

*Meeting @ LNF
Laboratori Nazionali di Frascati, 19 Dicembre 2012*

JLAB I 2 e gli altri esperimenti: punti di incontro e prospettive future

*M.Battaglieri & G.M.Urciuoli
on behalf of the JLAB I 2 Collaboration
INFN -GE, INFN-RMI
Italy*

The CEBAF parameters

- * Primary Beam: Electrons
- * Beam Energy: 4 GeV (original)

- $10 > \lambda > 0.1$ fm
nucleon \rightarrow quark transition
baryon and meson excited states

6 GeV now
12 GeV soon

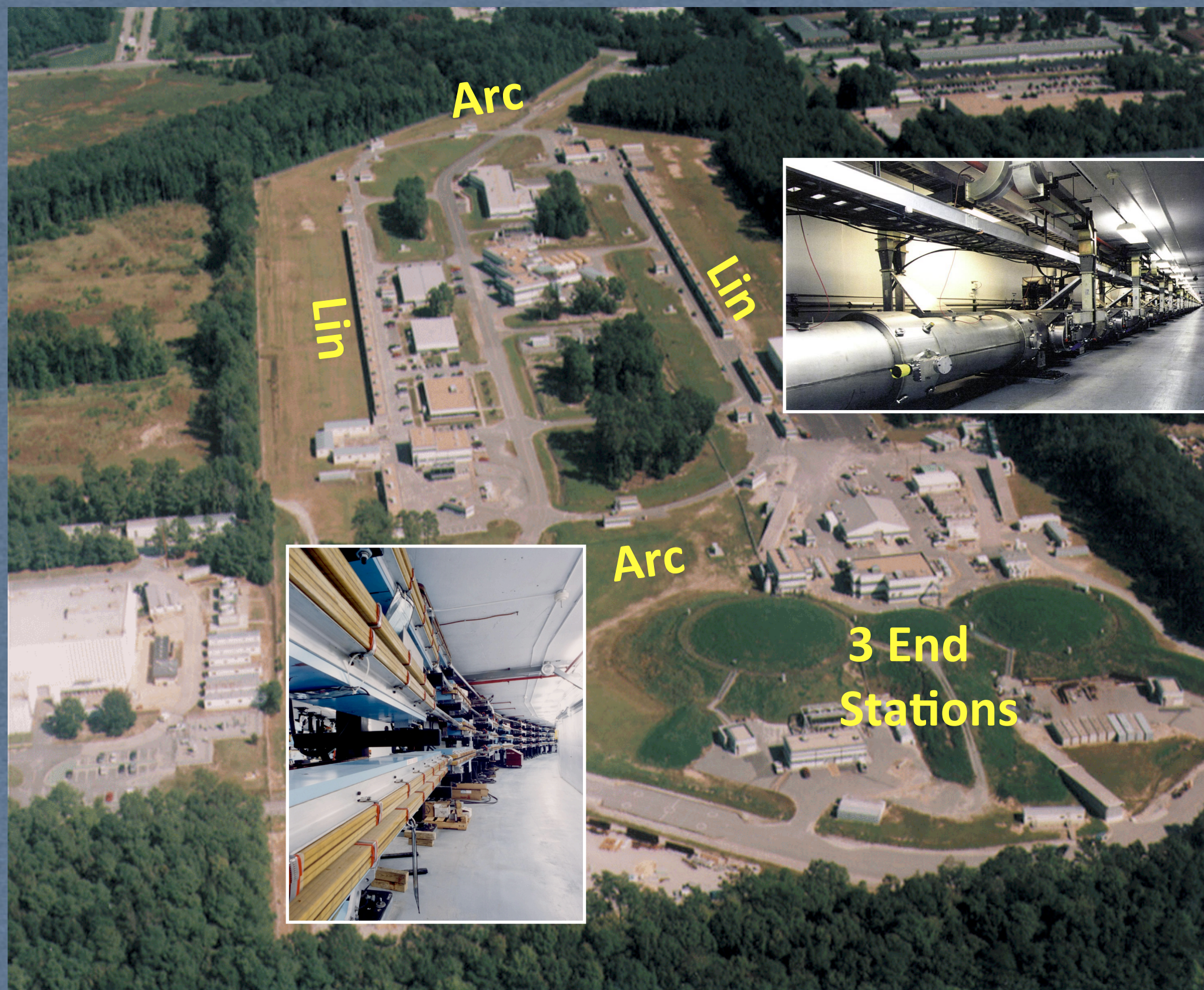
- * 100% Duty Factor (cw) Beam

- coincidence experiments
- Three Simultaneous Beams with Independently Variable Energy and Intensity
 - complementary, long experiments

- * Polarization (beam and reaction products)

- spin degrees of freedom
- weak neutral currents

$L > 10^6 \times$ SLAC at the time of the original DIS experiments!
JLab12 luminosity will increase by 10 x



The 12 GeV upgrade

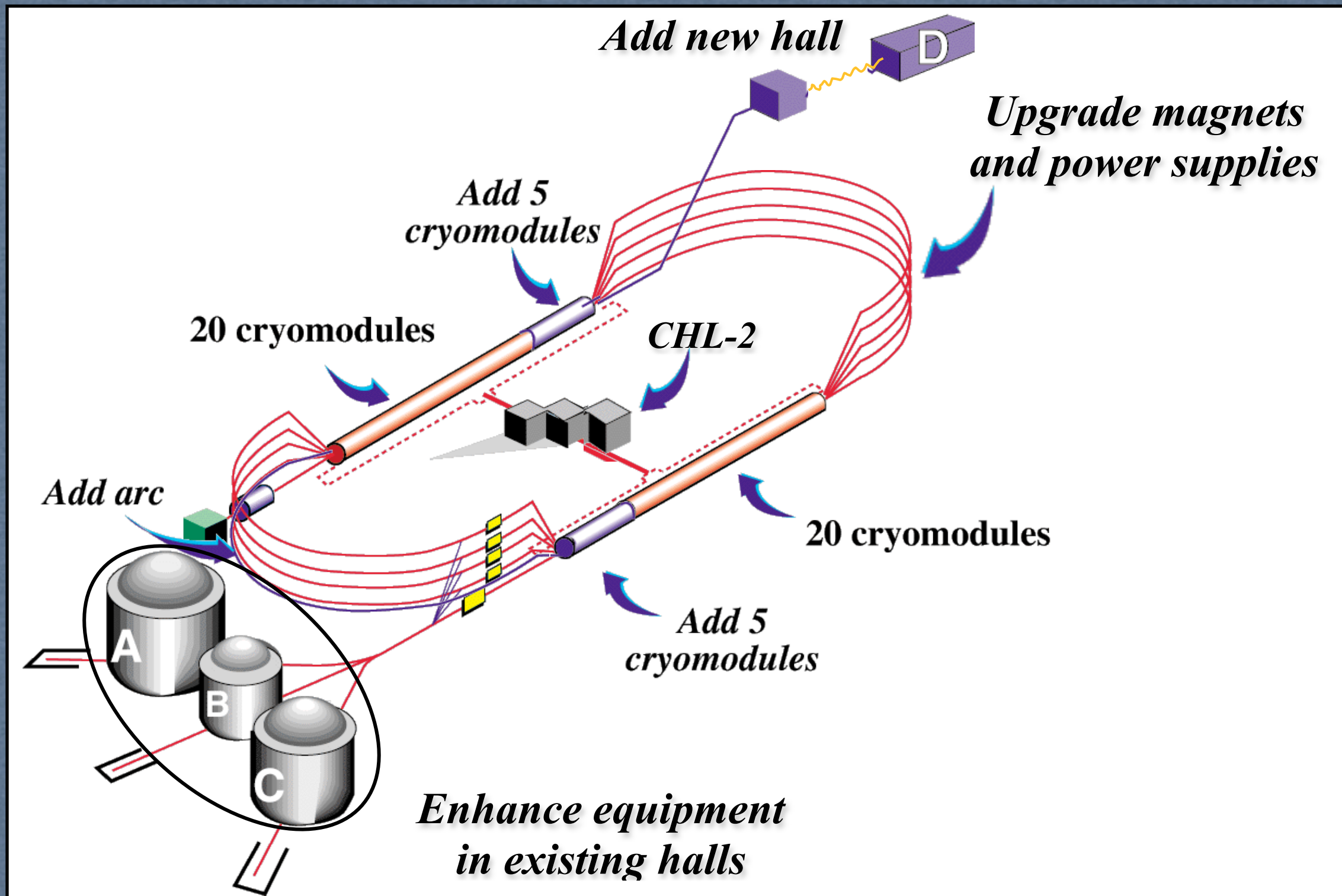
- * CEBAF design and performance make easy the energy upgrade
 - CEBAF RF cavities exceeded the designed specification by 50%
 - Maximum beam energy of 6 GeV routinely achieved (4 GeV max nominal energy)
 - ARCS can accommodate an electron beam up to 24 GeV
- * Upgrade of the accelerator
- * Construction of new equipment for Hall A, B and C
- * Construction of a new experimental hall (Hall D)

The Upgrade of CEBAF to 12 GeV (the highest priority of the 2007 NSAC Long Range Plan) is now well underway

- Project is “**on cost and on schedule**” and over half complete as of today
- Initial beam operation to begin in Hall A in **Oct 2014** and full operation by Jun 2015

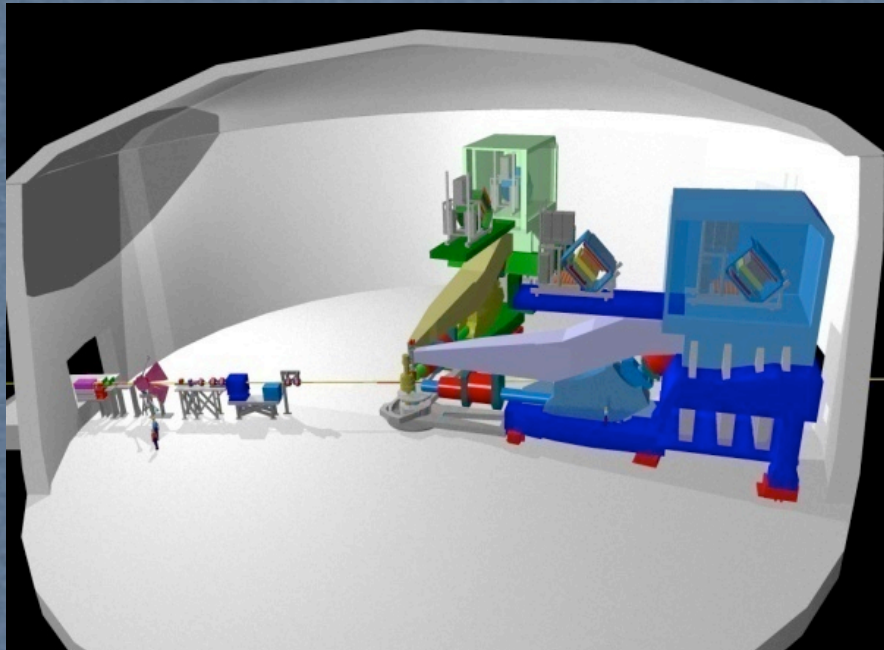
The 12 GeV Research Program is Evolving Rapidly

CEBAF @12 GeV

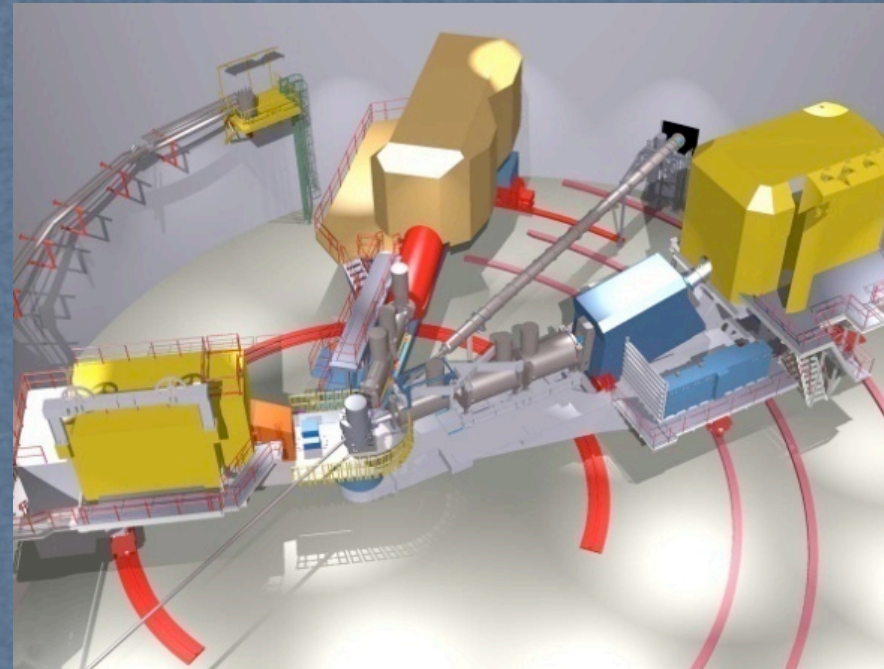


The 12 GeV equipment

Hall A – High Resolution Spectrometers and new multipurpose large acceptance detectors



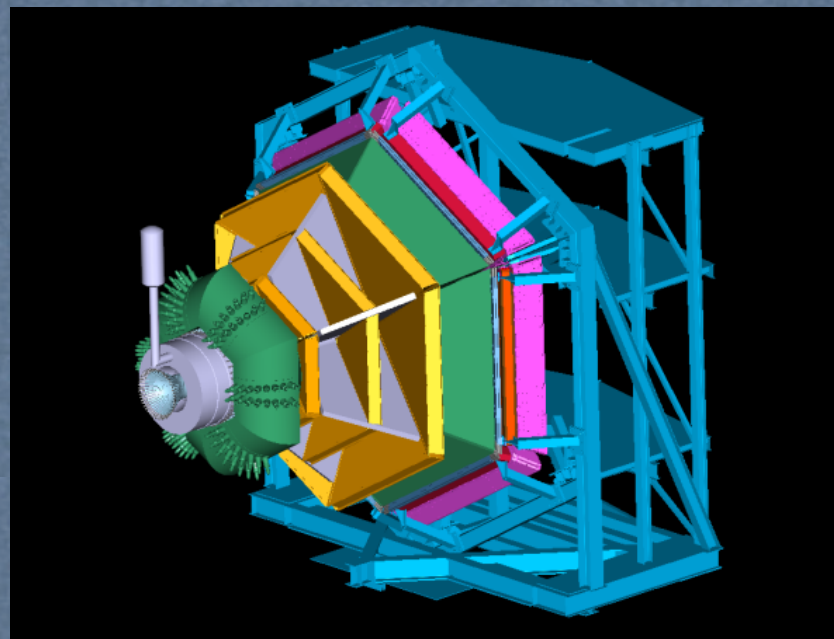
* short range correlations, form factors, and future new experiments: SOLID, MOELLER, SBS



Hall C – Super High Momentum Spectrometer (SHMS)

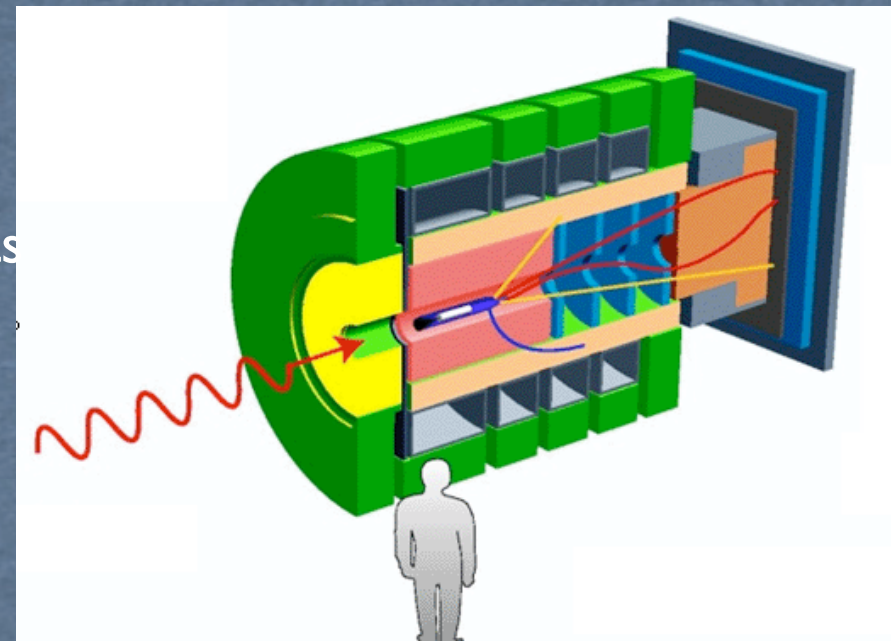
* precise determination of valence q properties in nucleons and nuclei

Hall D – GLUEx detector for photoproduction experiments



Hall B – Large acceptance detector CLAS12 for high luminosity measurements ($10^{35}\text{cm}^{-2}\text{s}^{-1}$)

* Understanding nucleon structure via GPDs and TMDs and hadron spectroscopy



* explore origin of confinement by studying hybrid mesons

Time schedule & Costs

May 18th 2012: 6 GeV program completed!

16-month installation:

May 2012 – Sept 2013

Hall A commissioning start

Feb 2014

Hall D commissioning start

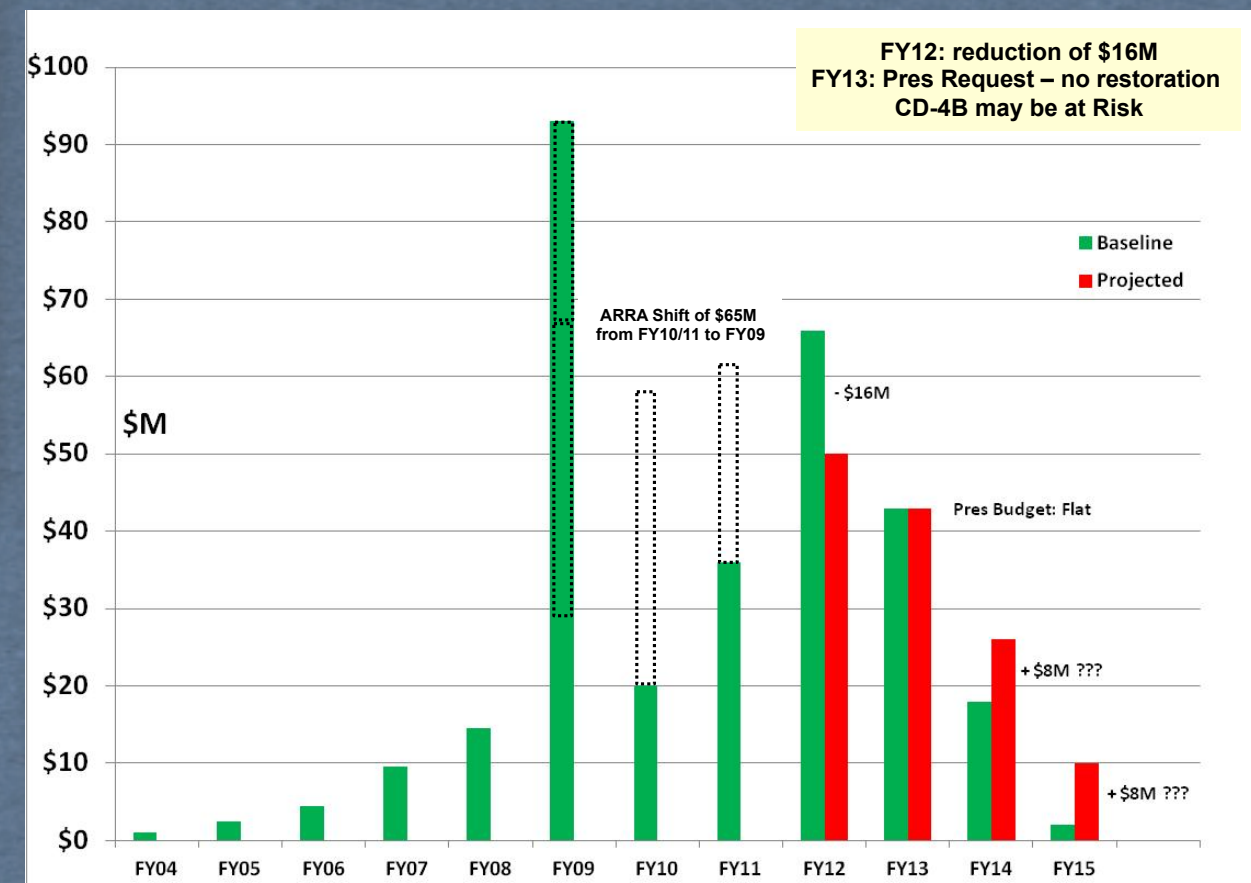
Oct 2014

Halls B/C commissioning start

April 2015

Project Completion

June 2015



- * 12 GeV - Total project cost: 310M\$
- * ~70% completed at June 2012
- * Base equipment fully funded by DOE
- * JLAB12 (Italy) contributes to extra equipment

JLab scientific mission

- * Understand how hadrons are constructed from the quarks and gluons of QCD
- * Understand the QCD basis for the nucleon-nucleon force
- * Explore the limits of our understanding of nuclear structure
 - high precision
 - short distances
 - the transition from the nucleon-meson to the QCD description
- * To make progress in these areas we must address critical issues in “strong QCD”:
 - What is the mechanism of confinement?
 - Where does the dynamics of the q-q interaction make a transition from the strong (confinement) to the perturbative (QED-like) QCD regime?
- * Probe potential new physics through high precision tests of the Standard Model

JLab I 2 summary: 2013 people and budget

Responsabili nazionali: M.Battaglieri, G.M.Urciuoli

Sezioni INFN	Resp Locale	Ric+Tecn	FTE	FTE/Ric	
BA	R.Perrino	6	2.6	0.43	
CT	V.Bellini	10	7.2	0.8	
FE	M.Contalbrigo	9	4.3	0.54	
GE	R. De Vita	9	6.2	0.7	
ISS	E.Cisbani	5	2.4	0.8	
LNF	M.Mirazita	13	10	0.9	
RM1	G.Urciuoli	2	1	0.5	
RM2	A.D'Angelo	4	2.2	0.55	
	Totali	58	35.9	0.7	0.8-0.9 M/y

JLab12 science: today and in the 12 GeV era

*Nucleon Structure

- EM, EW, and Flavor-Separated Form Factors
- Transverse Momentum Distributions (TMD)

*The Physics of Confinement – the Search for Hybrid Mesons

*Nuclear Structure and the Quark Structure of Nuclei

- Hypernuclear Physics

*Quark Electro-Weak Couplings and Standard Model Tests

Obiettivi

- * Far conoscere la Collaborazione JLAB12
- * Far conoscere le attività sperimentali su cui JLAB12 è impegnata
- * Presentare le attività future e gli spazi per possibili collaborazioni
- * Cercare punti di contatto con gli altri esperimenti/collaborazioni italiane
- * Cercare delle strategie ed iniziative comuni
- * Rafforzare il ruolo della fisica adronica in Italia
- * Primo di una lunga serie di incontri (speriamo!)

Agenda

Wednesday, 19 December 2012

08:50 - 09:00	Benvenuto 10'
09:00 - 10:20	JLAB12
09:00	Struttura del nucleone: fattori di forma -- SBS e HCAL per la Hall-A 20' Speaker: Evaristo Cisbani (ISS)
09:20	Struttura del nucleone: TMD -- il RICH e HDICE per CLAS12 20' Speaker: Marco Mirazita (LNF)
09:40	Spettroscopia adronica ed il Forward Tagger per CLAS12 20' Speaker: Raffaella De Vita (GE)
10:00	PV e fisica oltre il Modello Standard: PREX, SOLID, MOLLER, HPS, ... 20' Speaker: Guido Maria Urciuoli (ROMA1)
10:20 - 10:50	Coffe break
10:50 - 13:20	Altri esperimenti
10:50	MAMBO 25' Speaker: Rachele Anna Di Salvo (ROMA2)
11:15	KLOE 25' Speaker: Stefano Miscetti (LNF)
11:40	PANDA 25' Speaker: Dr. Paola Gianotti (LNF)
12:05	COMPASS 25' Speaker: Franco Bradamante (TS)
12:30	LHCb 25' Speaker: Antimo Palano (BA)
12:55	ALICE 25' Speaker: Prof. Domenico Di Bari (Universita e INFN Bari)
13:20 - 14:45	Lunch (Hotel Villa Mercedes (Ristorante "La cucina con Vista")) <i>E' previsto il trasferimento a mezzo bus dai LNF all'Hotel Villa Mercedes e ritorno.</i>
14:45 - 16:00	Panel + discussione generale Convener: Umberto Dosselli (PD), Marco Battaglieri (GE), Guido Maria Urciuoli (ROMA1), Rachele Anna Di Salvo (ROMA2), Dr. Patrizia Rossi (JLab), Fabio Bossi (LNF), Franco Bradamante (TS), Antimo Palano (BA), Dr. Marco Radici (PV), Dr. Paola Gianotti (LNF), Enzo De Sanctis (LNF)
16:00 - 16:30	Coffee break