

<sup>71</sup>Ge IT decay (20.22 ms)

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 188,1 (2023)	17-Jan-2023

Parent: <sup>71</sup>Ge: E=198.371 12; J<sup>π</sup>=9/2<sup>+</sup>; T<sub>1/2</sub>=20.22 ms 12; %IT decay=100

The 198-keV 20-ms isomer was produced and studied with pulsed beams, except as noted, by the following reactions:

2014De19: <sup>71m</sup>Ge activity by <sup>72</sup>Ge(n,2n) reaction by scattered neutrons incident on the HPGe detector system GEANIE at

LANSC-WNR Los Alamos facility. Measured T<sub>1/2</sub> from decay curve for 198.4-keV radiation from coincidence summing of 174.95γ and ce of 23.44-keV transition within HPGe detector array.

1971Go21: <sup>68</sup>Zn(α,n), <sup>70</sup>Zn(α,3n), <sup>69</sup>Ga(α,pn); E=34.8 MeV.

1972Br53: <sup>70</sup>Ge(n,γ); E=th, fast pneumatic tube.

1966Me02, 1963Al32, 1959G156: <sup>70</sup>Ge(n,γ); E=14.5 MeV.

1980Jo11, 1971Mu14, 1961Sc11: <sup>70</sup>Ge(d,p); E=6, 8.4, 4 MeV respectively.

1962Mo19, 1961Mo06: <sup>71</sup>Ga(p,n); E=19.2 MeV.

1976Ga33, 1974Bu14, 1970Ru08, 1969Ru10: <sup>72</sup>Ge(n,2n); E=14.7, 14.8 MeV.

1962Re09: <sup>72</sup>Ge(p,pn); E≈20 MeV.

<sup>71</sup>Ge Levels

E(level) <sup>†</sup>	J <sup>π</sup> <sup>†</sup>	T <sub>1/2</sub> <sup>†</sup>	Comments
0.0	1/2 <sup>-</sup>	11.43 d 3	
174.954 6	5/2 <sup>-</sup>	81 ns 3	
198.371 12	9/2 <sup>+</sup>	20.22 ms 12	T <sub>1/2</sub> : from the decay of 175γ in NaI detectors, except as noted. Value is weighted average of results listed as follows: 20.082 ms +71-70 (2014De19, in averaging uncertainty increased to 0.105 ms by evaluators to account for possible systematic uncertainties); 20.48 ms 18 (1980Jo11,Ge(Li) with NaI anti-Compton); 21.5 ms 4 (1974Bu14,neutron activation of Ge(Li) detector); 20.4 ms 4 (1976Ga33); 21.5 ms 10 (1971Go21); 22.2 ms 10 (1971Mu14); 20.4 ms 10 (1970Ru08,1969Ru10); 21.2 ms 12 (1966Me02); 20.0 ms 6 (1963Al32); 19.5 ms 5 (1962Re09,conversion electron detection in anthracene detector); 20 ms 1 (1962Mo19); 19.4 ms 4 (1961Mo06); 20.3 ms 3 (1961Sc11). Values of 21.87 ms 7 (1972Br53), and 16 ms 1 (1959G156) were not included in the averaging procedure, as these appear to be outliers.

<sup>†</sup> From the Adopted Levels.

γ(<sup>71</sup>Ge)

I<sub>γ</sub> normalization: I(γ+ce)(174.9γ)=100.

E <sub>γ</sub> <sup>†</sup>	I <sub>γ</sub> <sup>‡</sup>	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult. <sup>†</sup>	α <sup>#</sup>	Comments
23.438 15	1.0 2	198.371	9/2 <sup>+</sup>	174.954	5/2 <sup>-</sup>	M2	208 40	α(exp)=208 40 α(K)=169.5 25; α(L)=32.7 5; α(M)=5.03 8; α(N)=0.265 4 %I <sub>γ</sub> =0.48 10 α(exp): From I <sub>γ</sub> (175)/I <sub>γ</sub> (23)=190 37 and the requirement of an intensity balance at the 175 level(1971Mu14); α(exp)=206 40 from 1971Mu14 who use α(175γ)=0.086. Mult.: M2 from α(exp) and T <sub>1/2</sub> (1971Mu14).
174.956 9	190	174.954	5/2 <sup>-</sup>	0.0	1/2 <sup>-</sup>	E2	0.0915 13	α(K)=0.0808 12; α(L)=0.00924 13; α(M)=0.001369 20; α(N)=7.91×10 <sup>-5</sup> 11 %I <sub>γ</sub> =91.62 12

Continued on next page (footnotes at end of table)

$^{71}\text{Ge}$  IT decay (20.22 ms) (continued) $\gamma(^{71}\text{Ge})$  (continued)

† From the Adopted Gammas.

‡ For absolute intensity per 100 decays, multiply by 0.4822 6.

# Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on  $\gamma$ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

 $^{71}\text{Ge}$  IT decay (20.22 ms)Decay Scheme

Intensities:  $I_{(\gamma+ce)}$  per 100 parent decays  
%IT=100

## Legend

- $I_{\gamma} < 2\% \times I_{\gamma}^{max}$
- $I_{\gamma} < 10\% \times I_{\gamma}^{max}$
- $I_{\gamma} > 10\% \times I_{\gamma}^{max}$

