

# Primordial magnetic field and its impact on BBN

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In the standard big bang nucleosynthesis (BBN) model, there is a long-standing cosmic Lithium Problem that predicted primordial  ${}^7\text{Li}$  abundance is 4 times higher than the observation. In our recent work, we studied effects from an inhomogeneity primordial magnetic field (PMF) on BBN. In such a case, the primordial baryons are in local equilibrium with the same temperature and obey Maxwellian distribution; Globally, due to the existence of a fluctuated PMF, radiation energy density becomes inhomogeneous as the radiation temperature does. In this talk, I will show that the inhomogeneity eventually leads to a non-Maxwellian baryonic distribution function and eventually affect the predicted primordial  ${}^7\text{Li}$  abundance. Moreover, our present multi-zone BBN calculation result also shows the same effect of an inhomogeneous PMF, in this calculation, the multi-zone inhomogeneous PMF is encoded into nuclear reaction network, this code can lead to the future study of BBN under the circumstances of cosmological plasma evolution including fluctuations and magneto-hydrodynamical process in the early Universe.

[1] Luo., et al. 2019, ApJ, 872,172