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Recent results for the ^{12,13}C(p,γ)^{13,14}N reaction cross section in a wide energy range at LUNA and at Felsenkeller laboratory

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The $^{12,13}\mathrm{C}(\mathrm{p},\gamma)^{13,14}\mathrm{N}$ are the first reactions of the CNO cycle, active in both hydrostatic and explosive hydrogen burning. They contributes to the $^{12}\mathrm{C}/^{13}\mathrm{C}$ isotopic ratio, observed in stellar atmosphere in meteoritic grains and in the interstellar medium. The $^{12}\mathrm{C}/^{13}\mathrm{C}$ is a useful tool to study the mixing episodes and nucleosynthesis in Red Giant Branch (RGB) and Asymptotic Giant Branch (AGB) stars. A byproduct of the mixing events and nucleosynthesis taking place in Thermally pulsing AGB stars is the formation of the so called ^{13}C-pocket, which provides the neutron for s-process nucleosynthesis via the $^{13}\mathrm{C}(\alpha,\mathrm{n})^{16}\mathrm{O}$ reaction. Moreover the $^{12}\mathrm{C}(\mathrm{p},\gamma)^{13}\mathrm{N}$ reaction is one of the main source of Solar CNO neutrinos, via the ^{13}N decay.

Despite their important role in our understanding of stellar nucleosynthesis, up to recent years the $^{12,13}\mathrm{C}(\mathrm{p},\gamma)^{13,14}\mathrm{N}$ reaction rates were poorly constrained by the few data available which are also affected by high uncertainty, with dramatic impact on our predictions for the the $^{12}\mathrm{C}/^{13}\mathrm{C}$ isotopic ratio. In recent years, however, these two reactions have been the focus of renewed interest and of many experimental efforts. In the talk I will describe the complementary measurements recently performed at LUNA and at Felsenkeller underground laboratories in a wide energy region. In addition I will present results and I will compare them with previous literature and more recent data.

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