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Measurements of Proton Capture on Carbon at Astrophysical Energies

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Direct measurements of the cross sections for the radiative capture reactions $^{12,13}\text{C}(p, \gamma)^{13,14}\text{N}$ at energies of astrophysical interest are challenging, due to the rapidly falling cross sections towards lower energies, and for the absence of narrow resonances at low proton energies required for target characterization. The two reactions have been studied at the Laboratory for Underground Nuclear Astrophysics (LUNA). Exploiting the low-background setup at the deep-underground location, and using different solid targets and complementary detection techniques, a comprehensive data set for energies between $E_{c.m.} = 60$ keV and 370 keV has been obtained, providing direct data on this reaction at the lowest energies to date. We will present the performed experiments, and the results for the cross sections of both reactions.

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