Title:

Primordial Black Hole formation and Gravitational Wave production in the Horndeski theory of gravity

Abstract:

We discuss the formation of primordial black holes and the production of gravitational waves from cosmic inflation for cosmological models, so-called the Horndeski theory of gravity. Cosmological models of our interest incorporate the kinetic coupling between the scalar field and gravity and the derivative self-interaction of the scalar field. Considering equally important contributions from these two effects during inflation, we first reconstruct the inflaton potential that enables us to understand the cosmic history of the universe after inflation. In addition, we estimate the energy spectrum of scalar-induced gravitational waves and provide constraints in light of the observational data.

Research topics:

My research interests tend to focus on topics of early universe cosmology, including the initial condition of the universe, cosmic inflation, primordial origins of gravitational waves and black holes. I also have developing interests in understanding the nature of dark matter and dark energy and classical and quantum aspects of gravity.

Short Bio:

Gansukh Tumurtushaa (Ph.D.) was born and grew up in Mongolia. After receiving his B.Sc. in Physics from the National University of Mongolia in 2010, he moved to Seoul for his Ph.D. study and started his ten years of journey to South Korea. Supervised by Prof. Bum-Hoon Lee, he obtained his Ph.D. in Physics from Sogang University in Aug. 2016 and remained at Sogang, as a post-doc researcher in the Center for Quantum Spacetime (CQUeST), until Mar. 2017. In Apr. 2017, he joined the Center for Theoretical Physics of the Universe, Institute for Basic Science, Korea, as a research fellow and worked there for three years until Mar. 2020. Currently, he is a Junior Research Fellow at National Taiwan University.