Abundance Uncertainties Obtained With the PIZBUIN Framework For Monte Carlo Reaction Rate Variations

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Uncertainties in nucleosynthesis models originating from uncertainties in astrophysical reaction rates were estimated in a Monte Carlo variation procedure. Thousands of rates were simultaneously varied within individual, temperature-dependent errors to calculate their combined effect on final abundances. After a presentation of the method, results from application to three different nucleosynthesis processes are shown: the gamma-process and the s-process in massive stars, and the main s-process in AGB stars (preliminary results). Thermal excitation of nuclei in the stellar plasma and the combined action of several reactions increase the final uncertainties above the level of the experimental errors. The total uncertainty, on the other hand, remains within a factor of two even in processes involving a large number of unmeasured rates, with some notable exceptions for nuclides whose production is spread over several stellar layers and for s-process branchings.
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