Network Generator

Guide

What is to be found in the Table

- **Multi-particle reactions:** $N_{Av}^{(N-1)}$ *sigma v* [$(cm^3\ mole^{-1})^{(N-1)}\ s^{-1}$, where N refers to the number of particles in the entrance channel]
- **Radiative neutron capture reactions:** N_{Av} *sigma v* [$cm^3\ mole^{-1}\ s^{-1}$]
  N_{Av} *sigma v* is in some cases derived from the Maxwellian-averaged cross section $<sigma\ v>/v_T$ using the formula
  $N_{Av}\ sigma\ v = 2.645\ 10^4\ (kT)^{(1/2)} <sigma\ v>/v_T$, with N_{Av} *sigma v* expressed in cgs units, *kT* in keV and $<sigma\ v>/v_T$ in mb
- **Beta-decays, electron captures, or photodesintegrations:** *lambda* (s^{-1})
  Some beta-decay rates from Takahashi & Yokoi (1987) consist of four successive columns, corresponding to electron number densities of 1, 3, 10 and 30 x 10^{26} cm^{-3}. A special treatment applies to electron captures by 7Be, as indicated in the corresponding log file.

All reaction rates refer to a thermally-excited target. The *stellar enhancement factor* (ratio of reaction rate on thermally-excited nucleus to ground-state reaction rate) is computed using the Hauser-Feshbach calculation TALYS .

The reaction kind is coded in the header line labelled *Type* in the following way:

- --: two-particle reactions
- ---: three-particle reactions
- ----: four-particle reactions
- +: photodissociation or beta-decay
- ++: electron capture
- +++: electron capture on Be7
- nE+mm: value of the electron number density (in units of electrons/cm^3) for weak-interaction rates dependent upon electron number density

NaN (`Not a Number`) symbols are given in the table for temperatures at which no data are available and no extrapolation can be performed.

Reverse reaction rates with no data available for the direct reaction are set to NaN or to .1000E-98, although the exact value may possibly be much larger than .1000E-98 (especially for neutron-capture reactions)!

The energetics (Q = Qrad + Qnu) of the reaction is also provided in the header. The reaction Q-value is computed from Audi & Wapstra (Audi G., Wapstra A.H.,

1995, Nucl. Phys.A 595, 409) or Goriely et al. mass table (Goriely S., Pearson J.M., Tondeur F., 2000, Atomic Data Nucl. Data Tables, in press), as the difference between the mass excess in the entrance and exit chanels.
Qrad provides the radiative losses, i.e., Q - Qnu, where Qnu is the energy possibly carried away by neutrinos.
The neutrino loss Qnu is computed according to Eqs. 1 and 2 of Fowler W.A., Caughlan G.R. & Zimmerman B.A. (1975, ARA&A 13, 69). In the case of weak interaction rates taken from Oda et al. (1994, ADNDT 56, 231) and Langanke & Martinez (2000, Nucl. Phys. A673, 481), Qnu depends upon temperature and electron-density, with the corresponding values given in the "refs" file.

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