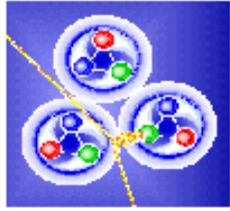


ELETTRO

35 Institutions + INFN (gruppo collegato Sanità and Bari)

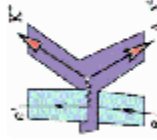
180 physicists
(10 from Italy)

INFN
responsible:
F. Garibaldi,
S. Frullani



Main physics items

- Nuclear structure at small inter-nucleon separations
- Nuclear medium effects on bound nucleon structure
- Precision measurements of high Q^2 form factors of nuclei and nucleons
- Strange-quark content of proton through parity violating experiments
- Measurements of the spin structure of the nucleons (GDH sum rule)
- Nucleon generalized polarizabilities through Virtual Compton Scattering)
- Kaon electro-production on proton (kaon form factor) and on nuclei (hypernuclear physics)



Electron Scattering Physics at Hall A Jefferson Lab



6 GeV Continuous Accelerator Facility

$E_{\text{beam}} = 6 \text{ GeV}$, $i = 200 \text{ mA}$,

$\sigma E/E = 2.5 \times 10^{-5}$, $\epsilon = 2 \times 10^{-9} \text{ mrad}$

Three simultaneous beam in the three Experimental Halls

(<http://www.jlab.org>)

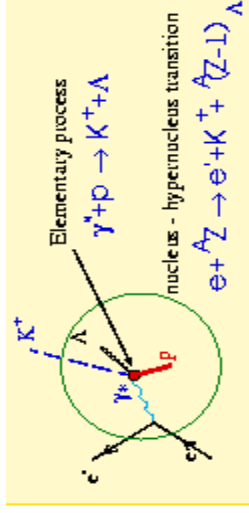
Experiments with main INFN Rome1 - Sanita', Bari contribution

Strangeness Electroproduction

on proton and nuclei

Exp 94-107 (INFN, Jlab, Fiu, Tohoku)

Exp 98-108 (INFN, FIU, Maryland)



GDH very low Q^2

Exp. 97110 INFN, Jlab, Virginia

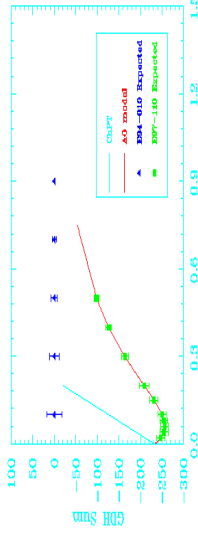
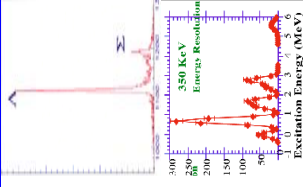
Parity

Exp. E00-003 INFN, Jlab, Syracuse

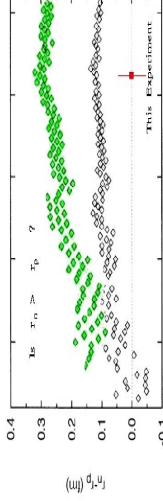
$N \rightarrow \Delta$

Exp. E-91-111, INFN, Maryland,

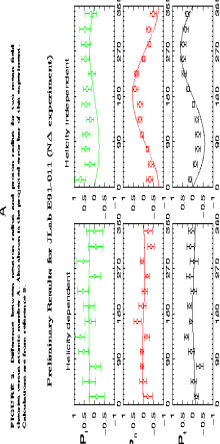
St Marys



Expected results



Expected results

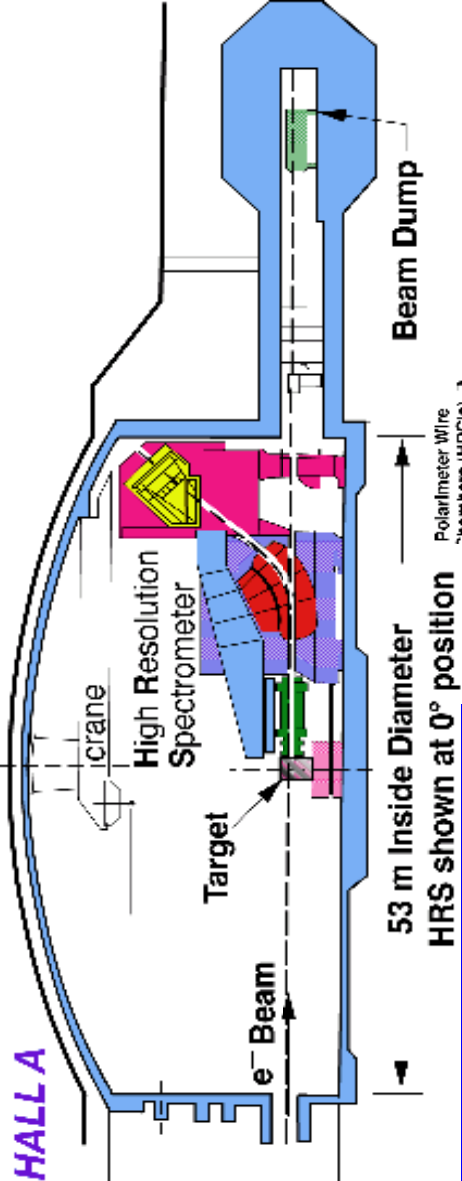
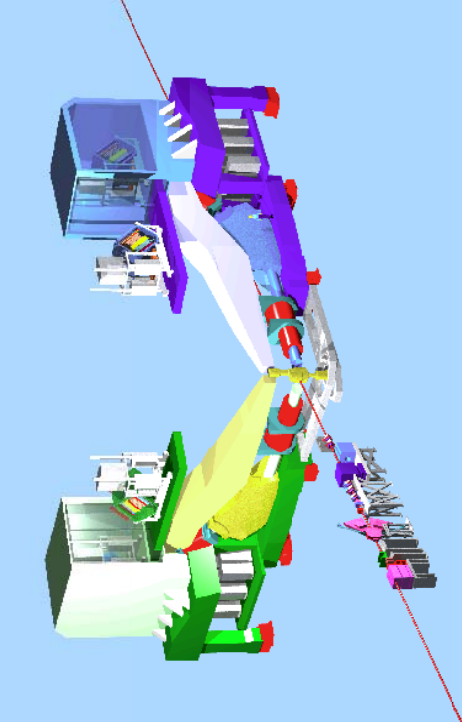


Preliminary results

FIGURE 10. Hypernuclear form factors for the Λ hypernucleus ${}^{\Lambda}\text{He}$ and ${}^{\Lambda}\text{Li}$. The plot shows the real and imaginary parts of the form factors F_1 and F_2 as a function of the momentum transfer Q^2 . The data points are compared with theoretical calculations. The plot is taken from the paper by S. Frullani et al., Phys. Rev. Lett. 87, 262001 (2001).

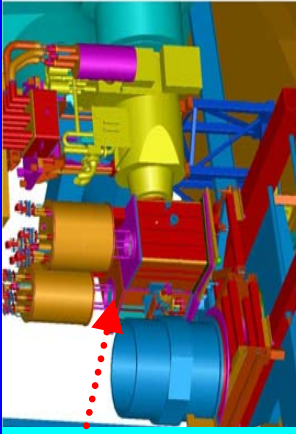
Hall A - Two High Resolution Spectrometers

QDQ - Momentum Range: 0.3 - 4 GeV/c $\Delta p/p : 1 \times 10^{-4} - \Delta p = \pm 5\% - \Delta\Omega = 5 - 6 \text{ mr}$

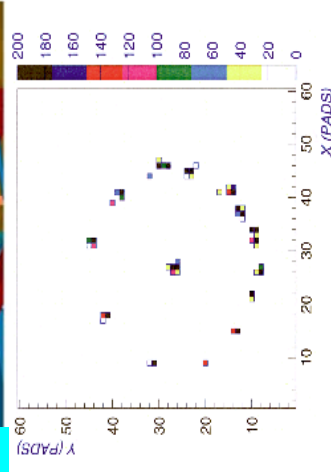
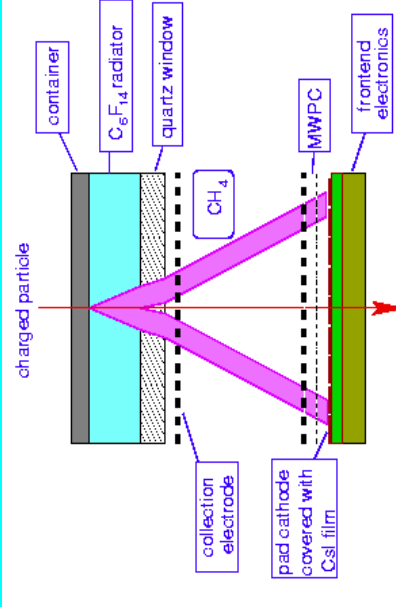
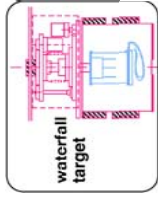


INFN Bari-Sanita main contribution

- Septum Magnets
- Gas and aerogel detectors
- Waterfall target
- RICH detector

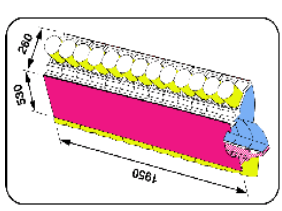
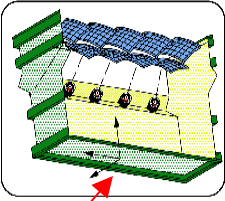
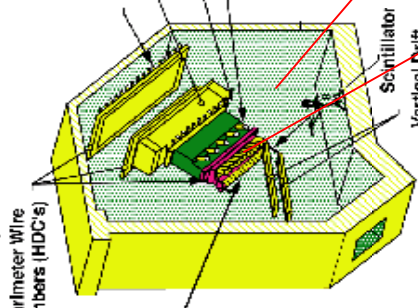


Aerogel Cherenkov

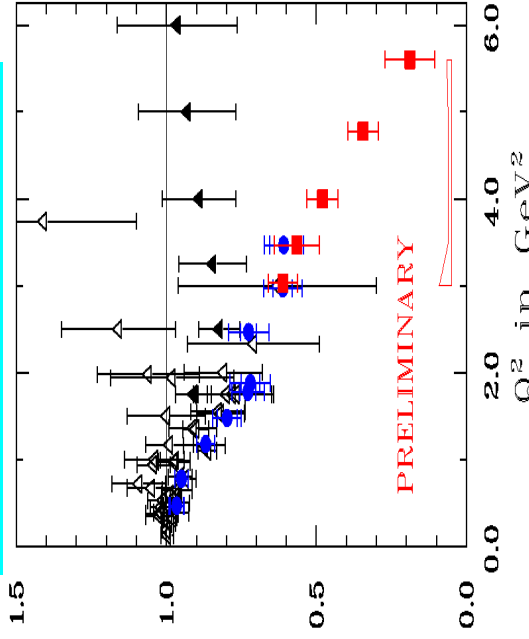


A typical ring (7 GeV/c pion, CERN tests)

RICH in Hall A

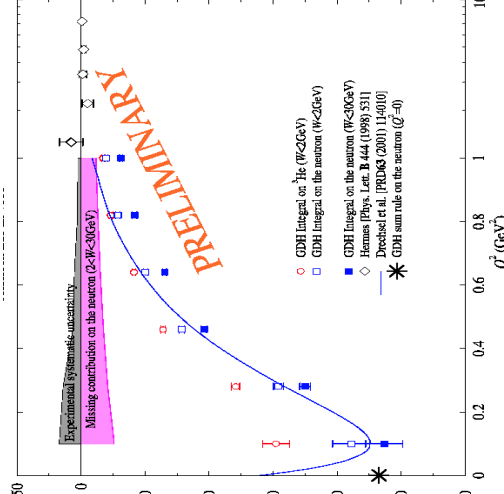


$\frac{H_p G_{Ep}}{G_{Mp}}$ in $ep \rightarrow ep$ JLab E93-027 and E99-007



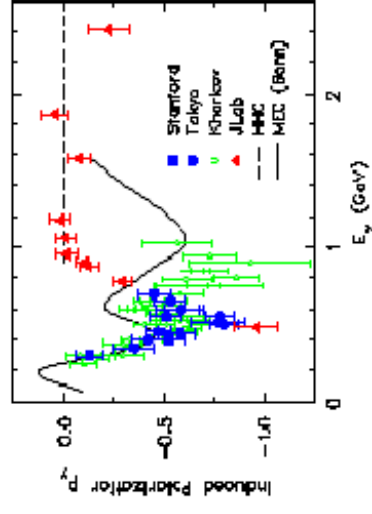
The results of JLab experiments 93-027 and 99-007 are shown with blue and red symbols, respectively. The new results confirm the trend of the ratio to decrease. Linear extrapolation indicates that G_E would cross zero at $Q^2 = 7.7 \text{ GeV}^2$

GDH Integral on the Neutron JLab E94-010



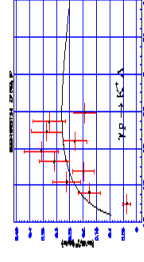
Measurement of the neutron (^3He) Spin Structure Function at low Q^2 . A connection between the Bjorken And Gerasimov-Drell-Hearn sum rules

Deuteron photodisintegration JLab E-89019

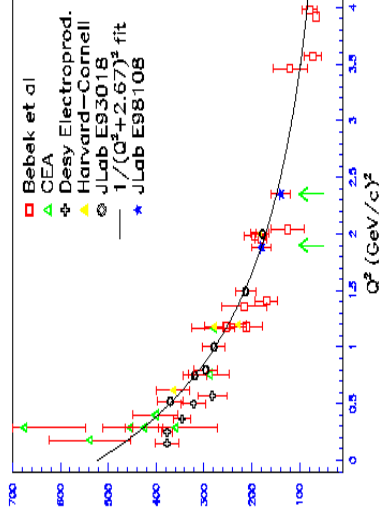
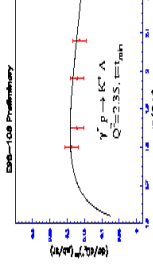


Induced polarization P_y at $q_{cm} = 90^\circ$

Invariant Mass Dependence



- Upper plot shows real photon data (Bonn)
- Lower plot shows virtual photon data (JLab)
- Agreement with empirical fit; present errors preliminary



Kaon electroproduction on proton E98-108 (preliminary)