

**$^{54}\text{Cr}(\alpha, \text{p}), (\alpha, \text{p}\gamma)$  E=15-26 MeV    [1978An10,1976Ma03](#)**

| Type            | Author     | History<br>Citation | Literature Cutoff Date |
|-----------------|------------|---------------------|------------------------|
| Full Evaluation | M. R. Bhat | NDS 85, 415 (1998)  | 24-Sep-1998            |

[1976Ma03](#): E=15– 24 MeV; measured Q values and excitation energies; magnetic spectrograph, emulsions. E=11.0 and 11.5 MeV; measured  $\text{p}\gamma$ -coincidences and  $\text{p}\gamma(\theta)$ ; Si, NaI or Ge(Li).

[Additional information 1](#).

[1978An10](#): measured  $\sigma(\theta)$  at 18 ( $15^\circ$ – $150^\circ$ , res= 32 keV) and 26 MeV ( $20^\circ$ – $90^\circ$ ; res=45– 60 keV); Si. DWBA.

Other: [1976AlZJ](#).

 $^{57}\text{Mn}$  Levels

| E(level) <sup>†</sup>  | $J^\pi$ <sup>‡</sup>  | Comments                                                                                                                                                                                           |
|------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0                      | $5/2^-$               | <a href="#">Additional information 2</a> .                                                                                                                                                         |
| 84.1 <sup>#</sup> 10   | $5/2^-, 7/2^-$        | $J^\pi$ : $7/2^-$ from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ); $J=3/2$ to $7/2$ from $\text{p}\gamma(\theta)$ ( <a href="#">1976Ma03</a> ).                                         |
| 851.1 <sup>#</sup> 10  | $3/2^-$               | $J^\pi$ : ( $3/2^-$ ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ); $J=3/2$ or $5/2$ from $\text{p}\gamma(\theta)$ ( <a href="#">1976Ma03</a> ).                                     |
| 1059.2 <sup>#</sup> 20 | $1/2^-, 3/2^-, 5/2^-$ | $J^\pi$ : ( $1/2^-$ ) from a fit to a peak at 1064 representing this and the next level ( <a href="#">1978An10</a> ); $J=1/2$ to $5/2$ from $\text{p}\gamma(\theta)$ ( <a href="#">1976Ma03</a> ). |
| 1073.8 <sup>#</sup> 20 | –                     | $J^\pi$ : ( $9/2^-$ ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ).                                                                                                                  |
| 1227.1 <sup>#</sup> 10 | –                     | $J^\pi$ : ( $11/2^-$ ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ).                                                                                                                 |
| 1376.5 <sup>#</sup> 13 | –                     |                                                                                                                                                                                                    |
| 1487 <sup>@</sup> 11   | –                     |                                                                                                                                                                                                    |
| 1533 10                | –                     |                                                                                                                                                                                                    |
| 1630 <sup>@</sup> 10   |                       |                                                                                                                                                                                                    |
| 1734 <sup>@</sup> 10   |                       |                                                                                                                                                                                                    |
| 1830 <sup>@</sup> 11   | –                     |                                                                                                                                                                                                    |
| 1925 7                 | –                     |                                                                                                                                                                                                    |
| 2016 <sup>@</sup> 14   | –                     |                                                                                                                                                                                                    |
| 2188.2 <sup>#</sup> 11 |                       | $J^\pi$ : $1/2^{(-)}$ from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ).                                                                                                                  |
| 2234.2 17              | $5/2^-, 7/2^-$        |                                                                                                                                                                                                    |
| 2343 <sup>@</sup> 8    | $5/2^+, 3/2^+$        |                                                                                                                                                                                                    |
| 2427 <sup>@</sup> 7    |                       |                                                                                                                                                                                                    |
| 2525 10                |                       | $J^\pi$ : ( $5/2^-$ ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ).                                                                                                                  |
| 2608 9                 |                       |                                                                                                                                                                                                    |
| 2631 11                |                       |                                                                                                                                                                                                    |
| 2700 11                | $1/2^-$ to $7/2^-$    |                                                                                                                                                                                                    |
| 2741 <sup>@</sup> 7    |                       |                                                                                                                                                                                                    |
| 2772 <sup>@</sup> 12   |                       |                                                                                                                                                                                                    |
| 2848 14                |                       |                                                                                                                                                                                                    |
| 2928 <sup>@</sup> 14   |                       |                                                                                                                                                                                                    |
| 3087 12                |                       |                                                                                                                                                                                                    |
| 3123 10                |                       |                                                                                                                                                                                                    |
| 3164 <sup>@</sup> 12   |                       |                                                                                                                                                                                                    |
| 3212 10                |                       |                                                                                                                                                                                                    |
| 3254 13                |                       |                                                                                                                                                                                                    |
| 3371 11                |                       |                                                                                                                                                                                                    |
| 3458 11                |                       |                                                                                                                                                                                                    |
| 3482 10                |                       |                                                                                                                                                                                                    |
| 3542 10                |                       |                                                                                                                                                                                                    |
| 3608 <sup>@</sup> 14   |                       |                                                                                                                                                                                                    |
| 3674 13                |                       |                                                                                                                                                                                                    |
| 3715 9                 |                       |                                                                                                                                                                                                    |

Continued on next page (footnotes at end of table)

$^{54}\text{Cr}(\alpha, \text{p}), (\alpha, \text{p}\gamma)$  E=15-26 MeV    [1978An10,1976Ma03](#) (continued) $^{57}\text{Mn}$  Levels (continued)

| E(level) <sup>†</sup> | Comments                                                                                                      |
|-----------------------|---------------------------------------------------------------------------------------------------------------|
| 3757@ 9               |                                                                                                               |
| 3796@ 7               |                                                                                                               |
| 3838 10               | $J^\pi$ : (5/2 <sup>-</sup> ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ).                     |
| 3870@ 9               |                                                                                                               |
| 3911@ 10              |                                                                                                               |
| 3947 9                |                                                                                                               |
| 4001 11               |                                                                                                               |
| 4029 4                | $J^\pi$ : (5/2 <sup>-</sup> , 9/2 <sup>-</sup> ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ).  |
| 4168 10               | $J^\pi$ : (9/2 <sup>-</sup> ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ).                     |
| 4211 10               | $J^\pi$ : (3/2 <sup>-</sup> , 11/2 <sup>-</sup> ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ). |
| 4292 15               |                                                                                                               |
| 4363 11               |                                                                                                               |
| 4472 9                | $J^\pi$ : (9/2 <sup>-</sup> ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ).                     |
| 4523& 23              |                                                                                                               |
| 4626& 15              | $J^\pi$ : (5/2 <sup>-</sup> ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ).                     |
| 4748& 15              | $J^\pi$ : (5/2 <sup>-</sup> ) from fits to $\sigma(\theta)$ ( <a href="#">1978An10</a> ).                     |
| 4841& 19              |                                                                                                               |
| 5009& 13              |                                                                                                               |
| 5060& 19              |                                                                                                               |
| 5167& 13              |                                                                                                               |

<sup>†</sup> From 18-MeV data of [1978An10](#), except as noted.

<sup>‡</sup> From Adopted Levels; supporting arguments from this data set are indicated.

# From [1976Ma03](#).

@ Observed only at 18 MeV.

& From 26 MeV data of [1978An10](#). Not observed at 18 MeV.

 $\gamma(^{57}\text{Mn})$ 

All data from [1976Ma03](#), except as noted.

| $E_i(\text{level})$ | $J_i^\pi$                                              | $E_\gamma^\dagger$ | $I_\gamma^\ddagger$ | $E_f$  | $J_f^\pi$                           | Mult. <sup>#</sup> | Comments                                              |
|---------------------|--------------------------------------------------------|--------------------|---------------------|--------|-------------------------------------|--------------------|-------------------------------------------------------|
| 84.1                | 5/2 <sup>-</sup> , 7/2 <sup>-</sup>                    | (84.1)             | 100                 | 0      | 5/2 <sup>-</sup>                    |                    |                                                       |
| 851.1               | 3/2 <sup>-</sup>                                       | 851.1              | 100                 | 0      | 5/2 <sup>-</sup>                    | Q(+D)              | $\delta$ : 0.1 +4-1 or $\leq -5$ .                    |
| 1059.2              | 1/2 <sup>-</sup> , 3/2 <sup>-</sup> , 5/2 <sup>-</sup> | 208.1              | 88 4                | 851.1  | 3/2 <sup>-</sup>                    | Q(+D)              | $\delta$ : $\geq 0.2$ if J=3/2; $\geq 1.25$ if J=5/2. |
|                     |                                                        | 1059.2             | 12 4                | 0      | 5/2 <sup>-</sup>                    |                    |                                                       |
| 1073.8              | -                                                      | 989.7              | 94 6                | 84.1   | 5/2 <sup>-</sup> , 7/2 <sup>-</sup> |                    |                                                       |
|                     |                                                        | 1073.8             | 6 6                 | 0      | 5/2 <sup>-</sup>                    |                    |                                                       |
| 1227.1              | -                                                      | 153.3              | 6 3                 | 1073.8 | -                                   |                    |                                                       |
|                     |                                                        | 1143.              | 94 3                | 84.1   | 5/2 <sup>-</sup> , 7/2 <sup>-</sup> |                    |                                                       |
| 1376.5              | -                                                      | 525.4              | 28 10               | 851.1  | 3/2 <sup>-</sup>                    |                    |                                                       |
|                     |                                                        | 1292.4             | 72 10               | 84.1   | 5/2 <sup>-</sup> , 7/2 <sup>-</sup> |                    |                                                       |

<sup>†</sup> Calculated from difference in excitation energies.

<sup>‡</sup> Percent photon branching from each level.

# From  $\text{py}(\theta)$ . Other  $\delta$ 's ruled out by adopted J.

<sup>54</sup>Cr( $\alpha$ ,p), ( $\alpha$ ,p $\gamma$ ) E=15-26 MeV 1978An10,1976Ma03

Legend

Level Scheme

Intensities: % photon branching from each level

-----►  $\gamma$  Decay (Uncertain)

