Liang Wang

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Research: SYK Holography Cosmology SUSY
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1 Education

Shanghai Jiao Tong University *2021.09 - 2025.06*

B.S(Physics,Tsung-Dao Lee Honor Class)
Grades: 85/100
Grad Courses: Group Theory(86) Gauge Field Theory(Audit) QFT(93) GR(93)

University of New South Wales *2023.09 - 2023.12*

Exchange(Physics)
Grades: 87.3/100
Courses: Particle Physics(96) TOR Research(91)

2 Academics Experience

Workshops & Advanced Summer Schools

- Workshop on Muon Physics at the Intensity and Precision Frontiers
- SUT-PSI School of Muon and Neutron Physics
- Joint TDLI and INPAC summer school in particle physics.
- 3rd and 4th Southeast University Frontier Summer School on String Theory, Field Theory, and Holography.
- SooChow University's 2nd SUIAS workshop on High Energy Physics, covering topics such as Gravitational Waves, String Theory, and Quantum Field Theory.

3 Research Experience

(gr-qc)Inflation and Early Universe *2023.09 - 2024.06*

Under the guidance of *Prof. Yvonne Wong* (The University of New South Wales), I studied cosmology and mainly focusing on early universe fluctuations and their connection to the CMB temperature.

Under the guidance of *Prof. HongJian He*(Shanghai Jiao Tong University), I researched and studied cosmological perturbation theory, cosmological collider properties and basics on cosmological bootstrap.

(hep-th) Holography

1. Duality between photon ring and black hole *2024.04 - 2024.06*

I investigated the duality between the photon ring and the Quasi Normal Modes(QNMs) of Schwarzschild-like black holes with *Prof. Tower Wang*(East China Normal University). A set of canonical variables for photon ring possess $SL(2,R)$ symmetry that QNMs has.

We attempted to extend this duality to astrophysics black holes. We found spherically symmetric black holes would all have this correspondence, though it's a trivial results.

2. Summer research study on AdS_5/CFT_4 *2024.06 - 2024.07*

In FuSEP summer research program at University of Science and Technology of China, I studyed the building of AdS/CFT under *Jianxin Lu*'s supervision. I presented a reading report on how to build the correspondence between $AdS_5 \times S^5/CFT_4$ through D_3 Branes on action level.

3. SYK,Wormhole and Teleportation *2024.11 - 2025.05*

Under Prof *Antonio Garcia*'s supervision (SJTU), I learned in depth the properties of the SYK model, JT/SYK duality, and Maldacena-Qi model(which has wormhole interpretation).I further explored the Keldysh dynamics of the open system SYK and looked into how measurements in the SYK model can be interpreted within its dual gravitational system.

4. N=(0,2) Super-Symmetric SYK and higher spin *2024.12 - Now*

Given N=(0,2) Super-Symmetric SYK-like model, with μ as a parameter indicating the number ratio of chiral and fermionic super-fields, demonstrating higher spin properties through kernel behavior. Supervised by *Prof Cheng Peng*(KITS-UCAS), we are currently studying whether this it is a general feature in different models. And we are focusing the one with specific E-term.

(Others)Other Research

Research on Muon Source feasibility *2023.01 - 2024.02*

Working in *Prof. Kim Siang Khaw* 's group in Tsung-Dao Lee Institute, we used GEANT4-based simulation software to simulate particle interaction processes, and optimize the target to maximize muon production on target.

Preprint: *Simulation studies of a high-repetition-rate electron-driven surface muon beamline at SHINE* arXiv:2503.01597

4 Skills

- Language & Coding:

  Tofel(105/120),Python, C++, Linux, Matlab, Mathematica,LaTeX, HTML

- Program:

  CAMB(Cosmology) MESA (Astro) ROOT,Geant4,Paraview(hep-ex) OpenVINO (Machine Learning and Computer-Vision),Origin(Data Processing).