Ta(^{12}Be,^{12}Be′γ) 2018Mo12

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, J. E. Purcell and C. G. Sheu	NP A968, 71 (2017)	1-Jan-2017

2018Mo12: XUNDL dataset compiled by TUNL, 2018.

The authors measured the lifetime of ^{12}Be*(2109: $J^{\pi}=2^{+}$) and evaluated the B(E2) strength.

A beam of E(^{12}Be)=55 MeV/nucleon ions, from the NSCL/A1900 fragment separator, impinged on Ta and Nb targets located at a modified S800 spectrometer target position that is selected to optimize the DSAM sensitivity. In this configuration, an array of seven 36-fold segmented GRETINA HPGe detectors covered $\theta_{lab}\approx 20°$ to 70°.

The ground-state decays from ^{12}Be*(2109 *1*,2715) were observed; the ^{12}Be*(2715) lifetime was held fixed at 1.9 fs, while the ^{12}Be*(2109) DSAM lifetime was deduced for the three targets. The lifetime values 1.34 ps *17*, 1.67 ps *16* and 1.14 ps *18* (statistical uncertainties) were obtained for the Ta(1330 mg/cm^2), Ta(2490 mg/cm^2) and Nb(1410 mg/cm^2) targets, respectively. Sources of systematic uncertainty are discussed. The authors indicate τ=1.38 ps *10*(stat) *19*(syst), though the variation of values justifies using external errors in the analysis resulting in τ=1.38 ps *20*(stat) *19*(syst).

Using their lifetime, B(E2)=14.2 e^{2}fm^4 *10*(stat) *20*(syst) [=14.2×10^{-4} e^{2}b^2 *10*(stat) *20*(syst)] is obtained. A comparison with various theoretical models suggests a dissolution of *magicity* in the N=8 ^{12}Be nucleus.

^{12}Be Levels

E(level)	J^{π}	$T_{1/2}$	Comments
0†	0+†	21.46† ms *5*	
2109 *1*	2+†	0.957 ps *19*	$T_{1/2}$: From τ=1.38 ps *20*(stat) *19*(syst).
2715†	1−†	1.3† fs *4*	

† From Adopted Levels.

γ(^{12}Be)

E_i(level)	J_i^{π}	E_γ	I_γ	E_f	J_f^{π}	Comments
2109	2+	2109 *1*	100	0	0+	B(E2)↓=14.2×10^{-4} *28*
2715	1−	2715	100	0	0+	

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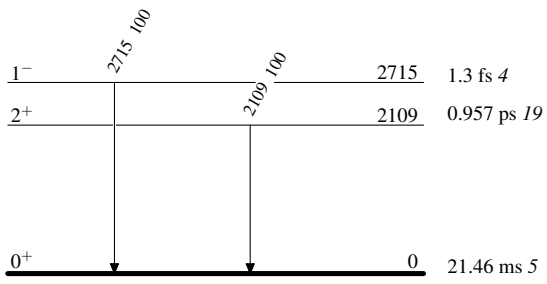
Level Scheme

Intensities: Relative photon branching from each level



$^{12}_{4}Be_{8}$