalance and explored the effect of polyelectrolyte with different electrical properties on immobilization and activity of tyrosinase.
- Won one national award out of 200 teams as a team member.

PROFESSIONAL SKILLS

- Programming Languages: Mathematica, Matlab, Python, Fortran, C++
- LaTeX, Linux (super-computing)
- SDSS queries

PUBLICATIONS

[1]. Z. Zuo†, **H. Song**, H. Xue, "Population synthesis on ultra-luminous X-ray sources with an accreting neutron star: Wind Roche-lobe overflow cases". *A&A* 649, L2 (2021)

[2]. "Ultra-luminous X-Ray sources with wind Roche lobe overflow in Ring galaxies", Graduate Thesis, Xi'an Jiaotong University.

[3]. **H. Song**, X. Nie, H. Su, H. Chen, Y. Zhou, X. Zhao, T. Peng†, M. O. Scully, "0.8% Nyquist noise-free computational ghost imaging via non-experimental deep learning", submitted to *Scientific Report*, arXiv:2108.07673

[4]. T. Peng†, **H. Song**, Z. Zhang†, and M. O. Scully, "Deep-learned speckle patterns and its application to ghost imaging".