

# Cosmological Tests of Gravity

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The most relevant force on astronomical scales is gravity. Currently, the most widely accepted and extensively tested theory of gravity is Einstein's General Relativity. General Relativity is a theory that links geometrical properties of spacetime with mass, energy, and momentum of objects occupying the spacetime. General Relativity accurately describes variety of astronomical phenomena such as motion of stars, expansion of the universe, bending of light, as well as existence and propagation of gravitational waves.

However, just as any other physical theory, General Relativity is expected to be replaced by a theory that will provide a deeper more thorough understanding of Nature and its properties.

In this series of lectures, I will discuss General Relativity and talk about cosmological tests of Einstein's theory of gravity.

Monday, 11.15am-12pm  
25 January 2021

## ***Road to Relativity***

This is the introductory lecture discussing basic concepts and experimental facts that led to Einstein's theory of gravity. This lecture is design to discuss concepts that students should already be familiar with. The lecture will finish with the introduction of the Einstein Equations.

Tuesday, 11.15am-12pm  
26 January 2021

## ***Standard Cosmological Model***

The second lecture will discuss cosmological solutions of the Einstein equations. The lecture will introduce the Standard Cosmological Model and will discuss its basic properties.

Wednesday, 11.15am-12pm  
27 January 2021

## ***Non-Riemannian Signatures and Nature of Gravity***

The third lecture will focus on geometrical foundations of Einstein's theory of gravity. The lecture will discuss light propagation and types of signatures in cosmological data that could point to non-Riemannian effects. The lecture will finish with a discussion on how future surveys could provide a better insight into the underlying geometry of the Universe.

Thursday, 11.15am-12pm  
28 January 2021

## ***Cosmological Tests of Gravity***

This final lecture will focus on various extensions of Einstein's General Relativity. The lecture will discuss how various models of gravity are tested with cosmological data. The lecture will finish with a discussion of the latest constraints.

Lectures will be delivered via Zoom

Meeting ID: **895 8099 7523**, Passcode: **994806**