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Axion Dark Matter and Cosmological Parameters HEYWOOD TAM, OZGUR ERKEN, PIERRE SIKIVIE, QIAOLI YANG, University of Florida — The excellent agreement between observations and the big bang nucleosynthesis (BBN) predictions for the primordial abundances of light elements is often touted as a triumph of the standard Λ-CDM cosmological model. There remains, however, one anomaly: the abundance of ^{7}Li is approximately two to three times less than what the theory predicts. This anomaly can be alleviated or removed altogether if photons have been cooled after BBN and before recombination. Such cooling is ordinarily difficult to achieve, though it may be realized if dark matter axions form a Bose-Einstein condensate after BBN and before decoupling. In this case, Bose enhancement helps facilitate energy exchange between the photons and axions, so that the baryon-to-photon ratio during BBN is smaller than originally thought. This scenario predicts a high effective number of neutrinos, as measured by the cosmic microwave anisotropy spectrum.

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