WP2010-17

Nuclear Data Section
International Atomic Energy Agency
P.O.Box 100, A-1400 Vienna, Austria

Memo CP-D/632

Date: 2 April 2010
To: Distribution
From: N. Otsuka, O. Schwerer

Subject: Resonance parameters in CPND entries

We have been accumulating resonance parameters of compound nucleus formed in neutron-induced reactions in EXFOR. These are usually derived from neutron-induced reactions. In addition, we often see resonance parameters derived from measurement of charged-particle induced reactions. They can be divided to the following two types:

(1) Resonance parameters of compound nucleus
(2) Resonance parameters of residual nucleus

Below are examples of these cases in recent publications:

(1) Resonance parameters of compound nucleus – EXFOR E2133.003 [1]
Authors derived resonance parameters (E_p and Γ_p) of ^{8}B from measurement of proton angular distribution in p+^{7}Be $\rightarrow$^{8}B $\rightarrow$ p+^{7}Be elastic scattering in the inverse kinematics technique. These values can be easily compiled in the EXFOR format as follows

Resonance energy: `(1-H-1(4-BE-7,0),,EN)`
Elastic width: `(1-H-1(4-BE-7,EL),,WID)`

(2) Resonance parameters of residual nucleus – EXFOR C1707.002 [2]
Authors derived resonance parameters (E_x, Γ_α, $\omega\gamma$) of ^{19}Ne from measurement of α decay branching ratios of ^{19}Ne populated by ^{19}F(^{3}He,t)^{19}Ne and known life-times for various ^{19}Ne resonance states. Because they are tabulated as a function of the excitation level energy of ^{19}Ne, we cannot compile these parameters as we have done for "classical" resonance parameters for neutron-induced reaction. Also we do not know what should be coded in SF1 (target) and SF2 (projectile) which forms the compound ^{19}Ne resonances.

Resonance properties derived by both methods have been also used for the nuclear structure data evaluation. The XUNDL database (Experimental Unevaluated Nuclear Data List) compiled by McMaster University, Argonne National Laboratory and Triangle Universities is an example of experimental resonance parameter collections for structure data evaluators and above two data sets are compiled in XUNDL.

We propose the following restriction:

"*Resonance parameters are compiled when both the projectile and target leading to the compound resonance are clarified by authors, and also the parameters are given as a function of incident energy on resonance (compiled under data heading EN-RES or, when determined in the same experiment, as REACTION with SF6=EN).*"

Note that compilers ask authors when the reference frame (lab. or c.m.) is not clear for the resonance parameters.

Erroneous subentries

In this occasion, we searched some suspicious resonance parameter compilation in EXFOR. Centres are requested to correct the affected entries or, if they fall under the above restriction, to delete the affected (sub)entries.

1) Resonance energy (SF6=EN) coded with SF3 ≠ 0

```
13197.005
23017.006
31475.002-004, 31668.003
40894.002, 40894.004, 41398.002-003, 41399.002
C0115.006, C1502.002
D0544.004-005
K2002.003, K2061.003
T0089.004, T0236.010, T0268.003-004
```

2) Resonance spin J (SF6=J) coded with SF3 ≠ 0

```
22318.004, 23017.006
40894.002, 40894.004
C1674.002
E1494.006, E1494.011-012
F0948.003
T0236.010, T0268.003-004
```

3) Resonance spin L (SF6=L) coded with SF3 ≠ 0

```
C0295.003-004, C1561.002-004, C1634.002
E1494.006, E1494.011-012
```

4) Resonance parity (SF6=PTY) coded with SF3 ≠ 0

```
41267.005
C1487.002, C1634.002, C1674.002
T0236.010, F0516.002, F0948.003
T0268.003-004
```

5) Resonance width (SF6=WID) coded with SF3 = 0.

```
12923.003
40383.007
D5032.003-004, D5032.006-007, D5035.003-006
F0632.005, F0632.007-008, F0800.007-008
O0810.002, O1068.002, O1108.002
```

References

[1] H. Yamaguchi *et al*, Phys. Lett. B **672**(2009)230 (XUNDL 2009YA01)
[2] W. P. Tan *et al*., Phys. Rev. C **79**(2009)055805 (XUNDL 2009TA09)

Distribution:

blokhin@ippe.ru
chiba@earth.sgu.ac.jp
claes.nordborg@oecd.org
emmeric.dupont@oecd.org
ganesan@barc.gov.in
gezg@ciae.ac.cn
hongwei@ciae.ac.cn
jhchang@kaeri.re.kr
j.roberts@iaea.org
kaltchenko@kinr.kiev.ua
katakura.junichi@jaea.go.jp
kato@nucl.sci.hokudai.ac.jp
kiralyb@atomki.hu
l.vrapcenjak@iaea.org
manuel.bossant@oecd.org
manokhin@ippe.ru
mmarina@ippe.ru
mwherman@bnl.gov
nicolas.soppera@oecd.org
nklimova@kinr.kiev.ua
n.otsuka@iaea.org
nrdc@jcprg.org
oblozinsky@bnl.gov
ogritzay@kinr.kiev.ua
otto.schwerer@aon.at
pronyaev@ippe.ru
r.forrest@iaea.org
samaev@obninsk.ru
s.babykina@polyn.kiae.su
scyang@kaeri.re.kr
s.dunaeva@iaea.org
stakacs@atomki.hu
stanislav.hlavac@savba.sk
taova@expd.vniief.ru
tarkanyi@atomki.hu
varlamov@depni.sinp.msu.ru
vlasov@kinr.kiev.ua
vmclane@optonline.net
v.zerkin@iaea.org
yolee@kaeri.re.kr

cc:

hispin@univmail.cis.mcmaster.ca