

Two experimental approaches in nuclear astrophysics using neutrons

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High resolution measurements using the (³He,n) reaction are used to determine excitation energies of astrophysically important states. Further, spins can be assigned by comparing the measured differential cross sections with Hauser-Feshbach cross sections. The reaction rates can be also calculated using the experimental values. Reference [1] is an example of such measurements.

Astrophysical S factors are calculated from neutron spectra and absolute cross sections are also determined. Experimental S factor ratios between similar structure nuclei and theoretical ratios deduced from DWBA calculations can be used to compare the results. Reference [2] is an example of such measurements.

[1] Y. Parpottas *et al.*, Phys. Rev. C **70**, 065805 (2004)

[2] Y. Parpottas *et al.*, Phys. Rev. C **74**, 015804 (2006)