

Proton decay of excited states in ^{12}N and ^{13}O and the astrophysical $^{11}\text{C}(p,\gamma)^{12}\text{N}$ reaction rate

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Using a ^{13}O beam, we have observed proton decays of ^{12}N and ^{13}O excited states following proton-knockout and inelastic interactions on a ^9Be target. The excited states were determined from detected two- and three-body exit channels using the invariant mass method. The width of the second excited state of ^{12}N was determined to be 55(20) keV, considerably smaller than the value listed in the ENSDF data base. Three new excited states of narrow width (≤ 50 keV) were observed in ^{13}O from the $p+^{12}\text{N}$ and $2p+^{11}\text{C}$ exit channels. One of these states ($E_x=3.67$ MeV) was found to sequentially decay to the second excited of ^{12}N . We again found these data to be inconsistent with the listed decay width. The ramifications for the astrophysically interesting $^{11}\text{C}(p,\gamma)^{12}\text{N}$ reaction are given. The work has been published in *Phys. Rev. C* **87**, 054329 (2013).