LITHIUM NUCLEOSYNTHESIS IN COSMOLOGY AND COSMIC RAYS

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Big bang nucleosynthesis (BBN) describes the production of the light elements ^{1}H, ^{2}H, ^{3}He, ^{4}He, and ^{7}Li in the early universe. BBN theory, together with light element observations, provides the best measure–for now–of the cosmic baryon content. The observed primordial Li abundance is determined from ancient, metal-poor (extreme Population II) stars. However, the Li abundance measured in these stars also contains contributions from Galactic cosmic ray nucleosynthesis, predominantly via $\alpha + \alpha \rightarrow {}^{6,7}$Li. This Galactic component should lead to a small but nonzero slope in Li vs. Fe (or O), and such a trend has now been observed. It is shown that the cosmic-ray Li component can be determined in a model-independent, empirical manner. Subtracting this component leads to a more accurate estimate of the primordial Li abundance. This refinement improves the BBN estimate of the cosmic baryon density, which will soon be independently and strongly tested by measurements of anisotropy in the cosmic microwave background radiation.