Primordial and Early Galactic Nucleosynthesis in Big-Bang Cosmology

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Cosmological theory of primordial nucleosynthesis has enjoyed a success for constructing the modern cosmology. The studies of the origin of the light elements provide a powerful theoretical tool in order to constrain the Universal baryonic mass-density and the mass of dark matter. Even the cosmological phase transition is to be discussed in conjunction with the primordial nucleosynthesis. Heavy radioactive nuclei like U and Th are synthesized in explosive nucleosynthesis of core-collapse supernovae in the early Galaxy. Since they have half lives which are comparable to the age of the expanding Universe, they are used as cosmochronometers to date the Universal or Galactic age, being completely free from uncertainty of cosmological parameters.

Cosmological theory of primordial nucleosynthesis has enjoyed a success for constructing the modern cosmology. The studies of the origin of the light elements provide a powerful theoretical tool in order to constrain the Universal baryonic mass-density and the mass of dark matter. Even the cosmological phase transition, which is thought to occur in the first ten microseconds after the Big-Bang, is to be discussed in conjunction with the primordial nucleosynthesis. Heavy radioactive nuclei like U and Th are synthesized in explosive nucleosynthesis of core-collapse supernovae in the early Galaxy. Since they have half lives which are comparable to the age of the expanding Universe, they are used as cosmochronometers to date the Universal or Galactic age, being completely free from uncertainty of cosmological parameters. I would like to discuss in this talk how to decipher the evolutionary history of the physical conditions of the Universe and Galaxy in terms of the time variation of elemntal abundances after the Big-Bang.