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Manganese as an Archaeological Tool to Study Type Ia Supernovae in Dwarf Galaxies

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Ancient, metal-poor dwarf galaxies provide some of the best links to the earliest nucleosynthesis in the nearby Universe. Stellar abundances in dwarf galaxies can be used to estimate nucleosynthetic yields from supernovae, which can in turn be used to distinguish among different physical models of these supernovae. In particular, manganese is a sensitive probe of the density of the white dwarf progenitors of thermonuclear supernovae (Type Ia SNe). In this work, we report preliminary work using Keck/DEIMOS medium-resolution spectroscopy to measure manganese abundances in classical dSph galaxies. We present initial validation of our measurement technique by testing on globular clusters, and we discuss potential implications for Type Ia supernova physics. We tentatively conclude that the majority of Type Ia SNe in ancient dwarf galaxies exploded below the Chandrasekhar mass.

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