^{9}Be(^{11}B,2pγ) 2008Wi05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	R. Spitzer, J. H. Kelley	ENSDF	30-Jun-2021

2008Wi05: XUNDL compiled by McMaster (2008).

Elements of the STARS-LIBERACE array were used at Berkeley to identify the ^{18}N events produced in ^{9}Be+^{11}B reactions and to measure the associated γ rays. Measured E_γ, I_γ, γ(2p) coin, level lifetimes.

In the first of two configurations, an E(^{11}B)=50 MeV beam, provided by the 88-Inch cyclotron, impinged on a 2.6 mg/cm^2 ^{9}Be that was surrounded by five HPGe clover detectors distributed at θ=40°, 90° and 140°. An annular position sensitive ΔE-E detector was positioned 3 cm downstream of the target and was used to detect the residual 2 protons associated with ^{18}N events. A thin lead foil covered the ΔE detector and stopped heavier particle ejectiles. γ-ray transitions between known states at ^{18}N*(0,115,587,742) are unambiguously identified along with their intensities.

The second configuration was similar to the first, except a thinner 1.35 mg/cm^2 target was used and a ^{nat}Pb stopper foil was used to measure the lifetime of the first excited state using the recoil-distance method. Events from ^{16}N transitions are also observed and used for internal calibration. The lifetime τ=582 ps *165* is reported. Results are compared with shell-model calculations. See also (2008WiZT).

^{18}N Levels

E(level)	J^π	$T_{1/2}$	Comments
0	1^-		Configuration: 47% $\pi(p_{1/2})\otimes\nu(d_{5/2})^3$; 36% $\pi(p_{1/2})\otimes\nu[(d_{5/2})^2(s_{1/2})]$.
115	(2^-)	0.40 ns *11*	$T_{1/2}$: From recoil-distance method (2008Wi05). Configuration: 68% $\pi(p_{1/2})\otimes\nu(d_{5/2})^3$; 16% $\pi(p_{1/2})\otimes\nu[(d_{5/2})(s_{1/2})^2]$.
587	(2^-)		Configuration: 48% $\pi(p_{1/2})\otimes\nu(d_{5/2})^3$; 34% $\pi(p_{1/2})\otimes\nu[(d_{5/2})^2(s_{1/2})]$.
742	(3^-)		Configuration: 69% $\pi(p_{1/2})\otimes\nu(d_{5/2})^3$; 17% $\pi(p_{1/2})\otimes\nu[(d_{5/2})(s_{1/2})^2]$.

γ(^{18}N)

E_γ †	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
115 *1*	100	115	(2^-)	0	1^-	M1	B(M1)(W.u.)=0.036 *10* Mult.: From RUL, E2 component is ruled out.
155 *1*	9	742	(3^-)	587	(2^-)		
472 *1*	22	587	(2^-)	115	(2^-)		
627 *1*	44	742	(3^-)	115	(2^-)		

† The authors state 1 keV resolution.

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Level Scheme

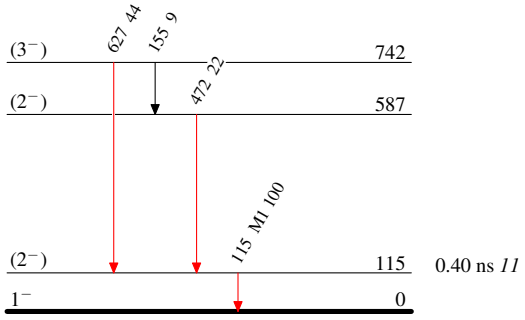
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{18}_{7}N_{11}$