Abstract Submitted
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Alpha-decay of exited states in 12C[1] JUAN MANFREDI, ROBERT CHARITY, KEVIN MERCURIO, REBECCA SHANE, LEE SOBOTKA, Washington University in St. Louis, ALAN WUOSMAA, Western Michigan University, ADRIANA BANU, LIVIUS TRACHE, ROBERT TRIBBLE, Texas A&M University, SOBOTKA/CHARITY LAB TEAM — Recently it was suggested that the state in ^{12}C at an excitation energy of 7.65 MeV ($J^\pi = 0^+$), the Hoyle state, can decay via a mechanism that produces three α-particles of almost equal energy. High-resolution triple-α coincidence data were used to reconstruct the decay of the excited states in ^{12}C at 7.65 MeV ($J^\pi = 0^+$) and 9.64 MeV ($J^\pi = 3^-$). These data were gathered at the Texas A&M University K500 cyclotron facility, where a ^{10}C beam impinged on a Be target and reaction products were detected using four Si $E - \Delta E$ detectors. The results of this experiment are consistent with the α-particle decay of both levels proceeding exclusively through $^8Be_{g.s.}$. In the first of these cases, the Hoyle state, upper limits of 0.45% and 3.9% (at the 99.75% confidence level) are set for an equal-energy α-particle decay process and a process uniformly spanning three-body phase space (respectively). The limit for the equal-energy α-particle decay is much lower than claimed in the previous result.

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