Yingqiu HE

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Education

Zhejiang University of Technolgy (ZJUT) *Hangzhou, China*

BSc in Optoelectronic Information Science & Engineering *Sept. 2020 - July 2024 (Expected)*

- **GPA (percentage):** 3.5/5.0 (84.9%) (Top 20%)
- **Main Courses:** Analytical Mechanics, Electromagnetic Field Theory, Quantum Mechanics, Statistical Physics (avg. score: 90)

The University of Electro-Communications (UEC) *Tokyo, Japan*

International Student of Short-Term Exchange JUSST Program *Oct. 2022 - Sept. 2023*

- **Main Courses**: Evolutionary Computation, Photonics and Opto-electronics, Optical Communication Engineering, Academic Skills (avg. score: 93)

Research Experience

Theoretical Study on Baryon Acoustic Oscillations *ZJUT, Hangzhou, China*

BSc Thesis, Supervisor: Assoc. Prof. Xinjuan YANG (Inst. for Theoretical Physics & Cosmology) *Oct. 2023 - Current*

- Investigate the evolution of the cosmic structure from linear perturbation theory to the dark halo model by means of linear and non-linear theoretical ΛCDM model analysis, and study in detail the matter power spectrum and its behaviors on different scales.
- Found that on large scales, the aggregation of the dark halo is the dominant factor, and the gravitational effects of baryons and dark matter jointly promote the structure growth; on small scales, the distribution of matter within individual halos dominates the structure.
- Abtained the BAO near $k \approx 0.1h\,\mathrm{Mpc}^{-1}$, indicating that the coupling of baryons and photons has a significant effect on power spectrum, and the two-point correlation function in both the real and the redshift spaces show a significant effect at $r \approx 100h^{-1}\,\mathrm{Mpc}$ at acoustic scales.

3-D Imaging Method Based on Spectral Interferometry Using Optical Frequency Comb *UEC, Tokyo, Japan*

Research Internship, Supervisor: Prof. Kaoru MINOSHIMA (Dept. of Engineering Science) *Oct. 2022 - Sept. 2023*

- Improved the overall imaging system aiming for high image resolutions, fast processing, and wide dynamic range using Optical Frequency Comb (OFC).
- Enhanced the spectrometer by designing an image sensor-driven circuit to detect and evaluate the OFC signal using MATLAB.
- Successfully acquired signals with reduced noise and increased integrity, which is expected to enhancing image resolution.
- **Conference Presentations:**

  [1] Development of Multichannel Spectrometer for Measuring Phase Difference in Optical Frequency Comb Pulses,
  Y. He, T. Kato, Y. Nekoshima, K. Hino, K. Minoshima, *Student Poster Presentation in Tokushima Univ.*, Tokushima, Japan, 2022/12/23.

  [2] Image Sensor-Driven Circuit Design for Measuring Optical Frequency Comb Spectrum,
  Y. He, T. Kato, Y. Nekoshima, K. Hino, K. Minoshima, *50th UEC Int. mini-Conf. for Students on Infom. Sci. and Engineering*, Tokyo, Japn, 2023/08/07.

Awards and Honors

2024	**Second Prize**, Zhejiang Provincial College Students Theoretical Physics Competition	*China*
2023	**Level 5**, Aikido Grading Examination	*Japan*
2022	**Scholar**, JASSO Goverment Scholarship	*Japan*
2021	**Third Prize**, College Scholarship for Studies	*China*
2020	**Eighth place**, Women's 3000-meter Race in the School Sports-Meeting	*China*

Skills or Interests

Programming	Mathematica (Halo model), MATLAB (OFC signal analysis), Python (Finite-Difference Time-Domain).
Miscellaneous	LaTeX (Overleaf/VScode), Markdown, Origin, Fusion 360, Visio, Microsoft Office, Git, Illustrator.
Languages	Chinese (native), English (TOEIC 765, CET-6 536), Japanese (JLPT-N1 passed)
Interests	Theoretical aspects of particle physics and cosmology for understanding the universe's origin.