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A precise determination of the ^{10}C excited state lifetime C.J. LISTER, E.A. MCCUTCHAN, R.B. WIRINGA, S.C. PIEPER, D. SEWERYNIAK, J.P. GREENE, P.F. BERTONE, M.P. CARPENTER, C.R. HOFFMAN, G. HENNING, R.V.F. JANSSENS, T.L. KHOO, T. LAURITSEN, S. SHU, G. GURDAL, ANL, C.J. CHIARA, U. Maryland — We have come to accept the notion of poorly bound neutrons forming spatially extended halos in light nuclei. However, the charge-conjugated situation involving decoupled protons is far from clear, and presents an interesting test of mirror symmetry and of our understanding of the structure of proton drip-line nuclei. New, precise, experiments interpreted with the help from modern ab-initio and cluster theories can clarify the situation. Specifically, we have used the H(^{10}B,n)^{10}C reaction at 95 MeV to populate the one bound excited state in ^{10}C at 3354 keV and have measured its lifetime using the Doppler Shift Attenuation Method (DSAM). The use of highly inverse kinematics, a variety of targets and backing materials, the Gammasphere array, and the Fragment Mass Analyzer, all helped reduce and quantify systematic uncertainties. We extract a mean lifetime of tau=219+-5$_{(stat)}$+- 8$_{(sys)}$ fs, very close to the lifetime of the ^{10}Be analog state and at a level of precision that really challenges contemporary nuclear models. The meaning of this observation will be discussed. This research was supported by the DOE Office of Nuclear Physics under Contract No. DE-AC02-06CH11357.

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