$^{12}C(^{12}C,\gamma)$ 2011Ma51

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 186, 2 (2022)	31-Mar-2022

Others: (2008Le27, 2008Ma56, 2007Je08 and 2005Je03 – same research group of 2011Ma51), 1988De18, 1981Na06, 1980Er06, 1979NaZX, 1978Sa05, 1969Fe05.

2011Ma51: E(c.m)=8 MeV. Target=60 μg/cm^2 enriched in ^{12}C beam. Fragment mass analyzer (FMA) and a multistep ion chamber/Parallel Grid Avalanche Counter (PGAC) were used for E-ΔE and tof measurement. 100 Compton-suppressed HPGe detectors. Measured Eγ, Iγ, $\gamma\gamma$ using Gammasphere array. Gamma-ray spectra were correlated with ^{24}Mg residues. Also measured decay branching from a resonance at E(c.m.)=8.0 MeV with most probable J^π=4$^+$.

1969Fe05: Studied excitation energy in the range of 19.73-25.3 MeV. Measured differential cross section (dσ/dΩ) 53 nb/sr *26* for the unresolved 2nd and 3rd excited states, 25 nb/sr *13* for the 1st excited state, and >6 nb/sr for g.s.

1978Sa05: E(c.m.)=5-11 MeV; reported a 2$^+$ resonance state at 21.98 MeV *3*, measured a peak cross section of 44.3 nb/sr *45* at 45° in ^{12}C(^{12}C,γ_0). FWHM=261 keV *74*.

1980Er06: E(c.m.)=11.8-20 MeV; measured σ(E); deduced resonances, spin, parity, Γ(^{12}C), Γ.

1981Na06: E(c.m.)=5.6-8 MeV; measured Eγ, $\sigma(\theta\gamma$,E), deduced resonances, Γ, Γγ, Γ(^{12}C)/Γ. Large volume NaI detector. Same research group of 1978Sa05.

1988De18: E(c.m.)=4.7-6.0 MeV; deduced resonances, Γ(capture)/Γ. Hauser-Feshbach calculations. Natural targets. NaI spectrometer.

All data from 2011Ma51, except where otherwise noted.

^{24}Mg Levels

2011Ma51 note, a coincidence of three counts between the 4641γ and 4571γ, implying the depopulation of the known (3,4)$^+$ (2$^+$,3,4$^+$ in adopted dataset) state at 10581 keV. The branch (4571γ) carries about 10% (8% in the adopted dataset) of the decay of the state and authors were not able to obtain clear evidence for the more dominant γ transition branches of the state.

E(level)	J$^\pi$	E(level)	J$^\pi$	E(level)	J$^\pi$
0	0$^+$	5235	3$^+$	8439	4$^+$
1368	2$^+$	6010	4$^+$	9284	2$^+$
4122	4$^+$	7617	3$^-$	9301	(2,3,4)
4238	2$^+$	8358	3$^-$	10028	5$^-$
				10333	(3$^-$)

$\gamma(^{24}Mg)$

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$
1368	100	1368	2$^+$	0	0$^+$	5161	2.4† *4*	9284	2$^+$	4122	4$^+$
1670	1.6 *4*	10028	5$^-$	8358	3$^-$	5176	2.4† *4*	9301	(2,3,4)	4122	4$^+$
2346	3.1 *6*	8358	3$^-$	6010	4$^+$	5905	2.7 *3*	10028	5$^-$	4122	4$^+$
2754	22 *1*	4122	4$^+$	1368	2$^+$	6248	2.3 *3*	7617	3$^-$	1368	2$^+$
2870	2.6 *6*	4238	2$^+$	1368	2$^+$	6988	6.0 *4*	8358	3$^-$	1368	2$^+$
3123	4.5 *10*	8358	3$^-$	5235	3$^+$	7069	3.5 *4*	8439	4$^+$	1368	2$^+$
3866	12.0 *8*	5235	3$^+$	1368	2$^+$	7914	4.0† *4*	9284	2$^+$	1368	2$^+$
4238	11.0 *7*	4238	2$^+$	0	0$^+$	7931	4.0† *4*	9301	(2,3,4)	1368	2$^+$
4641	8.4 *6*	6010	4$^+$	1368	2$^+$	8963	1.5 *3*	10333	(3$^-$)	1368	2$^+$

† Intensities for 5161+5176 or 7914+7931 doublets.

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Level Scheme

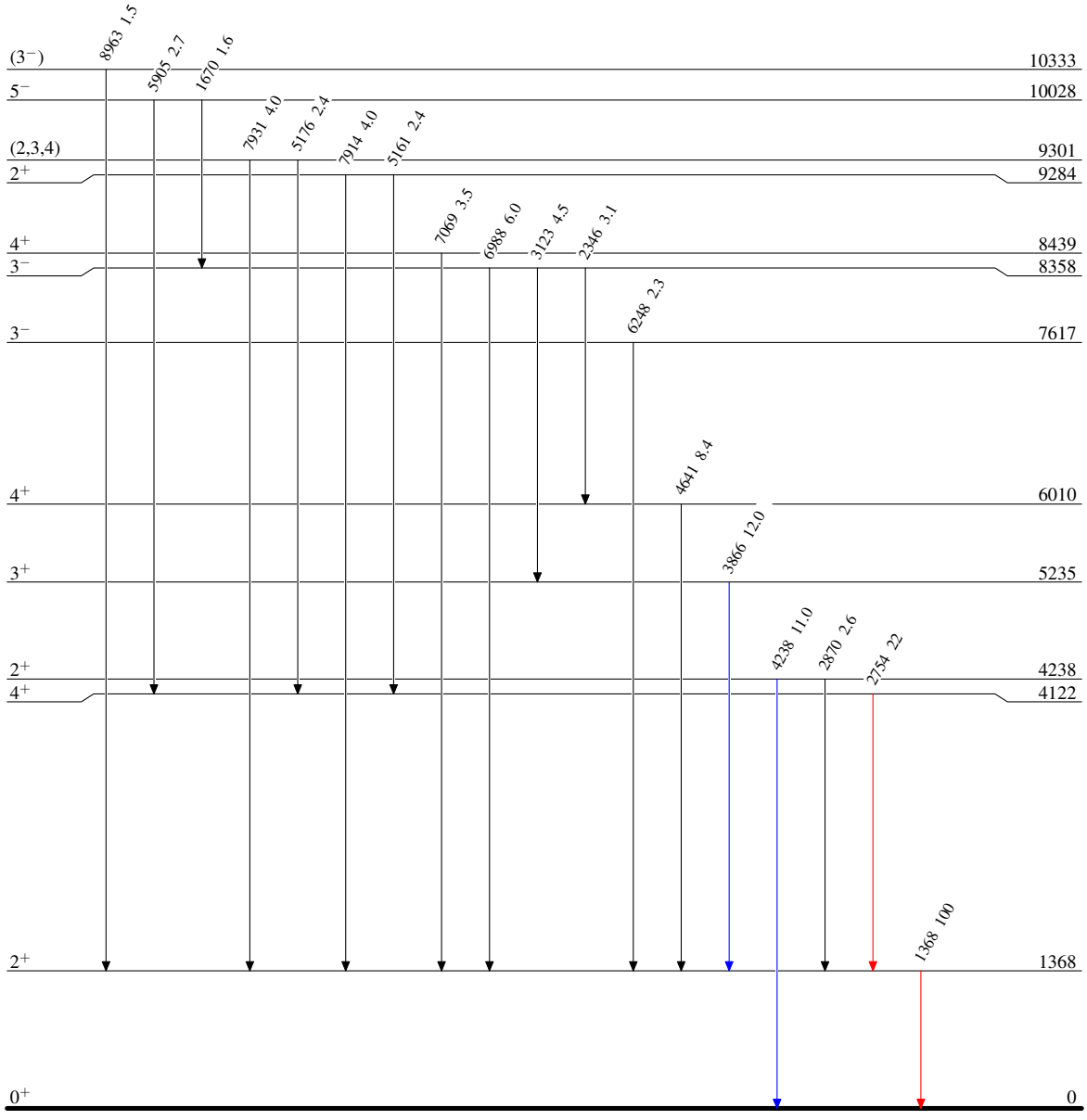
Intensities: Relative I_γ

Legend

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

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

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



$^{24}_{12}Mg_{12}$