This evaluation was done in December 2010 with a literature cut-off by the same date.

1. DECAY SCHEME

$^{215}$At decays 100% to levels of $^{211}$Bi by emission of $\alpha$ particles. The adopted $^{211}$Bi levels populated in the $^{215}$At decay are based on the experiment of 1966Gr07 and the evaluation by Browne (2004Br45).

The decay scheme of $^{215}$At seems to be incomplete as the alpha decays to higher levels in daughter $^{211}$Bi, which are known from the $\beta^-$ decay of $^{211}$Pb (see $^{211}$Bi Adopted Levels, Gammas of 2004Br45), are not observed yet.

The current evaluated data are supported by the agreement between $Q(\text{calculated}) = 8178$ (5) keV, deduced from the calculated average energies of all emissions, and $Q(\alpha) = 8178$ (4) keV, adopted from 2003Au03.

2. NUCLEAR DATA

$Q(\alpha)$ is from 2003Au03 where this value has been deduced from the measurement of $\alpha$-particle energy $E(\alpha_0,0) = 8026$ (4) keV by 1982Bo04 recommended in 1991Ry01.

The $^{215}$At half-life of 0.10 (2) ms is from the single measurement of 1951Me10.

2.1. Alpha Transitions

The alpha transition energies have been obtained from the $Q(\alpha)$ value and $^{211}$Bi level energies given in Table 1 from $^{211}$Bi Adopted Levels, Gammas of 2004Br45.

<table>
<thead>
<tr>
<th>Level</th>
<th>Energy (keV)</th>
<th>Spin and parity</th>
<th>Half-life</th>
<th>Probability of $\alpha$-transition (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0</td>
<td>9/2−</td>
<td>2.14 (2) min</td>
<td>99.95 (2)</td>
</tr>
<tr>
<td>1</td>
<td>404.854 (9)</td>
<td>7/2−</td>
<td>0.317 (11) ns</td>
<td>0.05 (2)</td>
</tr>
</tbody>
</table>

The alpha transition probability $P(\alpha_{0,1})$ is from the measurement of 1966Gr07 by means of $\alpha-\gamma$ coincidence technique with surface-barrier semi-conductor and NaI(Tl) detectors. The accurate $P(\alpha_{0,0})$ value has been deduced from the expression of $P(\alpha_{0,0}) + P(\alpha_{0,1}) = 100\%$.

The $\alpha$ decay hindrance factors have been calculated using the ALPHAD computer program from the ENSDF evaluation package with $r_0$ ($^{211}$Pb) = 1.5443 fm (2004Br45).

2.2. Gamma Transitions and Internal Conversion Coefficients

The 405-keV gamma-ray transition probability has been deduced from the intensity balance at the 405-keV level using the adopted alpha transition probability $P(\alpha_{0,1})$ and total internal conversion coefficient (ICC) $\alpha_T$ for $\gamma_{1,0}$ (405 keV). The multipolarity (M1+E2) and E2/M1 mixing ratio ($\delta$) of -1.1 (1) have been taken from 2004Br45. These are based on the measurements of conversion electrons in $^{211}$Pb $\beta^-$ decay and $\gamma(\theta)$ measurements with polarized $^{211}$Bi nuclei. ICCs $\alpha_T$, $\alpha_K$, $\alpha_L$, $\alpha_M$ have been interpolated using the BrIcc computer program, version v2.2a, data set BrIccFO (2008Ki07).
3. ATOMIC DATA
The fluorescence yields, X-ray energies and relative probabilities, and Auger electrons energies and relative probabilities are from the SAISINUC software.

4. ALPHA EMISSIONS
The energy of alpha-particle group $\alpha_{0,0}$ that populates the $^{211}$Bi ground state is the measured value from 1982Bo04 recommended in 1991Ry01. In 1966Gr07 the measured value of 8.00 (1) MeV was reported.

The energy of alpha-particle group $\alpha_{0,1}$ of 7628 (4) keV has been deduced from the Q(\alpha) value taking into account the level energy of 404.854 (9) keV and the recoil energy for $^{211}$Bi. The above value of E(\alpha_{0,1}) can be compared to the value of 7626 (15) keV as measured by 1966Gr07 and adjusted by the evaluator to the adopted E(\alpha_{0,0}) = 8026 (4) keV (the original value of 1966Gr07 is 7.60 (1) MeV).

The earlier measured energy of $\alpha$–emission in the decay of $^{215}$At is 8.00 (2) MeV (1951Me10).

5. ELECTRON EMISSIONS
The energies of the conversion electrons for $\gamma_{1,0}$ (405 keV) have been obtained from the gamma-ray transition energy and the atomic electron binding energies.

The emission probabilities of the conversion electrons have been deduced using the P$_{\gamma}$ and ICC values.

The absolute emission probabilities of K and L Auger electrons have been calculated using the EMISSION computer program.

6. PHOTON EMISSIONS
6.1 X - Ray emissions
The absolute emission probabilities of Pb KX- and LX-rays were calculated using the EMISSION computer program.

6.2. Gamma emissions
6.2.1. Gamma ray energies
The 405-keV gamma-ray energy has been adopted from the 405-keV level energy. In 1966Gr07 this energy was obtained from the $^{215}$At $\alpha$ decay as $\approx$ 404 keV.

6.2.2. Gamma ray emission probabilities
The 405-keV gamma-ray emission probability has been deduced from the alpha transition probability P($\alpha_{0,1}$) = 0.05 (2) % and total internal conversion coefficient $\alpha_T$ = 0.122 (8).

7. REFERENCES
1951Me10 W.W. Meinke, A. Ghiorso, G.T. Seaborg, Phys. Rev. 81, 782 (1951) (Half-life, energy of $\alpha$ -emission)
1991Ry01 A. Rytz, At. Data Nucl. Data Tables 47, 205 (1991) ($\alpha$ -particle energies and emission probabilities)
2004Br45 E. Browne, Nucl. Data Sheets 103, 183 (2004) ($^{215}$At $\alpha$ decay scheme, $^{211}$Bi levels)