^{9}Be(^{208}Pb,Xγ) 2011St21,2009Al30,2005Ca02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 143, 1 (2017)	31-Mar-2017

2011St21: ^{193}Re nuclide formed by in-flight fragmentation of ^{208}Pb beam at 1 GeV/nucleon from the GSI UNILAC and SIS-18 accelerator complex. Target thickness=2.526 g/cm^2, backed by ^{93}Nb foil of thickness=0.223 g/cm^2. Fragments identified in flight by the Fragment Separator (FRS) operated in achromatic mode based on time-of-flight, Bρ and energy loss. Transmitted ions slowed in Al degraders and stopped in a plastic catcher. The stopper was surrounded by the RISING γ-ray spectrometer. Measured Eγ, Iγ, delayed γ rays, isomer lifetime, x-ray.

2009Al30,2009Al16: RISING array of 15 seven-element Ge cluster detectors used for γ ray detection. Measured isomer half-life.

2005Ca02: Nuclide was produced by fragmentation of ^{208}Pb beam (E=208GeV) (2005Ca02) on beryllium target. ^{193}Re was identified with the GSI Fragment Separator; delayed γ events were recorded by 4 clover composite Ge detectors. 2005Ca02 also observed delayed Re Kα x ray and Kβ x ray, with intensities 1.05 *8* and 0.29 *6* relative to γ 146.1 keV assigned to the decay of the isomeric level.

x-ray energy	Intensity (relative and arbitrary) (2005Ca02)
60.6 *2*	989 *58*
69.5 *3*	247 *35*

^{193}Re Levels

E(level)	J$^\pi$[†]	T$_{1/2}$	Comments
0+x	(5/2$^+$)		
146.1+x *3*	(9/2$^-$)	69 μs *8*	T$_{1/2}$: Weighted average of 65 μs *9* (2011St21) and 72 μs *8* (2009Al30, 2009Al16). Uncertainty lower input value. Other: 75 μs *+450−40*, upper-limit corresponds to 100% isomeric formation ratio (2005Ca02). Experimental isomeric state population ratio=16% *+4−5* (2011St21).

[†] Proposed in 2011St21, based on systematics of ^{187,189}Re g.s., low lying 9/2$^-$ state, and BCS calculations.

γ(^{193}Re)

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	Comments
146.1 *3*	135 *26*	146.1+x	(9/2$^-$)	0+x	(5/2$^+$)	[M2]	E$_\gamma$,I$_\gamma$: From 2005Ca02. Other: 145.2 keV and Iγ=100 *11* (2011St21). 2011St21 propose that 145-keV transition connects the (9/2$^-$) and (5/2$^+$) states. The intensity (not listed) of the observed x rays is in agreement for this connection, noted in 2011St21. Mult.: Proposed in 2011St21. 2005Ca02 deduced hindrance factors for isomeric transition: HF=70 for M2 and 1000 for E2 (2005Ca02).

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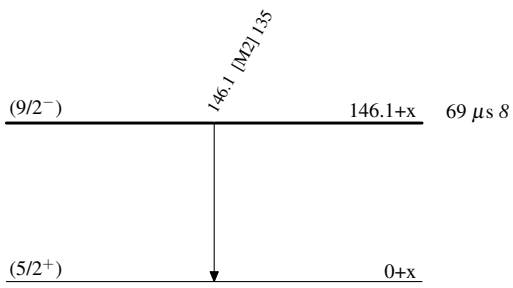
Level Scheme

Intensities: Relative I_γ



$^{193}_{75}Re_{118}$