

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 111,1807 (2010)	15-Jun-2010

Q(β⁻)=-5.81×10³ 4; S(n)=9.02×10³ syst; S(p)=9.8×10² 4; Q(α)=5063 13 [2012Wa38](#)

Note: Current evaluation has used the following Q record -5800 30 9030 SY1000 40 5063 13 [2003Au03,2009AuZZ](#).

ΔS(n)=60 ([2003Au03,2009AuZZ](#)).

Identification: comparison of ¹⁴¹Pr(³²S,xn) excitation functions, producing known tungsten isotopes, with ¹⁴¹Pr(³²S,pxn) excitation functions, producing new and established rhenium isotopes; presence of Ta x rays in α-γ coincidence spectra ([1992Me10](#)). Earlier assignments of various α groups to one or more isomers of ¹⁶⁸Re ([1978Ca11,1978Sc26,1982De11,1984Sc06](#)) are apparently incorrect.

¹⁶⁸Re Levels

ε decay from ¹⁶⁸Os to ¹⁶⁸Re is expected (57% branch) but has not yet been observed.

Cross Reference (XREF) Flags

- A ¹⁷²Ir α decay (4.4 s)
- B ¹⁷²Ir α decay (2.19 s)

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
0.0	(7 ⁺)	4.4 s 1	AB	%ε+%β ⁺ ≈100; %α≈5×10 ⁻³ %α: deduced from Iα/Iγ(199.3γ in ¹⁶⁸ W) and ε decay scheme for ¹⁶⁸ Re (1992Me10). E(level): the observed ε decay (4.4 s) branch to 6 ⁺ 1042 level in ¹⁶⁸ W suggests that the high-spin isomer of ¹⁶⁸ Re is the ground state. J ^π : M1+E2 162γ from (8 ⁺) 162; strongest ε branches feed 6 ⁺ and 8 ⁺ states in ¹⁶⁸ W, but decay scheme may be incomplete. 2004GoZZ suggest a K ^π =7 ⁺ configuration of (π 9/2[514])+(ν 5/2[523]) but 1992Me10 suggest (π 9/2[514])+(ν 3/2[521]), giving K ^π =6 ⁺ ; the neighboring ¹⁶⁷ Hf, ¹⁶⁹ W and ¹⁷¹ Os isotones are believed to have ν 5/2[523] ground states, compatible with the former configuration. T _{1/2} : from 1992Me10 (363γ(t), 480γ(t) in ε decay to ¹⁶⁸ W daughter). Others: 1984Sc06, 1992Me10 (7.1 s 25 from 4830α(t)).
89.7 [#] 4			A	J ^π : 136γ from (2,3,4) 226 implies J≤6.
162.1 2	(8 ⁺)		B	E(level): from ¹⁷² Ir α decay (2.19 s). J ^π : favored α decay (HF<4) from (8 ⁺) ¹⁷² Ir.
226.0 [#] 6			A	J ^π : (2,3,4) if the (E1) 123γ deexcites J=(3) 349 level; highly tentative because order of the 123γ-136γ-90γ cascade is unestablished. 2004GoZZ suggest the K ^π =2 ⁺ configuration (π 9/2[514])-(ν 5/2[523]), but J ^π =2 ⁺ is not compatible with a low-multipolarity two-step deexcitation to a (7 ⁺) g.s..
349.2 6	(3)		A	J ^π : favored α decay (HF<4) from J=(3) in ¹⁷² Ir α decay (4.4 s).

[†] From Eγ.

[‡] Note that these values arise primarily from the coupling of expected low-lying p and n orbitals to give likely configurations for the isomeric state(s) in both ¹⁶⁸Re and the ¹⁷²Ir α-decay parent; consequently, they are highly tentative.

[#] E may differ from value shown because order of 90γ-123γ-136γ cascade has not been established.

Adopted Levels, Gammas (continued)

$\gamma(^{168}\text{Re})$									
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ	E_f	J_f^π	Mult. [†]	δ^\dagger	α^\ddagger	Comments
89.7		89.7 4	100	0.0	(7 ⁺)				
162.1	(8 ⁺)	162.1 2	100	0.0	(7 ⁺)	M1+E2	0.99 16	0.99 6	Coincident with 5830 α from high-J ^{172}Ir (2004GoZZ).
226.0		136.3 4		89.7					
349.2	(3)	123.2 2	100	226.0		(E1)		0.224	$E_\gamma, \text{Mult.}$: from ^{172}Ir α decay (4.4 s).

[†] From ^{172}Ir α decay (2.19 s), except as noted.

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

Adopted Levels, Gammas**Level Scheme**

Intensities: Relative photon branching from each level

