CHING-YAO TANG

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ching-yao-tang- ChingYaoTang

COURSES

Undergraduate courses:

- General Physics I/II (A-/A+)
- Calculus I/II (A+/A+)
- Matrices and Vector Analysis (A+)
- Electricity and Magnetism I/II (A+/A+)
- Electromagnetic Waves (A+)
- Applied Mathematics I/II (A+/A+)
- Mathematical Physics (A+)
- Computational Physics I/II (A+/A+)
- Intro. to Quantum Physics I/II (A+/A+)
- Mechanics I/II (A+/A+)
- Modern Physics (A+)
- Thermal Physics (A+)
- Introductory Statistical Mechanics (A-)

Graduate courses in college:

- Quantum Mechanics I/II (A+/A+)
- Statistical Mechanics (A+)

Graduate courses in graduate school:

- Classical Electrodynamics I (A-)
- Statistical Physics I (A)
- Advanced Astrophysics (A)
- Computational Astrophysics (A-)
- Statistics for Astronomy (A)

SKILLS

Programming:

Python | C/C++ | Shell | Git | Tensorflow | Latex

Experience of HPC:

- Taiwania 1 (NCHC, Taiwan)
- Tiara (ASIAA, Taiwan)
- Cori (NERSC, US)

Languages:

- English (IELTS 5.5)

EXPERIENCE

Research Assistant | Institute of Astronomy and Astrophysics, Academia Sinica (ASIAA)

02/2022 – 04/2023 Taipei, Taiwan

- We simulated the turbulent structure formation of the primordial cloud with high-performance computing (HPC). I rectified the hydrodynamics code written in C and analyzed the simulation data with Python packages.
- We made a rigorous comparison with other papers and found out that our turbulence model can bridge the discrepancy between observation and simulation by tuning the turbulence parameters.
- Publication: Submitted to The Astrophysical Journal (manuscript #: AAS45499). arxiv.org/abs/2303.00751

EDUCATION

M.S. | Dept. of Physics, Natl. Taiwan Univ. (NTU)

09/2019 – 08/2021 Taipei, Taiwan

- GPA: 3.81/4.3
- Thesis: The Pop III Star Formation within the Turbulent Primordial Cloud

B.S. | Dept. of Physics, Natl. Dong-Hwa Univ. (NDHU)

09/2015 – 06/2019 Hualien, Taiwan

- GPA: 4.34/4.5

PROJECTS

Deep Learning for Gravitational Wave Detection

10/2017 – 06/2019 Natl. Taiwan Normal Univ.

- We proposed a deep learning method to speed up the process of identification and parameter estimation of the gravitational wave (GW) detection. I used a pre-trained residual neural network written in Python (Tensorflow) to enhance the accuracy and trained it with HPC.
- By transforming the time-series data of GW into spectrogram, our 2D convolutional neural network model have accuracy about 98.75% and faster than previous methods.

Parallel Multi-grid Gravity Solver Algorithm

04/2020 – 06/2020 NTU

- We programmed a parallel multi-grid method with C, OpenMP, and MPI to solve the 2D Poisson equation. The algorithm was collaboratively developed by Git and GitHub.
- The performance scaling such as wall-clock time was measured and compared with naive method to realize the importance of advance algorithm and parallel computing.

EXTRACURRICULAR ACTIVITIES

Coordinator of Activities | Student Association of Dept. of Physics

06/2017 – 06/2018 NDHU

Counsellor | Preparation Team of Freshman Orientation

04/2016 – 08/2016 NDHU