Abstract

Theories beyond the standard model often contain a large number of scalar fields in addition to the standard-model fields. In the very early universe it is natural to expect the initial values of these fields to be displaced from the minimum of their potential. If they are displaced by more than the Planck scale then they can drive a period of inflation. But if they are displaced from their minimum by less than the Planck scale they will oscillate about the minimum of their potential once the Hubble rate, H, drops below their effective mass. An oscillating massive field has the equation of state (averaged over several oscillations) of a pressureless fluid. Thus the energy density of a weakly interacting massive field tends to grow relative to radiation in the early universe. Such fields must therefore decay before the primordial nucleosynthesis era to avoid spoiling the standard, successful hot big bang model. And if the energy density of a late-decaying scalar is non-negligible when it decays then any inhomogeneity in its energy density will be transferred to the primordial radiation. This is the curvaton scenario for the origin of structure.

I try to show you that how we are able to test curvaton model with non-Gaussianity, gravitational waves and other parameters which are related with observational cosmology.

During this talk I would also like to mention the possible non-Gaussianity in multi curvaton models (Phys.Rev.D76 (2007) 103003, hep-ph/0708.0233)