量子物理学・ナノサイエンス第 251 回セミナー

Anisotropy evolution in *f(R)* gravity

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場所　：　本館 2 階 239 物理学系輪講室

概　要

Although the present universe is homogeneous and isotropic in large scales, possibility of inhomogeneity and anisotropy at the very early stages of the universe cannot be ruled out. Indeed, any 'good' theory of the early universe, be it inflation or bounce, is demanded to possess some kind of isotropization mechanism inbuilt in it. In my talk I will mainly be focused on anisotropic universes, which are described by Bianchi models. In general relativity, behavior of anisotropy is relatively simple; in absence of any anisotropic source, the total amount of anisotropy varies simply as inverse of the cube of the scale factor, i.e., decreases in an expanding universe and increases in a contracting universe.

However, in modified *f(R)* theories of gravity, behavior of anisotropy is not so simple; this is because of a strange intertwining between the definition of Ricci scalar for Bianchi models and the solution of the anisotropy parameter in *f(R)* gravity! The evolution of anisotropy in *f(R)* gravity becomes nonlinear and complicated. In my talk I will analyze the behavior of anisotropy in *f(R)* gravity from three different points of view; the dynamical systems analysis of *f(R)* gravity for Bianchi-I spacetimes, reconstruction method of *f(R)* gravity in presence of metric anisotropy, and explicit calculation of anisotropy evolution in a simple exactly solvable case. My talk is based on the my works arXiv numbered 1805.03237, 1803.01594, 1710.07906.

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