Aiace is the italian for Aiax, the Iliad hero

Aiace by A. Canova

AIACE

AIACE stands for *Attivita' Italiana A CEbaf*.
It is the collaboration of the INFN groups of **Frascati** and **Genova** which participates into the physics program carried on with the **Large Acceptance Spectrometer**, **CLAS**, in the Hall B at **Jefferson Laboratory** located in Newport News, Virginia (USA).
The Continuous Electron Beam Accelerator Facility (CEBAF) at Jefferson Laboratory delivers a **high intensity** (200 μA) **continuous electron beam of up to 6 GeV energy.**

CLAS primary mission is to carry out **electroproducion** and (together with the ancillary equipment including photon tagger) **photoproduction** experiments which require the **detection of several, only loosely correlated particles in the hadronic final state**, in situations involving a **luminosity up to 10^{34} cm^{-2} s^{-1} .**
The broad physics program approved by the Jefferson Lab Program Advisory Committee covers:
a) elementary and nuclear **excitations of N* resonances**;
b) **spin structure functions of the nucleon**;
c) **inclusive electron scattering on nuclei**;
d) elementary and nuclear **hyperon production and decays**;
e) **structure of the few body systems**;
f) **nuclear medium effects;**

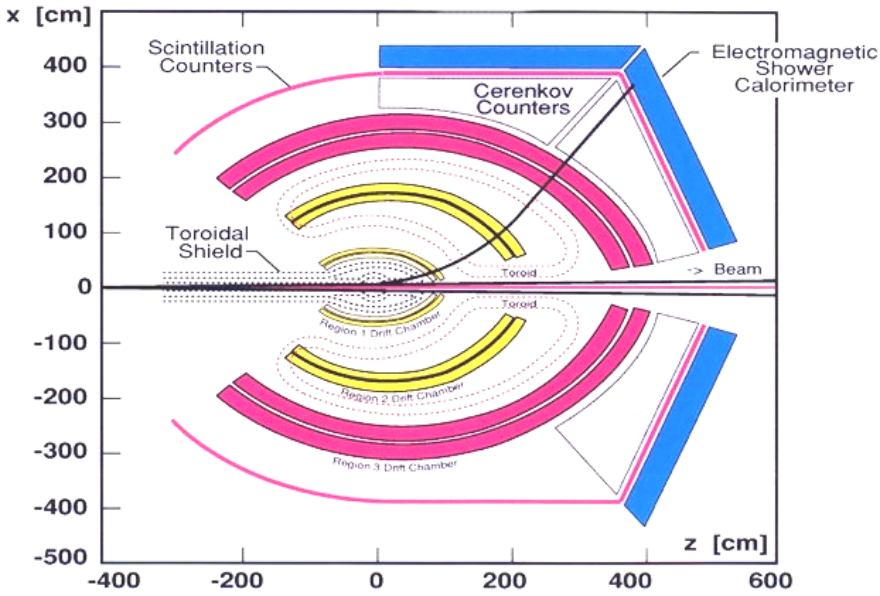
The CLAS collaboration counts **140 scientists** from **35 institutions**.
The AIACE collaboration consists of **8 staff** and **6 temporary scientists**.
The leaders are:
Marco Ripani (*ripani@ge.infn.it*) and
Patrizia Rossi (*rossi@lnf.infn.it*)

The CLAS detector

CLAS is a **large acceptance spectrometer** based on a toroidal magnetic field, generated by six superconducting coils arranged around the beam line.

Each sector is independently equipped with: a) three layers of **drift chambers** to track the charged particles, b) **gas-Cherenkov counters** to discriminate electrons from pions, c) **scintillation counters** for the time-of-flight measurements and d) **electromagnetic shower calorimeters** to detect electrons, photons and neutrons.
The two modules of the **Large Angle Calorimeter** have been provided by the AIACE collaboration.

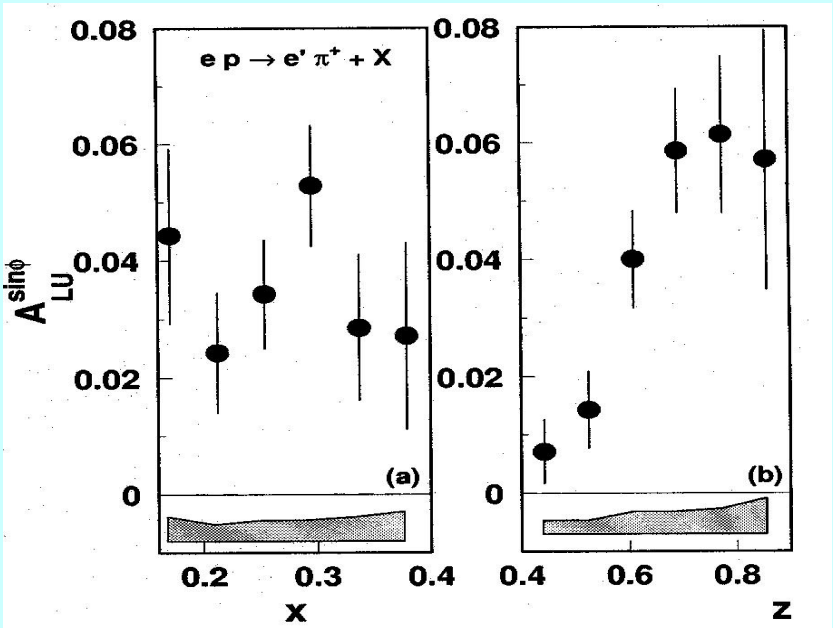
CLAS **momentum resolution** is **0.5 %** in the forward direction and **1%** at large angles.
The **high data acquisition rate (3000 Hz)** well matches the **luminosity of 10^{34} cm^{-2} s^{-1}**.



Azimuthal view of CLAS

The CLAS in Hall B at Jefferson Lab

Results (year 2002)

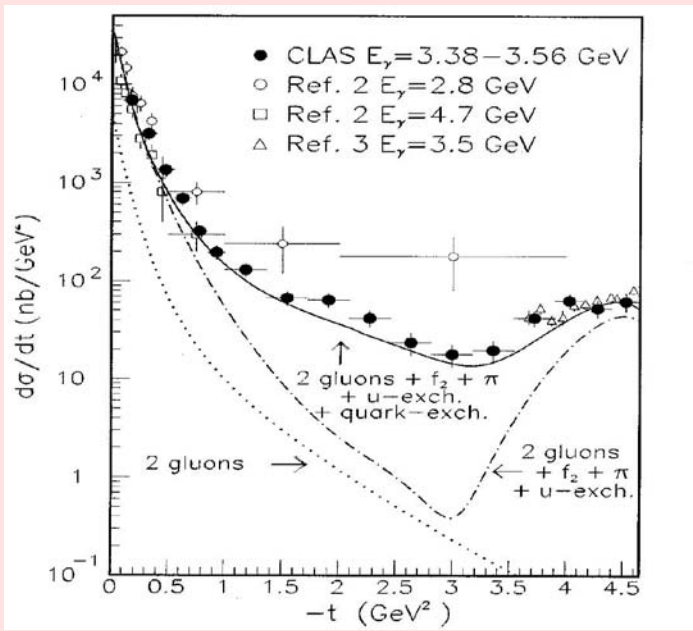


First measurement of a significant **Beam Single Spin Asymmetry (A_{LU} sin(ϕ))** in semi-inclusive pion electroproduction above the baryon resonance region.
The data are presented as a function of the Bjorken variabile x and the fraction of the energy of the virtual photon transfer to the pion, z.
Asssuming that factorization is valid, data provide the first information on the chiral-odd twist-3 parton distribution function e(x)

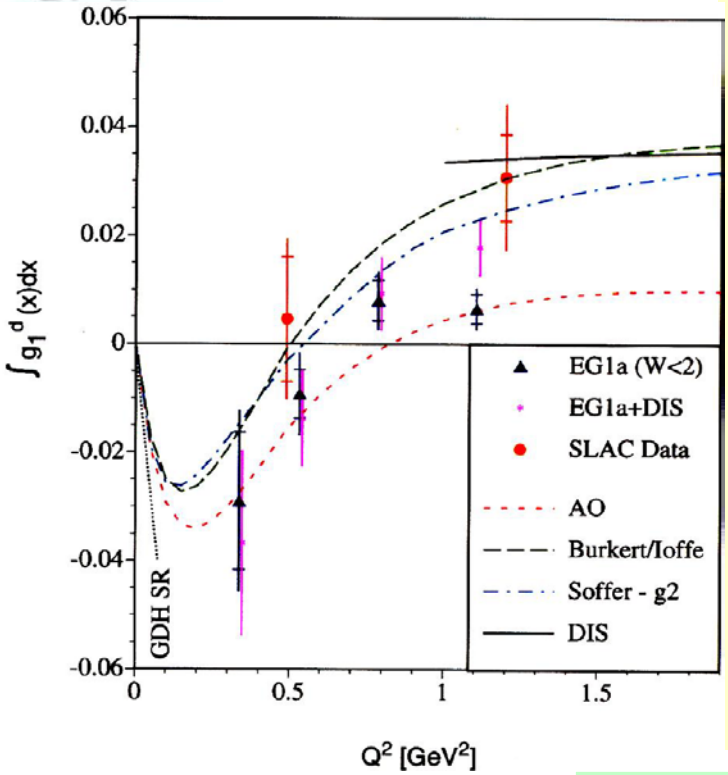
Hep-ex/0301005, Submitted to Phys. Rev. Lett.

***ω*-photoproduction** measured above the resonance region and up to t=5 GeV^2.
The differential cross section shows a diffraction pattern at low momentum transfer consistent with the Pomeron and Reggeon-echange while at large t its flat behaviour requires the inclusion of quark interchange processes, beside the QCD-inspired two-gluon exchange.
This description is coherent with the previous CLAS results for ϕ and ρ photoproduction.

Hep-ex/0210023, Accepted by Phys.Rev.Lett.



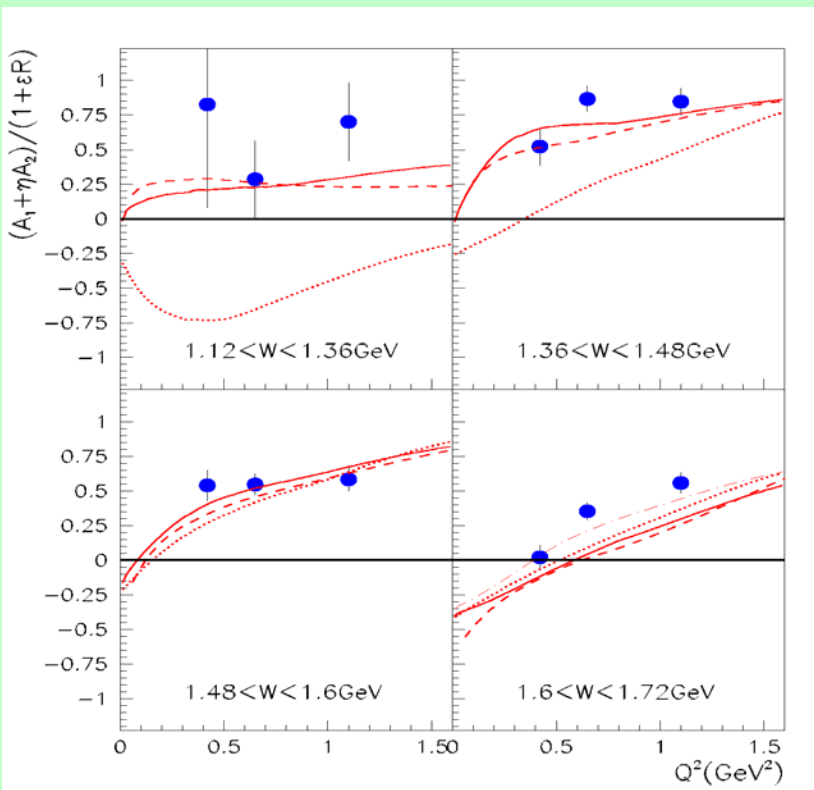
Results (year 2002)



Inclusive Spin Structure Functions of the deuteron: measurement of inclusive polarized structure function g_1^d in the resonance region at moderate momentum transfers (Q^2=0.27-1.3 (GeV/c)^2).
The data significantly expand the kinematic coverage and statistical precision beyond the only previous data from SLAC.
The integral over g_1^d follows the expected trend and puts a more stringent constraint on any theory aiming to describe the spin structure of the nucleon at various scales.

Hep-ex/0212044, Submitted to Physical Review C

First measurement of the **Double Spin Asymmetry** for e(pol) p(pol) $\rightarrow$ e'π n in the baryon resonance region.
This observable provides direct information on the helicity structure of the reaction and on the resonant helicity amplitudes $A_{1/2}$ and $A_{3/2}$.
In the low W region (<1.36 GeV) the asymmetry is strongly affected by non-resonant processes, leading to positive values in the Δ region.
For W>1.48 GeV the resonance contribution is dominant and the asymmetry is positive indicating that the reaction is dominated by helicity $A_{1/2}$.



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