4-momentum transfer and momentum distribution data

There was agreement on these new quantities proposed by NNDC as summarized in memo CP-C/295, except for a minor correction requested by NDS concerning the required units (CP-D/330). All new dictionary codes were already included. The earlier memos CP-C289 and 290 are attached also for reference.

NATIONAL NUCLEAR DATA CENTER
Bldg. 197D
Brookhaven National Laboratory
P. O. Box 5000
Upton, NY 11973-5000 U.S.A.

(*Internet*) "NNDC@BNL.GOV

Telephone: (516)344-2902
FAX: (516)344-2806

Memo CP-C/295

DATE: June 28, 2001
TO: Distribution
FROM: V. McLane
SUBJECT: 4-momentum transfer (CP-C/289) and momentum distribution data (CP-C/290) consensus

There is agreement on 4-momentum transfer and momentum distribution data.

Regarding a comment made by Felix Chukreev on 4-momentum transfer: the data I have compiled are for incident energies below 1 GeV. When the time comes to compile data dealing with mass invariance, we will deal with how to compile it.

Proposed LEXFOR entry and dictionary additions follow.

Distribution:
M. Chiba, Sapporo	S. Maev, CJD
F. E. Chukreev, CAJaD	O. Schwerer, NDS
S. Dunaeva, Sarov	S. Takács, ATOMKI
O. Gritzay, KINR	F. T. Tárkányi, ATOMKI
K. Kato, JCPDG	V. Varlamov, CDFE
M. Kellett, NEADB	Zhuang Youxiang, CNDC
V. N. Manokhin, CJD	NNDC File

Dictionary 24 (Data Headings)

-t	4-momentum transfer squared (= q**2)

Dictionary 25 (UNITS)

GEV2/C2	(GeV/c)**2	EC2
MB/GEV2/C2	Miilibarns/(GeV*c)**2	D4
MB/MEV/C	Millibarns/MeV/c	DP

Dictionary 32 (Parameters)

DP	Differential with respect to linear momentum of outgoing particles
DT	Differential with 4-momentum transfer squared of outgoing particles

Dictionary 36 (Quantities)

,DT	Differential c/s with respect to 4-momentum transfer squared.
LON,DA/DP,,IPA	Diff. with respect to longitudinal sec.lin.mom.,int. over ang.range
LON,DA/DP,P,IPA	Diff. with respect to longitudinal sec.lin.mom.,int. over p ang.range

LEXFOR Entry (Differential Data)

Differential with respect to angle and linear momentum of outgoing particles

REACTION Coding: DA/DP in SF6 (Parameter).

Unit type: DP (*e.g.*, MB/MEV/C) *Note by NDS: should be MB/SR/MEVC unless SF8 = IPA*

Example:

(…(5-B-8,X)…,LON,DA/DP)   differential with respect to angle and longitudinal secondary linear momentum

Differential with respect to 4-momentum transfer squared

REACTION Coding: DT in SF6 (Parameter).

Unit type: D4 (*e.g.*, MB/GEV2/C2)

Example:

(2-HE-4(P,EL)2-HE-4,,DT)   differential with respect to 4-momentum transfer squared

A LEXFOR entry on momentum will be drafted.

Memo CP-D/330

16 November 2001

From: O. Schwerer

To: Distribution

Subject: Momentum distribution data (CP-C/295 and CP-C/290)

There is a mistake in the proposed LEXFOR entry on Differential data with respect to angle and linear momentum of outgoing particles (CP-C/295, 2nd page).

The quantity given in the example

(…(5-B-8,X)…,LON,DA/DP)

would require units of type MB/SRMEVC.

The units given in the example, MB/MEV/C are correct **only** for the quantities which are integrated over an angular range, such as

LON,DA/DP,,IPA   Diff. with respect to longitudinal sec.lin.mom.,int. over ang.range
LON,DA/DP,P,IPA   Diff. with respect to longitudinal sec.lin.mom.,int. over p ang.range

which are the ones actually proposed for dictionary 36.

Without IPA in SF8, "per steradian" is needed in the denominator of the units.

Distribution:

Memo CP-C/290

DATE: July 24, 2001
TO: Distribution
FROM: V. McLane
SUBJECT: Momentum distribution data (revised)

I have received some data from a study of the longitudinal momentum distribution using 8B beams on Pb and Ag, and propose we add a new code DP to Dictionary 32 for such data. Appropriate units will also be needed.

Proposed dictionary additions follow.

Dictionary 25 (UNITS)
    `MB/MEV/C`   Millibarns/MeV/c   DP

Dictionary 32 (Parameters)
    `DP`   Differential with respect to linear momentum of outgoing particles

Dictionary 36 (Quantities)
    `LON,DA/DP,,IPA`   Diff. with respect to longitudinal sec.mom.,int. over ang.range
    `LON,DA/DP,P,IPA`   Diff. with respect to longitudinal p mom.,int. over p ang.range

I have attached a sample coded entry.

Distribution:
  M. Chiba, Sapporo   S. Takács, ATOMKI
  F. E. Chukreev, CAJaD   F. T. Tárkányi, ATOMKI
  S. Dunaeva, Sarov   V. Varlamov, CDFE
  O. Gritzay, KINR   Zhuang Youxiang, CNDC
  K. Kato, JCPDG   NNDC File
  M. Kellett, NEADB
  V. N. Manokhin, CJD
S. Maev, CJD
O. Schwerer, NDS

```
TRANS                     20010723
ENTRY           C0820     20010723
SUBENT        C0820001    20010723
BIB               9          17
INSTITUTE  (1USAMSU,1USAANL,2UK SUR)
REFERENCE  (J,PR/C,63,065806,2001)
AUTHOR     (B.Davids,S.M.Austin,D.Bazin,H.Esbensen,B.M.Sherrill,
            I.J.Thompson,J.A.Tostevin)
TITLE      Electromagnetic dissociation of 8B and the rate of the
            7Be(p,gamma)8B reaction in the Sun
FACILITY   (CYCLO,1USAMSU) K1200 cyclotron.
INC-SOURCE 8B beam produced using 100 and 125 MeV/nucleon beams
            of 12C.  Beam magnetically analyzed using A1200
            fragment separator.
            Beam contaminents included 7Be (5-8 times
            more intense than 8B component), 6Li, and 9C.
ERR-ANALYS (ERR-S) Statistical uncertainty given.
            In addition, there are 9% systematic uncertainties
            due to target thickness and beam intensity.
STATUS     Data received by email from B.Davids, 26 June 2001.
HISTORY    (20010723C) VM
ENDBIB            17          0
NOCOMMON           0          0
ENDSUBENT         20          0
SUBENT        C0820002    20010723
BIB                5         14
REACTION   (47-AG-0(5-B-8,X)4-BE-7,LON,DA/DP,,IPA)
SAMPLE     27 mg/cm2 Ag target.
DETECTOR   (MAGSP) S800 spectrometer used to detect 7Be fragments
            Spectrometer comprised of:
            . 2 position-sensitive cathode readout drift chambers
              to measure position and angles of 7Be fragments,
            . a 16 segment ionization chamber to record energy
              losses,
            . 3 plastic scintillators, the first of which measured
              total energies of particles reaching focal plane.
METHOD     (TOF) 8B particles in beam identified by time-of-
            flight.
CORRECTION Corrected for overall efficiency of drift chambers,
            and angular acceptance of S800 spectrometer.
ENDBIB            14          0
COMMON             1          3
EN
MEV
352.
ENDCOMMON          3          0
DATA               4         42
ANG-MAX    MOM-SEC     DATA       ERR-S
ADEG       MEV/C      MB/MEV/C   MB/MEV/C
  1.5      1979.65    0.0806159  0.0161105
  1.5      1989.0     0.296264   0.0320699
  1.5      1998.35    0.497803   0.0313007
  1.5      2007.7     0.642912   0.0354975
  1.5      2017.05    0.693297   0.0368623
…
  2.5      2101.19    0.0665081  0.0267443
ENDDATA           44          0
ENDSUBENT         67          0
ENDENTRY           6          0
ENDTRANS           1          0
```

Memo CP-C/289

DATE: June 28, 2001
TO: Distribution
FROM: V. McLane
SUBJECT: 4-momentum transfer

I have come across some data given in three old references given as dsigma/dt (4-momentum transfer). Data for 2 of these are given as a function of angle as well as 4-momentum transfer (-t), where $-t = q^2$. Since these are old data and I did not find any new data in this form, I could compile them as DA,,MSC. The third set, however, is given as a function of $-t$ in units of (Gev c)^2. (If anyone else has encountered such data, please let me know).

Therefore, I propose we add a new code DT to Dictionary 32 for such data, and a field heading $-t$ or q-SQ to Dictionary 24. Appropriate units will also be needed.

Proposed dictionary additions follow.

Distribution:
  M. Chiba, Sapporo
  F. E. Chukreev, CAJaD
  S. Dunaeva, Sarov
  O. Gritzay, KINR
  K. Kato, JCPDG
  M. Kellett, NEADB
  V. N. Manokhin, CJD

  S. Maev, CJD
  O. Schwerer, NDS
  S. Takács, ATOMKI
  F. T. Tárkányi, ATOMKI
  V. Varlamov, CDFE
  Zhuang Youxiang, CNDC
  NNDC File

Dictionary 24 (Data Headings)
```
-t                 4-momentum transfer squared (= q**2)
```

Dictionary 25 (UNITS)
```
GEV2/C2          (GeV/c)**2                 EC2
MB/GEV2/C2    Miilibarns/(GeV*c)**2      D4
```

Dictionary 32 (Parameters)
```
DT                 Differential with 4-momentum transfer squared of outgoing particles
```

Dictionary 36 (Quantities)
```
,DT                Differential c/s with respect to 4-momentum transfer squared.
```

I have attached a sample coded entry.

```
TRANS                       20010711                          10000  0    0
ENTRY           C0128       20010711                          C0128  0    1
SUBENT          C0128001    20010711                          C0128  1    1
BIB             15          25                                C0128  1    2
INSTITUTE  (1USACLA,1USATEX,1USALAS,1USAMIN,1USABNL)          C0128  1    3
REFERENCE  (J,PL/B,78,205,197809)                             C0128  1    4
AUTHOR     (J.Fong,T.S.Bauer,G.Igo,G.Pauletta,R.Ridge,R.Rolfe, C0128  1    5
            J.Soukup,C.A.Whitten Jr,G.W.Hoffmann,N.M.Hintz,    C0128  1    6
            M.A.Oothoudt,G.S.Blanpied,R.P.Liljestrand,T.Kozlowski)C0128 1   7
TITLE       p-4He elastic scattering at 788 MeV.              C0128  1    8
FACILITY   (MESON,1USALAS) LAMPF.                             C0128  1    9
INC-SOURCE (POLIS)                                            C0128  1   10
SAMPLE      Liquid helium in cylindrical flask.              C0128  1   11
METHOD     (PHD,TOF)                                          C0128  1   12
DETECTOR   (MAGSP) High resolution spectrometer.             C0128  1   13
           (TELES) Beam-target interaction monitored by      C0128  1   14
            scintillator telescopes placed at 45 and 115 degrees C0128 1  15
            with respect to beam direction.                  C0128  1   16
           Beam intensity monitored by 3 ionization chambers and C0128 1  17
            a secondary emission monitor.                    C0128  1   18
           Horizontal beam profile monitored by multiwire chamberC0128 1  19
            at backward angles.                              C0128  1   20
MONITOR    (2-HE-4(P,EL)2-HE-4,,DA)                           C0128  1   21
MONIT-REF  (,R.KLEM+,J,PL/B,70,155,1977)                     C0128  1   22
CORRECTION Corrected for background.                         C0128  1   23
ERR-ANALYS (ERR-S) Statistical uncertainty.                 C0128  1   24
            Scale accuracy 20%.                              C0128  1   25
STATUS      Data received by email from L. Ray, 12 August 1999. C0128 1  26
HISTORY    (19990816C) VM                                    C0128  1   27
ENDBIB          25          0                                C0128  1   28
COMMON          1           3                                C0128  1   29
EN                                                           C0128  1   30
MEV                                                          C0128  1   31
788.                                                         C0128  1   32
ENDCOMMON       3           0                                C0128  1   33
ENDSUBENT       32          0                                C0128  99999
SUBENT          C0128002    20010711                          C0128  2    1
BIB             2           3                                C0128  2    2
REACTION   (2-HE-4(P,EL)2-HE-4,,DT)                           C0128  2    3
EN-SEC      Momentum given corresponds to angles of 13.3 - 165.5 C0128 2   4
            degrees.                                         C0128  2    5
ENDBIB          3           0                                C0128  2    6
NOCOMMON        0           0                                C0128  2    7
DATA            3           267                              C0128  2    8
-t        DATA-CM     ERR-S                                   C0128  2    9
GEV2/C2   MB/GEV2/C2 MB/GEV2/C2                               C0128  2   10
 0.111     0.394E+02   0.79E+00                              C0128  2   11
 0.114     0.364E+02   0.73E+00                              C0128  2   12
 0.118     0.330E+02   0.66E+00                              C0128  2   13
 0.121     0.307E+02   0.61E+00                              C0128  2   14
 0.124     0.271E+02   0.54E+00                              C0128  2   15
 0.127     0.247E+02   0.49E+00                              C0128  2   16
 0.131     0.223E+02   0.45E+00                              C0128  2   17
 0.134     0.195E+02   0.39E+00                              C0128  2   18
 0.137     0.178E+02   0.36E+00                              C0128  2   19
…
4.192      0.632E-04   0.57E-05                              C0128  2  277
ENDDATA         269         0                                C0128  2  278
ENDSUBENT       277         0                                C0128  99999
ENDENTRY        2           0                                C01289999999
ENDTRANS        1           0                                Z99999999999
```