

$^{59}\text{Co}(p,p'\gamma)$  1980Ha17

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia		NDS 151, 1 (2018)	1-Apr-2018

Others: 1971Kr12, 1972Ab16.

1980Ha17: E(p)=6 MeV; measured E(p), E $\gamma$ , I $\gamma$ , p $\gamma$  coin, T $_{1/2}$  (coin version of DSAM); Si surface barrier and Ge(Li) detectors; DSAM with two Si detectors at +110° and -100° and a Ge(Li) detector at 90°. The finite size of the detector was taken into account.

1972Ab16: E(p)=1-2.5 MeV. Measured  $\gamma(\theta)$  averaged over E(p)=2-2.5 MeV.

 $^{59}\text{Co}$  Levels

E(level) <sup>†</sup>	J $^{\pi}$ <sup>‡</sup>	T $_{1/2}$ <sup>#</sup>	Comments
0.0			
1099.2 2	[3/2 <sup>-</sup> ]	>2.4 ps	
1189.5 1	9/2 <sup>-</sup> , 11/2 <sup>-</sup>	33 fs 6	Adopted J $^{\pi}$ =9/2 <sup>-</sup> .
1291.7 2	3/2	>0.76 ps	
1434.5 3	1/2		
1459.5 2	7/2 <sup>-</sup>	2 ps +11-1	Adopted J $^{\pi}$ =11/2 <sup>-</sup> .
1482.1 2	7/2 <sup>-</sup>	139 fs +35-28	Adopted J $^{\pi}$ =5/2 <sup>-</sup> .
1745.1 3	7/2 <sup>-</sup> , 9/2	0.52 ps +55-21	Adopted J $^{\pi}$ =7/2 <sup>-</sup> .
2062.8 4	9/2 <sup>-</sup>	0.10 ps +6-4	Adopted J $^{\pi}$ =7/2 <sup>-</sup> .
2088.3 5	5/2, 3/2 <sup>-</sup>	0.2 ps +12-1	
2153.4 6	15/2	≥14 fs	
2185.4 6	11/2	33 fs +8-6	
2204.5 6		≥0.14 ps	
2397.1 6	9/2	0.07 ps +14-6	
2479.0 7	5/2	26 fs +13-8	
2541.0 9	9/2	0.2 ps +18-1	
2585.9 7	7/2	62 fs +28-14	
2712.7 7			
2722.4 9			
2770.3 9			
2781.0 9		<58 fs	
2823.3 10		55 fs +21-42	
2914.6 10			
2959.3 10			
2963.0			
3016.8 10			

<sup>†</sup> Quoted from 1980Ha17; based on measured but unenumerated E $\gamma$ .

<sup>‡</sup> From comparison with Hauser-Feshbach calculations, assuming J $^{\pi}$ =3/2<sup>-</sup> for 1099 level (1980Ha17). Discrepancies with adopted J $^{\pi}$  are noted.  $\sigma(\theta)$  measured at  $\theta$ =110°, 130°, and 150°.

<sup>#</sup> From DSAM (1980Ha17).

 $\gamma(^{59}\text{Co})$ 

E $_i$ (level)	J $_i^{\pi}$	E $_{\gamma}$ <sup>†</sup>	I $_{\gamma}$ <sup>‡</sup>	E $_f$	J $_f^{\pi}$
1099.2	[3/2 <sup>-</sup> ]	1099.2	100 10	0.0	
1189.5	9/2 <sup>-</sup> , 11/2 <sup>-</sup>	1189.5	100 10	0.0	
1291.7	3/2	192.5	4 2	1099.2	[3/2 <sup>-</sup> ]
		1291.7	96 4	0.0	
1434.5	1/2	142.8	43 8	1291.7	3/2
		335.3	57 8	1099.2	[3/2 <sup>-</sup> ]

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$^{59}\text{Co}(p,p'\gamma)$  1980Ha17 (continued) $\gamma(^{59}\text{Co})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	Mult.	$\delta$	Comments
1459.5	7/2 <sup>-</sup>	270.0	7 3	1189.5	9/2 <sup>-</sup> ,11/2 <sup>-</sup>			
		1459.5	93 7	0.0				
1482.1	7/2 <sup>-</sup>	382.9	27 7	1099.2	[3/2 <sup>-</sup> ]			
		1482.1	73 7	0.0				
1745.1	7/2 <sup>-</sup> ,9/2	263.0	12 2	1482.1	7/2 <sup>-</sup>			
		555.6	34 5	1189.5	9/2 <sup>-</sup> ,11/2 <sup>-</sup>			
		1745.1	54 7	0.0				
2062.8	9/2 <sup>-</sup>	317.7	3 2	1745.1	7/2 <sup>-</sup> ,9/2			
		580.7	48 5	1482.1	7/2 <sup>-</sup>			
		873.3	40 5	1189.5	9/2 <sup>-</sup> ,11/2 <sup>-</sup>			
		2062.8	9 2	0.0				
2088.3	5/2,3/2 <sup>-</sup>	343.2	13 4	1745.1	7/2 <sup>-</sup> ,9/2			
		796.6	50 10	1291.7	3/2			
		2088.3	37 9	0.0				
2153.4	15/2	693.9	100 3	1459.5	7/2 <sup>-</sup>			
2185.4	11/2	750.9 <sup>@a</sup>	3 <sup>@</sup>	1434.5	1/2			$E_\gamma$ : Placement yields $\Delta J=5$ , not adopted.
		995.9	90 & 8	1189.5	9/2 <sup>-</sup> ,11/2 <sup>-</sup>			
		2185.4	10 8	0.0				
2204.5		722.4	31 5	1482.1	7/2 <sup>-</sup>			
		770.0	8 2	1434.5	1/2			
		912.8	24 5	1291.7	3/2			
		1015.0	19 4	1189.5	9/2 <sup>-</sup> ,11/2 <sup>-</sup>			
		2204.5	18 4	0.0				
2397.1	9/2	334.3	6 2	2062.8	9/2 <sup>-</sup>			
		652.0	52 6	1745.1	7/2 <sup>-</sup> ,9/2			
		937.6	20 4	1459.5	7/2 <sup>-</sup>	D(+Q)	-0.12 11	Mult., $\delta$ : From 1980Ha17.
		2397.1	22 5	0.0				
2479.0	5/2	274.5	13 10	2204.5				
		2479.0	87 10	0.0				
2541.0	9/2	795.9	72 9	1745.1	7/2 <sup>-</sup> ,9/2			
		1351.5	14 4	1189.5	9/2 <sup>-</sup> ,11/2 <sup>-</sup>			
		2541.0	14 3	0.0				
2585.9	7/2	1396.4	81 15	1189.5	9/2 <sup>-</sup> ,11/2 <sup>-</sup>			
		2585.9	19 4	0.0				
2712.7		559.3	<20	2153.4	15/2			$E_\gamma$ : $\gamma$ -ray not adopted by the evaluator for spin-parity assignments in Adopted Levels, which yields a $\Delta J$ of 3 or more from 1/2 <sup>+</sup> to 2153.62 keV level with conflicting spin-parity assignments.
		1613.5	>80	1099.2	[3/2 <sup>-</sup> ]			
2722.4		181.4	<20	2541.0	9/2			
		537.0	>80	2185.4	11/2			
2770.3		707.5	#	2062.8	9/2 <sup>-</sup>			
2781.0		2781.0	#	0.0				
2823.3		669.9	20 8	2153.4	15/2			
		735.0	24 8	2088.3	5/2,3/2 <sup>-</sup>			
		2823.3	56 20	0.0				
2914.6		517.5	28 3	2397.1	9/2			
		826.3	25 5	2088.3	5/2,3/2 <sup>-</sup>			
		1725.1	47 7	1189.5	9/2 <sup>-</sup> ,11/2 <sup>-</sup>			
2959.3		1860.1	#	1099.2	[3/2 <sup>-</sup> ]			
2963.0		2963.0		0.0				
3016.8		619.7	20 7	2397.1	9/2			
		1271.7	49 15	1745.1	7/2 <sup>-</sup> ,9/2			
		1557.3	31 12	1459.5	7/2 <sup>-</sup>			

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${}^{59}\text{Co}(\text{p},\text{p}'\gamma)$  1980Ha17 (continued)

$\gamma({}^{59}\text{Co})$  (continued)

† Deduced by evaluator from level separation. 1980Ha17 give level energies only;  $E\gamma$  and  $\Delta E(\gamma)$  are not specified.

‡ Photon branching ratios (%).

# Transition was observed but  $I\gamma$  was not determined.

@ From Fig. 1 of 1980Ha17; transition not listed in table 2. Placement is shown as tentative here and is not included in Adopted Levels levels, gammas because evaluator assumes transition to be an error in fig. 1 (adopted  $\Delta J$  precludes such a  $\gamma$ ).

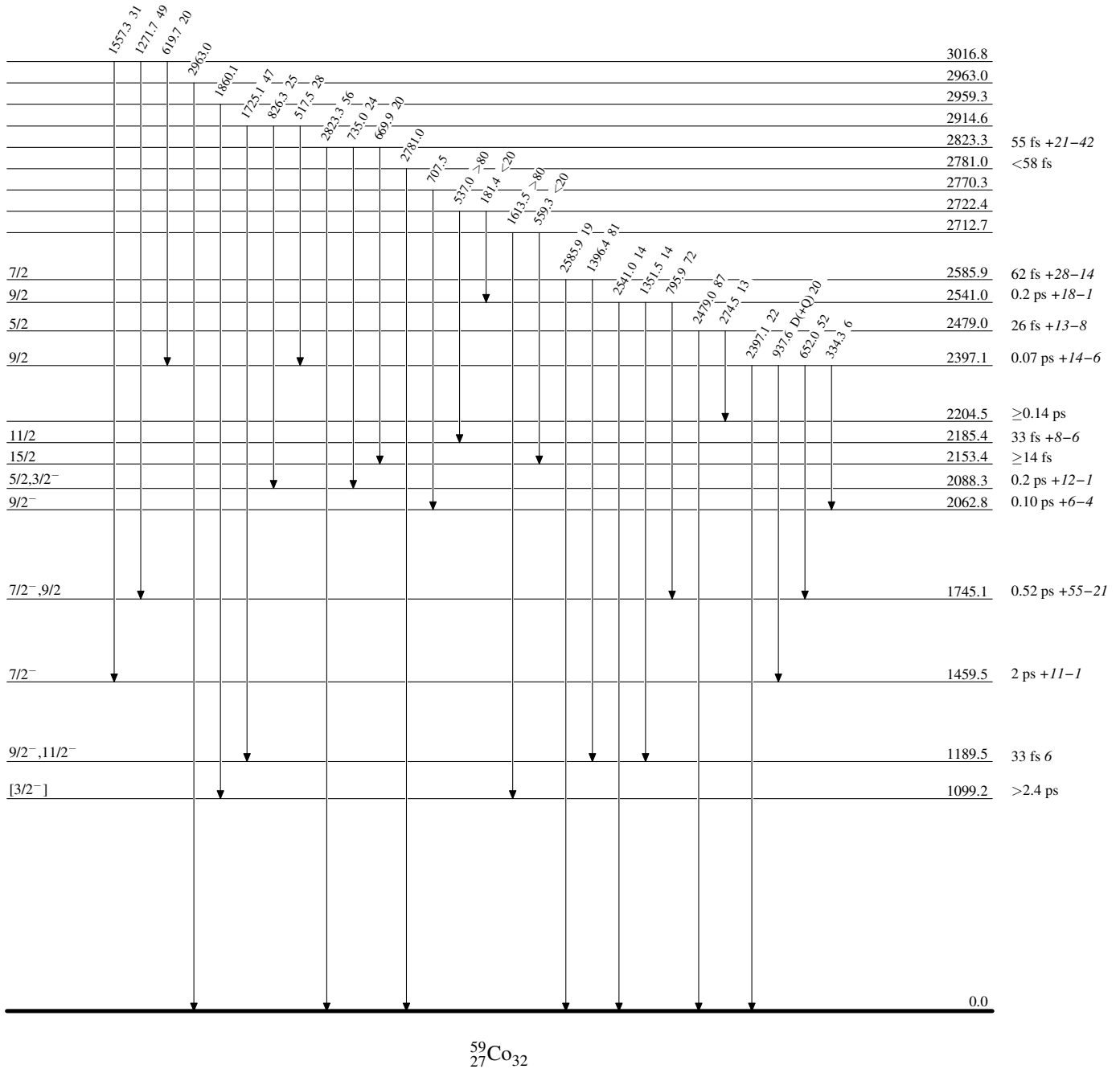
& From table 2 of 1980Ha17; shown as 87% on fig.1.

<sup>a</sup> Placement of transition in the level scheme is uncertain.

$^{59}\text{Co}(p,p'\gamma)$  1980Ha17

## Level Scheme

Intensities: % photon branching from each level



$^{59}\text{Co}(p,p'\gamma)$  1980Ha17

Legend

## Level Scheme (continued)

Intensities: % photon branching from each level

-----►  $\gamma$  Decay (Uncertain)