

HAOTIAN SONG

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EDUCATION

University of Manchester, Manchester, UK <i>MPhys(Hons) Physics</i>	Aug 2020 – Current
Xi'an Jiaotong University, Xi'an Shaanxi, China <i>Tsien Hsue-shen Talented Program (top 10%), Bachelor of Science in Physics (Honors)</i>	Sept 2017 – June 2020
	GPA: 89.37/100
Peking University, Beijing, China <i>Visiting student, Summer school program</i>	July 2020 – Aug 2020

RESEARCH EXPERIENCES

I. X-ray Astronomy <i>Position: Research Assistant</i> <i>Advisor: Zhaoyu Zuo, Professor, Department of Physics, Xi'an Jiaotong University</i> <ul style="list-style-type: none">● 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]	Aug 2018 – Current
II. Radio Astronomy <i>Position: Research Assistant</i> <i>Advisor: Anna Scaife, Professor, Department of Physics, University of Manchester</i> <ul style="list-style-type: none">● Built several branch convolutional neural networks for the hierarchical Fanaroff-Riley classification of radio galaxies and improve the accuracy of the traditional network significantly.● Conceived an idea of a united loss function for the hyper-classification and accelerate the convergence in deep-learning progress.	Feb 2021 – Current
III. Quantum Optics, Correlation Imaging & Spectroscopy <i>Position: Research Assistant</i> <i>Advisor: Marlan O. Scully, University Distinguished Professor, Department of Physics & Astronomy, Texas A&M University</i> <ul style="list-style-type: none">● 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]	Aug 2019 – Current
IV. Other Research Area <i>Position: Research Assistant</i> <i>Advisor: Zhedong Zhang, Assistant Professor, Department of Physics, City University of Hong Kong</i> <ul style="list-style-type: none">● Programmed workflow for deep-learning process and contributed to the idea of the structure of Deep-Learned Time-Resolved Coherent Raman Spectroscopy. [5]● Realized time- and frequency-resolved Raman spectroscopy using entangled photons by Liouville approach, utilize the deep-learning approach for Liouville equation.	Aug 2020 – Current
<i>Position: Research Assistant</i> <i>Advisor: Lei Zhang, Professor, Department of Physics, Xi'an Jiaotong University</i> <ul style="list-style-type: none">● 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.	Sep 2019 – Oct 2020

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 in Shaanxi	Dec 2018
● Outstanding Student, Xi'an Jiaotong University	Nov 2018
● Second-Class Scholarship, Xi'an Jiaotong University	Nov 2018
● Second Prize of Everest Scholarship, Xi'an Jiaotong University	Oct 2018

PROFESSIONAL SKILLS

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

PUBLICATIONS

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- [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]. **H. Song**, Z. Zuo[†], “Ultra-luminous X-Ray sources with wind Roche lobe overflow in Ring galaxies”.
- [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]. X. Nie, **H. Song**, T. Peng[†], Z. Zhang[†], and M. O. Scully, “Deep-learned speckle patterns and its application to ghost imaging”.
- [5]. X. Nie, Y. Ma, Z. Han, **H. Song**, T. Peng[†], Z. Zhang[†], and M. O. Scully, “Deep-Learned Time-Resolved Coherent Raman Spectroscopy”.