Key Differences Between Big Bang Nucleosynthesis and Stellar Nucleosynthesis

Big Bang Nucleosynthesis

1. Time Scale: $1200\,\mathrm{s} = 20\,\mathrm{m}$.
2. Abundant free neutrons: This means there is no reliance on the nuclear weak force for the rate-determining step.
3. Temperature: $0.1\,\mathrm{MeV} \approx 10^9\,\mathrm{K}$???.

Stellar Nucleosynthesis

1. Time Scale: millions to billions to 1000s of billions of years.
2. No free neutrons: This means that the PPI chain reaction is slow since the the first step the burning H to D (i.e., $^2\mathrm{H}$) relies the nuclear weak force to convert a proton to a neutron.
3. Temperature: $\sim 10^7\,\mathrm{K}$.

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