

PHYS-738

Quantum Field Theory Methods in Gravity and Cosmology

Sibiryakov Sergey

Cursus	Sem.	Type
Physics		Obl.

Language of teaching	English
Credits	2
Session	
Exam	Oral
Workload	60h
Hours	30
Courses	20
Exercises	10
Number of positions	

Frequency

Every 2 years

Remark

Every 2 years / Next time: Spring 2019

Summary

The aim of the course is to address several topics in the modern theory of gravity and cosmology, which involve in an essential way the quantum properties of fundamental fields.

Content

Topics to be covered:

1. Quantum fields in curved space-time
 1. a) Hawking radiation of black holes and the information paradox
 1. b) Production of particles in an expanding universe
2. The theory of cosmic inflation
 2. a) Production of primordial gravitational waves and density perturbations in the slow-roll model
 2. b) Extensions of the simplest model: effective theory of inflation
 2. c) Statistical properties of the primordial spectra

Learning Prerequisites**Required courses**

Foundations of quantum field theory and general relativity