Dictionary 236 (Quantities): -L,SIG and -L,SIG,,SFC

(N. Otsuka, S. Dunaeva, 2023-07-17, CP-D/1087)

EXFOR O0316.006 and 007 provide the "ground state" and quasi-metastable state (13.98 ms) production cross sections of ^{87}Sr(p,γ)^{88}Y in Table III of S. Harissopulos+, J,PR/C,104,02504,2021:

TABLE III. Same as in Table II but for the ^{87}Sr$(p, \gamma)^{88}$Y reaction investigated with the 4π γ-summing technique in the present work. The σ_m given in the 7th column is the cross sections to the $J^\pi = 8^+$ isomeric state of ^{88}Y at 675 keV.

$E_{c.m.}$ (MeV)	f_s	σ_T (μb)	S_T (10^3 MeV b)	σ_g (μb)	S_g (10^3 MeV b)	σ_m (μb)	S_m (10^3 MeV b)
2.566	1.053	572 ± 125	21970 ± 4783	549 ± 186	21060 ± 4775	24 ± 7	909 ± 274
2.764	1.048	982 ± 213	17275 ± 3755	940 ± 318	16531 ± 3749	42 ± 12	744 ± 206
2.962	1.043	1612 ± 350	14114 ± 3064	1540 ± 522	13487 ± 3059	72 ± 19	627 ± 167
3.160	1.039	1134 ± 242	5295 ± 1128	1061 ± 360	4953 ± 1124	73 ± 20	342 ± 95
3.358	1.035	1289 ± 278	3400 ± 734	1212 ± 415	3198 ± 732	77 ± 22	202 ± 57
3.555	1.032	1249 ± 264	1957 ± 414	1155 ± 393	1810 ± 412	94 ± 25	147 ± 39
3.753	1.030	1571 ± 336	1527 ± 327	1466 ± 501	1426 ± 326	105 ± 29	102 ± 28
3.951	1.028	1903 ± 404	1191 ± 253	1752 ± 599	1097 ± 251	151 ± 44	95 ± 28
4.149	1.026	2057 ± 431	858 ± 180	1884 ± 641	785 ± 179	173 ± 46	72 ± 19
4.940	1.020	1640 ± 351	175 ± 37	1485 ± 520	158 ± 55	158 ± 37	17 ± 5

The "ground state" production provided in this table is the cross section excluding the quasi-metastable state production cross section. The nuclide does not have a metastable state, and we cannot define the ground state production cross section (The isomeric flag -G is legal only when the nuclide has a metastable state.).

This reminds us of discussion on gamma production cross section excluding cascade involving a quasi-metastable state in the NRDC 2023 meeting (WP2023-26). We found the branch code approved in the meeting L- (Excluding formation via quasi-metastable state production) is useful. We propose the following new quantity codes for compilation of the "ground state" production cross section and corresponding S-factor:

Example (O0316.006):

```
SUBENT          O0316006   20230313                              O0316  6    1
BIB                 8          13                                O0316  6    2
REACTION  1(38-SR-87(P,G)39-Y-88,L-,SIG)                         O0316  6    3
          2(38-SR-87(P,G)39-Y-88,L-,SIG,,SFC)                    O0316  6    4
DECAY-DATA (39-Y-88,106.626D)                                    O0316  6    5
…
ENDBIB             13           0                                O0316  6   16
COMMON              2           3                                O0316  6   17
EN-ERR     ERR-2                                                 O0316  6   18
MEV        PER-CENT                                              O0316  6   19
   0.0075    10.                                                 O0316  6   20
ENDCOMMON           3           0                                O0316  6   21
DATA                6          10                                O0316  6   22
EN-CM      DATA     1ERR-T     1DATA      2ERR-T      2MISC       O0316  6   23
MEV        MICRO-B  MICRO-B    B*MEV      B*MEV       NO-DIM      O0316  6   24
    2.566      549.      186. 2.1060E+07  4.775E+06 1.053        O0316  6   25
    2.764      940.      318. 1.6531E+07  3.749E+06 1.048        O0316  6   26
    2.962     1540.      522. 1.3487E+07  3.059E+06 1.043        O0316  6   27
…
```

Dictionary 236 (Quantities)

L-,SIG	Cross section excluding quasi-metastable state production
L-,SIG,,SFC	S-factor excluding quasi-metastable state production

Use of multiple reaction formalism for cross section and S-factor

We also propose the pair of the cross section and S-factor as a combination allowed to be together in the same subentry with the multiple reaction formalism.