

⁹Be(²⁰⁸Pb,X γ) 2011St21,2005Ca02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 195,368 (2024)	1-Dec-2023

2011St21: ¹⁹¹Re produced from fragmentation of ²⁰⁸Pb beam, E=1 GeV/nucleon, bombarding ⁹Be target (thickness=2.526 g/cm²) at GSI. Fragments identified in flight by the Fragment Separator (FRS) operated in achromatic mode based on time of flight, B ρ 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 E γ , I γ , delayed γ rays, isomer lifetime.

2005Ca02: Projectile fragmentation of ²⁰⁸Pb beam at 1 GeV/nucleon. Fragment Recoil separator (FRS) used to identify ¹⁹¹Re nuclide.

Measured E γ , I γ , and $\gamma\gamma$, $\gamma\gamma(t)$ using four “Clover” type Ge detectors (providing 16 independent Ge crystals). The experimental setup also included two multi-wire proportional counters for position measurements; two scintillation detectors providing time-of-flight and position information; and additional two scintillators and an ionisation chamber (MUSIC) for energy loss measurements.

¹⁹¹Re Levels

E(level)	T _{1/2}	Comments
0		
0+x	77 μ s 33	E(level): May be the same level at 1601.6 in adopted dataset, based on comparable lifetime of the level. In 2011St21 and 2005Ca02 , isomer level energy was not determined. T _{1/2} : From $\gamma(t)$ of the delayed γ rays (2011St21). Other: 1-75 μ s (2005Ca02 – lower counting statistics did not permit the quantitative determination of decay half-lives. However, the recording time ranges provide constraint on the isomer half-life).

$\gamma(^{191}\text{Re})$

E γ [†]	I γ [†]	E _i (level)	Comments
^x 53 [‡]			
^x 61 [‡]			
^x 69 [‡]			
^x 134.5 5	42 11		
^x 139.9 5	40 11		E γ : Other: 139 (2005Ca02 – figure 16).
^x 158.3 5	57 13		E γ : Other: 159 (2005Ca02 – figure 16).
^x 224.6 5	100 19		E γ : possible doublet (2011St21). Other: 226 (2005Ca02 – figure 16).
^x 308 [‡]			
^x 360 [‡]			
^x 418.5 5	65 18		E γ : Other: 419 (2005Ca02 – figure 16).
^x 443.7 5	42 15		E γ : Other: 444 (2005Ca02 – figure 16).

[†] From [2011St21](#), except where otherwise noted. No placement was available in [2011St21](#). In the adopted dataset, placement of comparable gammas except 53, 61, and 69 are listed in the comments.

[‡] Delayed γ from figure 16 of [2005Ca02](#).

^x γ ray not placed in level scheme.