IOA Colloquium

Modified Gravity

Date 14:00 - 15:30, November 6 (Wednesday), 2024

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

Speaker

Prof. Shin' ichi Nojiri (野尻 伸一)

Kobayashi-Maskawa Institute for the Origin of Particles and the Universe, Nagoya University

（小林-益川素粒子宇宙起源研究所, 名古屋大学）

Abstract

The development of cosmological observations in recent decades has led to the current era of precision cosmology. As a precursor to this development, at the end of the last century, observations of Type Ia supernovae and cosmic background radiation revealed that the universe had accelerated expansion for approximately 6.6 billion years. The unknown fluid causing this accelerated expansion has been named dark energy, and its elucidation is considered the biggest challenge in physics this century. The simplest dark energy model is the cosmological constant, which is remarkably consistent with observations. However, assuming that dark energy is the cosmological constant, a theoretical problem called the 'coincidence problem' or the 'fine-tuning problem' arises, and many attempts to explain accelerated expansion by extending or modifying general relativity have been proposed since the beginning.

I will review the modified gravity theories, especially, scalar-tensor theory, scalar-Einstein-Gauss-Bonnet gravity, and F(R) gravity. We discuss how these models can be realistic. We find cosmological or spherically symmetric solutions different from Einstein's gravity, which could be verified in future observations or experiments. We also consider the modifications of the generation and propagation of the gravitational wave.

Biography

Prof. Shin'ichi Nojiri completed doctoral course at the Graduate School of Science, Kyoto University in March 1981, and received the degree of Doctor of Science from Kyoto University. He became a professor at Nagoya University in April 2006 and an emeritus professor from April 2024. After his appointment at Nagoya University, he served as Director of Center for Theoretical Studies, Kobayashi-Maskawa Institute for the Origin of Particles and the Universe (KMI), etc. and was elected councillor of the Nagoya University Union in April 2016 (until March 2022).