

$^{58}\text{Ni}(^{54}\text{Fe},\text{p}2\text{n}\gamma)$ 2007Pe32,2011Pr12

| Type | Author | History | Citation | Literature Cutoff Date |
|-----------------|--|---------|-------------------|------------------------|
| Full Evaluation | S. Kumar(a), J. Chen(b) and F. G. Kondev | | NDS 137, 1 (2016) | 31-May-2016 |

2007Pe32,2007CeZX: E(^{54}Fe)=195 MeV, JYFL accelerator facility, University of Jyväskylä; production cross section of $\sigma=10 \mu\text{b}$. Target: 1 mg/cm², self-supported, 99.8% isotopically enriched. Detectors: JUROGAM array of 43 HPGe detectors, RITU recoil separator in conjunction with GREAT focal-plane spectrometer, double-sided silicon strip detector. Measured; E γ , I γ , p γ , p $\gamma\gamma$, T_{1/2}, angular-intensity ratio (R); Recoil-decay-tagging technique.

2011Pr12,2012Cu03: E(^{54}Fe)=206 MeV from JYFL K130 cyclotron. The recoiling ^{109}I nuclei were separated using the RITU separator and implanted in a DSSD detector at the focal plane. Detector system GREAT was used in conjunction with the recoil-decay tagging technique. Measured E γ , I γ , T_{1/2} recoil-distance Doppler shift technique using PRE-JUROGAM II array consisting of 12 segmented clover detectors and 15 single-crystal Ge detectors.

^{109}I Levels

| E(level) [†] | J π [‡] | T _{1/2} | Comments |
|-----------------------------|---|---------------------------|--|
| 0 x [#] | (1/2 ⁺ , 3/2 ⁺) (7/2 ⁺) | 92 μs <i>I</i> | J π : from Adopted Levels. Additional information 1. E(level): it is not clear whether this level corresponds to the g.s. |
| 593.90+x [#] 20 | (11/2 ⁺) | 10.7 ps <i>I3</i> | T _{1/2} : from recoil-distance doppler-shift technique using the differential decay curve method and the 594 γ (2011Pr12). |
| 1142.1+x [@] 3 | (11/2 ⁻) | | |
| 1312.0+x [#] 3 | (15/2 ⁺) | | |
| 1650.3+x ^{&} 5 | (13/2 ⁻) | | |
| 1680.0+x [@] 3 | (15/2 ⁻) | | |
| 2146.9+x ^{&} 5 | (17/2 ⁻) | | |
| 2193.7+x [#] 4 | (19/2 ⁺) | | |
| 2346.1+x [@] 4 | (19/2 ⁻) | | |
| 2790.6+x ^{&} 6 | (21/2 ⁻) | | |
| 3083.8+x [@] 5 | (23/2 ⁻) | | |
| 3112.6+x [#] 6 | (23/2 ⁺) | | |

[†] From a least-squares fit to E γ .

[‡] From 2007Pe32, based on measured Mult, the observed band structures and systematics of neighboring odd-A, I isotopes.

[#] Band(A): $\pi g_{7/2}$ band.

[@] Band(B): $\pi h_{11/2}$ band.

[&] Band(C): $\pi g_{7/2} \otimes \nu(g_{7/2}, h_{11/2})$, but admixtures with $\pi g_{7/2} \otimes 3^-$ are also possible.

$\gamma(^{109}\text{I})$

| E γ [†] | I γ [†] | E _i (level) | J π _i | E _f | J π _f | Mult. [#] | Comments |
|-------------------------|-------------------------|------------------------|----------------------|----------------|----------------------|--------------------|--|
| 368.1 3 | <5 | 1680.0+x | (15/2 ⁻) | 1312.0+x | (15/2 ⁺) | | |
| 496.6 2 | 20 <i>I</i> | 2146.9+x | (17/2 ⁻) | 1650.3+x | (13/2 ⁻) | E2 | Mult.: R(θ)=1.2 2. |
| 537.8 [‡] 2 | 27 <i>I</i> | 1680.0+x | (15/2 ⁻) | 1142.1+x | (11/2 ⁻) | E2 | Mult.: R(θ)=1.0 <i>I</i> . |
| 548.2 2 | 23 <i>I</i> | 1142.1+x | (11/2 ⁻) | 593.90+x | (11/2 ⁺) | (E1) | Mult.: R(θ)=1.0 <i>I</i> suggests $\Delta J=0$, dipole transition. |
| 593.9 2 | 100 3 | 593.90+x | (11/2 ⁺) | x | (7/2 ⁺) | E2 | Mult.: R(θ)=1.0 <i>I</i> . |
| ^x 603.8 2 | 17 <i>I</i> | | | | | | |
| 643.7 [‡] 2 | 33 2 | 2790.6+x | (21/2 ⁻) | 2146.9+x | (17/2 ⁻) | E2 | Mult.: R(θ)=1.2 2. |
| 666.1 2 | 23 <i>I</i> | 2346.1+x | (19/2 ⁻) | 1680.0+x | (15/2 ⁻) | E2 | Mult.: R(θ)=1.1 <i>I</i> . |
| ^x 708.2 3 | 10 <i>I</i> | | | | | | |

Continued on next page (footnotes at end of table)

$^{58}\text{Ni}(^{54}\text{Fe},\text{p}2\text{n}\gamma)$ 2007Pe32,2011Pr12 (continued) $\gamma(^{109}\text{I})$ (continued)

| E_γ † | I_γ † | $E_i(\text{level})$ | J_i^π | E_f | J_f^π | Mult. # | Comments |
|----------------------|--------------|---------------------|----------------------|----------|----------------------|---------|---|
| 718.1 2 | 49 2 | 1312.0+x | (15/2 ⁺) | 593.90+x | (11/2 ⁺) | E2 | Mult.: R(θ)=1.1 1. |
| ^x 729.2 3 | 13 2 | | | | | | |
| 737.7 3 | 17 1 | 3083.8+x | (23/2 ⁻) | 2346.1+x | (19/2 ⁻) | E2 | Mult.: R(θ)=1.2 2. |
| ^x 760.0 4 | 7 1 | | | | | | |
| ^x 819.5 4 | 15 1 | | | | | | |
| ^x 837.4 3 | 23 1 | | | | | | |
| ^x 860.2 5 | 6 1 | | | | | | |
| 881.7 3 | 23 1 | 2193.7+x | (19/2 ⁺) | 1312.0+x | (15/2 ⁺) | E2 | Mult.: R(θ)=1.2 2. |
| 918.9 4 | 10 1 | 3112.6+x | (23/2 ⁺) | 2193.7+x | (19/2 ⁺) | | |
| ^x 938.4 4 | 11 1 | | | | | | |
| ^x 952.8 5 | 6 1 | | | | | | |
| 1056.4 4 | 29 2 | 1650.3+x | (13/2 ⁻) | 593.90+x | (11/2 ⁺) | (E1) | Mult.: R(θ)=0.7 1 suggests $\Delta J=1$, dipole transition. |

† From 2007Pe32.

‡ Possible doublet.

Based on R(θ) in 2007Pe32, where R(θ)= $I_\gamma(\theta=157.6^\circ, 133.6^\circ)/I_\gamma(\theta=94.2^\circ, 85.8^\circ)$, normalised to R(θ)=1.0 for 593.9 γ .^x γ ray not placed in level scheme.

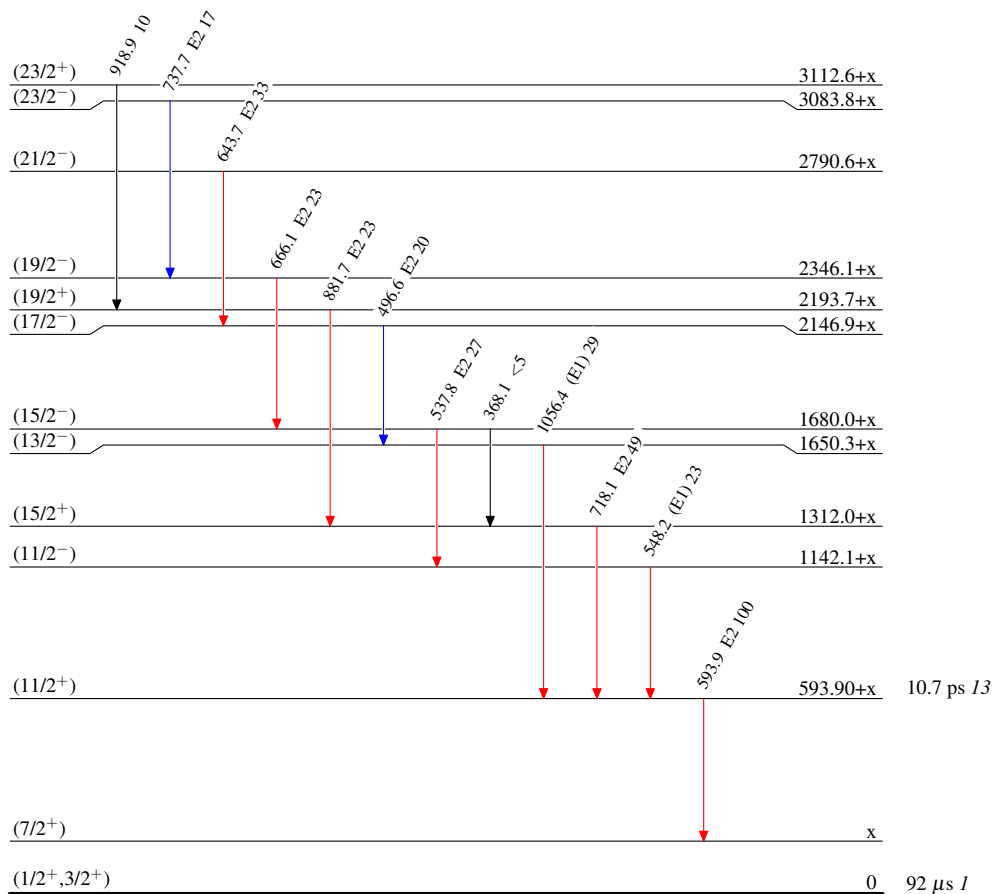
$^{58}\text{Ni}(^{54}\text{Fe},\text{p}2\text{n}\gamma)$ 2007Pe32,2011Pr12

Level Scheme

Intensities: Relative I_γ

Legend

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

 $^{109}_{53}\text{I}_{56}$

$^{58}\text{Ni}(^{54}\text{Fe},\text{p}2\text{n}\gamma)$ 2007Pe32,2011Pr12