

The Nucleosynthesis of First Stars

The first stars emerge about 400 Million years after the Big Bang with the end of the dark age of the Universe. The chemical composition represents a primordial abundance distribution of hydrogen, helium, and lithium isotopes as defined by Big Bang nucleosynthesis. The first stars are predicted to have had masses up to several hundred solar masses. Later generation stars are stabilized by internal nuclear burning in their interior, however, the primordial fuel distribution in first stars is insufficient causing their contraction, collapse, and transition to a first generation of supernovae. These conditions of gradual contraction provides an environment for nuclear reactions bridging the mass 5 and mass 8 gap forming the first generation of light nuclei up to mass 40 as detected in the abundance distribution of the oldest observed stars. The most likely nucleosynthesis patterns for forming these heavier nuclei will be presented.