北京师范大學 物理与天文学院
SCHOOL OF PHYSICS AND ASTRONOMY, BEIJING NORMAL UNIVERSITY

题目: Effective dust collapse models: LQG-inspired polymerizations and beyond

报告人: Prof. Dr. Kristina Giesel, FAU Erlangen-Nürnberg

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报告人简介:

Kristina Giesel has been a professor at the Institute for Quantum Gravity at the Friedrich-Alexander Universität Erlangen-Nürnberg since 2011. She was previously an Assistant Professor at Louisiana State University in Baton Rouge and held postdoctoral positions at the Albert Einstein Institute, Max Planck Institute for Gravitational Physics in Postdam, the Nordic Institute for Theoretical Physics (Nordita) in Stockholm and the Excellence Cluster Universe at LMU in Munich. In 2025, she was awarded a Simons Emmy Noether Fellowship from the Perimeter Institute for Theoretical Physics in Waterloo. Her research field is quantum gravity, with a particular focus on the dynamics including the formulation of the Quantum Einstein Equations in loop quantum gravity and with applications to cosmology and black holes. This also includes the role and properties of (quantum) reference frames in this context. In addition, she has recently started to investigate open quantum systems including gravity and gravitationally induced decoherence with applications in the context of neutrino oscillations.

报告摘要:

Symmetry-reduced quantizations have been successfully applied in the context of loop quantum cosmology and corresponding effective models encoding quantum corrections to the classical model via polymerization functions have been derived. Recently, interest has grown in the study of such effective models in the context of dust collapse models. After a brief introduction to spherically symmetric effective models, recent results on effective LTB models as well as regular black hole models are presented. This includes the embedding of generalized LTB models into polymerized spherically symmetric models and a discussion of their physical implications such as the presence of shock solutions. Furthermore, for certain classes of models, the relation between regular black hole solutions and the corresponding polymerized models as well as their extension to effective marginally bound LTB models is presented.