

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 152, 1 (2018)	30-Sep-2017

$Q(\beta^-)=12240$  70;  $S(n)=3700$  80;  $S(p)=1.534\times 10^4$  13;  $Q(\alpha)=-14050$  70 [2017Wa10](#)

$S(2n)=10510$  70,  $S(2p)=35150$  170,  $Q(\beta^-n)=4200$  70 ([2017Wa10](#)).

$^{38}\text{P}$  first produced and identified by [1971Ar32](#) in  $^{232}\text{Th}(^{40}\text{Ar},X)$  at  $E=290$  MeV.

[1986Du07](#) produced  $^{38}\text{P}$  in  $^9\text{Be}(^{40}\text{Ar},X)$   $E=60$  MeV/nucleon, measured half-life and  $\beta\gamma$  coin, deduced decay scheme of  $^{38}\text{P}$  to  $^{38}\text{S}$ .

Other measurements:

[1987Gi05](#):  $^{181}\text{Ta}(^{40}\text{Ar},X)$   $E=60$  MeV/nucleon, measured fragment rigidity, deduced mass excess.

[1991Zh24](#):  $^{232}\text{Th}(p,X)$   $E=800$  MeV.

[1997Fo01](#):  $^{208}\text{Pb}(^{37}\text{Cl},X)$   $E=230$  MeV, measured yield of  $^{38}\text{P}$ .

[1995ReZZ](#):  $^{232}\text{Th}(p,X)$   $E=800$  MeV. Measured  $\beta$ (fragment) coin,  $\% \beta^-n$ .

[1999Ai02](#):  $^9\text{Be}(^{55}\text{Mn},X)$   $E=90$  MeV/nucleon, deduced integrated cross section and strong absorption radius.

[2006Kh08](#): Cross section measurement in  $\text{Si}(^{38}\text{P},X)$   $E=30-65$  MeV/nucleon, deduced reduced strong absorption radius= $1.210$  fm<sup>2</sup>

24. The  $^{38}\text{P}$  beam obtained from fragmentation of  $^{48}\text{Ca}$  beam with  $^{181}\text{Ta}$  target at GANIL facility.

Mass measurements: [2015Xu14](#), [2001Sa72](#) (also [2000Sa21](#)), [1991Zh24](#), [1987Gi05](#).

$\beta^-n$  decay of 47.5-ms  $^{39}\text{Si}$  may populate levels in  $^{38}\text{P}$ .

Structure calculations: [2004Kh16](#).

 $^{38}\text{P}$  LevelsCross Reference (XREF) Flags

- A  $^{38}\text{Si}$   $\beta^-$  decay (63 ms)  
 B  $^{208}\text{Pb}(^{36}\text{S},X\gamma)$

<u>E(level)<sup>†</sup></u>	<u>J<sup>π</sup><sup>‡</sup></u>	<u>T<sub>1/2</sub></u>	<u>XREF</u>	<u>Comments</u>
0	(2 <sup>-</sup> )	0.64 s 14	AB	$\% \beta^- = 100$ ; $\% \beta^-n = 12.5$ ( <a href="#">1995ReZZ</a> ) E(level): assumed that the 0.64 s activity corresponds to the g.s. ( <a href="#">1986Du07</a> ). J <sup>π</sup> : from <a href="#">2015Ch56</a> in $^{208}\text{Pb}(^{36}\text{S},X\gamma)$ and <a href="#">2017Tr02</a> in $^{38}\text{Si}$ $\beta^-$ decay based on shell-model predictions; (0 <sup>-</sup> to 4 <sup>-</sup> ) from possible $\beta$ feeding of 2 <sup>+</sup> , 1292 state in $^{38}\text{S}$ ( <a href="#">1986Du07</a> ). T <sub>1/2</sub> : from <a href="#">1986Du07</a> . $\% \beta^-n$ : other: <10 ( <a href="#">1988Mu08</a> ). Calculated T <sub>1/2</sub> : 0.28 s ( <a href="#">2003Mo09</a> ), 12.6 s ( <a href="#">2016Ma12</a> ). Calculated $\% \beta^-n$ : 1.6 ( <a href="#">2003Mo09</a> ), 57.3 ( <a href="#">2016Ma12</a> ). J <sup>π</sup> : from <a href="#">2015Ch56</a> in $^{208}\text{Pb}(^{36}\text{S},X\gamma)$ based on shell-model predictions.
380 1	(4 <sup>-</sup> )		B	
1120? 2	(1 <sup>+</sup> )		A	
1694 1	1 <sup>+</sup>		A	
1874 1	1 <sup>+</sup>		A	

<sup>†</sup> From E<sub>γ</sub> values.

<sup>‡</sup> From allowed  $\beta$  feedings in  $^{38}\text{Si}$   $\beta^-$  decay for excited states.

Adopted Levels, Gammas (continued) $\gamma(^{38}\text{P})$ 

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Comments
380	(4 <sup>-</sup> )	380 <i>I</i>		0	(2 <sup>-</sup> )	$E_\gamma$ : seen only by <a href="#">2015Ch56</a> via $^{208}\text{Pb}(^{36}\text{S}, X\gamma)$ .
1120?	(1 <sup>+</sup> )	1120 <sup>‡</sup> <i>2</i>	100	0	(2 <sup>-</sup> )	
1694	1 <sup>+</sup>	1694 <i>I</i>	100	0	(2 <sup>-</sup> )	
1874	1 <sup>+</sup>	1874 <i>I</i>	100	0	(2 <sup>-</sup> )	

† From [2017Tr02](#) in  $^{38}\text{Si}$   $\beta^-$  decay, unless otherwise noted.

‡ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----►  $\gamma$  Decay (Uncertain)