(HI,xnγ) 2020Au01,2014Ka23,2005Uu02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 187,355 (2023)	20-Sep-2022

2020Au01: ^{169}Tm(^{36}Ar,4nγ) at E(^{36}Ar)=178, 184, and 187 MeV. Evaporation residues separated with RITU separator and implanted into a DSSD. Measured Eγ, Iγ, Eα, α(t), ce(t) using an array of silicon PIN diodes and three Clover-type HPGe detectors.

2014Ka23: ^{149}Sm(^{56}Fe,p3n) at E(^{56}Fe)=275 MeV produced by the GSI accelerator facility. Target=370 μg/cm^2 thick enriched to 96.4% in ^{147}Sm, with 40 μg/cm^2 thick carbon backing and covered with a 10 μg/cm^2 layer of carbon, and mounted on a rotating wheel. Detectors: SHIP recoil separator, 16-strip position sensitive Si detectors (PSSD), six Si strip detectors to detect escaping α particles and one HPGe clover detector behind the PSDD. Measured: recoil-α-γ(t) and recoil-α-α(t). Deduced: Eα and $T_{1/2}$.

2005Uu02: produced using ^{170}Yb(^{36}Ar,p4n),E(^{36}Ar)=180 and 185 MeV. Target: 70 % enriched in ^{170}Yb. Detectors: gas filled mass separator, position sensitive silicon detectors with a typical resolution (FWHM) of 30 keV, multi-wire proportional gas counter. Measured: Eα, $T_{1/2}$.

2005De01: produced in a bombardment with a 1.4 GeV pulsed proton beam on 51 g/cm^2 thorium/graphite target. Detectors: on-line mass separator, recoils were implanted on a carbon foil for 100 ms and subsequent α-decay counted using a 400 mm^2, 1 mm thick silicon detector for 1100 ms; Measured: Eα, $T_{1/2}$.

Others: 1996En01: produced using ^{170}Yb(^{35}Cl,4n), E(^{35}Cl)=205 and 213 MeV; Target: 72 % enriched in ^{170}Yb; Detectors: gas filled mass separator, position sensitive silicon detectors with a typical resolution (FWHM) of 35 keV; Measured: Eα, $T_{1/2}$. Assignment to ^{201}Fr is based on the observed Eα1-Eα2 correlation with the characteristic daughter α-decay; 1980Ew03: produced using ^{238}U(p,spallation); E(p)=600 MeV; Detectors: on-line mass separator, silicon charged particle detector; Measured: Eα, $T_{1/2}$.

^{201}Fr Levels

E(level)†	Jπ†	$T_{1/2}$	Comments
0	9/2$^-$	63 ms *4*	%α≈100 $T_{1/2}$: From Adopted Levels. Individual measurements: 64 ms *3* (2014Ka23), 53 ms *4* (2005Uu02), 67 ms *3* (2005De01), 48 ms *15* (1980Ew03) and 69 ms *+16−11* (1996En01). Eα1=7369 keV *5* (2014Ka23); Eα1=7369 keV *8*, correlated with Eα2(^{197}At)=6959 keV *6* (2005Uu02); Eα1=7379 keV *7* (2005De01); Eα1=7361 keV *7*, correlated with Eα2(^{197}At)=6956 keV *5* (1996En01); Eα1=7388 keV *15* (1980Ew03). σ(^{201}Fr)=4.0 nb *4* at 275 MeV (2014Ka23). configuration: π $h^{+1}_{9/2}$.
129 *10*	1/2$^+$	37 ms *+14−8*	%α=100 $T_{1/2}$: From α(t) in 2020Au01 (14 α1−α2−α3 correlated events). Others: 8 ms *+12−3* (2014Ka23) and 19 ms *+19−6* (2005Uu02). Eα=7457 keV *9* (2020Au01), Eα=7445 keV *8* (2014Ka23) and Eα=7454 keV *8* (2005Uu02). Isomeric Ratio: I(1/2$^+$ isomer)/I(9/2$^-$ g.s.)=0.02 *1* (2014Ka23). configuration: π $s^{-1}_{1/2}$.
289.5 *4*	13/2$^+$	720 ns *40*	%IT=100 $T_{1/2}$: from ce(t) in 2020Au01. Others: 0.7 μs *+5−2* (2014Ka23). configuration: π $i^{+1}_{13/2}$.

† From Adopted Levels.

γ(^{201}Fr)

Eγ	E_i(level)	J^π_i	E_f	J^π_f	Mult.	Comments
289.5 *4*	289.5	13/2$^+$	0	9/2$^-$	M2	Eγ: From 2020Au01. Mult.: From K/LMN+=3.0 *9* in 2020Au01.

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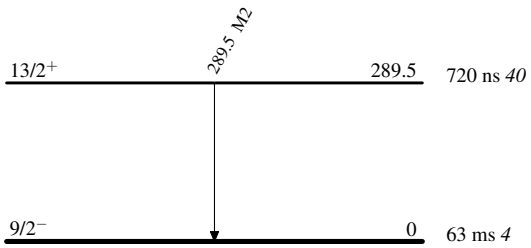
Level Scheme



$^{201}_{87}Fr_{114}$