**Nuclear Data Section**

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**Memo 4C-3/423**

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**To:** Distribution

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**Subject: Gamma production cross sections from GEANIE spectrometer**

It has been known the “gamma production cross sections” measured with the GEANIE spectrometer and compiled in EXFOR are often “transition cross sections” (i.e., gamma production cross section multiplied by 1+α, where α is the internal conversion coefficient).

*Example*: 238U(n,n’)238U 159 keV γ production cross section

The two datasets (13901.003, 14240.002) from GEANIE are gamma production cross sections multiplied by 1+α~2.8, and therefore systematically higher than the dataset from GELINA (22795.002).

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The next table summarizes the situation of all absolute gamma production cross sections from GEANIE and in EXFOR. We would like to ask NNDC to check if corrections of the EXFOR entries are required. (We may think replacement of FCT or MSC with a new modifier indicating multiplication by 1+α.)

|  |  |  |  |
| --- | --- | --- | --- |
| **X4#** | **(1+α) multiplied?** | **Evidence** | **Comment** |
| 13786 | Y | Eq. (3.1) of J,PR/C,64,054613,2001 |  |
| 13787 | Y |  | SF8=FCT coded except for 002 which Egamma is high |
| 13788 | Y | "An excitation function for each g-ray transition ... was generated ... taking into account internal conversion and …" |  |
| 13885 | Y | Eq. (1) of J,PR/C,68,024312,2003 |  |
| 13901 | Y | Eq. (1) of J,PR/C,69,024601,2004 | SF8=MSC coded in 002-003. Must be added in 004-006? |
| 13910 | ? |  |  |
| 13949 | ? |  | Add SF7=G |
| 13996 | Y | Eq. (1) of R,UCRL-TR-205760,,2004 |  |
| 13997 | Y | Eq. (7) of R,UCRL-TR-209474,,2005  |  |
| 14041 | ? |  |  |
| 14118 | Y | "Corrections to the ratio include: …, and internal conversion." |  |
| 14144 | Y | Eq. (8) of R,UCRL-ID-140313,2000 |  |
| 14148 | Y | Eq. (1) of R,AIP-1342,9,2011 |  |
| 14162 | Y | Eq. (1) of J,NSE,157,65,2007 |  |
| 14231 | Y | Eq. (1) of J,PR/C,79,054604,2009 |  |
| 14240 | Y | Eq. (1) of J,PR/C,80,014603,2009 |  |
| 14255 | Y | "Systematic uncertainties for the data reported here include: … internal conversion corrections (∼0.1%); …" |  |
| 14266 | Y | Eq. (1) of J,NIM/B,268,114,2010 |  |
| 14341 | Y | Eq. (1) of J,PR/C,85,064614,2012 |  |
| 14352 | ? |  |  |
| 14359 | ? |  |  |
| 14368 | ? |  |  |
| 14370 | ? |  |  |
| 14461 | Y | "Systematic uncertainties originate from ... γ-ray internal conversion corrections, ... " |  |
| 14515 | Y | "The influence of internal conversion is very weak (much smaller than measurement uncertainties) for all measured γ rays." |  |
| 14522 | ? |  |  |
| 14588 | Y | Eq. (3.1) of T,CASOLI,2003 |  |
| 14658 | Y | The cross sections reported in the present work were corrected for ...,internal conversion, ..." | SF8=FCT coded |

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