

$^{93}\text{Nb}$        $Z = 41$        $N = 52$       adopted link      ENSDF link

Based on ENSDF from Oct 2022, and mass evaluation from 2020

BE = 805.769 ( 0.001) MeV

|         | Energy T | J+    | J-         | J-other              | T1/2              |
|---------|----------|-------|------------|----------------------|-------------------|
| 93NB 1  | 0.000    | 9/2+  |            |                      | 1 STABLE          |
| 93NB 2  |          |       | 0.031 1/2- |                      | 2 16.12 Y 12      |
| 93NB 3  |          |       | 0.687 3/2- |                      | 3 0.28 PS +48-14  |
| 93NB 4  | 0.744    | 7/2+  |            |                      | 4 0.51 PS 4       |
| 93NB 5  | 0.809    | 5/2+  |            |                      | 5 6.16 PS 20      |
| 93NB 6  |          |       | 0.810 5/2- |                      | 6 1.0 PS GT       |
| 93NB 7  | 0.950    | 13/2+ |            |                      | 7 4.36 PS 15      |
| 93NB 8  |          |       |            | 0.970 1/2-, 3/2-     | 8                 |
| 93NB 9  | 0.979    | 11/2+ |            |                      | 9 258 FS 18       |
| 93NB 10 | 1.083    | 9/2+  |            |                      | 10 2.8 PS GT      |
| 93NB 11 |          |       |            | 1.127 3/2, 5/2, 7/2  | 11                |
| 93NB 12 |          |       |            | 1.284 (5/2)-         | 12 0.17 PS +6-4   |
| 93NB 13 |          |       |            | 1.290 1/2-, 3/2-     | 13                |
| 93NB 14 | 1.297    | 9/2+  |            |                      | 14 0.21 PS 3      |
| 93NB 15 | 1.316    | 5/2+  |            |                      | 15 0.37 PS +31-12 |
| 93NB 16 | 1.335    | 17/2+ |            |                      | 16 14 NS LT       |
| 93NB 17 |          |       | 1.370 5/2- |                      | 17 0.55 PS GT     |
| 93NB 18 |          |       |            | 1.395 (7/2-)         | 18 0.55 PS GT     |
| 93NB 19 |          |       |            | 1.455 (1/2+, 3/2+)   | 19                |
| 93NB 20 |          |       |            | 1.484 7/2(+)         | 20 45.7 FS 24     |
| 93NB 21 | 1.491    | 15/2+ |            |                      | 21 14 NS LT       |
| 93NB 22 |          |       |            | 1.500 (9/2-)         | 22 0.84 PS 22     |
| 93NB 23 |          |       | 1.572 3/2- |                      | 23 0.19 PS +15-7  |
| 93NB 24 |          |       |            | 1.588 3/2(-), 5/2(-) | 24 0.87 PS GT     |
| 93NB 25 |          |       |            | 1.603 (9/2-)         | 25                |
| 93NB 26 | 1.603    | 11/2+ |            |                      | 26 0.32 PS +17-9  |
| 93NB 27 | 1.666    | 5/2+  |            |                      | 27 0.24 PS +7-5   |
| 93NB 28 |          |       |            | 1.679 5/2(+), 7/2    | 28 0.22 PS +6-4   |
| 93NB 29 | 1.683    | 9/2+  |            |                      | 29 104 FS +17-14  |
| 93NB 30 | 1.686    | 13/2+ |            |                      | 30 0.17 PS +4-3   |
| 93NB 31 |          |       |            | 1.694                | 31                |
| 93NB 32 |          |       |            | 1.704 3/2+, 5/2+     | 32 0.15 PS +19-6  |
| 93NB 33 |          |       |            | 1.773 (LE7/2)        | 33 87 FS +14-10   |
| 93NB 34 |          |       |            | 1.779 (5/2-)         | 34 73 FS +30-19   |
| 93NB 35 |          |       |            | 1.784 (5/2+)         | 35                |
| 93NB 36 |          |       |            | 1.812 (19/2)         | 36 104 FS +35-24  |
| 93NB 37 |          |       |            | 1.840 3/2-, 5/2-     | 37 71 FS +24-17   |
| 93NB 38 |          |       |            | 1.908 (5/2)          | 38                |

|                              |    |  |       |       |       |                  |      |         |        |
|------------------------------|----|--|-------|-------|-------|------------------|------|---------|--------|
| 93NB                         | 39 |  |       |       | 1.911 | 7/2+,9/2+,11/2+  | 39   | 162 FS  | 13     |
| 93NB                         | 40 |  |       |       | 1.916 | 7/2              | 40   | 62 FS   | 7      |
| -----                        |    |  |       |       |       |                  |      |         |        |
| S-alpha= 1.927 ( 0.002)----- |    |  |       |       |       |                  |      |         |        |
| 93NB                         | 41 |  |       |       | 1.948 | 3/2,5/2,7/2      | 41   | 0.16 PS | +9-5   |
| 93NB                         | 42 |  |       |       | 1.950 | (7/2+)           | 42   | 0.5 PS  | +11-2  |
| 93NB                         | 43 |  |       |       | 1.950 | (11/2)           | 43   | 0.6 PS  | +26-3  |
| 93NB                         | 44 |  |       |       | 1.968 | (13/2-)          | 44   |         |        |
| 93NB                         | 45 |  | 1.969 | 11/2+ |       |                  | 45   | 111 FS  | 19     |
| 93NB                         | 46 |  |       |       | 1.997 | 3/2-,5/2-        | 46   | 64 FS   | +15-12 |
| 93NB                         | 47 |  |       |       | 2.003 | (11/2+)          | 47   | 0.55 PS | GT     |
| 93NB                         | 48 |  |       |       | 2.012 | (LE5/2)-         | 48   | 21 FS   | +20-8  |
| 93NB                         | 49 |  |       |       | 2.020 | (7/2-,9/2-)      | 49   |         |        |
| 93NB                         | 50 |  |       |       | 2.024 | (LE5/2)-         | 50   | 54 FS   | +28-17 |
| -----                        |    |  |       |       |       |                  |      |         |        |
| 93NB                         | 51 |  |       |       | 2.037 | (9/2+,11/2+)     | 51   |         |        |
| 93NB                         | 52 |  |       |       | 2.099 | (3/2-,5/2,7/2)   | 52   | 92 FS   | +43-25 |
| 93NB                         | 53 |  | 2.123 | 9/2+  |       |                  | 53   | 97 FS   | 16     |
| 93NB                         | 54 |  |       |       | 2.127 | (5/2-,7/2,9/2-)  | 54   | 0.16 PS | +12-8  |
| 93NB                         | 55 |  |       |       | 2.133 | (GE7/2)          | 55   |         |        |
| 93NB                         | 56 |  |       |       | 2.154 | (1/2,3/2,5/2-)   | 56   | 80 FS   | +19-14 |
| 93NB                         | 57 |  |       |       | 2.163 | (11/2+,13/2,15/2 | 57+) | 0.28 PS | +21-9  |
| 93NB                         | 58 |  | 2.171 | 9/2+  |       |                  | 58   | 0.24 PS | +11-6  |
| 93NB                         | 59 |  |       |       | 2.180 | 3/2+,5/2+        | 59   |         |        |
| 93NB                         | 60 |  |       |       | 2.180 | (17/2)-          | 60   |         |        |
| -----                        |    |  |       |       |       |                  |      |         |        |
| 93NB                         | 61 |  |       |       | 2.184 |                  | 61   | 76 PS   | +31-21 |
| 93NB                         | 62 |  |       |       | 2.204 | (9/2+)           | 62   |         |        |
| 93NB                         | 63 |  |       |       | 2.250 |                  | 63   |         |        |
| 93NB                         | 64 |  |       |       | 2.281 | (7/2-)           | 64   |         |        |
| 93NB                         | 65 |  |       |       | 2.311 |                  | 65   |         |        |
| 93NB                         | 66 |  |       |       | 2.320 | 3/2+,5/2+        | 66   |         |        |
| 93NB                         | 67 |  |       |       | 2.330 |                  | 67   |         |        |
| 93NB                         | 68 |  |       |       | 2.368 | 9/2,13/2(+)      | 68   |         |        |
| 93NB                         | 69 |  |       |       | 2.507 |                  | 69   | 66 FS   | +21-14 |
| 93NB                         | 70 |  |       |       | 2.520 | (1/2+)           | 70   |         |        |
| -----                        |    |  |       |       |       |                  |      |         |        |
| 93NB                         | 71 |  |       |       | 2.584 | 3/2+,5/2+        | 71   |         |        |
| 93NB                         | 72 |  |       |       | 2.753 | (19/2)+          | 72   |         |        |
| 93NB                         | 73 |  | 2.833 | 21/2+ |       |                  | 73   |         |        |
| 93NB                         | 74 |  |       |       | 2.838 | 11/2             | 74   |         |        |
| 93NB                         | 75 |  |       |       | 2.980 |                  | 75   |         |        |
| 93NB                         | 76 |  |       |       | 3.086 | (21/2)           | 76   |         |        |
| 93NB                         | 77 |  |       |       | 3.150 |                  | 77   |         |        |
| 93NB                         | 78 |  |       |       | 3.512 |                  | 78   |         |        |
| 93NB                         | 79 |  |       |       | 3.668 |                  | 79   |         |        |
| 93NB                         | 80 |  |       |       | 3.674 | (25/2)           | 80   |         |        |
| -----                        |    |  |       |       |       |                  |      |         |        |
| 93NB                         | 81 |  |       |       | 3.685 |                  | 81   |         |        |
| 93NB                         | 82 |  |       |       | 3.720 |                  | 82   |         |        |

|          |   |         |          |               |     |
|----------|---|---------|----------|---------------|-----|
| 93NB 83  |   |         | 3.840    |               | 83  |
| 93NB 84  |   |         | 3.930    |               | 84  |
| 93NB 85  |   |         | 4.060    |               | 85  |
| 93NB 86  |   |         | 4.105    | 25/2(+)       | 86  |
| 93NB 87  |   |         | 4.224    |               | 87  |
| 93NB 88  |   |         | 4.340    |               | 88  |
| 93NB 89  |   |         | 4.403    | (29/2)        | 89  |
| 93NB 90  |   |         | 4.460    |               | 90  |
| -----    |   |         |          |               |     |
| 93NB 91  |   |         | 4.548    |               | 91  |
| 93NB 92  |   |         | 4.650    |               | 92  |
| 93NB 93  |   |         | 4.700    |               | 93  |
| 93NB 94  |   |         | 4.810    |               | 94  |
| 93NB 95  |   |         | 4.865    | 29/2(+)       | 95  |
| 93NB 96  |   |         | 5.000    |               | 96  |
| 93NB 97  |   |         | 5.155    |               | 97  |
| 93NB 98  |   |         | 5.340    |               | 98  |
| 93NB 99  |   |         | 5.490    |               | 99  |
| 93NB 100 |   |         | 5.904    | 33/2(+)       | 100 |
| -----    |   |         |          |               |     |
| S-p      | = | 6.043   | ( 0.001) | -----         |     |
| 93NB 101 |   |         | 6.464    | 11/2(+)       | 101 |
| 93NB 102 |   |         | 7.372    | (35/2-)       | 102 |
| 93NB 103 |   |         | 7.435    | 37/2(-)       | 103 |
| 93NB 104 |   |         | 7.828    | 39/2(-)       | 104 |
| 93NB 105 |   |         | 8.325    | 41/2(-)       | 105 |
| 93NB 106 |   |         | 8.377    | (37/2)        | 106 |
| -----    |   |         |          |               |     |
| S-n      | = | 8.831   | ( 0.002) | -----         |     |
| 93NB 107 |   |         | 8.940    | (43/2-)       | 107 |
| 93NB 108 |   |         | 9.134    | (41/2-)       | 108 |
| 93NB 109 |   |         | 9.425    | (45/2+)       | 109 |
| 93NB 110 |   |         | 9.699    | (39/2-,41/2-) | 110 |
| -----    |   |         |          |               |     |
| 93NB 111 |   |         | 9.782    |               | 111 |
| 93NB 112 |   |         | 9.922    | (43/2-)       | 112 |
| -----    |   |         |          |               |     |
| S-p      | = | 6.043   | ( 0.001) | -----         |     |
| S-n      | = | 8.831   | ( 0.002) | -----         |     |
| S-2p     | = | 15.439  | ( 0.002) | -----         |     |
| S-2n     | = | 16.717  | ( 0.003) | -----         |     |
| S-alpha  | = | 1.927   | ( 0.002) | -----         |     |
|          |   |         |          |               |     |
| S+p      | = | -8.490  | ( 0.001) |               |     |
| S+n      | = | -7.228  | ( 0.002) |               |     |
| S+2p     | = | -13.387 | ( 0.005) |               |     |
| S+2n     | = | -15.716 | ( 0.002) |               |     |
| S+alpha  | = | -2.437  | ( 0.004) |               |     |
|          |   |         |          |               |     |
| gap p    | = | -2.448  | ( 0.002) |               |     |

gap n = 1.603 ( 0.003)  
gap 2p = 2.053 ( 0.006)  
gap 2n = 1.001 ( 0.004)  
gap alpha = -0.510 ( 0.005)