

Resolving the Cosmological ${}^7\text{Li}$ Abundance Anomaly via Baryon Emission from Evaporating Primordial Black Holes

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Although the standard model of Big Bang nucleosynthesis successfully describes the formation of light elements, it faces a well-known challenge: the observed abundance of lithium-7 is approximately three times lower than the theoretically predicted value. This work proposes a mechanism to resolve this primordial lithium deficit through the emission of baryons by evaporating primordial black holes (PBHs). The lithium fraction can be efficiently reduced to the observed level via the transformation of ${}^7\text{Li}$ through nucleon capture by lithium nuclei. This capture process produces ${}^8\text{Li}$ or ${}^8\text{Be}$ isotopes, which then rapidly decay into pairs of helium (${}^4\text{He}$) nuclei. The analysis explores scenarios involving both “hot” and “cool” PBHs.

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