Comparisons of Isotopic distributions from a Range of Type Ia Models

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Type Ia supernovae are used extensively in determination of extragalactic distance scales, and the expansion rate of the universe, as standard candles. In addition, Type Ia ejecta contribute significantly to the elemental and isotopic distribution of solar material, particularly in the iron group. Despite this, there is still significant uncertainty as to the progenitors of these events. Due to the homogeneous nature of Type Ia supernovae, determining progenitors of Type Ia SN is difficult. The main observable from individual explosions - the lightcurves - depend mainly on nuclear properties of the system, as many of the initial conditions are erased as part of the explosion. This is not true of the isotopic distribution however, as this depends on the details of burning in the progenitors, which can change significantly between Chandrasekhar and Sub-Chandrasekhar progenitors. In this work we present a detailed comparison of the isotopic yields from several models, post processed using a large nuclear reaction network. Using consistent nuclear physics data allows us to separate the nuclear uncertainties from the model dependencies of the various codes. From this we can identify which of the observable solar isotopic ratios may be used to determine the progenitors, or relative proportions of progenitor systems, of Type Ia supernovae. We also present our first results of sensitivity studies in Type Ia supernovae tracer particles, investigating those reaction rates which have the largest impact on the isotopic distribution of the iron-group elements.