

# Shiau-Jie Rau

## Curriculum Vitae



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## RESEARCH EXPERIENCES

- 2021 – **Research Assistant**, *National Center for Theoretical Sciences*, Hsinchu, Taiwan.
- Study type Ia supernovae with Professor Kuo-Chuan Pan.
  - Perform 2-D hydrodynamics simulation with AMR code.
- 2019 – 2021 **Master Student**, *National Tsing Hua University*, Hsinchu, Taiwan.
- Study type Ia supernovae with Professor Kuo-Chuan Pan.
  - Perform 2-D hydrodynamics simulation with AMR code.
  - Attend international conferences.
- We investigate the response of surviving companions via two-dimensional hydrodynamics simulations of supernova ejecta on binary companions and the subsequent long-term stellar evolution of surviving companions. We also consider a wide range of possible hydrogen-rich companions and characterize the companion response systematically.
- 2018 **Summer Student**, *Institute of Astronomy and Astrophysics, Academia Sinica*, Taipei, Taiwan.
- Study PAH evolution in galaxies with Dr. Hiroyuki Hirashita.
  - Post-process hydrodynamical simulation.
  - Attend international conferences.
- We investigate the evolution of polycyclic aromatic hydrocarbon (PAH) abundance in a galaxy. We calculate the evolution of dust grain size distribution in a manner consistent with the physical conditions of the interstellar medium by post-processing our previous hydrodynamical simulation of an isolated disc galaxy. We also differentiate between aromatic and non-aromatic grains for carbonaceous dust species and explicitly considered the aromatization process.
- 2016 – 2017 **Summer Student**, *Institute of Physics, Academia Sinica*, Taipei, Taiwan.
- Simulate signals from cosmic ray with Dr. Li, Hau-Bin, Chen, Wun-Yi, Jiang, Ming-Chun, and Yu, Kuan Wei
- We use Geant4 to simulate signals for the Ge detector from cosmic rays. We consider jets from the atmosphere. We also consider the geometry and materials of the power plant and the shelter which the Ge detector locates in.

## EDUCATION

- 2019 – **Master of Science in Physics**, *National Tsing Hua University*, Hsinchu, Taiwan, GPA: 4.11/4.30.
- 2015 – 2019 **Bachelor of Science in Physics**, *National Tsing Hua University*, Hsinchu, Taiwan, GPA: 4.01/4.30.  
Graduate with honor

## PUBLICATION LIST

- 2019 **Modelling the evolution of PAH abundance in galaxies.**
- By [Rau S.-J.](#), Hirashita H., Murga M., 2019, MNRAS, 489, 5218

## SCIENTIFIC ACTIVITIES

- 2020 **Hiding Surviving Companions in Type Ia Supernova Remnants.**
  - Poster at 2020 Astronomical Society of the Republic of China Annual Meeting
  - With K.C. Pan
- 2020 **Characterizing Surviving Companions After Type Ia Supernova Explosions.**
  - Poster at 2020 Physical Society of Taiwan Annual Meeting
  - With K.C. Pan
- 2019 **Modeling the Evolution of PAH Abundance in Galaxies.**
  - Oral at 2019 Astronomical Society of the Republic of China Annual Meeting
  - With H. Hirashita
- 2019 **Charactering the Surviving Companion After a Type Ia Supernova Explosion.**
  - Poster at 2019 Astronomical Society of the Republic of China Annual Meeting
  - With K.C. Pan

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## HONORS

- 2019 **Graduate with honor.**  
From National Tsing-Hau University, Department of Physics
- 2018 **Lu Tian-Hui Scholarship.**  
For students ranked 1<sup>st</sup> in *Biophysics*.
- 2017 **Ma Shang-Keng Scholarship.**  
For students have outstanding grades.
- 2017 **Outstanding Academic Achievement Award.**  
For students ranked top 5%.
- 2016 **Outstanding Academic Achievement Award.**  
For students ranked top 5%.

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## OTHER EXPERIENCES

- 2020. 10 - 2021. 06 **Physics turtor for physically challenged students**, National Tsing Hua University, Resource Room.
- 2018. 04 - 2018. 07
  - Teach *General Physics*, *Experimental Physics*, *Quantum Mechanics*, and *Applied Math*.
  - Assist in exam preparation and report writing.
  - Create an interactive learning environment.
  - Edit teaching material.
- 2020 Spring **Teaching assistant**, *General Physics B II*.
  - Evaluate exam papers and homework.
  - Answer questions from students.
- 2018 Fall **Teaching assistant**, *Theoretical Mechanics*.
  - Evaluate exam papers and homework.
  - Host TA session.
  - Answer questions from students.

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## PROGRAMMING

### Language.

C/C++, Fortran, python

### Software.

FLASH, MESA, Geant4, ROOT, Linux, LaTeX