

Curriculum Vitae

Personal information

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Education

- **Huazhong University of Science and Technology** **2023–Present**
Advisor: Prof. Chao Liu
Thesis: Proofs of singularity-free solutions and scalarization in nonlinear Einstein-scalar-Gauss-Bonnet cosmology
- **Huazhong University of Science and Technology** **2019–2023**
B.S. in Physics
Relevant Courses: General Relativity, Quantum Field Theory, Differential Geometry

Research Experience

- **Holographic Mapping of Particle Dynamics** **2022–2023**
Advisor: Prof. Wuzhong Guo, HUST
- Established operator-state correspondence for AdS geodesics in CFT.
- Proved semiclassical consistency ($G \rightarrow 0$) between commutators and Poisson brackets.
- Derived conformal transformation rules for initial conditions.
- **Singularity-Free Cosmology in ESGB Gravity** **2023–Present**
Advisors: Prof. Chao Liu, HUST, Prof. Jinhua Wang, XMU
- Class. Quantum Grav. 43 125005, arXiv:2512.00455
- First rigorous proof of global singularity-free solutions in nonlinear ESGB theory.
- Developed the *power identity* method to derive structural differential inequalities.

Publications

- **He, C., Liu, C., Wang, J.** (2025). "Proofs of singularity-free solutions and scalarization in nonlinear Einstein-scalar-Gauss-Bonnet cosmology"
arXiv preprint Class. Quantum Grav. 43 125005
- **He, C., Liu, C.** (2025). "Existence and bounds of nonlinear singularity-free cosmological solutions in a string-inspired gravity"
arXiv preprint arXiv:2512.00455