Duality and the generation of scale invariant primordial magnetic fields in bouncing scenarios

Debika Chowdhury
Indian Institute of Technology Madras
India

Magnetic fields have been observed in our universe over a wide variety of scales, ranging from stars and galaxies to the large scale structures and the intergalactic medium. A seed field of primordial origin seems to be required to explain the prevalence of the magnetic fields on the largest scales. Although inflation is currently considered to be the most favorable scenario to describe the origin of perturbations in the early universe, it is worthwhile to examine the origin of magnetic fields in certain alternative scenarios known as the bouncing models. In this talk, I shall discuss how scale invariant magnetic fields can be generated in a certain class of bouncing models by breaking the conformal invariance of the electromagnetic action. I shall show that the shapes of the spectra of the electric and magnetic fields are preserved across the bounce. Lastly, I shall also discuss the "duality" invariance of the power spectrum of the magnetic field under a two parameter family of transformations of the non-minimal coupling function.