

$^{142}\text{Gd}$        $Z = 64$        $N = 78$       adopted link      ENSDF link

Based on ensdf\_240402 (Apr 2024), and mass evaluation from 2020

BE = 1163.016 ( 0.028) MeV

Qbeta+ = 4.349 ( 0.041) MeV

|          | Energy T | J+       |       | J-    |       | J-other     |    | T1/2           |
|----------|----------|----------|-------|-------|-------|-------------|----|----------------|
| -----    |          |          |       |       |       |             |    |                |
| S-alpha= | -2.113   | ( 0.030) | ----- |       |       |             |    |                |
| -----    |          |          |       |       |       |             |    |                |
| 142GD 1  | 0.000    | 0+       |       |       |       |             | 1  | 70.2 S 6       |
| 142GD 2  | 0.515    | 2+       |       |       |       |             | 2  |                |
| 142GD 3  |          |          |       |       |       | 0.980 1+,2+ | 3  |                |
| 142GD 4  | 1.209    | 4+       |       |       |       |             | 4  |                |
| 142GD 5  | 1.369    | (0+)     |       |       |       |             | 5  |                |
| 142GD 6  |          |          |       |       |       | 1.445       | 6  |                |
| 142GD 7  |          |          |       |       |       | 1.915       | 7  |                |
| 142GD 8  | 2.002    | 6+       |       |       |       |             | 8  |                |
| 142GD 9  |          |          |       | 2.032 | 5-    |             | 9  |                |
| 142GD 10 |          |          |       |       |       | 2.103       | 10 |                |
| -----    |          |          |       |       |       |             |    |                |
| 142GD 11 |          |          |       |       |       | 2.280       | 11 |                |
| 142GD 12 |          |          |       |       |       | 2.314       | 12 |                |
| 142GD 13 |          |          |       | 2.342 | (7-)  |             | 13 |                |
| 142GD 14 |          |          |       |       |       | 2.344       | 14 |                |
| 142GD 15 |          |          |       |       |       | 2.535       | 15 |                |
| 142GD 16 |          |          |       |       |       | 2.753       | 16 |                |
| 142GD 17 | 2.758    | 8+       |       |       |       |             | 17 |                |
| 142GD 18 |          |          |       | 2.945 | (8-)  |             | 18 |                |
| 142GD 19 |          |          |       | 3.070 | (9-)  |             | 19 |                |
| 142GD 20 | 3.137    | (10+)    |       |       |       |             | 20 |                |
| -----    |          |          |       |       |       |             |    |                |
| 142GD 21 | 3.165    | 10+      |       |       |       |             | 21 |                |
| 142GD 22 |          |          |       |       |       | 3.304       | 22 |                |
| 142GD 23 | 3.408    | 10+      |       |       |       |             | 23 |                |
| 142GD 24 | 3.710    | 12+      |       |       |       |             | 24 |                |
| 142GD 25 | 3.729    | (12+)    |       |       |       |             | 25 |                |
| 142GD 26 |          |          |       |       |       | 3.737       | 26 |                |
| 142GD 27 |          |          |       |       |       | 3.750 (10)  | 27 |                |
| 142GD 28 |          |          |       | 3.789 | (10-) |             | 28 |                |
| 142GD 29 | 3.839    | 11+      |       |       |       |             | 29 |                |
| 142GD 30 |          |          |       | 3.940 | 11-   |             | 30 |                |
| -----    |          |          |       |       |       |             |    |                |
| 142GD 31 |          |          |       | 4.068 | (12-) |             | 31 |                |
| 142GD 32 | 4.102    | 12+      |       |       |       |             | 32 |                |
| S-p =    | 4.323    | ( 0.031) | ----- |       |       |             |    |                |
| 142GD 33 | 4.451    | 14+      |       |       |       |             | 33 | 1.04 PS +16-12 |
| 142GD 34 | 4.467    | 13+      |       |       |       |             | 34 |                |

|          |       |         |       |       |       |  |            |  |                   |  |
|----------|-------|---------|-------|-------|-------|--|------------|--|-------------------|--|
| 142GD 35 |       |         |       | 4.546 | (11-) |  |            |  | 35                |  |
| 142GD 36 |       |         |       |       |       |  | 4.550 (12) |  | 36                |  |
| 142GD 37 |       |         |       | 4.768 | 12-   |  |            |  | 37                |  |
| 142GD 38 |       | 4.779   | (14+) |       |       |  |            |  | 38 0.80 PS 21     |  |
| 142GD 39 |       |         |       | 4.786 | 13-   |  |            |  | 39                |  |
| 142GD 40 |       |         |       |       |       |  | 4.863 (13) |  | 40                |  |
| -----    |       |         |       |       |       |  |            |  |                   |  |
| 142GD 41 |       | 4.893   | (14+) |       |       |  |            |  | 41                |  |
| 142GD 42 |       | 4.899   | (14+) |       |       |  |            |  | 42 1.6 PS +4-3    |  |
| 142GD 43 |       |         |       | 4.991 | 13-   |  |            |  | 43                |  |
| 142GD 44 |       |         |       |       |       |  | 5.071 (14) |  | 44                |  |
| 142GD 45 |       |         |       | 5.184 | 14-   |  |            |  | 45                |  |
| 142GD 46 |       |         |       |       |       |  | 5.229 (13) |  | 46                |  |
| 142GD 47 |       | 5.278   | 15+   |       |       |  |            |  | 47                |  |
| 142GD 48 |       | 5.285   | 16+   |       |       |  |            |  | 48 0.35 PS +7-5   |  |
| 142GD 49 |       |         |       |       |       |  | 5.302 (15) |  | 49                |  |
| 142GD 50 |       |         |       |       |       |  | 5.326 (14) |  | 50                |  |
| -----    |       |         |       |       |       |  |            |  |                   |  |
| 142GD 51 |       |         |       | 5.419 | 15-   |  |            |  | 51                |  |
| 142GD 52 |       |         |       |       |       |  | 5.426 (15) |  | 52                |  |
| 142GD 53 |       |         |       | 5.445 | 15-   |  |            |  | 53                |  |
| 142GD 54 |       |         |       | 5.541 | 15-   |  |            |  | 54                |  |
| 142GD 55 |       | 5.605   | (16+) |       |       |  |            |  | 55 1.8 PS +7-5    |  |
| 142GD 56 |       |         |       | 5.611 | 16-   |  |            |  | 56                |  |
| 142GD 57 |       | 5.614   | (16+) |       |       |  |            |  | 57                |  |
| 142GD 58 |       | 5.639   | (16+) |       |       |  |            |  | 58                |  |
| 142GD 59 |       | 5.810   | (16+) |       |       |  |            |  | 59 0.55 PS +25-17 |  |
| 142GD 60 |       |         |       | 5.813 | 16-   |  |            |  | 60 0.35 PS +11-8  |  |
| -----    |       |         |       |       |       |  |            |  |                   |  |
| 142GD 61 |       |         |       | 5.897 | 17-   |  |            |  | 61 0.90 PS 35     |  |
| 142GD 62 |       | 5.913   | (16+) |       |       |  |            |  | 62                |  |
| S-2p =   | 6.081 | (0.031) | ----- |       |       |  |            |  |                   |  |
| 142GD 63 |       | 6.127   | 18+   |       |       |  |            |  | 63 0.38 PS 6      |  |
| 142GD 64 |       | 6.177   | 17+   |       |       |  |            |  | 64 1.5 PS +6-4    |  |
| 142GD 65 |       | 6.216   | 17+   |       |       |  |            |  | 65                |  |
| 142GD 66 |       | 6.260   | (18+) |       |       |  |            |  | 66                |  |
| 142GD 67 |       |         |       | 6.271 | 18-   |  |            |  | 67 0.76 PS 21     |  |
| 142GD 68 |       | 6.283   | (18+) |       |       |  |            |  | 68                |  |
| 142GD 69 |       |         |       | 6.287 | 17-   |  |            |  | 69 0.49 PS +17-10 |  |
| 142GD 70 |       |         |       |       |       |  | 6.399 (18) |  | 70                |  |
| -----    |       |         |       |       |       |  |            |  |                   |  |
| 142GD 71 |       | 6.477   | 18+   |       |       |  |            |  | 71 0.90 PS +28-21 |  |
| 142GD 72 |       |         |       | 6.566 | 19-   |  |            |  | 72 1.11 PS +35-21 |  |
| 142GD 73 |       |         |       | 6.621 | 18-   |  |            |  | 73 1.0 PS GT      |  |
| 142GD 74 |       | 6.859   | 19+   |       |       |  |            |  | 74 0.37 PS +17-10 |  |
| 142GD 75 |       | 6.917   | (20+) |       |       |  |            |  | 75 0.49 PS +7-5   |  |
| 142GD 76 |       | 7.028   | 19+   |       |       |  |            |  | 76                |  |
| 142GD 77 |       |         |       | 7.071 | 19-   |  |            |  | 77 1.0 PS GT      |  |
| 142GD 78 |       |         |       | 7.093 | 20-   |  |            |  | 78 0.43 PS 9      |  |
| 142GD 79 |       | 7.138   | 20+   |       |       |  |            |  | 79                |  |

|           |   |        |          |  |       |       |  |  |  |  |  |     |       |    |        |
|-----------|---|--------|----------|--|-------|-------|--|--|--|--|--|-----|-------|----|--------|
| 142GD 80  |   | 7.175  | (20+)    |  |       |       |  |  |  |  |  | 80  | 1.18  | PS | 22     |
| -----     |   |        |          |  |       |       |  |  |  |  |  |     |       |    |        |
| 142GD 81  |   | 7.285  | 20+      |  |       |       |  |  |  |  |  | 81  | 0.36  | PS | +14-10 |
| 142GD 82  |   |        |          |  | 7.455 | (20-) |  |  |  |  |  | 82  | 1.4   | PS | GT     |
| 142GD 83  |   | 7.502  | (20+)    |  |       |       |  |  |  |  |  | 83  |       |    |        |
| 142GD 84  |   | 7.532  | (20+)    |  |       |       |  |  |  |  |  | 84  |       |    |        |
| 142GD 85  |   |        |          |  | 7.560 | 21-   |  |  |  |  |  | 85  | 0.49  | PS | +12-10 |
| 142GD 86  |   | 7.597  | (21+)    |  |       |       |  |  |  |  |  | 86  | 0.76  | PS | +21-17 |
| 142GD 87  |   | 7.625  | (21+)    |  |       |       |  |  |  |  |  | 87  |       |    |        |
| 142GD 88  |   | 7.646  | 21+      |  |       |       |  |  |  |  |  | 88  | 0.65  | PS | +15-11 |
| 142GD 89  |   | 7.780  | 22+      |  |       |       |  |  |  |  |  | 89  |       |    |        |
| 142GD 90  |   | 7.827  | (22+)    |  |       |       |  |  |  |  |  | 90  | 0.26  | PS | 5      |
| -----     |   |        |          |  |       |       |  |  |  |  |  |     |       |    |        |
| 142GD 91  |   |        |          |  | 7.844 | 21-   |  |  |  |  |  | 91  |       |    |        |
| 142GD 92  |   | 8.018  | 22+      |  |       |       |  |  |  |  |  | 92  | 0.68  | PS | +28-17 |
| 142GD 93  |   | 8.093  | (22+)    |  |       |       |  |  |  |  |  | 93  |       |    |        |
| 142GD 94  |   | 8.160  | (22+)    |  |       |       |  |  |  |  |  | 94  |       |    |        |
| 142GD 95  |   |        |          |  | 8.199 | 22-   |  |  |  |  |  | 95  | 0.30  | PS | +14-12 |
| 142GD 96  |   | 8.249  | 23+      |  |       |       |  |  |  |  |  | 96  | 0.23  | PS | 8      |
| 142GD 97  |   | 8.328  | (23+)    |  |       |       |  |  |  |  |  | 97  | 0.58  | PS | 12     |
| 142GD 98  |   | 8.568  | (23+)    |  |       |       |  |  |  |  |  | 98  |       |    |        |
| 142GD 99  |   | 8.593  | 24+      |  |       |       |  |  |  |  |  | 99  | 0.44  | PS | 10     |
| 142GD 100 |   |        |          |  | 8.637 | 23-   |  |  |  |  |  | 100 | 0.53  | PS | +17-14 |
| -----     |   |        |          |  |       |       |  |  |  |  |  |     |       |    |        |
| 142GD 101 |   | 8.730  | 24+      |  |       |       |  |  |  |  |  | 101 |       |    |        |
| 142GD 102 |   | 8.807  | 24+      |  |       |       |  |  |  |  |  | 102 | 0.236 | PS | 35     |
| 142GD 103 |   |        |          |  | 8.964 | 24-   |  |  |  |  |  | 103 | 0.83  | PS | +28-21 |
| 142GD 104 |   | 9.141  | 25+      |  |       |       |  |  |  |  |  | 104 | 0.24  | PS | 10     |
| 142GD 105 |   | 9.223  | (24+)    |  |       |       |  |  |  |  |  | 105 |       |    |        |
| 142GD 106 |   | 9.280  | (25+)    |  |       |       |  |  |  |  |  | 106 | 0.19  | PS | 8      |
| 142GD 107 |   |        |          |  | 9.475 | (25-) |  |  |  |  |  | 107 |       |    |        |
| 142GD 108 |   | 9.628  | (25+)    |  |       |       |  |  |  |  |  | 108 |       |    |        |
| 142GD 109 |   | 9.700  | 26+      |  |       |       |  |  |  |  |  | 109 | 0.19  | PS | 10     |
| 142GD 110 |   | 9.747  | (26+)    |  |       |       |  |  |  |  |  | 110 | 0.31  | PS | 7      |
| -----     |   |        |          |  |       |       |  |  |  |  |  |     |       |    |        |
| 142GD 111 |   |        |          |  | 9.859 | 26-   |  |  |  |  |  | 111 |       |    |        |
| 142GD 112 |   | 10.097 | (25+)    |  |       |       |  |  |  |  |  | 112 |       |    |        |
| 142GD 113 |   | 10.103 | (26+)    |  |       |       |  |  |  |  |  | 113 |       |    |        |
| 142GD 114 |   | 10.312 | 27+      |  |       |       |  |  |  |  |  | 114 |       |    |        |
| 142GD 115 |   | 10.396 | (27+)    |  |       |       |  |  |  |  |  | 115 |       |    |        |
| 142GD 116 |   | 10.703 | (28+)    |  |       |       |  |  |  |  |  | 116 |       |    |        |
| 142GD 117 |   | 10.809 | (27+)    |  |       |       |  |  |  |  |  | 117 |       |    |        |
| 142GD 118 |   | 10.990 | (28+)    |  |       |       |  |  |  |  |  | 118 |       |    |        |
| 142GD 119 |   | 11.123 | (27+)    |  |       |       |  |  |  |  |  | 119 |       |    |        |
| 142GD 120 |   | 11.352 | (29+)    |  |       |       |  |  |  |  |  | 120 |       |    |        |
| -----     |   |        |          |  |       |       |  |  |  |  |  |     |       |    |        |
| S-n       | = | 11.807 | ( 0.034) |  |       |       |  |  |  |  |  |     |       |    |        |
| -----     |   |        |          |  |       |       |  |  |  |  |  |     |       |    |        |
| 142GD 121 |   | 11.826 | (30+)    |  |       |       |  |  |  |  |  | 121 |       |    |        |
| 142GD 122 |   | 12.384 | (31+)    |  |       |       |  |  |  |  |  | 122 |       |    |        |
| 142GD 123 |   | 13.135 | (32+)    |  |       |       |  |  |  |  |  | 123 |       |    |        |

S-p = 4.323 ( 0.031) -----  
S-n = 11.807 ( 0.034) -----  
S-2p = 6.081 ( 0.031) -----  
S-2n = 21.320 ( 0.040) -----  
S-alpha= -2.113 ( 0.030) -----

S+p = -0.749 ( 0.058)  
S+n = -9.343 ( 0.202)  
S+2p = -4.188 ( 0.029)  
S+2n = -20.943 ( 0.040)  
S+alpha = 1.980 ( 0.029)

gap p = 3.574 ( 0.066)  
gap n = 2.464 ( 0.205)  
gap 2p = 1.893 ( 0.042)  
gap 2n = 0.377 ( 0.056)  
gap alpha = -0.134 ( 0.042)