

## NEW OBSERVATIONS AND NUCLEAR PHYSICS FOR BIG-BANG NUCLEOSYNTHESIS

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The successful prediction of the measured abundances of deuterium and helium-4 relative to hydrogen by big-bang nucleosynthesis calculations is a major triumph of modern cosmology. However, the precision of these comparisons lags behind the level obtained in Cosmic Microwave Background studies. In addition, there remain significant discrepancies between observations and predictions for the absolute lithium-7 abundances and the lithium-6:lithium-7 isotope ratio. Recent developments in these areas are considered. A new high-precision determination of the primordial deuterium abundance (Pettini and Cooke 2012, arXiv:1205.3785v2) opens the door for high-precision big-bang nucleosynthesis comparisons. Possible resolutions of the “lithium problems” resulting from nuclear physics are that a larger reaction network must be taken into consideration, or that estimated cross sections in the existing network are grossly incorrect. Finally, the role of non-thermal nuclear reactions in big-bang nucleosynthesis will be discussed and evaluated.