

AS2001

Nucleosynthesis and the Chemical Evolution of the Universe

Tutorial 3

Question 1

Put the following terms in the right temporal order and give a one-sentence explanation/description for each: recombination, baryogenesis, stellar nucleosynthesis, electro-weak transition, quantum gravity (TOE) era, end of GUT era, structure formation, primordial nucleosynthesis, quark-hadron transition, matter-radiation equality.

Question 2

The term ‘recombination’ might be considered inappropriate for the process it describes. Why?

Question 3

Consider a gas cloud consisting only of ^1H , ^4He and ^7Li . Given the abundance of ^7Li relative to H by number, $\frac{n_{\text{Li}}}{n_{\text{H}}} = 10^{-6}$, and the abundance of ^4He by mass, $Y = \frac{\text{mass of He}}{\text{total mass}} = 0.25$, what is the abundance of ^4He by number, $\frac{n_{\text{He}}}{n_{\text{H}}}$?