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Cross sections for reactions in explosive H burning from indirect methods[1] LIVIUS TRACHE, T. AL-ABDULLAH, A. BANU, C. FU, C.A. GAGLIARDI, J.C. HARDY, V.E. IACOB, M. MCCLESKEY, A.M. MUKHAMEDZHANOV, G. TABACARU, R.E. TRIBBLE, Y. ZHAI, Texas A&M University — We present results for the cross sections of radiative proton capture reactions relevant for explosive H burning in stars, extracted from a number of indirect techniques using stable or radioactive nuclear beams. We use or combine proton transfer reactions above the Coulomb barrier, breakup of loosely bound proton rich nuclei at intermediate energies, and beta-decay studies to extract nuclear information needed to determine capture cross sections at very low energies. The extraction of ANC from proton transfer reactions around 10 MeV/u will be briefly discussed with examples from the latest measurements at the K500 superconducting cyclotron. Studies of the breakup of ^{9}C and ^{23}Al will be used to exemplify the method and its spectroscopic power, and to assess the astrophysical S-factors for the ^{8}B(p,γ)^{9}C and ^{22}Mg(p,γ)^{23}Al reactions, respectively. Finally, we will show how the results of a β-decay study of pure samples of ^{23}Al separated with MARS can be used to constrain the direct contribution to the reaction rate for ^{22}Mg(p,γ)^{23}Al and to determine resonant contributions for the ^{22}Na(p,γ)^{23}Mg. These reactions are considered candidates to explain why space-based gamma-ray telescopes do not observe γ-rays from the decay of long-lived ^{22}Na formed in ONe novae explosions: flux is diverted from the A=22 into the A=23 mass chain.

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