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Memo CP-D/434

Date: 10 May 2005
To: Distribution
From: S.Dunaeva, O.Schwerer
Subject: Energy spectrum as function of sum of kinetic energies of several particles
(Addition to Dictionary 36 and to LEXFOR)

The following code is proposed for inclusion in dictionary 36:

Quantity	Independent Variable	Unit dimension	Reference
,DE,N/N/A	E	DE	NP/A,700,3,2002

,DE,N/N/A – Energy spectrum as a function of the sum of kinetic energies of alpha particle and two neutrons.

The secondary energy is to be defined under EN-SEC:

EN-SEC (E,N/N/A) – sum of kinetic energies of alpha particle and two neutrons

Many experiments were done in this specific manner:

(J,NP/A,700,3,2002) (see example entry, Appendix 2)

(J,NP/A,633,234,1998)

(J,NP/A,679,462,2001), etc.

(In all these publications the excitation-energy spectrum was reconstructed from the measured momenta of the two neutrons and the alpha particle after dissociation.)

Since this is a new type of energy distribution, an addition to the LEXFOR page on **Differential Data** is proposed as well (**Appendix 1**).

An example entry is given as **Appendix 2**.

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Appendix 1

Proposed addition of new **item 5.** to page D.12 of LEXFOR page **Differential Data**

Secondary Energy Distributions

1. Energy distribution: probability for a particle to be emitted with a given energy E' or in a given energy range E_{\min} to E_{\max} ; given as $\sigma(E') = d\sigma/dE$. The data are given in units of cross section per unit of secondary energy (*e.g.*, mb/MeV).

REACTION coding: DE in SF6.

Unit type: DE (*e.g.*, B/MEV)

2. Energy distribution for a correlated pair: Probability that a particle a and a particle b will be emitted at a relative energy E_{rel} , usually given as the center-of-mass energy of the relative motion of the correlated pair:

REACTION coding: DE in SF6; particles in SF7 as $a+b$ (*e.g.*, P+A).

Unit type: DE (*e.g.*, B/MEV)

The energy is given under the data heading E-RL-CM

3. Linear momentum distribution: probability for a particle to be emitted with a given momentum p' ; given as $\sigma(p') = d\sigma/dp$. The data are given in units of cross section per unit of secondary linear momentum (*e.g.*, mb/MeV/c).

REACTION coding: DP in SF6.

Unit type: DA (*e.g.*, MB/MEV/C)

Example:

(.....(N,X).....,LP,DP) longitudinal momentum distribution of emitted particles.

The linear momentum is given under the data heading MOM-SEC.

4. Linear momentum distribution for a correlated pair: Probability that a particle a and a particle b will be emitted at a mean linear momentum p_m or a relative linear momentum p_{rel} .

REACTION coding: DP in SF6; particles in SF7 as $a+b$ (*e.g.*, P+A).

Unit type: DP (*e.g.*, MB/MEV/C)

The linear momentum is given under the heading MOM-SEC-MN or MOM-SEC-RL.

5. Energy distribution as a function of the sum of kinetic energies of several particles: Probability that particles a and b , or particles a , b , and c , will be emitted with a total kinetic energy E .

REACTION coding: DE in SF6; particles in SF7 as $a/b/c$ (*e.g.*, P/A/A).

Unit type: DE (*e.g.*, B/MEV)

Appendix 2

ENTRY	D0172	20050404	D0172	0	1
SUBENT	D0172001	20050404	D0172	1	1
BIB	9	32	D0172	1	2
TITLE	8He-6He: A comparative study of electromagnetic fragmentation reactions		D0172	1	3
AUTHOR	(M.Meister, K.Markenroth, D.Aleksandrov, T.Aumann, T.Baumann, M.J.G.Borge, L.V.Chulkov, D.Cortina-Gil, B.Eberlein, Th.W.Elze, H.Emling, H.Geissel, M.Hellstrom, B.Jonson, J.V.Kratz, R.Kulesa, A.Leistenschneider, I.Mukha, G.Munzenberg, F.Nickel, T.Nilsson, G.Nyman, M.Pfutzner, V.Pribora, A.Richter, K.Riisager, C.Scheidenberger, G.Schrieder, H.Simon, O.Tengblad, M.V.Zhukov)		D0172	1	4
INSTITUTE	(2SWDCTH, 2GERTHD, 4RUSKUR, 2GERGSI, 2SPNSPN, 2SPNSAU, 2GERMNZ, 2GERFRK, 3POLUJK, 2ZZZCER, 2DENAAU)		D0172	1	5
REFERENCE	(J,NP/A,700,3,2002)		D0172	1	6
FACILITY	(J,NP/A,633,234,1998) Tech. details.		D0172	1	7
	(SYNCH, 2GERGSI) The heavy-ion synchrotron at GSI.		D0172	1	8
	The experiments were carried out at the ALADIN-LAND setup.		D0172	1	9
	(PRJFS, 2GERGSI) The secondary beam of 227 MeV/u 8He and 240 MeV/u 6He was produced in a 8 g/cm2 beryllium production target from a primary beam of 180 with an energy of 340 MeV/u. The 8He or 6He nuclei were separated out from the primary reaction products using the fragment separator FRS.		D0172	1	10
SAMPLE	Pb targets of thickness 0.387 g/cm2 and 0.87 g/cm2 were used for 8He and 6He, respectively.		D0172	1	11
DETECTOR	(PSSCN) The selected events for the 8He breakup were coincidences between 6He and neutrons, detected in the large area neutron detector, LAND, while alpha-neutron coincidences were selected for 6He.		D0172	1	12
STATUS	(TABLE) Tables received from Dr. L.V.Chulkov (APRVD) Entry was approved by Dr. M.Meister		D0172	1	13
HISTORY	(20050404C) SD		D0172	1	14
ENDBIB	32	0	D0172	1	15
NOCOMMON	0	0	D0172	1	16
ENDSUBENT	35	0	D0172	199999	17
SUBENT	D0172004	20040929	D0172	4	1
BIB	4	7	D0172	4	2
REACTION	(82-PB-208(2-HE-6, 2N+A)82-PB-208, ,DE,N/N/A)		D0172	4	3
SAMPLE	Pb targets of thickness .87 g/cm2		D0172	4	4
EN-SEC	(E,N/N/A)		D0172	4	5
COMMENT	The 6He excitation-energy (Ex) spectrum reconstructed from measured momenta of the two neutrons and the alpha particle after dissociation of 240 MeV/u 6He in a lead target.		D0172	4	6
ENDBIB	7	0	D0172	4	7
COMMON	1	3	D0172	4	8
EN			D0172	4	9
MEV/A			D0172	4	10
240.			D0172	4	11
ENDCOMMON	3	0	D0172	4	12
DATA	3	61	D0172	4	13
E	DATA-CM	DATA-ERR	D0172	4	14
MEV	MB/MEV	MB/MEV	D0172	4	15
1.125	1.2	1.2	D0172	4	16
1.275	14.7	3.6	D0172	4	17
1.425	25.4	5.8	D0172	4	18
.....					
.....					
9.825	40.1	17.5	D0172	4	19
9.975	45.2	14.9	D0172	4	20
10.125	39.5	15.5	D0172	4	21
ENDDATA	63	0	D0172	4	22
ENDSUBENT	79	0	D0172	499999	23
ENDENTRY	11	0	D017299999999		24