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The neutrino process in supernova nucleosynthesis

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\begin{document}
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\begin{center}
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\TITLE{The ν process in supernova nucleosynthesis}\\[3mm]
%%%
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%%%
\AUTHORS{\underline{A. Sieverding[1]}, G. Mart\'inez Pinedo[1,2], K. Langanke[1,2], A. Heger[3] }

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{\small \it
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\centerline{Contact email: {\it asiever@theorie.ikp.physik.tu-darmstadt.de}}

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%%% Abstract proper starts here.
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Core-collapse supernova explosions are accompanied by large neutrino fluxes emitted
from the cooling stellar core. The neutrino irradiation affects the
shock-heated nucleosynthesis in the
ν process \cite{Heger.Kolbe.ea:2005} affecting the final composition of the
ejecta.\\
Since neutrino energies are relatively high cross sections
for the reactions are mainly
sensitive to collective excitations and can be calculated fairly well with
relatively simple nuclear models that allow calculations for a large range of
target nuclei. As state-of-the-art supernova simulations tend to predict
neutrino energies to be lower than expected in the past, charged current
channels like ν_e absorption gain in relative importance. Often
they are determined by a few low-energy
Fermi and Gamow-Teller transitions, for which strengths
are in some cases directly known from experiments or can be inferred from
mirror nuclei. In the case of the reaction ^{26}Mg(ν_e,e$^-$) ^{26}Al
for example, that contributes to the production of radioactive ^{26}Al in
supernova explosions, the cross section can be derived from the $B(GT)$ strength
measured in (t,^{3}He) charge-exchange reactions \cite{Zegers.Akimune.ea:2006}.
\\
For high excitation energies these cross sections can be supplemented by
calculations for forbidden transitions. Using a set of
neutrino-nucleus cross-sections based on experimental data wherever possible
and supplemented by RPA-based theoretical calculations we have performed
nucleosynthesis calculations with progenitor and explosion models calculated
with the 1D stellar evolution and hydrodynamics code KEPLER as e.g. in
\cite{Heger.Kolbe.ea:2005}. We have also investigated the effect that
the reduction of expected neutrino energies in recent years has on the ν
process in general. We find that the production of the isotopes that are
expected to have contributions from the ν process is reduced
but still in good agreement with observations (see also
\cite{Balasi.Langanke.ea:2015}). We also find that the neutrino-induced
enhancement of the production of ^{26}Al is reduced from roughly 20\% to 10\%
(see also \cite{Balasi.Langanke.ea:2015,Sieverding.Huther.ea:2015}) and we try
to quantify how this ν process contributes to the uncertainty in the yields
of ^{26}Al.
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{\small
\begin{thebibliography}{1}

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\end{thebibliography}
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