SPIN PHYSICS AT COMPASS2

CERN, July 2, 2004

ASSUMPTION:

1. In period 2006 -2010, 2 years running with NH_3 target

⇨ **in 2010 COMPASS will still have 2 times less statistics for $\Delta G/G$ than anticipated in the Proposal**

2. after 2010 considerable increase in muon flux
(5 times more muon intensity, 2 times more running time)

⇨ **strong physics interest in resuming the polarised programme**

- **Longitudinal target polarization**
- **Transversity**

Longitudinal target polarization

1. $\Delta G/G$ — Present measurements statistically limited

Unlikely that RHIC measurements give definitive answers

2. g_1 — at low x, for both p and n needed to reduce systematic error in first moment due to extrapolation / *impact of future measurements to be evaluated*

Low x behaviour interesting by itself

3. $g_1(x,Q^2)$ — for both p and n

Needed for Q^2 evolution and $\Delta G/G$ / *impact of future measurements to be evaluated*

4. Flavour decomposition of g_1

In particular Δs (puzzling data from HERMES)

but also Δu and Δd

Transversity

Physics case gains momentum at high speed

(see Transversity Workshop in Trento, June 04, www.lnf.infn.it/conference/transversity04/)

- **Presently only a small signal seen by HERMES**
- **Tremendous need to improve on statistics**
  - **Q^2- dependence**
  - **x- dependence**
  - **z- dependence**
  - **k_T- dependence**

  multidimensional analysis badly NEEDED
- **Many channels to be explored**
  - **1 hadron (Collins, Sivers)**
  - **2 hadrons**
  - **Vector mesons**
- **Q^2- evolution (different from longitudinal case)**

Transversity

Long Term Goal:

Measurement of the Tensor Charge

$$dq(Q^2) = \int_0^1 dx\left(dq - d\bar{q}\right)$$

- **"all valence" object**
- **important for understanding c-simmetry breaking**
- **important to calculation of EDM**
- **accessible to LATTICE CALCULATION**