Japan Charged-Particle Nuclear Reaction Data Group

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Memo CP-E/049

Date: August 20, 2004
To: Distribution
From: OTSUKA Naohiko
Subject: Angular distribution data
Reference: CP-C/346

I have three comments on CP-C/346:

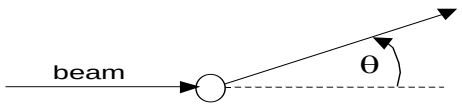
1. Data heading for azimuthal angle:

If we limit the use of `ANG-AZ` to "Azimuthal angle between reaction planes of two particles", `ANG-AZ-RL` or `ANG-RL-AZ` may be better than `ANG-AZ`.

2. Unit for relative angular distribution:

In general, relative data must be combined with `ARB-UNITS`. The following correction may be needed:

Angular distribution: probability for a particle to be emitted into an area of solid angle $d\Omega$ lying at a mean angle of θ to the incident beam direction in the reaction plane; given as $\sigma(\theta) = d\sigma/d\Omega$. The data are given in units of cross section per unit solid angle (*e.g.*, mb/sr).



REACTION coding: DA in SF6.
Units are of the type DA (*e.g.*, B/SR)

Data may also be given as relative angular distribution $W(\theta)$; the data are dimensionless, and are most often normalized to $W(90°) = 1$.

REACTION coding: DA in SF6; REL in SF8.

Units are ~~NO DIM~~ ARB-UNITS.

3. Relative angular correlation: "`,DA/DA,,REL` "or "`,DA/CRL`" ?:

So far, I understood the difference between "`,DA/DA`" and angular correlation "`,DA/CRL`" is in their normalization, namely, absolute value σ (θ_a, θ_b) or relative value (incl. count) $W(\theta_a, \theta_b)$. `DA/DA` has not been connected with `REL` (only one exception is T0224).

This time V. McLane proposes the use of "`,DA/DA,*,REL`" (relative angular correlation in her draft) for M0469.003, M0627.003-004, O0460.010-011. Does CP-C/346 propose replacing "`,DA/CRL`" by "`,DA/DA,*,REL`" for the data which are differential with respect to two angles? I prefer this solution, and propose the following addition into her draft:

Angular correlation: probability that, if a particle *a* in emitted at a mean angle of θ_a to the incident beam direction in the reaction plane, particle *b* will be emitted at a mean angle of θ_b to the incident beam direction in the same plane (coplanar); given as $d^2\sigma/d\Omega_a d\Omega_b$. The data are given in units of cross section per unit solid angle squared (*e.g.*, mb/sr^2).

…

REACTION coding: DA/DA in SF6; particles in SF7 as *a*/*b* (*e.g.*, P/D).
The angles θ_a and θ_b are coded under the headings ANG1 and ANG2, in the same order as the particles appear in SF7.
Units are of the type DA2 (*e.g.*, MB/SR2)

Data may also be given as relative angular correlation $W(\theta_a, \theta_b)$;.

REACTION coding: DA in SF6; REL in SF8.
Units are ARB-UNITS.

If CP-C/346 is accepted, the use of "`,DA/CRL`" is strictly limited to the quantities which refer only one angle with respect to particle pair (i.e. mean angle of two particle θ_m , relative angle between two particle θ_{rel}). Therefore updates will be necessary for many "`,DA/CRL`" entries in our present database.

By the way, what is the difference between "`,DA/CRL`" and "`,DA/CRL,,REL`" in present rule? I found the latter quantity codes in some entries.

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