

Longitudinal Momentum

Attached: CP-C/313, CP-E/021, CP-E/023

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Memo CP-C/313

DATE: January 28, 2003
TO: Distribution
FROM: V. McLane
SUBJECT: Longitudinal Momentum

I had proposed in Memo CP-C/290 to use the code "LON,DA/DP,,IPA", where LON stood for longitudinal secondary linear momentum. N. Otuka of the JCPRDG points out that the definition of LON in Dictionary 31 is longitudinal spins, and would not apply here for momentum. He also questions whether this is a correct use of the branch field, and whether the use MOM-SEC is correct.

I can see that a problem might arise if a polarization quantity were given as a function of longitudinal momentum; this is a possibility in the future.

I make the following proposals.

- 1) Add the quantity LP to Dict. 31 for longitudinal momentum. (In future, TP can be added for transverse momentum, if required).
- 2) The longitudinal momentum is a component of the total linear momentum and, therefore, it can be argued that the use of SF5 is correct.
- 3) MOM-SEC is defined as secondary linear momentum, and its' use for the longitudinal component is correct.

Changes for Dictionary 36 (Quantities): replace LON with LP.

| | |
|-----------------|----------------|
| LON,DA/DP,,IPA | LP,DA/DP,,IPA |
| LON,DA/DP,P,IPA | LP,DA/DP,P,IPA |

I will take care of correcting the entry already transmitted (C0820).

Distribution

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Memo CP-E/021

Date: April 19, 2003
To: Distribution
From: OTUKA Naohiko and KATŌ Kiyoshi
Subject: Differential cross section with respect to longitudinal momentum

We are compiling two experiments in which fragment longitudinal momentum distributions are measured from the breakup of secondary beam provided by RIKEN Projectile Fragment Separator - RIPS - (R. Kanungo *et al.*, Phys. Rev. Lett. **88** (2002) 142502 and T. Suzuki *et al.*, Phys. Rev. Lett. **89** (2002) 012501). Fragments ^{15}B , ^{22}O and ^{21}O coming from $\text{Be}(^{17}\text{B}, ^{15}\text{B})\text{X}$, $\text{C}(^{23}\text{O}, ^{22}\text{O})\text{X}$, and $\text{C}(^{23}\text{O}, ^{21}\text{O})\text{X}$ are detected. In EXFOR, these detected fragments are treated as residual nuclei. We propose the following code for longitudinal momentum distribution for residual nuclei:

Dictionary 36 (Quantities)

LP, DP, RSD DP Differential cross section with respect to longitudinal secondary momentum

Also we need to add some flags for unstable nuclei used as beam and detected as outgoing fragments:

Dictionary 27 (Nuclides)

5-B-17 Flag 2 at column 14
5-B-15 Flag 3 at column 15
8-O-23 Flag 2 at column 14
8-O-22 Flag 3 at column 15

We attach a coding sample of this quantity.

Distribution:

| | | | |
|---------------------|--------------------|------------------------|-------------------|
| J.H. Chang, KAERI | M. Chiba, JCPRG | F.E. Chukreev, CAJaD | S. Dunaeva, Sarov |
| O. Gritzay, KINR | A. Hasegawa, JAERI | K. Kato, JCPRG | M. Kellett, NEADB |
| M. Lammer, NDS | S. Maev, CJD | V.N. Manokhin, CJD | V. McLane, NNDC |
| P. Oblozinsky, NNDC | Y. Ohbayasi, JCPRG | N. Otuka, JCPRG | V. Pronyaev, NDS |
| O. Schwerer, NDS | S. Takacs, ATOMKI | F.T. Tárkányi, ATOMKI1 | V. Varlamov, CDFE |
| M. Vlasov, KINR | M. Wirtz, NDS | V. Zerkin, NDS | Y.X. Zhuang, CNDC |

Sample of coded entry (E1780.002):

T. Suzuki et al., Phys. Rev. Lett. **89** (2002) 012501 Fig.2 (upper panel)

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SUBENT      E1780002   20030312                E178000200001
BIB         6         22                    E178000200002
REACTION    (4-BE-9(5-B-17,X)5-B-15,LP,DP,RSD) E178000200003
DATA:       distribution of 15B longitudinal momentum in the E178000200004
            projectile rest frame is characterized by a      E178000200005
            FWHM=86+-10MeV/c and 80+-10MeV/c for folding and E178000200006
            unfolding the system resolution (14MeV/c in 1     E178000200007
            sigma)                                           E178000200008
DATA-ERR:   uncertainty (22%) due to normalization          E178000200009
            factor (2 neutron separation cross section)      E178000200010
            is not included                                   E178000200011
MONITOR     experimental data points were normalized to the  E178000200012
            measured 2 neutrons separation cross section value E178000200013
PART-DET    (5-B-15)                                       E178000200014
ADD-RES     (COMP)Glauber approximation.(longitudinal momentum E178000200015
            distribution was calculated by using              E178000200016
            Eqs.(3.5)-(3.18) in [Y.Ogawa et al., Nucl.Phys. E178000200017
            A571 (1994)784]. Pure 2s1/2, 1d2/5              E178000200018
            configuratoinis and their configuration mixing  E178000200019
            are considered.)                                 E178000200020
MOM-SEC     (MOM-SEC,5-B-15)longitudinal momentum in the   E178000200021
            projectile rest frame                             E178000200022
STATUS      (TABLE)Data (Fig.2-a,p012501-3 in reference) sent by E178000200023
            author                                           E178000200024
ENDBIB      22         0                    E178000200025
NOCOMMON    0         0                    E178000200026
DATA        3         15                  E178000200027
MOM-SEC     DATA      DATA-ERR          E178000200028
MEV/C       MB/MEV/C   MB/MEV/C          E178000200029
-140.0     0.19       0.07              E178000200030
-120.0     0.17       0.08              E178000200031
-100.0     0.36       0.09              E178000200032
-80.0      0.46       0.13              E178000200033
-60.0      0.64       0.22              E178000200034
-40.0      1.32       0.31              E178000200035
-20.0      2.11       0.32              E178000200036
0.0        1.62       0.3              E178000200037
20.0       1.52       0.27              E178000200038
40.0       1.07       0.28              E178000200039
60.0       0.64       0.24              E178000200040
80.0       0.2        0.16              E178000200041
100.0      0.37       0.1              E178000200042
120.0      0.18       0.06              E178000200043
140.0      0.18       0.06              E178000200044
ENDDATA    17         0                    E178000200045
ENDSUBENT  44         0                    E178000299999
```

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Memo CP-E/023

Date: June 9, 2003
To: Distribution
From: OTUKA Naohiko and KATŌ Kiyoshi
Subject: Dictionary 27 (Nuclides) and secondary linear momentum

1. Radon isotope which alpha decay is measured

We are compiling two experiments of fusion-evaporation residue measurements at JAERI (S.Mitsuoka *et al.*, Phys. Rev. **C65** (2002) 054608 and K.Satou *et al.*, Phys. Rev. **C65** (2002) 054602). In these experiments, alpha decay of ^{206}Rn was observed. We propose to add Flag 3 for ^{206}Rn .

Dictionary 27 (Nuclides)

86-RN-206 Flag 3 at column 15

2. Secondary Linear Momentum and parameter DP

□□ Now data heading belonging to Secondary Linear Momentum (family L, e.g. MOM-SEC) can be used when parameter (SF6) contains the linear momentum correlation MCO (EXFOR System Manual (April, 2001) 7.10). We propose that the parameter DP (differential with linear momentum of out going particles) also allows the use of family L.

(Now CHEX often gives error message like

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** Illegal independent variable          SEC.ENERGY
```

when DP is connected with family L).

Distribution:

| | | | |
|-------------------|----------------------|----------------------|---------------------|
| J.H. Chang, KAERI | M. Chiba, JCPRG | F.E. Chukreev, CAJaD | S. Dunaeva, VNIIEF |
| O. Gritzay, KINR | A. Hasegawa, JAERI | A. Kaltchenko, KINR | K. Kato, JCPRG |
| M. Kellett, NEADB | M. Lammer, NDS | S. Maev, CJD | V.N. Manokhin, CJD |
| V. McLane, NNDC | C.Nordborg, NEADB | P. Oblozinsky, NNDC | Y. Ohbayasi, JCPRG |
| N. Otuka, JCPRG | V. Pronyaev, NDS | O. Schwerer, NDS | S. Takacs, ATOMKIF. |
| S. Taova, VNIIEF | T. Tárkányi, ATOMKII | V. Varlamov, CDFE | M. Vlasov, KINR |
| M. Wirtz, NDS | V. Zerkin, NDS | Zhuang Y.X., CNDC | |

Sample of coded entry (E1779.002):

R. Kanungo *et al.*, Phys. Rev. Lett. **88** (2002) 142502 Fig.2-a

| | | | | |
|----------------|---|-----------|---------------|---------------|
| SUBENT | E1779002 | 20030606 | E177900200001 | |
| BIB | 4 | 7 | E177900200002 | |
| REACTION | (6-C-0(8-O-23,X)8-O-22,LP,DP,RSD,REL) | | E177900200003 | |
| | DATA: count number | | E177900200004 | |
| PART-DET | (8-O-22) | | E177900200005 | |
| MOM-SEC | (MOM-SEC,8-O-22)longitudinal momentum in projectile | | E177900200006 | |
| | rest frame | | E177900200007 | |
| STATUS | (CURVE)Data scanned from Fig.2-a (filled | | E177900200008 | |
| | circle),p.142502-2 in reference | | E177900200009 | |
| ENDBIB | 7 | 0 | E177900200010 | |
| NOCOMMON | 0 | 0 | E177900200011 | |
| DATA | 3 | 15 | E177900200012 | |
| <u>MOM-SEC</u> | DATA | DATA-ERR | E177900200013 | |
| MEV/C | ARB-UNITS | ARB-UNITS | E177900200014 | |
| | -2.532E+02 | 1.126E+01 | 4.929E+00 | E177900200015 |
| | -2.214E+02 | 1.971E+01 | 4.225E+00 | E177900200016 |

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