^{93}Pd εp decay 2001Xu05,2000Sc31

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 113,2187 (2012)	15-Sep-2012

Parent: ^{93}Pd: E=0.0; J^π=(7/2$^+$,9/2$^+$); $T_{1/2}$=1.00 s *9*; Q(εp)=7880 *syst*; %εp decay=?

^{93}Pd-Q from 2011AuZZ; uncertainty is 400 keV. Other: 7420 *500* from systematics (2003Au03).

^{93}Pd-$T_{1/2}$: Unweighted average of 0.7 s *+2−1* from ε-delayed proton decay and 1.0 s *3* from γ(t) for ε-delayed 240γ (^{93}Rh) (2000Sc31), 1.0 s *2* (2001Ki13), 1.3 s *2* (2001Xu05 and 2005Xu04 from 865γ(t)); supported by $T_{1/2}$=0.9 s *6* and 0.9 s *4*, respectively, for 382γ and $\gamma^\pm$ from 2000Sc31.

2001Xu05: ^{93}Pd from ^{58}Ni(^{40}Ca,2p3n), E($^{40}Ca^{12+}$=232 MeV; 98% ^{58}Ni target on cooled Cu wheel; He-jet tape transport; 430° C $PbCl_2$ aerosol; fully-depleted Si detector either side of tape (for E(p)=2.4-5.0 MeV p detection), each followed by a coaxial HPGe detector (γ detection); measured Eγ, 865γ(t), p-γ coin; deduced p branching from ^{93}Rh, $T_{1/2}$(^{93}Pd), parent J^π from comparison of relative proton branching with predictions from statistical model calculations for various parent J^π values. See also 2002XuZZ, 2005Xu04.

2000Sc31: ^{93}Pd from ^{58}Ni(^{40}Ca,αn), E=188 MeV; enriched ^{58}Ni target, online mass separation; FEBIAD-E and FEBIAD-B2C ion sources; Si E-ΔE telescope, plastic scin detector and 12 Ge detectors; measured direct and/or ε-delayed protons, Eγ, Iγ, γβ+ coin and γγβ$^+$ coin (supersedes 2000ScZZ).

$T_{1/2}$=0.79 s *17* for ^{93}Pd parent (2000Sc31); from weighted average of 0.7 s *+2−1* measured in ε-delayed proton decay and 1.0 s *3* from γ(t) for ε-delayed 240γ.

For A=93, the only energetically-viable proton precursors are Pd, Ag and Rh, and for Rh the Q is too low to be consistent with the observed E(p). The assignment of Pd as the precursor for the observed proton activity is based on the very large reduction in proton activity when a FEBIAD-B2C ion source, which hinders the release of Pd relative to that of Ag, is employed. 2000Sc31 estimate an upper limit of 5% for any contribution from delayed protons from ^{93}Ag; further, E-ΔE anticoincidence measurements indicated no proton events with E(p)<1200 which could be assigned to p emission from the ^{93}Ag g.s.

^{92}Ru Levels

E(level)†	J^π‡
0.0	0$^+$
865	(2$^+$)
1856	(4$^+$)
2673	(6$^+$)

† From Eγ.

‡ From Adopted Levels.

γ(^{92}Ru)

E_γ†	E_i(level)	J_i^π	E_f	J_f^π	Comments
817	2673	(6$^+$)	1856	(4$^+$)	I_γ: limit from 2001Xu05; γ not visible above background in fig. 1 of 2001Xu05.
865	865	(2$^+$)	0.0	0$^+$	E_γ: this may be the γ reported by 2000Sc31 and attributed by them to ^{93}Pd ε decay; the strongest ^{93}Rh lines from ^{93}Pd ε decay are not observed by 2001Xu05.
991	1856	(4$^+$)	865	(2$^+$)	

† From Γ-(2.4-5.0 MeV p) coin spectrum in fig. 1 of 2001Xu05.

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Delayed Protons (^{92}Ru)

E(p)	E(^{92}Ru)	I(p)†	Comments
≈3000			from fig. 1 (spectrum of β-delayed protons at α=93) of 2000Sc31 and E(p): Centroid energy of proton spectrum estimated by evaluator from fig. 1 (spectrum of β-delayed protons at A=93) of 2000Sc31 and fig. 2 (spectrum of β-delayed protons gated by 865γ) of 2001Xu05.
	865	100	
	1856	23 *5*	
	2673	≤3	

† Relative branching from 2001Xu05.

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Decay Scheme