

(HI,xn $\gamma$ ) **2000Mu20**

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huo Junde, Yang Dong, Huo Meirong,	ENSDF	28-Aug-2008

**2000Mu20:** <sup>52</sup>Cr(<sup>16</sup>O, $\alpha$ p $\gamma$ ), E=65 MeV, gold-backed natural chromium target,  $\gamma$  detector array of twelve HPGE with BGO Compton suppressors, 4  $\pi$  charged particle detector array consisted of fourteen phoswich  $\Delta$ E-E detectors.

**1997HaZT:** <sup>40</sup>Ca(<sup>28</sup>Si,5p $\gamma$ ), E=120 MeV, in-beam  $\gamma$ -rays were measured using an array of 10 germanium detectors with BGO Compton suppressed detectors in coincidence with the evaporated charged particles which were detected with a Si ball. Measured  $\gamma$ ,  $\gamma(\theta)$ , DCO,  $\gamma\gamma$ .

<sup>63</sup>Cu Levels

E(level) <sup>‡</sup>	J $\pi$ <sup>†</sup>	E(level) <sup>‡</sup>	J $\pi$ <sup>†</sup>	E(level) <sup>‡</sup>	J $\pi$ <sup>†</sup>	E(level) <sup>‡</sup>	J $\pi$ <sup>†</sup>
0.0	3/2 <sup>-</sup>	2092.03 8	7/2 <sup>-</sup>	3295.03 9	(11/2 <sup>+</sup> )	5007.23 16	(19/2 <sup>+</sup> )
962.06 6	5/2 <sup>-</sup>	2208.17 8	9/2 <sup>-</sup>	3461.22 11	11/2 <sup>+</sup>	5318.23 16	
1326.87 7	7/2 <sup>-</sup>	2505.21 7	9/2 <sup>+</sup>	4129.23 13	13/2 <sup>+</sup>	5768.24 16	
1410.04 8	5/2 <sup>-</sup>	2617.96 10		4155.23 11	13/2 <sup>+</sup>	6283.25 14	19/2 <sup>(+)</sup>
1861.10 7	7/2 <sup>-</sup>	2676.70 9		4497.23 13	17/2 <sup>+</sup>	7073.26 18	23/2 <sup>(+)</sup>
1952.14 10		2911.21 13		4576.23 14			

<sup>†</sup> Based on  $\gamma$ (mult) deduced by DCO.

<sup>‡</sup> From a least-squares fit to the E $\gamma$  data.

$\gamma$ (<sup>63</sup>Cu)

E $\gamma$	I $\gamma$	E <sub>i</sub> (level)	J $\pi$ <sub>i</sub>	E <sub>f</sub>	J $\pi$ <sub>f</sub>	Comments
297.0 1	3	2505.21	9/2 <sup>+</sup>	2208.17	9/2 <sup>-</sup>	
342.0 1	45	4497.23	17/2 <sup>+</sup>	4155.23	13/2 <sup>+</sup>	DCO=1.02.
365.0 1	18	1326.87	7/2 <sup>-</sup>	962.06	5/2 <sup>-</sup>	DCO=0.73.
368.0 1	4	4497.23	17/2 <sup>+</sup>	4129.23	13/2 <sup>+</sup>	
406.0 1	4	2911.21		2505.21	9/2 <sup>+</sup>	
413.0 1	28	2505.21	9/2 <sup>+</sup>	2092.03	7/2 <sup>-</sup>	DCO=0.61.
421.0 1	10	4576.23		4155.23	13/2 <sup>+</sup>	
448.0 1	4	1410.04	5/2 <sup>-</sup>	962.06	5/2 <sup>-</sup>	
468.0 1	3	2676.70		2208.17	9/2 <sup>-</sup>	
510.0 1	20	5007.23	(19/2 <sup>+</sup> )	4497.23	17/2 <sup>+</sup>	DCO=0.49.
526.0 1	7	2617.96		2092.03	7/2 <sup>-</sup>	
553.0 1	2	2505.21	9/2 <sup>+</sup>	1952.14		
618.0 1	5	3295.03	(11/2 <sup>+</sup> )	2676.70		
644.0 1	36	2505.21	9/2 <sup>+</sup>	1861.10	7/2 <sup>-</sup>	DCO=0.47.
668.0 1	12	4129.23	13/2 <sup>+</sup>	3461.22	11/2 <sup>+</sup>	DCO=0.74.
694.0 1	14	4155.23	13/2 <sup>+</sup>	3461.22	11/2 <sup>+</sup>	DCO=0.43.
765.0 1	3	2092.03	7/2 <sup>-</sup>	1326.87	7/2 <sup>-</sup>	
790.0 1	8	3295.03	(11/2 <sup>+</sup> )	2505.21	9/2 <sup>+</sup>	
790.0 1	13	7073.26	23/2 <sup>(+)</sup>	6283.25	19/2 <sup>(+)</sup>	DCO=1.15.
821.0 1	2	5318.23		4497.23	17/2 <sup>+</sup>	
861.0 1	6	4155.23	13/2 <sup>+</sup>	3295.03	(11/2 <sup>+</sup> )	DCO=0.41.
881.0 1	3	2208.17	9/2 <sup>-</sup>	1326.87	7/2 <sup>-</sup>	
899.0 1	8	1861.10	7/2 <sup>-</sup>	962.06	5/2 <sup>-</sup>	DCO=0.51.
956.0 1	21	3461.22	11/2 <sup>+</sup>	2505.21	9/2 <sup>+</sup>	DCO=0.55.
962.0 1	100	962.06	5/2 <sup>-</sup>	0.0	3/2 <sup>-</sup>	DCO=0.55.
990.0 1	8	1952.14		962.06	5/2 <sup>-</sup>	
1087.0 1	2	3295.03	(11/2 <sup>+</sup> )	2208.17	9/2 <sup>-</sup>	
1130.0 1	37	2092.03	7/2 <sup>-</sup>	962.06	5/2 <sup>-</sup>	DCO=0.63.

Continued on next page (footnotes at end of table)

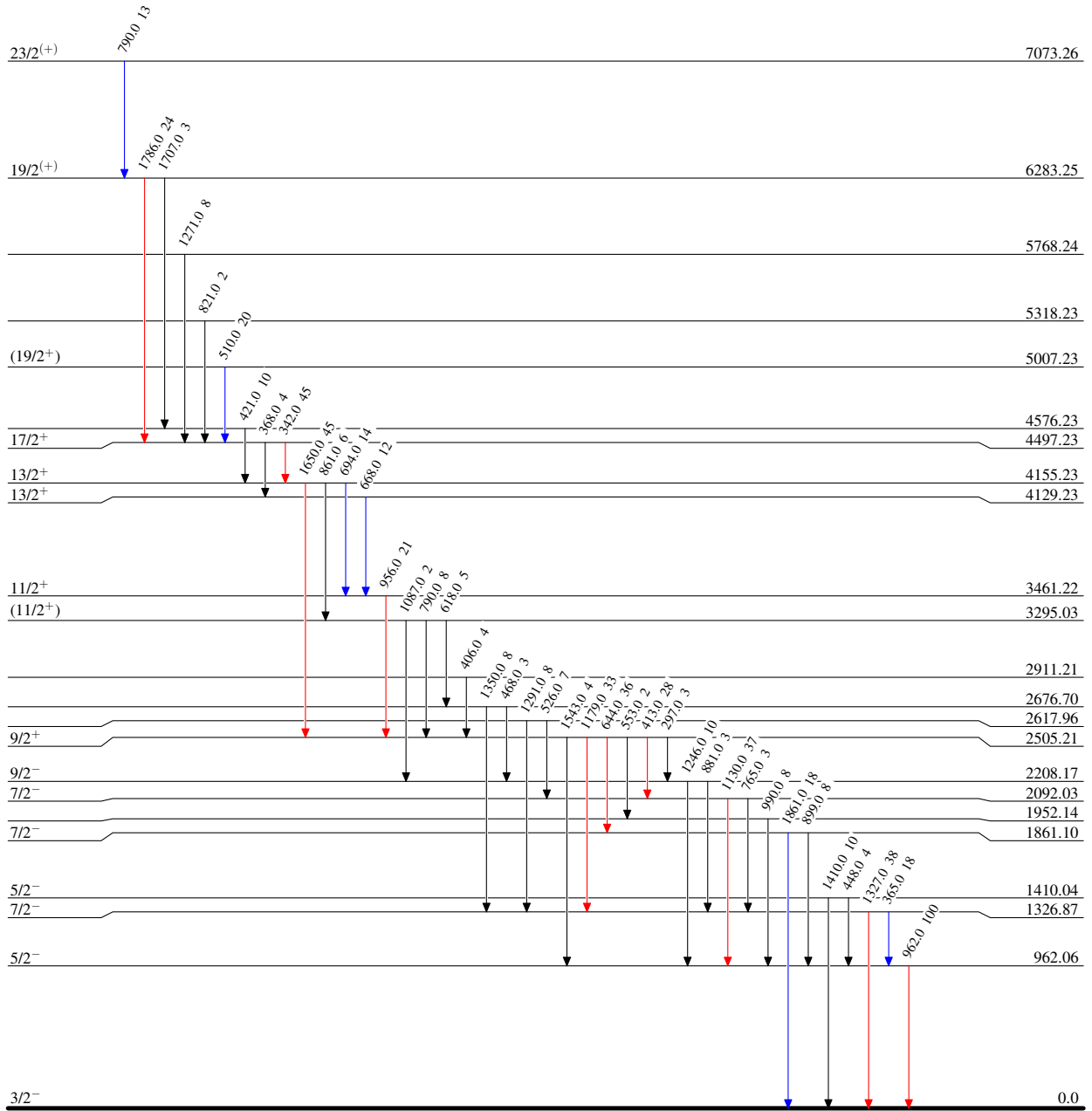
(HI,xn $\gamma$ ) 2000Mu20 (continued) $\gamma(^{63}\text{Cu})$  (continued)

$E_\gamma$	$I_\gamma$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Comments
1179.0	1	33 2505.21	9/2 <sup>+</sup>	1326.87	7/2 <sup>-</sup>	DCO=0.67.
1246.0	1	10 2208.17	9/2 <sup>-</sup>	962.06	5/2 <sup>-</sup>	DCO=0.98.
1271.0	1	8 5768.24		4497.23	17/2 <sup>+</sup>	
1291.0	1	8 2617.96		1326.87	7/2 <sup>-</sup>	
1327.0	1	38 1326.87	7/2 <sup>-</sup>	0.0	3/2 <sup>-</sup>	DCO=1.10.
1350.0	1	8 2676.70		1326.87	7/2 <sup>-</sup>	
1410.0	1	10 1410.04	5/2 <sup>-</sup>	0.0	3/2 <sup>-</sup>	DCO=0.62.
1543.0	1	4 2505.21	9/2 <sup>+</sup>	962.06	5/2 <sup>-</sup>	
1650.0	1	45 4155.23	13/2 <sup>+</sup>	2505.21	9/2 <sup>+</sup>	DCO=1.13.
1707.0	1	3 6283.25	19/2 <sup>(+)</sup>	4576.23		
1786.0	1	24 6283.25	19/2 <sup>(+)</sup>	4497.23	17/2 <sup>+</sup>	DCO=0.62.
1861.0	1	18 1861.10	7/2 <sup>-</sup>	0.0	3/2 <sup>-</sup>	DCO=0.94.

**(HI,xn $\gamma$ ) 2000Mu20****Level Scheme**Intensities: Relative  $I_\gamma$ 

## Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$

 $^{63}_{29}\text{Cu}_{34}$