SBS collaboration meeting, June 13

for information about SBS see
http://hallaweb.jlab.org/12GeV/SuperBigBite/

from 9:30 AM, room F326

1.	Scintillator Fiber Tracker,	M.Khandaker	- 25’
2.	Magnet and calculations,	J.LeRose	- 15’
3.	Front Tracker Progress,	Garibaldi	- 20’
4.	DAQ aspects,	Ole Hansen	- 20’
tea break			- 10’
5.	Hadron Calorimeter,	G.Franklin	- 20’
6.	Trigger scheme/status,	J.Calarco	- 20’
7.	Neutron Polarimeter in SBS,	John Annand	- 20’
8.	BigBite for GEn(2),	Doug	- 20’
coffee break			- 10’
9.	Electron Arm of GEp(5),	L.Pentchev	- 20’
10.	GEM new development,	E.Cisbani	- 20’
11.	Project progress, conferences,	Bogdan	- 10’

closing at 13:20 PM

Jefferson Lab
Thomas Jefferson National Accelerator Facility
Exploring the Nature of Matter

Hugh E. Montgomery
Laboratory Director and Jefferson Science Associates President

March 11, 2009

Dear Jefferson Lab Users,

This year marks the start of construction of the 12 GeV Upgrade Project, which will significantly enhance the capabilities of our flagship nuclear physics facility, CEBAF. The Jefferson Lab PAC has played a major role over the years in the development of the scientific case for the Upgrade and the planning for its research capabilities; and this PAC is the third to review formal proposals for experiments that will use the Upgrade.

While there are many ways the performance of a laboratory can be measured, a particularly important yardstick is the proposals to use the facility. Our hopes were rewarded in the form of six letters of intent and nineteen proposals. Of the proposals, nine were approved, five conditionally approved and five deferred or rejected for various reasons. The committee also provided some guidance to proponents of experiments of Semi-Inclusive Deep Inelastic (SIDIS) experiments that they hope will guide our development of a coherent and comprehensive program. Five of the letters of intent were deemed sufficiently attractive for the team to be encouraged to proceed to develop a proposal.

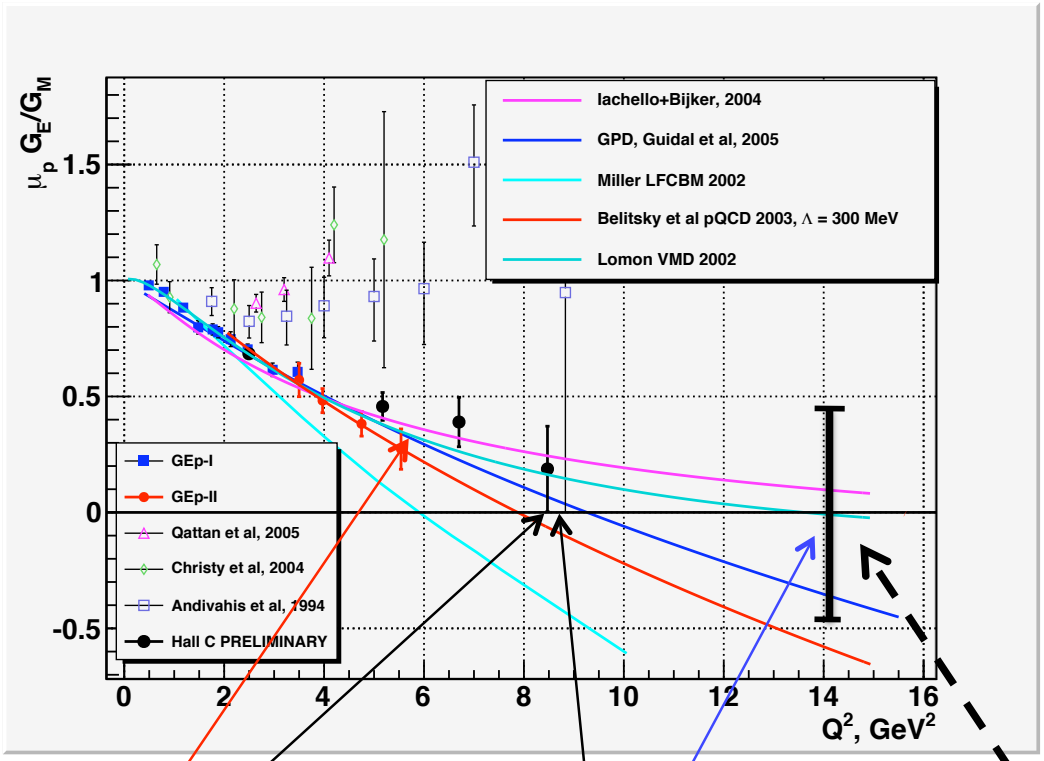
PAC34 was the first 12 GeV PAC that considered new initiatives for the 12 GeV era that would go beyond the baseline equipment included explicitly as part of the 12 GeV Upgrade Project. Among the proposals well received were one to measure the weak coupling of electrons using Møller Scattering and three that will utilize various configurations of apparatus that is collectively known as the SuperBigBite Spectrometer. Another proposed experiment with major apparatus would more broadly explore parity them.

The perspective of the physics embodied in the remarks and recommendations of the PAC is impressive. Their devotion to duty and attention to detail was likewise meticulous. The previous Chairman, Roy Holt, ensured the end of his term by signing a good fraction of the proposals so that recusal could not be denied. Mike Pennington stepped in and conducted the proceedings with consummate skill; we are delighted that he has agreed to continue as chair for the next two PACs. Finally it is traditional to remark on the fortitude of those who are leaving, graduating, if you will and in this category we have, David Bowman, Pierre Guichon, Roy Holt, Naomi Makins, and Marco Ripani. To all we express our gratitude and best wishes for the future.

Sincerely,

Hugh E. Montgomery
Laboratory Director

Proton GEP high momentum challenge



$(5/8)^8 = 1/42$ $(8/14)^8 = 1/90$

Form factor $\propto Q^{-4}$

Cross section $\propto E^2/Q^4 \times Q^{-8}$

Figure-of-Merit $\epsilon A_Y^2 \times \sigma \times \Omega$

$\propto E^2/Q^{16}$

Let us extrapolate by using just existing data (some of them preliminary)

"Existing" equipment (triple beam time)

Proton GEP high momentum challenge

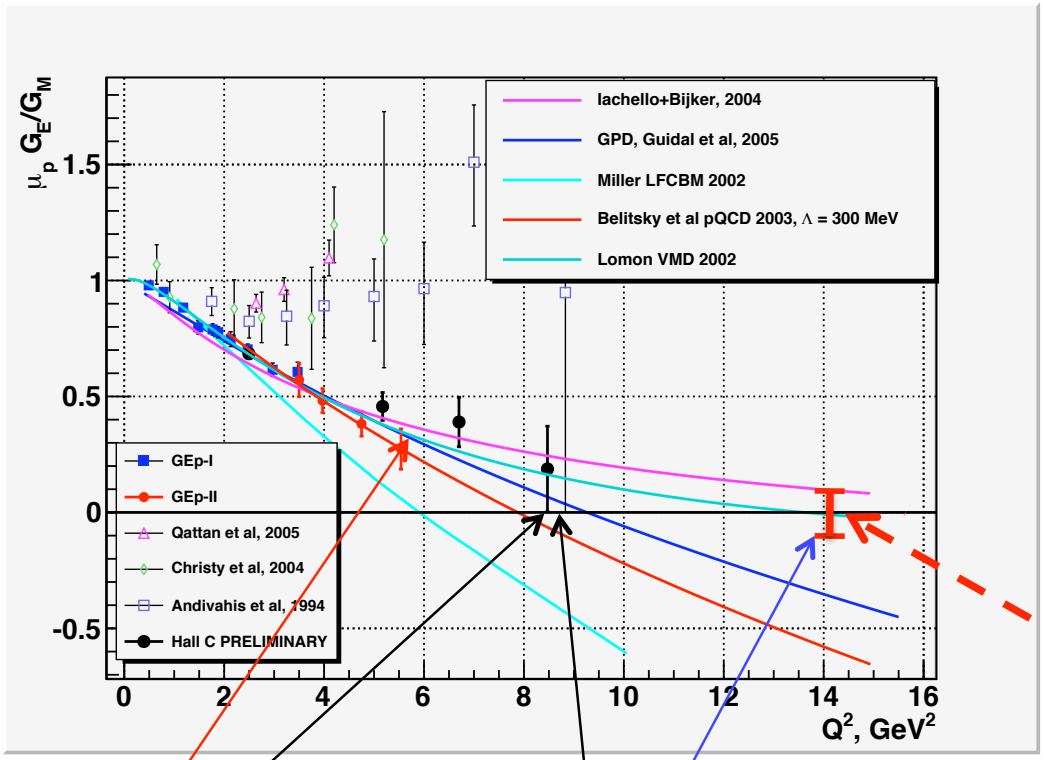


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Figure-of-Merit $\epsilon A_y^2 \times \sigma \times \Omega$

$\propto E^2/Q^{16}$

Larger Figure-of-Merit is absolutely crucial

SBS physics program

- **GEP** : reach unique high 15 $(GeV/c)^2$ approved
- GMN: reach absolute max 18 $(GeV/c)^2$ approved
- GEN: reach full glory with 10 $(GeV/c)^2$ approved
- SSA in nSIDIS: 30,000 gain vs HERMES cond. approved

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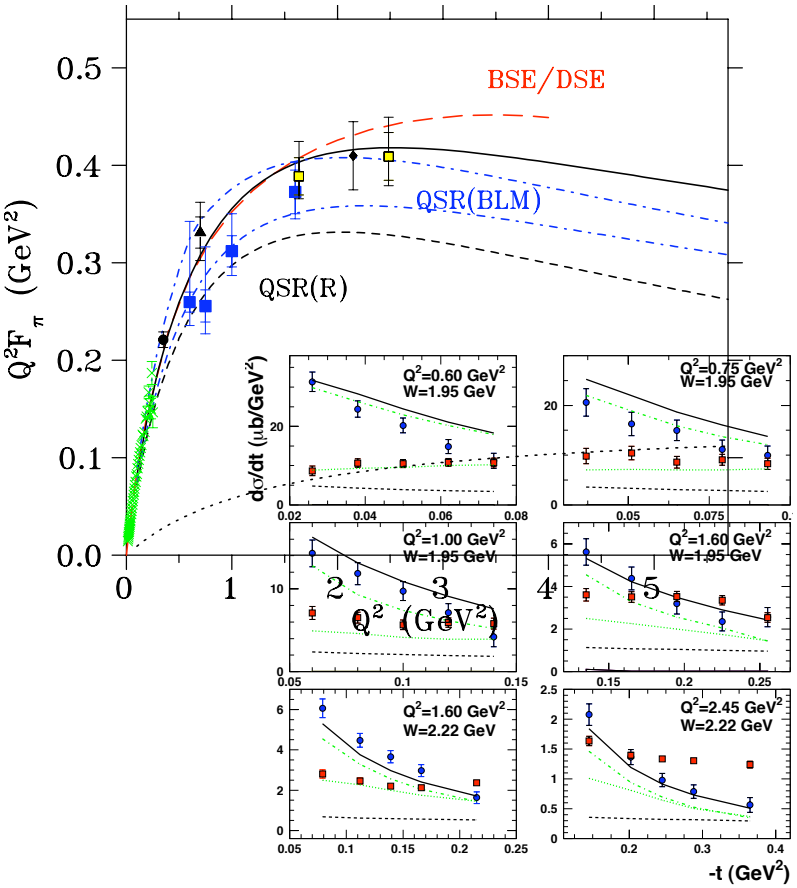
- **A1n**/d2n – now has gain of 30 vs Hall C, approved for BigBite
- A1p/d2p – with best experimental setup
- D(e,e'd) -- event rate gain ~ 50 at 6 $(GeV/c)^2$
- T/^{3}He(e,e') : 0.1 g of T in the target = 0.6% of Bates
- RCS – double t,s $d\sigma/dt, K_{LL}, A_{LL}$
- PVDIS – gain 10-15 compare with two HRSs
- A(e,e'ϕ) - large program including DIS, pol.target, exclusive

- H(e,e'π^+n) – recoil polarization in || kinematics => F_π

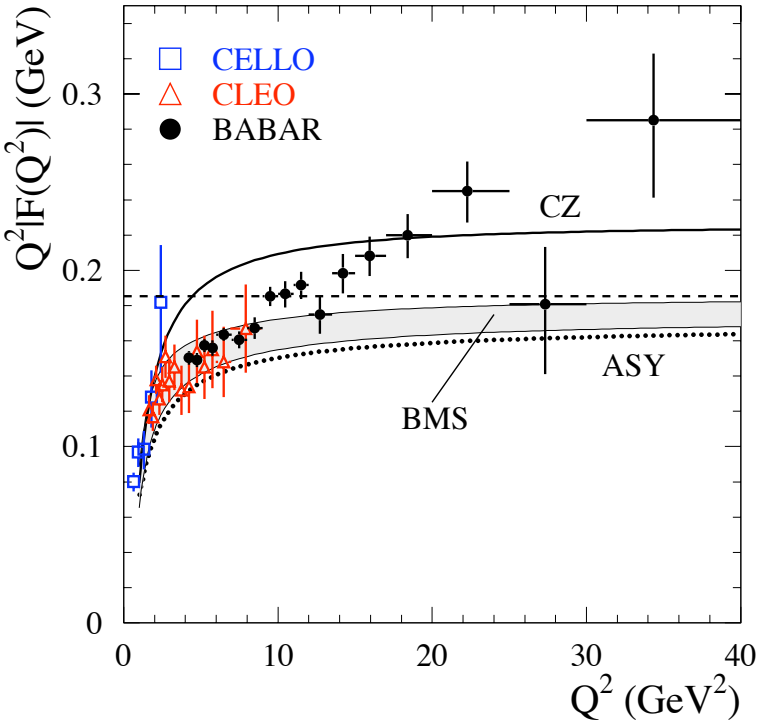
Pion Charge Form Factor

Hall C experiment via
L/T separation



SLAC BABAR: $\gamma\gamma^* \rightarrow \pi^o$

The same w.f => transition FF



Pion w.f. = x(1-x) ??

Institute, responsibilities, source of fund

Institute	Responsibility	Funding	Source
INFN	GEM Tracker	$1.10M	INFN
		(€720k)	
NSU	GEM Polarimeter		DOE*
UVa	GEM Polarimeter		DOE*
W&M	GEM Polarimeter		DOE*
Glasgow	GEM Polarimeter	$0.22M	STFC requested
CMU	Hadron Calorimeter	$0.08M	CMU
Dubna	Hadron Calorimeter		JINR requested
St.Mary/TRIUMF	SciFi Polarimeter	$0.15M(C)	NSERC request
Rutgers	Trigger	$0.05M	NSF
UNH	Trigger		DOE*
JLab	Infrastructure		DOE*
Total			

Cost and components:

1.	Magnet mod., beam line, infrastructure, design, tech. manpower			$ 1.35M
2.	Tracker (GEM)	$1.1M (paid by INFN)		
3.	Tracker (Polarimeters)			
			GEM	$ 1.10M
			SciFi (*)	$ 0.40M
4.	Hadron Calorimeter			$ 0.25M
5.	Trigger for DAQ/HCal			$ 0.20M
----- total cost for government sources ----------				$ 3.30M

* decision from D0 collaboration is expected

** design of the He-3 target is a UVA project

SBS further steps

Development of the physics
Development of the GEM/PID – tests in Hall A
Design of the Magnet
Presenting SBS at ∀ conference!

Science proposal to DOE
including all SBS components required
in approved nucleon FFs experiments

It will use, in part, already written CDR report
and will be submitted by early fall 2009

SBS further steps

Development of the physics
Development of the GEM/PID – tests in Hall A
Design of the Magnet
Presenting SBS at V conference!

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A1n, A(Q2), u/d – likely could be ready
F-pi, Phi are very strong new physics

Need test GEM: prepare readout, plan
of measurement with BigBite magnet 2010 ?

Need $11k of university for CLEO electronics
Need $10k for designer to start SBS magnet

Conferences: Milos, DNP, …

SBS further steps

Science proposal to DOE
including all SBS components required
in approved nucleon FFs experiments

proposed “Editorial board”

Kees	- Science
John	- Magnet+
Nilanga	- GEM
Mahbub	- SciFi
Gregg	- HCal
Ron	- Trigger
Bogdan	- Editor-contact