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HAMILTONIAN FORMALISM OF BIANCHI TYPE I MODEL FOR PERFECT FLUID

ALOKANANDAKAR[1] & SHOUVIK SADHUKHAN[2]

[1]Student, Department of Physics, University of Calcutta, West Bengal, India

[2]Student, Department of Physics, Indian Institute of Technology, Kharagpur, West Bengal, India

ABSTRACT

We propose the Hamiltonian formalism of Bianchi type 1 cosmological model for perfect fluid. We have considered both the equation of state parameter ω and the cosmological constant Λ as the function of volume V(t) which is defined by the product of three scale factors of the Bianchi type 1 line element. We propose a Lagrangian for the anisotropic Bianchi type-1 model in view of a variable mass moving in a variable potential. We can decompose the anisotropic expansion in terms of expansion and shearing motion by Lagrangian mechanism. We have considered a canonical transformation from expanding scale factor to scalar field ø which helps us to give the proper classical definition of that scalar field in terms of scale factors of the mentioned model. This definition helps us to explain the cosmological inflation. We have used large anisotropy (as in the cases of Bianchi models) and proved that cosmic inflation is not possible in such large anisotropy. Therefore we can conclude that the extent of anisotropy is less in case of our universe. Otherwise the inflation theory which explained the limitations of Big Bang cannot be resolved. Part II is contained with some analysis of the lagrangian; derived in Part I; on the quintessence model.

KEYWORDS: General Theory of Relativity, Bianchi Type I model, Isotropic and Anisotropic Cosmology, Perfect fluid, Fluid Mechanics, Quintessence Model, Cosmological Inflation, Viscosity & Gravitational Physics