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MEMO CP-A/89
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20 April 1998

To: Distribution
From: F.E. Chukreev
Subject: Action 60 of Brookhaven Meeting (3-7 June 1996)

Action 60: Chukreev-Draft LEXFOR entry on this data representation, including the formula for converting wave-number to angle.
Enclosed is LEXFOR entry as WORD 6.0 document. Sorry, but I have not POSTSCRIPT editor and I did not find it at Moscow shops.

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Content-type: application/octet-stream; name=Lexfor.doc

October 1997
ANGLE

Angle

Secondary-particle Angle

The angle of the secondary particle(s) with respect to the incident-projectile beam may be entered either

a) angle in degrees or

b) cosine (units given as NO-DIM) or

c) transferred linear momentum by projectile particles (units given as MEV/C, GEV/C etc) or

d) wave number of transferred momentum (units given as FM-1).

An angle given in degrees and minutes must be entered in two separate fields with the data heading repeated. See EXFOR 5.4.

Data-heading keywords:

ANG	= angle in LAB system
ANG-CM	= angle in center-of-mass (CM) system
COS	= cosine of angle in LAB system
COS-CM	= cosine of angle in CM system
MOM-TR	= transferred linear momentum in CM system
WVE-NM	= wave number of MOM-TR.

Transferred linear momentum (p_{tr}) and its wave number (k_{tr}) are connecred by the relation.

$$p_{tr} = \eta \cdot k_{tr} \qquad (1)$$

If the dimension of p_{tr} is MeV/c and k_{tr} is 1/fermi, then

$$p_{tr} = 197.3 k_{tr} \qquad (2)$$

The relations between ANG-CM and MOM-TR:

In general cases needed relations could be found by using relativistic kinematics. These relations, as rule, very complex. Therefore inelastic scattering case (the most important case of transferred momentum formalizm using) will be considered.

If, in CM system, p_i is initial linear moment colliding particles with masses m and M, p_f is final linear moments and Q is excitation energy of the particle M, then

$p_{tr}^2 = p_i^2 + p_f^2 - 2p_i p_f \cos(\Theta)$, where Θ - scattering angle of beam particle in CM frame.

At $Q << Mc^2$

$$p_{tr} = 2p_i \sin\left(\frac{\Theta}{2}\right)\left[1 - \frac{Q\left(1+\frac{m}{M}+\frac{T}{mc^2}\right)}{2T\left(2+\frac{T}{mc^2}\right)}\right] \qquad (3)$$

where T - kinetic energy of particle m in laboratory system,

$$p_i^2 = 2mT\frac{1+\frac{T}{2mc^2}}{\left(1+\frac{m}{M}\right)^2+2\frac{T}{mc^2}} \qquad (4)$$

Angular Error and Resolution

Numerical values for the angular error or resolution may be entered in the COMMON or DATA section using data headings from Dictionary 24 with the family code H, e.g., ANG-RSL, COS-ERR, MOM-TR-RSL. Further information can be given in free text under ERR-ANALYS, see page 8.E.2. See also **Errors, Resolution.**

Angular correlation

Reaction coding: Quantities defining the angular correlation between two or more emitted particles or radiations are coded with the parameter COR in SF6 (parameter). The angles given are defined by the particles specified in the REACTION code in either the process field (SF3) or the particle considered field (SF7).

Example:

(.....(N,N+P).....,,COR) neutron-proton correlation in the (n,np) reaction: The angles are coded in the COMMON or DATA section using the data heading ANG1, ANG2, *etc.*, in the same order in which the particles are specified in the REACTION string.