

# Modifying Gravity Without Extra Degrees of Freedom

**Date** 10:30 - 12:00, May 17(Friday), 2024

**Place** 1131, Building 9 (Zoom ID: 881 5903 1592)

## Speaker

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## Abstract

The detection of gravitational waves (GWs) has provided us with a novel tool to test gravitational theories, which also raises a fundamental question: is General Relativity the unique theory for the two tensorial degrees of freedom (TTDOFs) associated with the GWs? In other words, is it possible to modify gravity without introducing any extra degree of freedom?

In this talk, we will first introduce the motivation and previous attempts to build gravity theories with only the TTDOFs. We will then discuss our results in building such TTDOF theories in the framework of spatially covariant gravity, including: (1) the conditions for the Lagrangian to propagate only the TTDOFs, and(2) constructing the Hamiltonian directly with auxiliary constraints.

## Biography

Xian Gao is a professor in the School of Physics and Astronomy at Sun Yat-sen University (SYSU). He earned his Ph.D. in 2010 from the Institute of Theoretical Physics, Chinese Academy of Sciences. He then conducted postdoctoral research at Paris University 7, Tokyo Institute of Technology, and the University of Tokyo, before joining SYSU as faculty in 2016. Xian Gao's research focuses on gravitational theories and cosmology, including modified gravity and related cosmological models, primordial inflation and perturbations, and gravitational waves. He has published more than 50 scientific papers with over 3000 citations and is the author of a textbook on classical mechanics. He is also a committee member of the branch of Gravitation and Relativistic Astrophysics at the Chinese Physical Society.