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Big-Bang Nucleosynthesis from B²FH to 21st-Century Cosmology

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In majestically laying out the case for element synthesis in stars, B²FH deliberately avoided primordial nucleosynthesis; nevertheless, they identified stellar sources and sinks for the lightest elements and presciently laid out issues which have remained at the center of big-bang nucleosynthesis (BBN) through to the present. We will briefly review the theory of cosmological nucleosynthesis (to which Hoyle and Fowler made pivotal contributions) and its broad concordance with observed light element abundances; this agreement not only marks a great success for the hot big bang, but also measures the cosmic baryon density. BBN takes a changing but still central role in the dawning era of precision cosmology: measurements of the cosmic baryon density by WMAP and large-scale structure observations provide an independent test of BBN and cosmology. The status of this test will be discussed, as will implications for dark matter and dark energy.