Dazhi Zhou

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Education

2015-Now **Wuhan University**
B.Sc. Hons
School of Physics and Technology & Honor Science Program of Hongyi Honor College

Averaged Grade: 87.8%
Major GPA: 3.71
Cumulative GPA: 3.68

Spring 2018 **University of California, Santa Barbara**

Visiting Student

Research Experience

May 2019 - Undecided SFIG Group, Purple Mountain Observatory (PMO) , Nanjing, China
Advisor: **Prof. Yu Gao**

The Global Star Formation Laws of Galaxies from the MALATANG Survey

Investigated the correlation between the star formation rate and dense molecular gas mass.

Plan:

- Analyzed the data from the MALATANG Survey.
- Investigated the relation between the luminosity of IR/HCN and the star formation rate.
- Evaluated different models by our result and interpreted the physics mechanism.

Keywords: Star Formation Rate (SFR), Star Formation Efficiency (SFE), Interstellar Medium (ISM), Infrared, Accretion rate, MALATANG Survey.

Jan 2019 - May 2019 Astrophysics Center, School of Physics an Technology, Wuhan University
Advisor: **Prof. Wei Wang**

The Study of the Black Hole Binary System with HXMT's Data.(Bachelor Thesis)

Use the latest HXMT's data to analyze the properties of the black hole binary system..

Plan:

- Investigate the variation of the inner radius of the accretion disk and Fe emission lines in the increment of the black hole binary system's luminosity.
- Compare our result with the previous works.
- Clarify the existence and mechanism of outflows. Verify whether outflows are the reason of the odd relation between the inner radius and the luminosity.

Keywords: Binary system, Accretion and outflow region, Black hole, HXMT.

Sep 2018 - Now Astrophysics Center, School of Physics an Technology, Wuhan University
Advisor: **Prof. Wei Wang**

The Measurement of the Black Hole Spin.

Identified the iron Kα lines from HXMT's data and get the spin of the black hole.

- X-ray timing analysis of a HXMT newly-discovered black hole.
- Analyzed broad iron lines to get the inner radius of the accretion disks and black hole spin.

The Origin of the AGN Maser.

Investigated the distribution of the AGN maser to verify the unified model of AGN. This research focuses on the relation between the inner radius of the dust torus and the maser disk size.

- Developed a new model for AGN maser.
- Derived the radius of the innermost dust torus from Chandra and Nustar's data.
- Verified our result by Monte Carlo Simulation and other methods(Fe Kα line, interference).

Keywords: Megamaser, Radiative transfer model, Monte Carlo Simulation, Fe Kα line, Spin.

May 2018 - Aug 2018 Experimental Cosmology Group, Department of Physics, UC Santa Barbara
Advisor: **Prof. Philip Lubin**

The Simulation for the Laser-Phased Array

Evaluated the intensity distribution at a certain target plane.

- Calculated the optical field directly from each sub-aperture by far field diffraction pattern.
- Developed the algorithm and summed the optical fields from each element numerically to get the beam profile of the whole array.

Keywords: Laser, Diffraction simulation, Optimization algorithm, Laser-phased array.

Jun 2018 - Aug 2018 ENIGMA Research Group, Department of Physics, UC Santa Barbara
Advisor: **Prof. Joseph Hennawi**

Modeling the Time Variability of SDSS Stripe 82 Quasars as a Damped Random Walk

It is a repeated process of the procedure from a paper *(Modeling the Time Variability of SDSS Stripe 82 Quasars as a Damped Random Walk)*, which is more or less a research training in observation.

- Collected and Selected the data (9275 S82 quasars) from SDSS DR7.
- Plotted the light curve and got the power spectrum.
- Computed the structure function for the Damped Random Walk Model.

Keywords: Damped Random Walk Model (DRW), Power Spectral Distribution (PSD), Structure Function (SF), Time Variability, SDSS.

Jan 2018 - Feb 2018 Institute of Physics, Chinese Academy of Sciences, Beijing, China
Advisor: **Prof. Xinyu Pan**

Solid State Quantum Computing (using nitrogen-vacancy center spin in diamond)

The electron spin of Nitrogen-vacancy (NV) center is a good candidate for quantum computing, which has very long coherence time and can be initialized , manipulated and readout by optical and microwave pulses.

- Surveyed adiabatic quantum computation, calculated adiabatic inversion and simulated the spin echo.
- Constructed an experimental realization of optimal phase-covariant quantum cloning machine with an NV center in diamond nano-particle with other graduate students.

Keywords: Spin dynamics, Nitrogen-vacancy (NV) center, Rabi frequency, Optically Detected Magnetic Resonance (ODMR).

Summer School

2016 **Columbia University**

2017 **Peking University**

Programming Skills

- **Programming Languages**

  Python, C/C++, Julia, PHP

- **Software**

  Mathematica, Matlab, Jupyter, LaTex, Origin,
  ROOT, Geant4 **(Hep)**
  MESA, XSPEC, Polaris, RADMC-3D, HXMT Data Analysis Software **(Astro)**

Interests

- **Ping Pong, Tennis, Swimming, Cycling, Badminton, Running**
- **Saxophone**
- **Photography**