Abstract Submitted
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New precision lifetime measurement of the 2_1^+ state of ^{12}Be C. MORSE, C.J. LISTER, P. CHOWDHURY, E. MERCHAN, V.S. PRASHER, UML, E.A. MCCUTCHAN, T.D. JOHNSON, A.A. SONZOGNI, BNL, H. IWASAKI, V.M. BADER, D. BAZIN, S. BECEIRO-NOVO, A. GADE, C. LOELIUS, E. LUNDERBERG, F. RECCHIA, D. WEISSHAAR, K. WHITMORE, NSCL/MSU — The ^{12}Be nucleus exhibits a tension between two different nuclear structure effects: strong α-clustering characteristics similar to ^{8,10}Be, and a tendency towards spherical, single-particle behavior due to the canonically magic neutron number $N = 8$. The observed drop of 1.2 MeV in its 2_1^+ energy compared to ^{10}Be suggests that the $N = 8$ magic number breaks down in this nucleus, instead giving way to clustering. However, the previously determined $B(E2; 2_1^+ \rightarrow 0_1^+)$ strength lacks sufficient precision to ascertain whether ^{12}Be is more elongated than ^{10}Be, which is a critical test of the exact role of the valence neutrons. To resolve this issue, a new experiment has been performed using GRETINA with the Doppler shift attenuation method to determine the lifetime of the 2_1^+ state with better than 10% precision. Preliminary results from the analysis will be presented and the implications for the structure of ^{12}Be will be discussed.

Chris Morse
Univ of Mass - Lowell

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