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Neutron cross sections for reading the abundance history

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In the last decades considerable effort in experimental nuclear astrophysics, stellar modelling, and observations led to an improved understanding of various nucleosynthesis scenarios. This is particularly true for the main s process in low-mass AGB stars, which is largely responsible for the production of about half of the elemental abundances in the mass range $90 \leq A \leq 209$. The weak s process, which produces elements with $A \leq 90$, however, is much less understood. Since this process operates in massive stars it is ultimately linked with the abundance contributions of explosive nucleosynthesis in supernovae (SN II). In this field more accurate neutron capture cross sections in the mass range $56 \leq A \leq 90$ are indispensable for meaningful comparisons of model predictions with observational data. The abundant light elements with $A < 56$ play an important role, since they act as neutron poisons and affect the stellar neutron balance. The essential role of the time of flight facility n_TOF at CERN for determining the important key neutron capture reactions will be discussed.

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