



Contribution ID: 197

Type: **not specified**

Generation of sparse and localized curvature perturbation from inflation

Friday 11 September 2015 14:40 (20 minutes)

We propose a mechanism of producing new type of primordial perturbation from which primordial black holes whose mass is comparable to the supermassive black holes observed at high redshifts are produced. The observable Universe consists of two kinds of many small patches which experienced different history during inflation. Large amplitude of the primordial perturbation enough to form primordial black hole is generated on patches that experienced more Hubble expansion than the others. By making the former patches minor component, rarity of supermassive black holes is explained. Most region of the Universe belongs to the major history and has only standard adiabatic perturbation at the same level of the large scale value. Thus our mechanism can evade the constraint from the non-detection of the CMB distortion set by the COBE/FIRAS measurement. Prediction of our scenario which can be tested by future observations is also discussed.

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Session Classification: Inflation and phase transitions