Attivita' della Collaborazione Italiana al Thomas Jefferson National Accelerator Facility

Contalbrigo Marco - INFN Ferrara

Jefferson Lab

INFN @ JLab

INFN presence since the beginning (1991)
Increasing interest in 12 GeV era
Exp Users: ~40 FTEs, including ~15 students (PhD and post-doc)
Theo Support: ~ 30 scientists, including ~ 10 students

Spokespersonship: > 20% of approved 12 GeV experiments

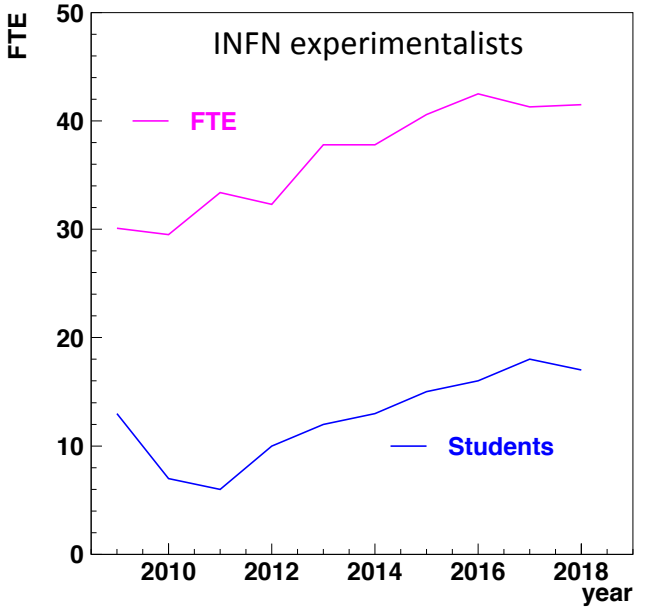
Responsibility roles: Hardware, Analysis, Coordinating

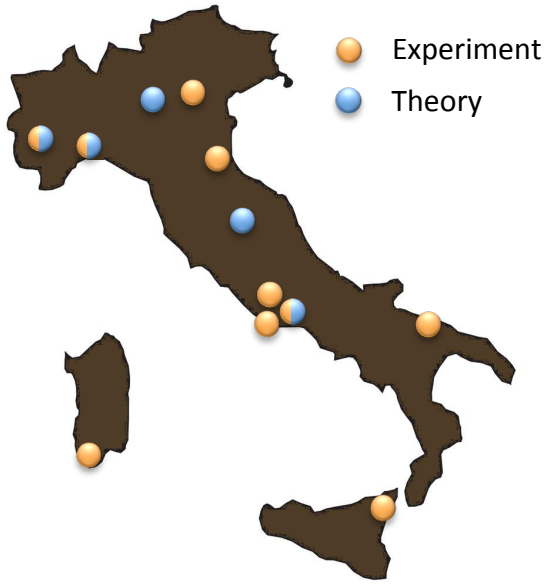
P. Rossi	Deputy Associate Director
R. De Vita:	CLAS collaboration Chair (till 01/09)
	Hall-B Software Responsible
M. Battaglieri:	Hall-B Leader (since 16/09)
	Program Deputy for the Laboratory
M. Contalbrigo:	CLAS Coordinating Committee (till 01/09)
M. De Napoli:	HPS Executive Committee member
A. Celentano:	Chair of HPS Publications Committee

MoU: Renovated in September 2017

Management: Regular meetings
last: Ambasciata Italiana, December 4, 2019
A. Zoccoli, A. Masiero, E. Nappi, M. Taiuti

PAC members: INFN members since 1991
now: **A. Bacchetta** INFN-PV





JLab12: News

Marco Battaglieri

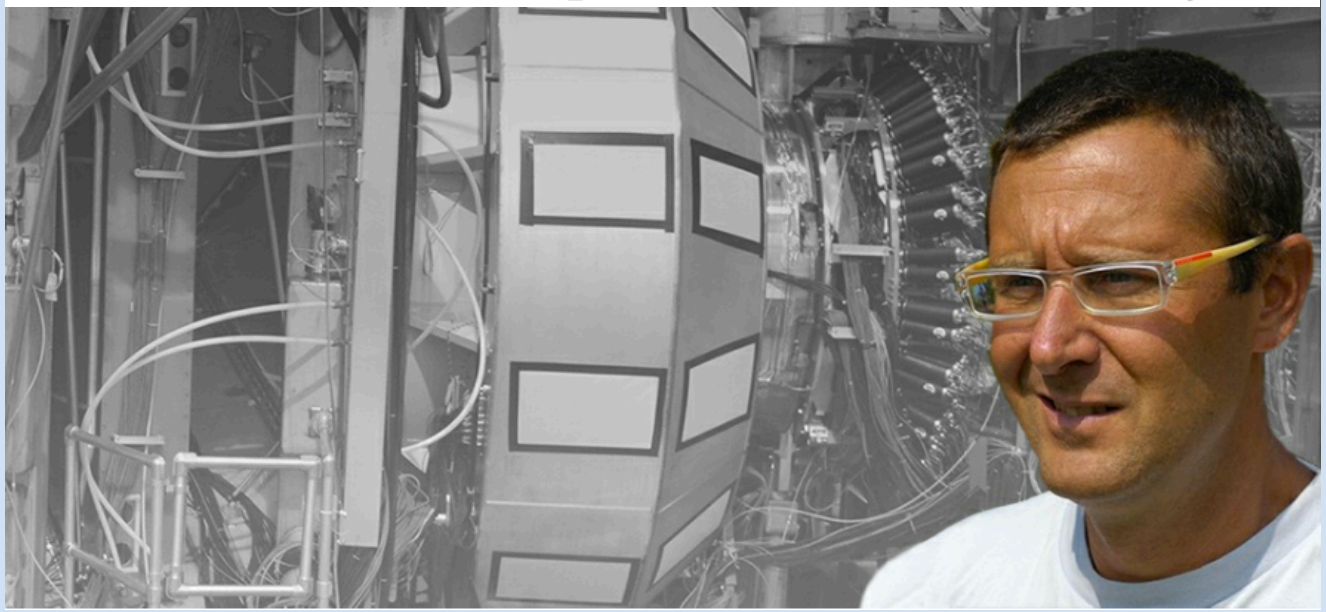
designato nuovo
Hall-B Leader

(da settembre 2019)

SIF PRIMA PAGINA

SOCIETÀ ITALIANA DI FISICA — 120 ANNI E OLTRE

È italiano il nuovo responsabile dalla Hall B al JLab



EXPERIMENTAL NUCLEAR PHYSICS

NEW HALL B GROUP LEADER

After a wide international search, Jefferson Lab is pleased to welcome Dr. Marco Battaglier as the new Experimental Hall B Group Leader. Battaglier is a long-standing Hall B User and began his scientific career in hadron physics at Jefferson Lab in 1997. He is anticipated to begin work on Monday, Sept. 16.

INFN 12 GeV Projects

Nucleon 3D

RM1, CT, BA

E07-109 Proton form factor '22
E17-004 Neutron form factor '22
E09-018 SIDIS off neutron (^{3}He) '23

FE, LNF,GE

E06-112 Quark dynamics '18
E12-008 TMDs '18
C11-111 TMDs '21
C12-009 Dihadron probes '21

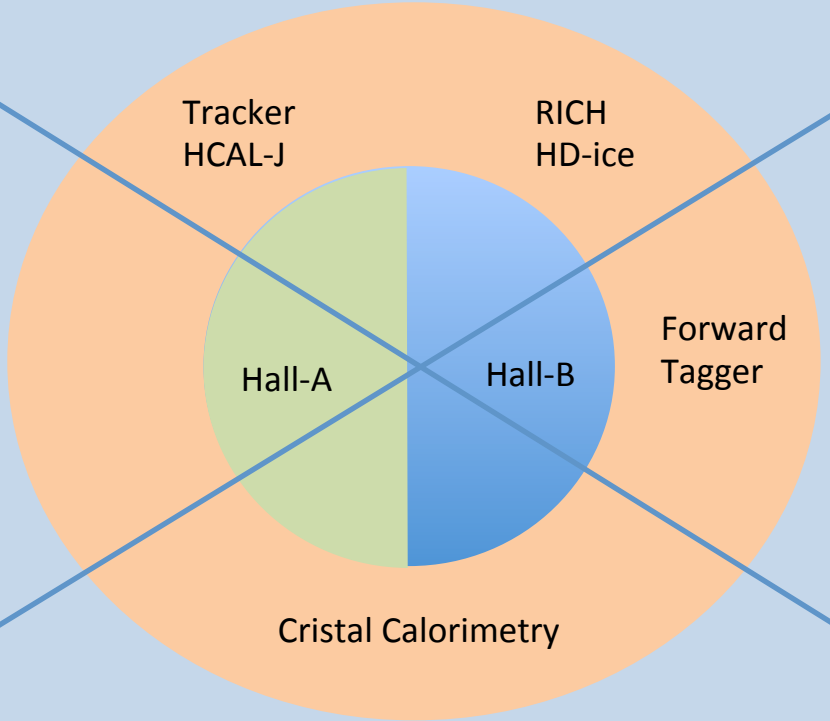
Nuclear Potentials

RM1

E17-003 '18
Lambda-nn off trithium (^{3}H)

E11-101 '19
PREX-II: neutron skin

E15-008 '24
Lambda hypernuclei



Spectroscopy

GE, RM2, TO, PV

E11-005 '18
MESONX

E12-001A '18
J/psi and penta-quark

E16-010 '18
Hybrid Baryons

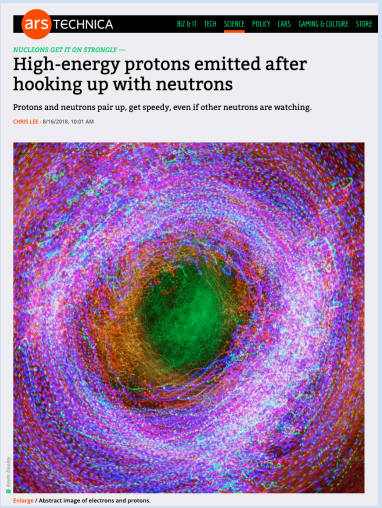
Dark Sector

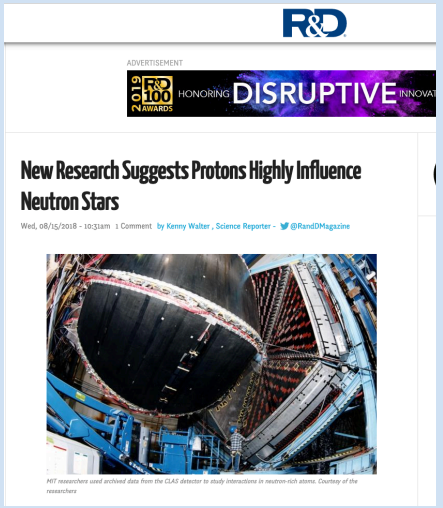
GE, CT, PV, LNS, RM2, TO, PD

E11-006 HPS '17

E16-001 BDX '24

JLab Physics Reach



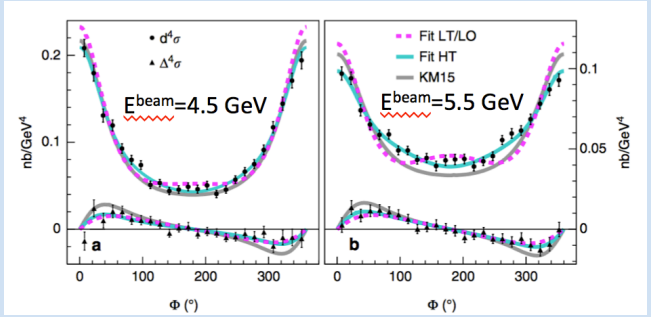


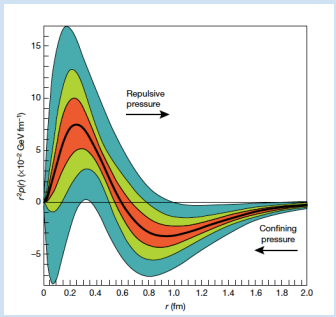
- A glimpse of gluons through deeply virtual compton scattering on the proton, Hall-A Collaboration, *Nature Comm* ***8****, 1408 (2017)*

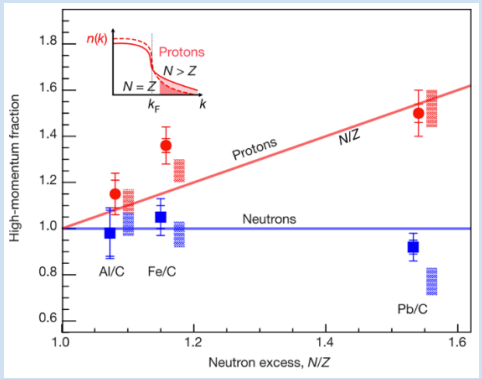
- *The pressure distribution inside the proton, V. Burkert, L. Elouadhriri, F.X. Girod, Nature* ***557*** *396-399 (2018)*

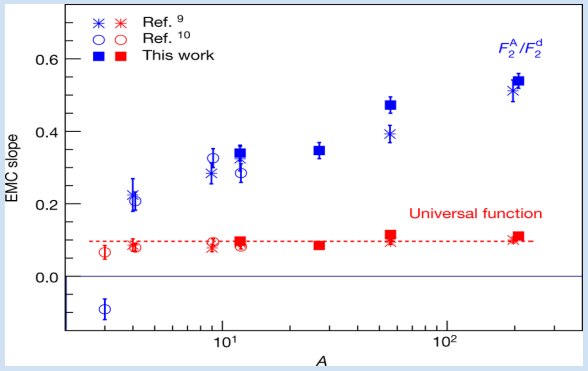
- *Ultrafast Nucleons in Asymmetric Nuclei,* The CLAS Collaboration, *Nature* **560**, 617-621 (2018).

- *Modified structure of protons and neutrons in correlated pairs*, The CLAS Collaboration, *Nature* **566**, 354–358 (2019).









JLab Schedule

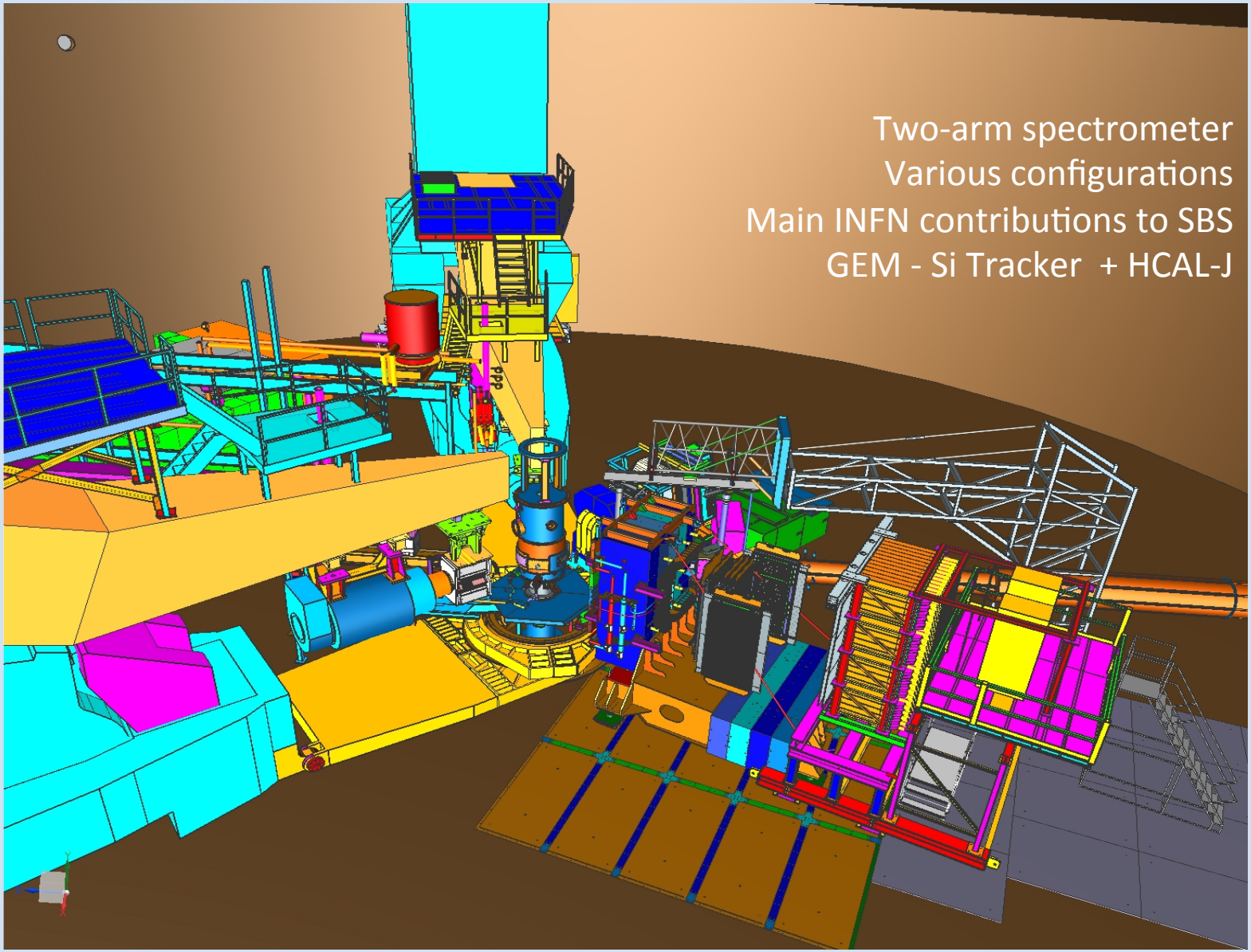
Hall-A:

Fall 18 : Esperimenti con bersaglio di trizio
Spring 19 : Esperimento APEX (fotone pesante)
Summer 19 : PREX-II (raggio neutroni piombo)
Fall 19 : CREX (raggio neutroni calcio 48)
2020…. : SBS era

Hall-B:

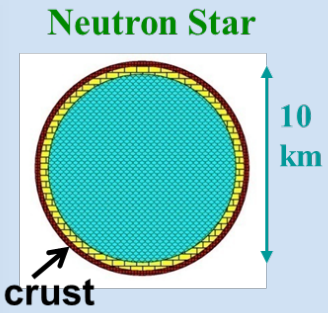
Oct 18 – Nov 18 : RGA-II (fascio a 10.6 GeV/c, bersaglio di idrogeno)
Nov 18 – Dec 18 : RGK-I (fascio a 6.5 e 7.5 GeV/c, bersaglio di idrogeno)
Jan 19 – Mar 19 : RGB-I (fascio a 10.6 GeV/c, bersaglio di deuterio)
Apr 19 : RGA-III (fascio a 10.6 GeV/c, bersaglio di idrogeno)
Jun19 – Sep 19 : HPS
Oct-19 – Dec 19 : RGB-II (fascio a 10.6 GeV/c, bersaglio di deuterio)
2020 : BoNUS (tagged scattering off neutron)
2021 : Nuclear and Polarized targets

Hall-A

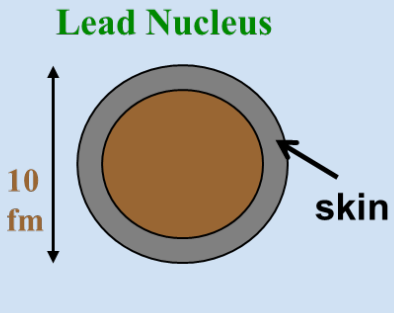

Two-arm spectrometer
Various configurations
Main INFN contributions to SBS
GEM - Si Tracker + HCAL-J

From Quarks to Cosmos

Tidal deformability $\Lambda \sim R^5$ from wave phase



(LIGO)

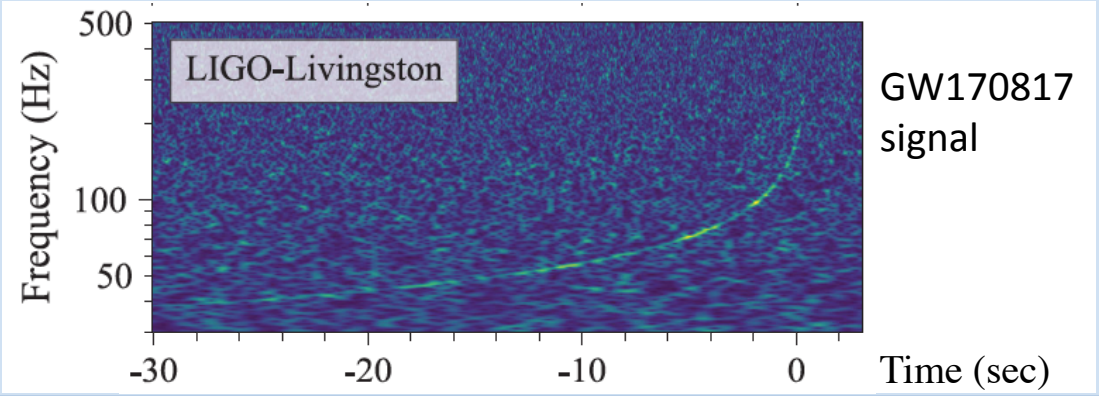


(JLab)

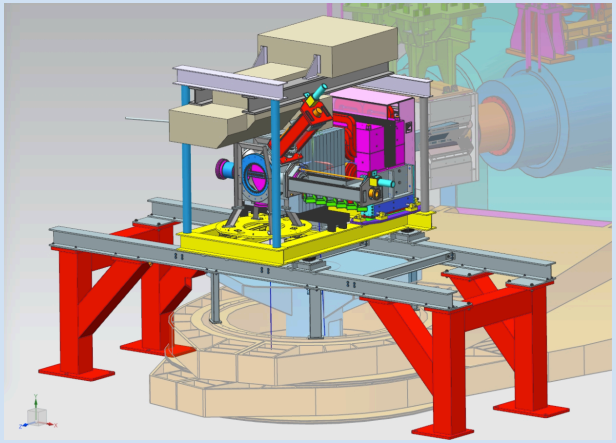
PReX experiment

Despite 10^{19} scale difference, common origin from pressure of neutron rich matter vs surface tension or gravity

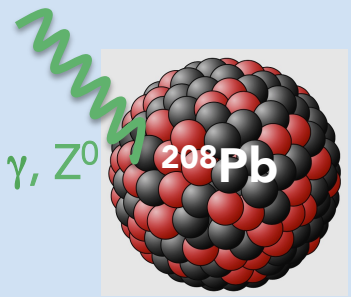
EOS constrained by JLab neutron skin as from GW measurements



GW170817 signal



Heavy Nuclei Neutron Skin



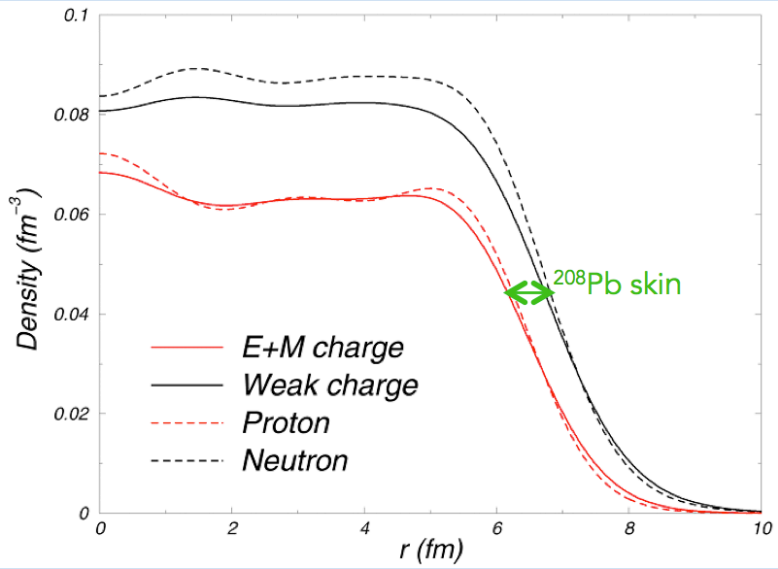
	Proton	Neutron
Electric charge	1	0
Weak charge	~0.08	-1

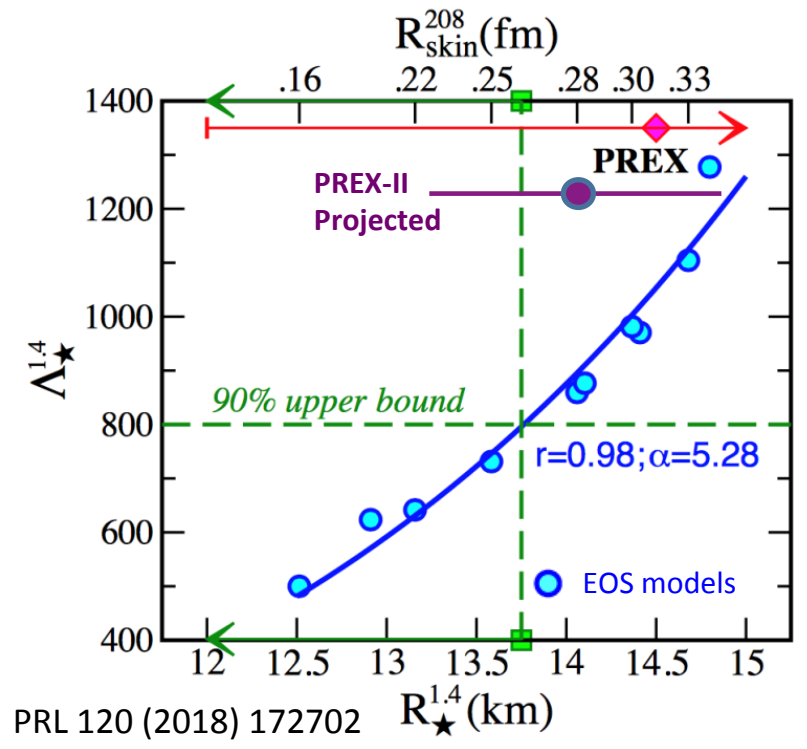
$$Q_w^p = (1 - 4\sin^2\theta_W)$$
$$Q_w^n = -1$$

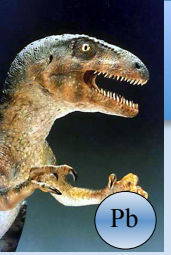
Parity Violating Electron Scattering sensitive to neutron distribution

Provides a **model-independent probe of neutron densities** free from most strong-interaction uncertainties

- **Precise determination of ^{208}Pb neutron radius:**
  - set basic constraints to nuclear dynamics (constrains the EOS of neutron matter)
  - has implications for the theory of neutron stars

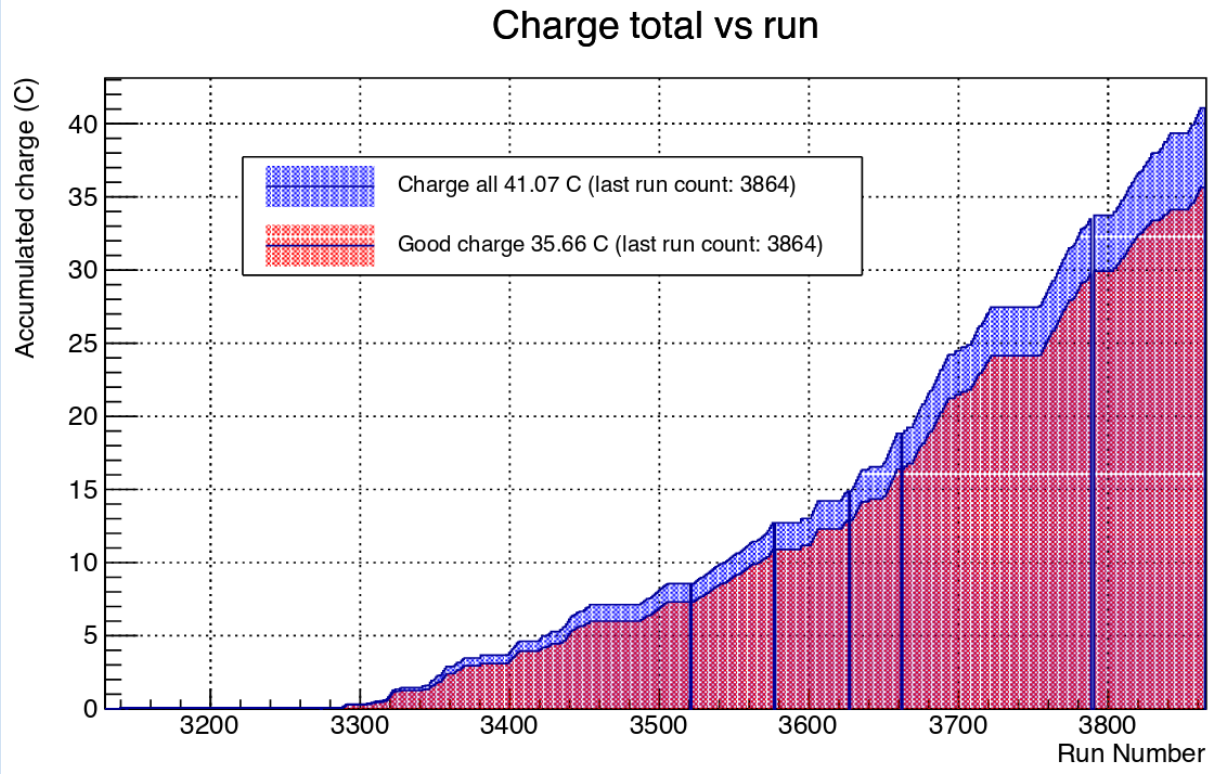






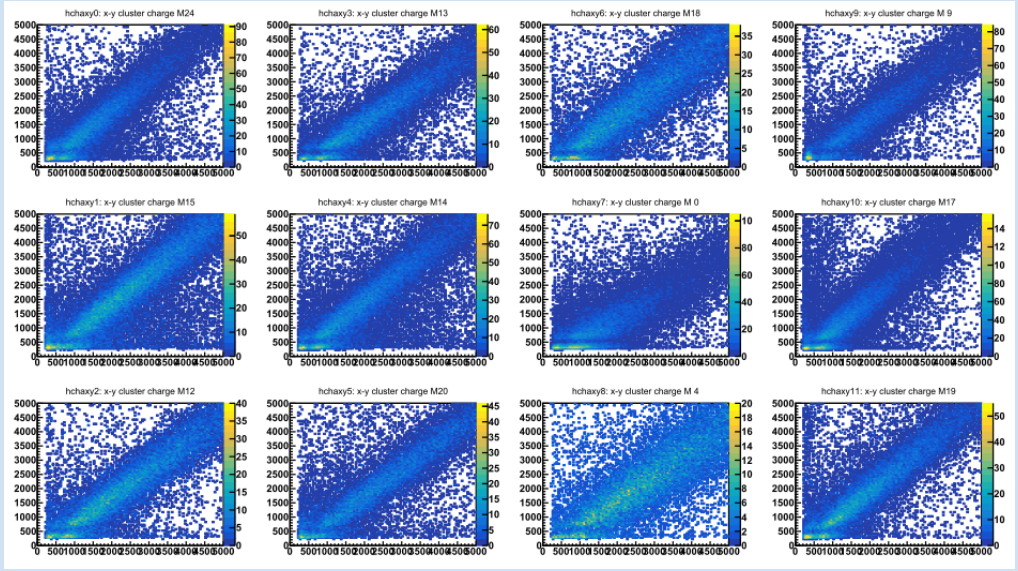
PREX-II Run

- Data taking from June 16 to September 9
- Initially scheduled from June 16 to August 17, it was extended for allowing PREX to meet its precision goal.
- “Small” problems because of the complexity of the experiment, but a good and satisfactory data taking in the end.



SBS GEM Tracker

x/y charge sharing

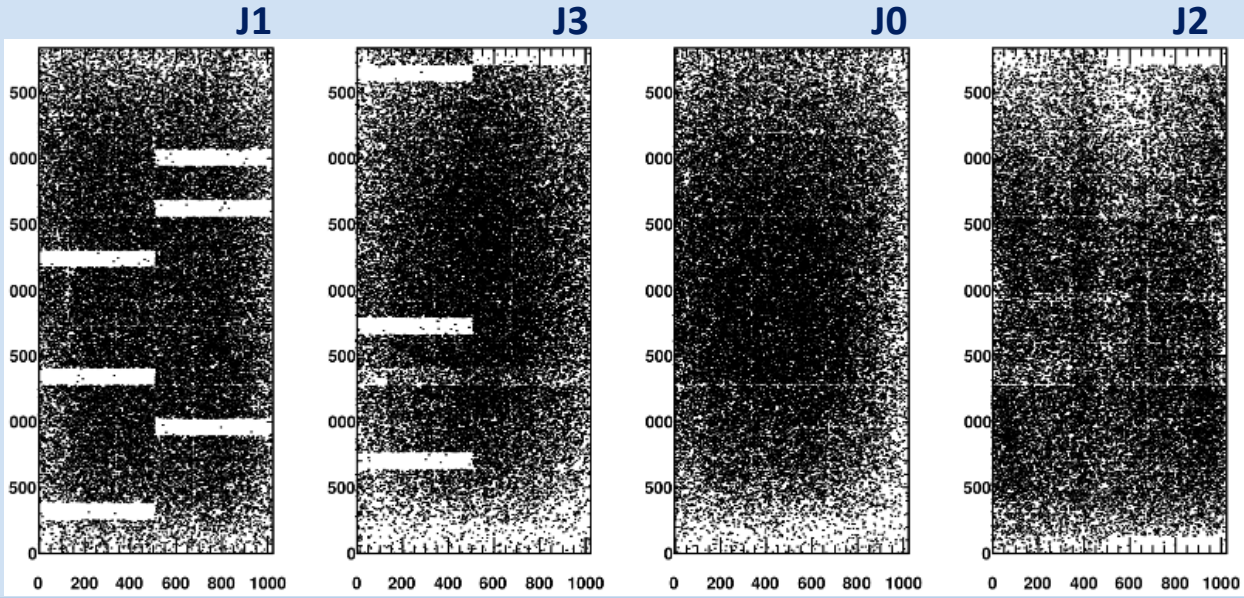


2 modules with shorted sectors replaced, improved configuration (8 dead sectors vs 10 before);

4 chambers ready for installation

Chamber	Geometrical Efficiency
J0, J2	100 %
J3	95 %
J1	90%

Cosmic Hit Map (4100 V)

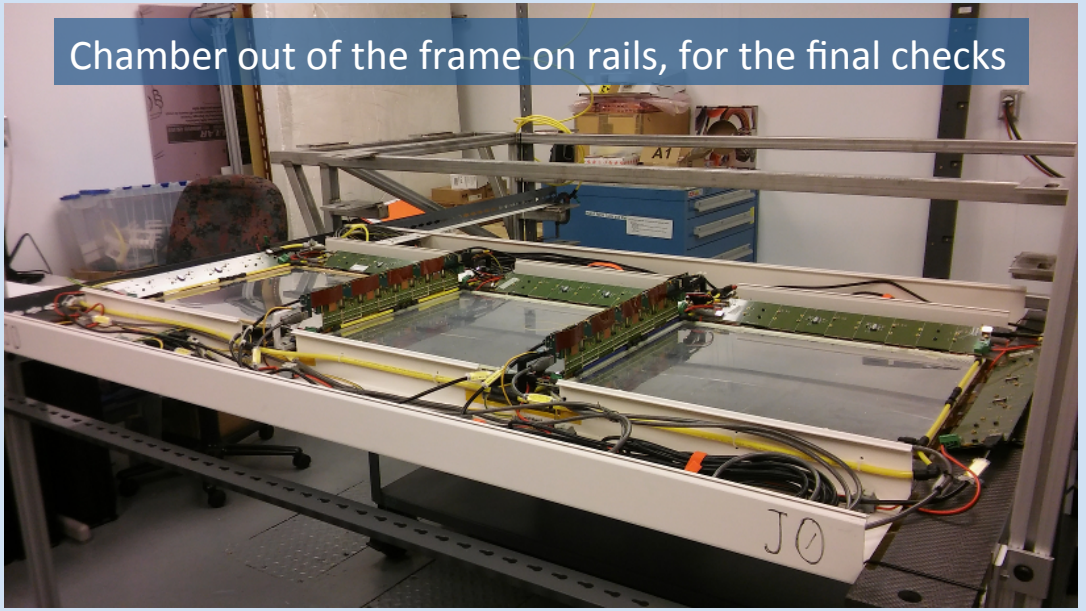


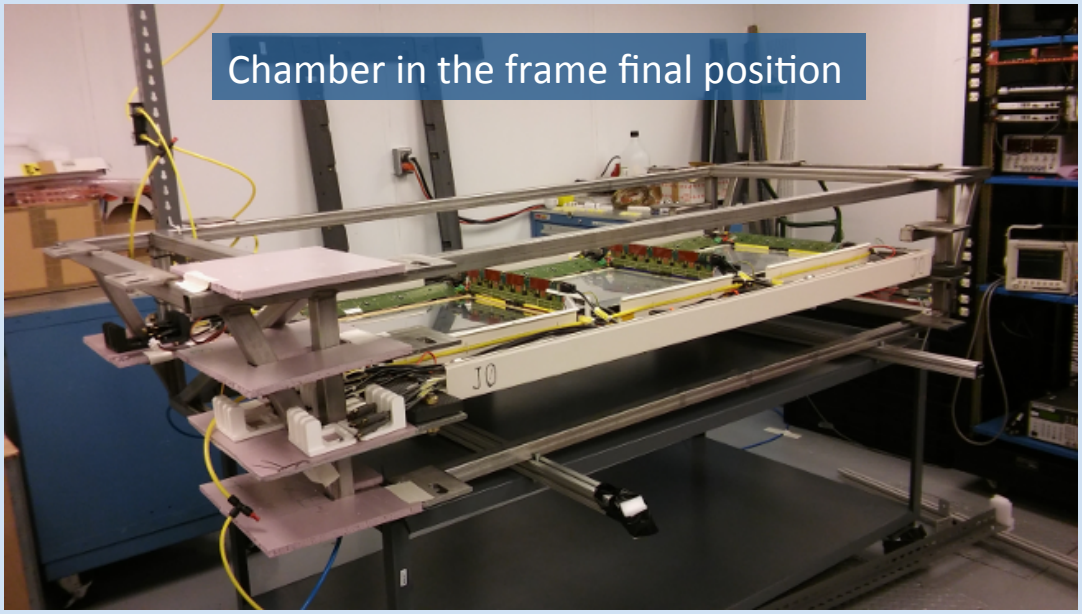
We still have 3 modules to assemble one additional chamber in the coming week.

We will try to «clean» by ultrasound the rejected modules: we may fix up to 8 modules.

First Chamber Loaded in BB Frame

- Implemented sliding system to load the chambers in the **limited and critical space** of the BigBite Frame
- Tested loading on the first chamber; likely solved all relevant issues, so far

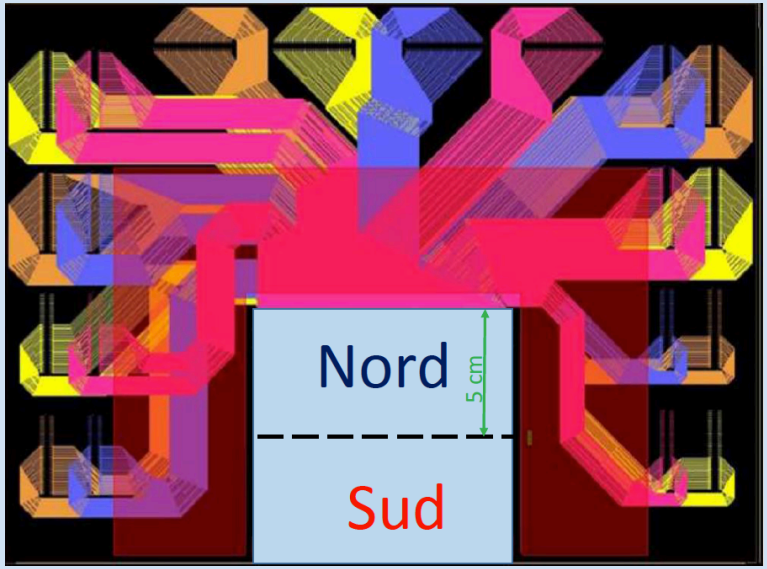




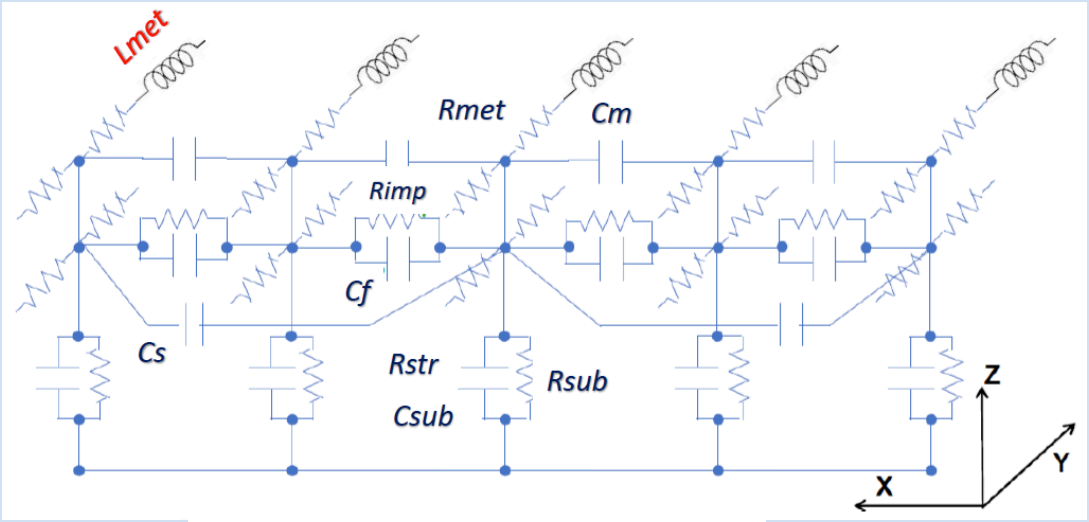
- Designed the patch panel (pink in left picture) for the cable ends, gas and power supply of the electronics to easy installation
- Ready to load all other chambers in the BB frame

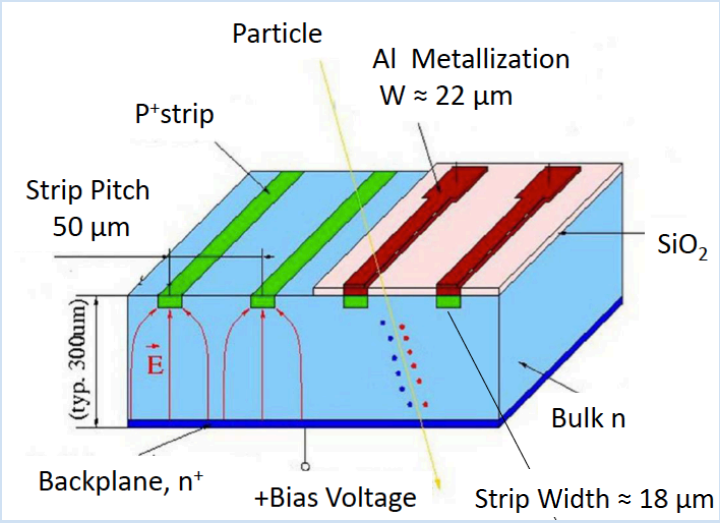
Si Tracker Demo

Complex PCB to adapt 50 μm of SiPM to 300 μm of APV25 front-end chip



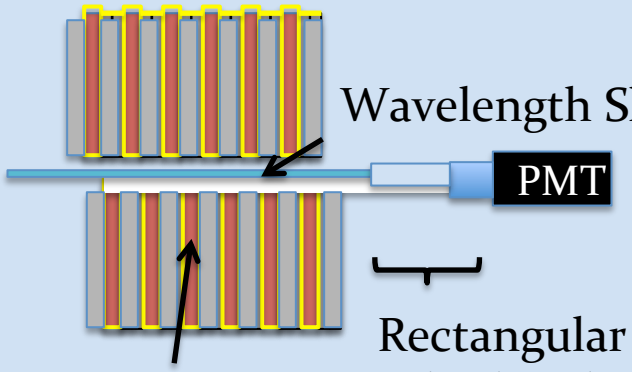
Demo test: ☺ Nord: Efficienza ≈ 70 % ☹ Sud: Efficienza ≈ 30% PCB under revision study

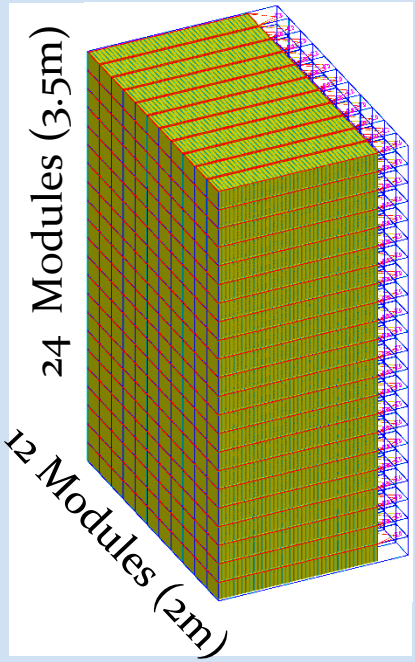




HCAL-J Stand and Cable Gantry

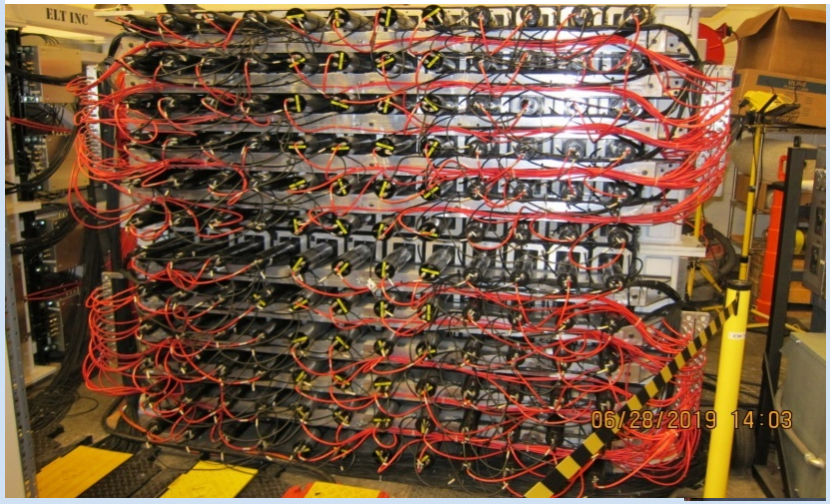
Joint venture between INFN, JLab and CMU





All long connecting cables are installed

Cosmic tests with final electronics



The DAQ with VME fADC and TDC is operational.

JLab Schedule

Hall-A:

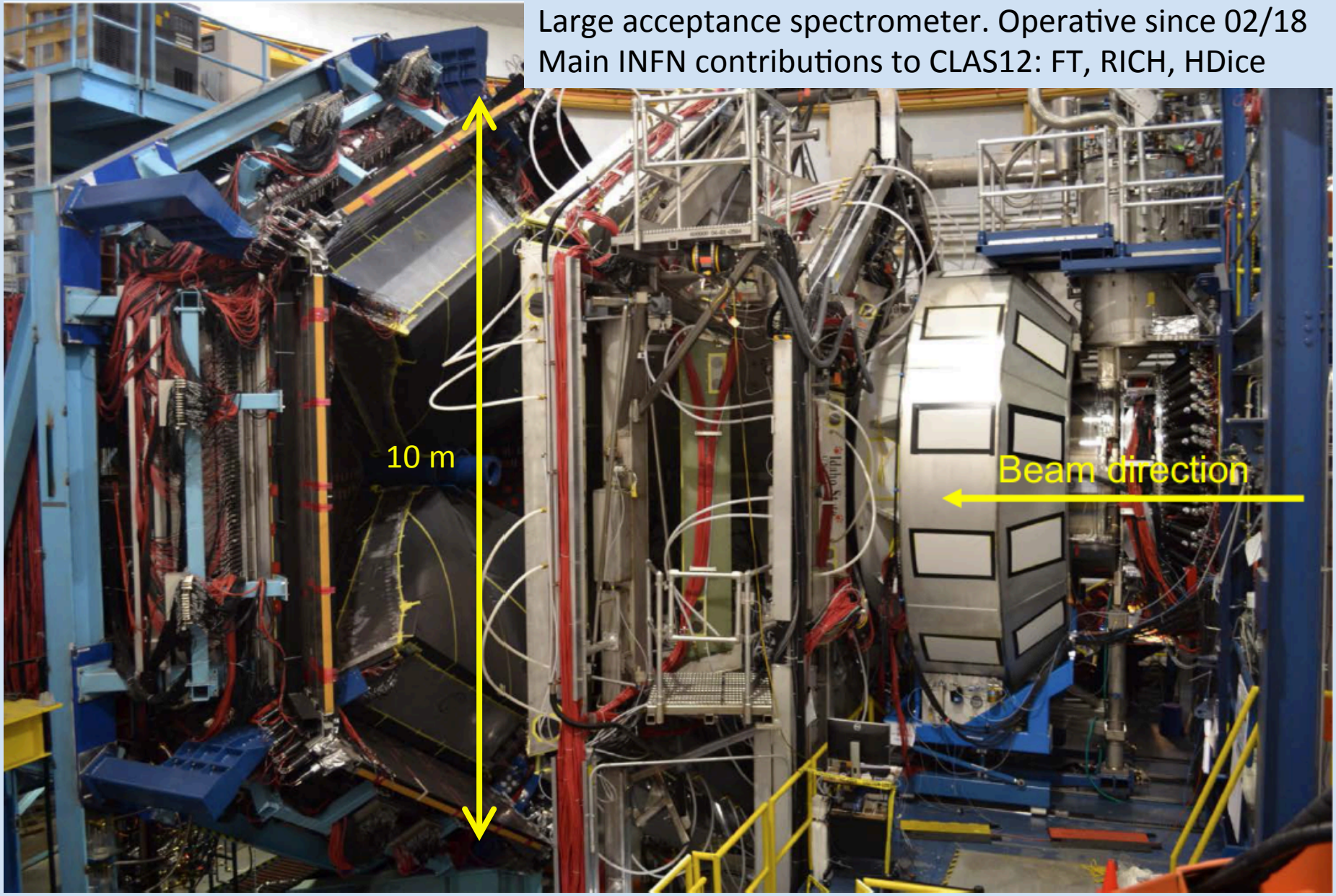
Fall 18 : Esperimenti con bersaglio di trizio
Spring 19 : Esperimento APEX (fotone pesante)
Summer 19 : PREX-II (raggio neutroni piombo)
Fall 19 : CREX (raggio neutroni calcio 48)
2020…. : SBS era
2024…. : BDX era

Hall-B: CLAS12

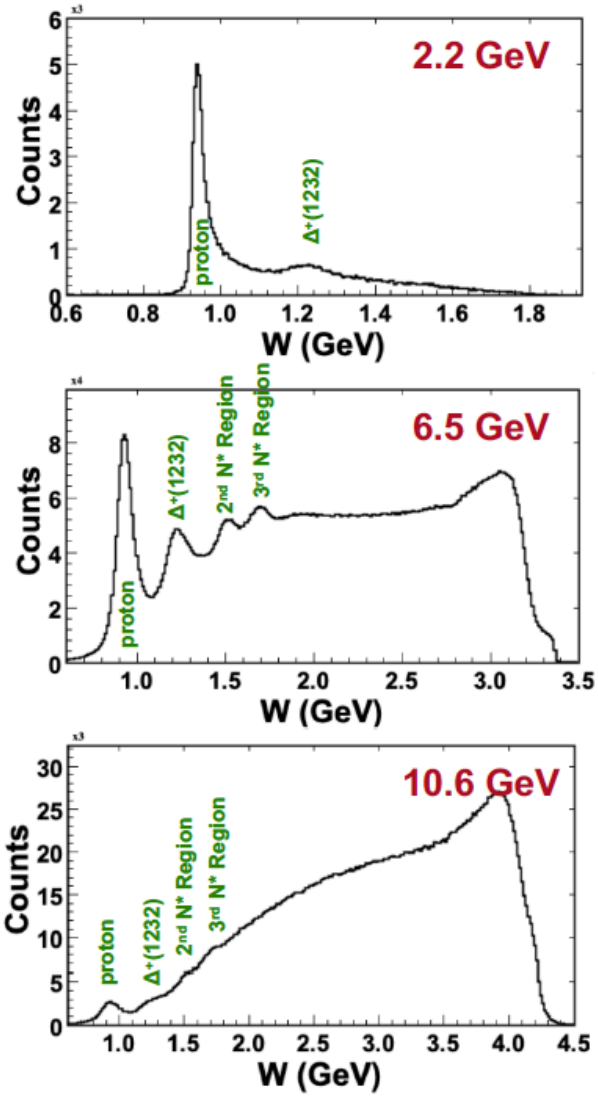
Oct 18 − Nov 18 : RGA-II (fascio a 10.6 GeV/c, bersaglio di idrogeno)
Nov 18 − Dec 18 : RGK-I (fascio a 6.5 e 7.5 GeV/c, bersaglio di idrogeno)
Jan 19 − Mar 19 : RGB-I (fascio a 10.6 GeV/c, bersaglio di deuterio)
Apr 19 : RGA-III (fascio a 10.6 GeV/c, bersaglio di idrogeno)
Jun19 − Sep 19 : HPS
Oct-19 − Dec 19 : RGB-II (fascio a 10.6 GeV/c, bersaglio di deuterio)
2020 : BoNUS (tagged scattering off neutron)
2021 : Nuclear and Polarized targets

CLAS12 in Hall-B

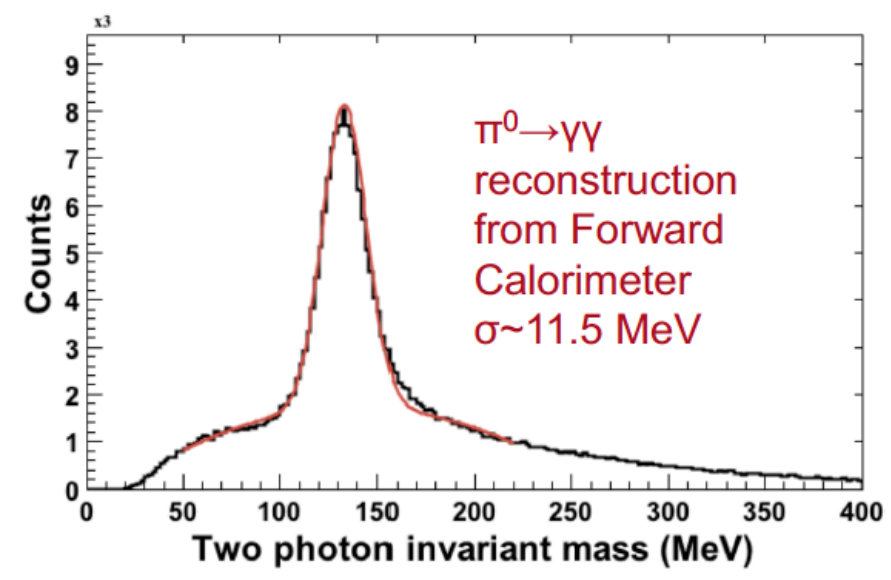
Large acceptance spectrometer. Operative since 02/18
Main INFN contributions to CLAS12: FT, RICH, HDice

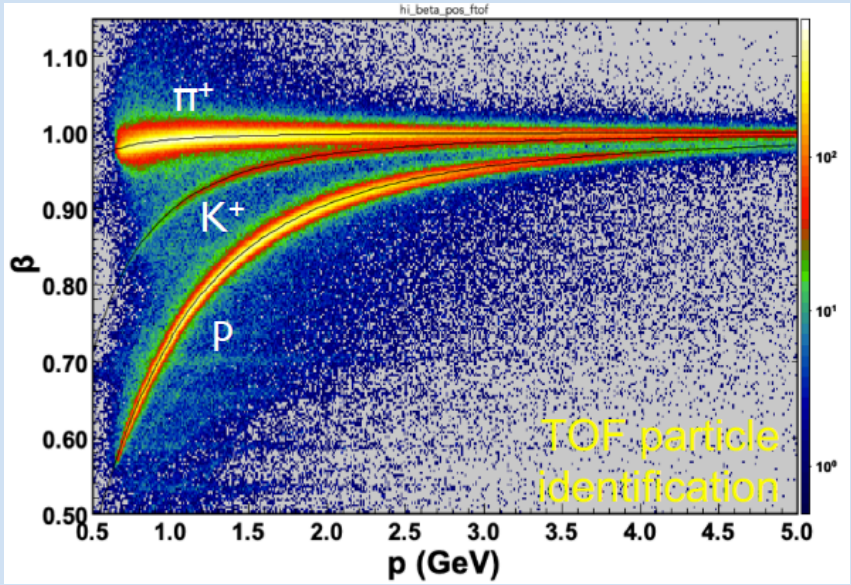


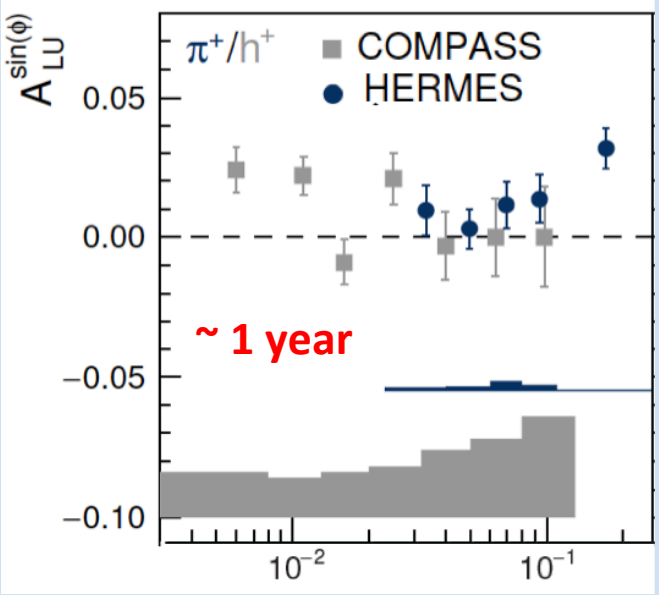
- **First commissioning run** (KPP) in February 2017
- **Engineering run** in December 2017-February 2018
- Physics data taking start in February 2018:
  - **Run Group A**:
    - 13 experiments
    - 10.2-10.6 GeV polarized electrons
    - Liquid-hydrogen target
    - ~300 mC, ~50% of approved beam time
  - **Run Group K**:
    - 3 experiments
    - 6.5, 7.5 GeV polarized electrons
    - Liquid-hydrogen target
    - ~45 mC, ~12% of approved beam time
  - **Run Group B**:
    - 7 experiments
    - 10.2-10.5 GeV polarized electrons
    - Liquid-deuterium target
    - ~84 mC, ~24% of approved beam time

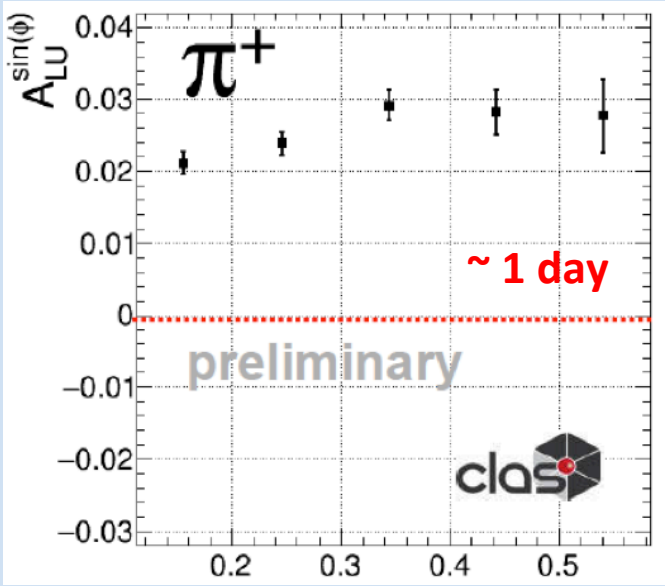


CLAS12 News


x3
Counts
Two photon invariant mass (MeV)
$\pi^0 \rightarrow \gamma\gamma$
reconstruction
from Forward
Calorimeter
σ~11.5 MeV


hi_beta_pos_ftof
β
p (GeV)
π+
K+
p
TOF particle
identification


$A_{LU}^{\sin(\phi)}$
π+/h+
COMPASS
HERMES
~ 1 year


$A_{LU}^{\sin(\phi)}$
π+
~ 1 day
preliminary

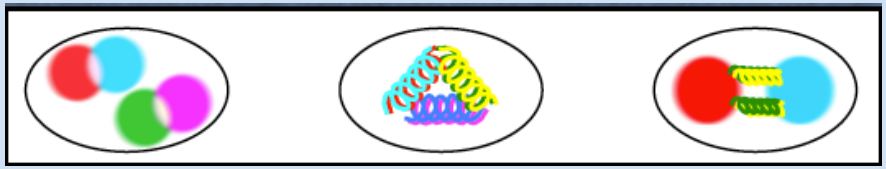
Spectroscopy

Unprecedented precision with electro-production at very low-Q^2

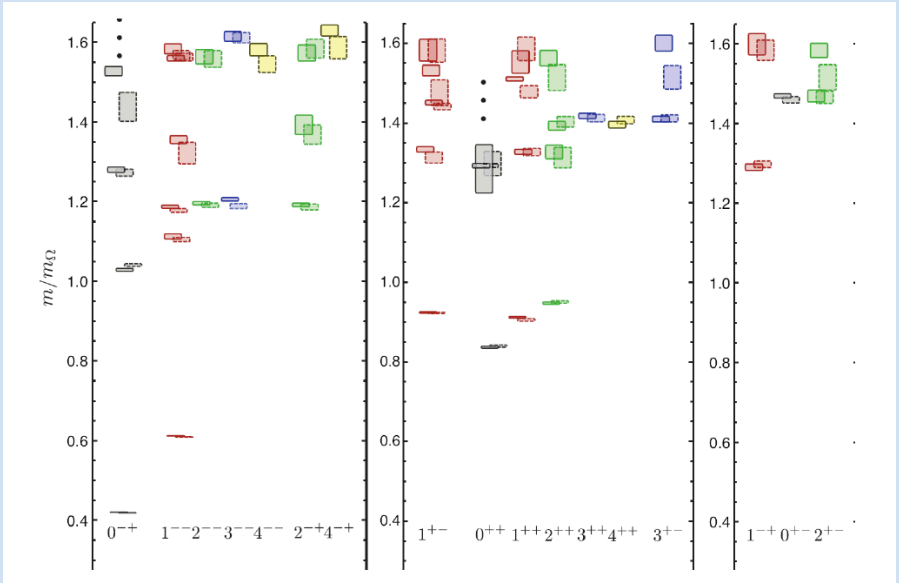
E12-11-005 **MesonX** Study the meson spectrum in the 1-3 GeV mass range to identify gluonic excitations of meson (hybrids) and other quark configurations beyond the CQM

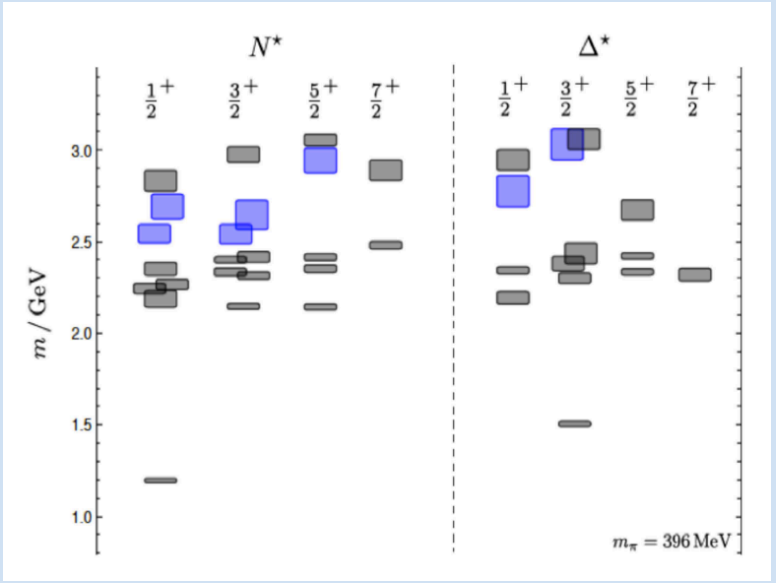
E12-16-010 **Hybrid Baryons** Study the nucleon excitation spectrum with emphasis on the high mass region and gluonic excitations

Mesons



Baryons





Forward Tagger Project Status

Coordination: INFN-Genova

Contributors: CEA, INFN-Ge, INFN-RM2, INFN-To, U. Edinburg, U. Glasgow, JLab, James Madison U., Norfolk State U., Ohio U.

Full Forward Tagger installed in CLAS12 in July 2017

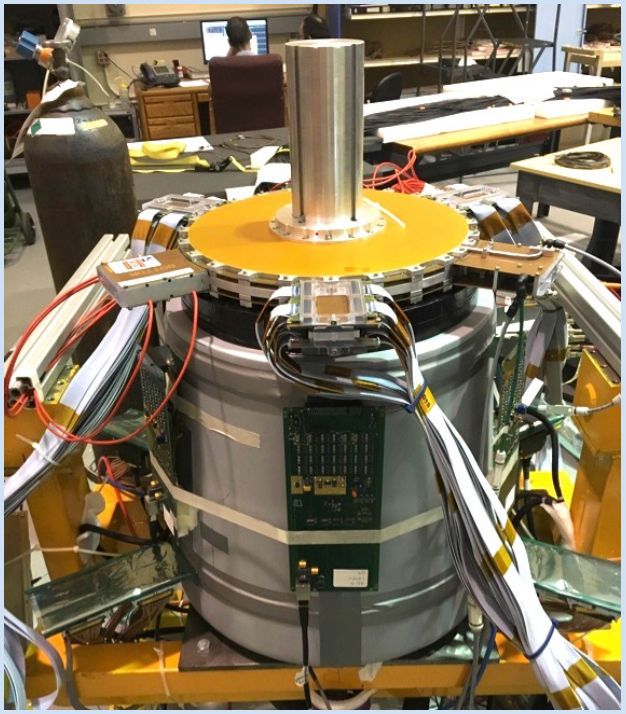
Commissioned with cosmic ray data in July- November 2017 to study:

- Response of individual detectors
- Efficiency and energy calibration
- Relative timing

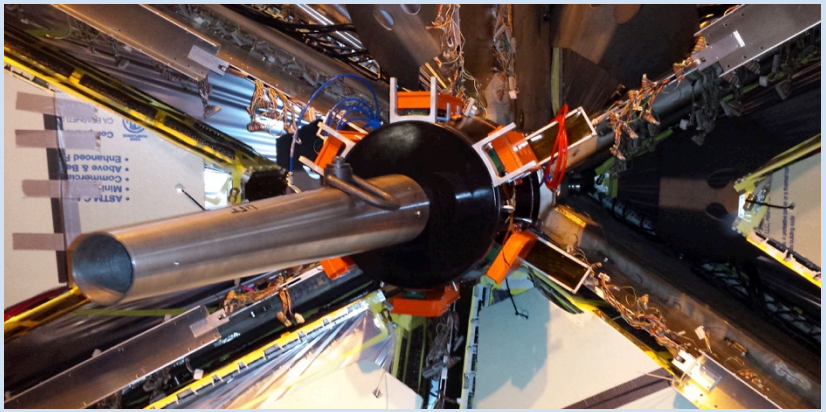
On-beam commissioning during CLAS12 engineering run in January 2018

Physics running since February 2018:

- RGA: 10.2-10.6 GeV on LH2 from in 2018/2019
- RGK: 7.5 GeV on LH2 in Fall 2018
- RGB: 10.2-10.5 GeV on LD2 in 2019



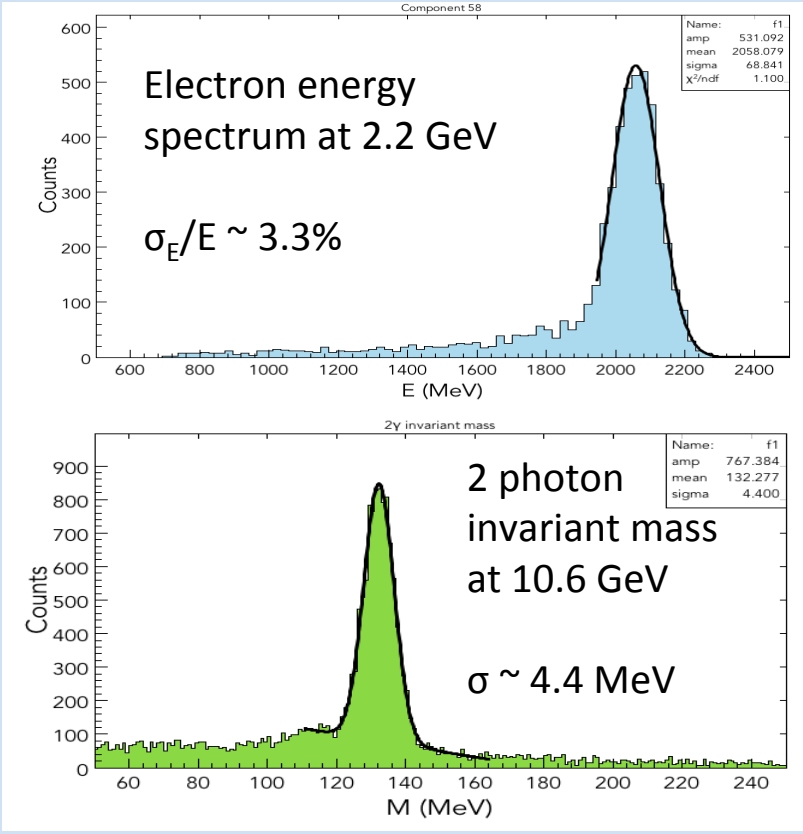
Forward Tagger during cosmic ray tests



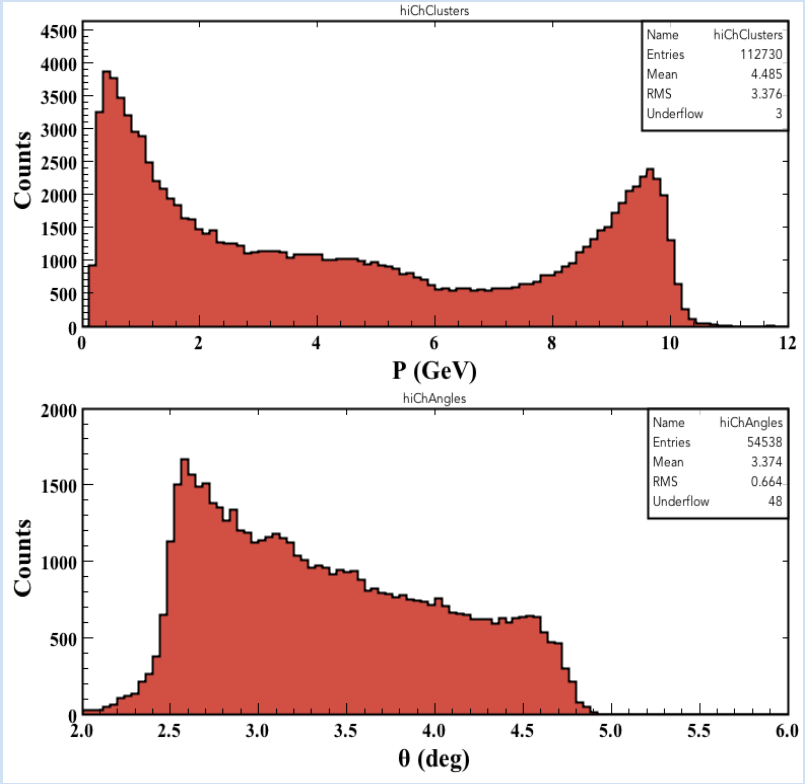
Forward Tagger Calorimeter during the installation in CLAS12

FT Performance

Performance	Expected Value	Measured Value
Azimuthal angular coverage	2.5° to 4.5°	2.6° to 4.6°
EM shower energy range	(0.5-8) GeV	(0.3 – 9.5) GeV
Energy resolution	$\sigma_E/E \leq 2\%/\sqrt{E(\text{GeV})} \oplus 1\%$	3.3% @ 2 GeV
Time resolution	≤ 300 ps	150 ps



Charged Cluster E and θ ranges

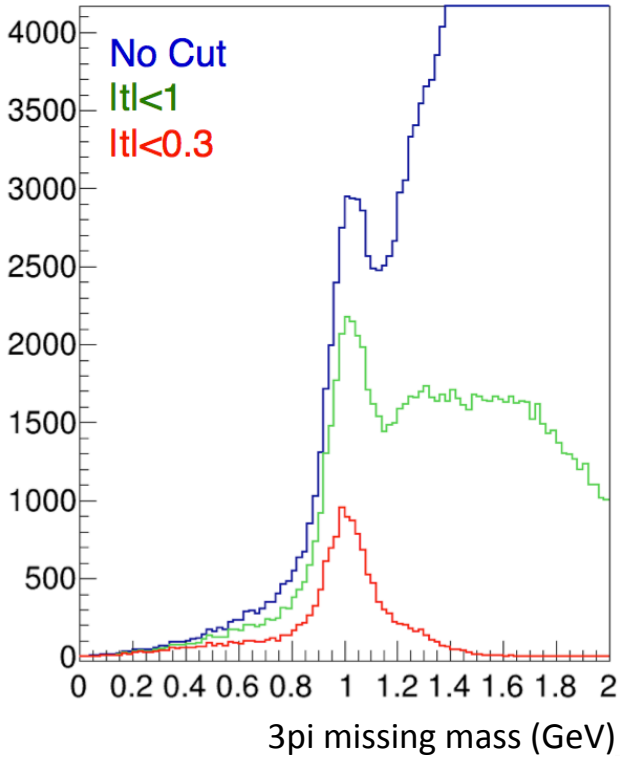


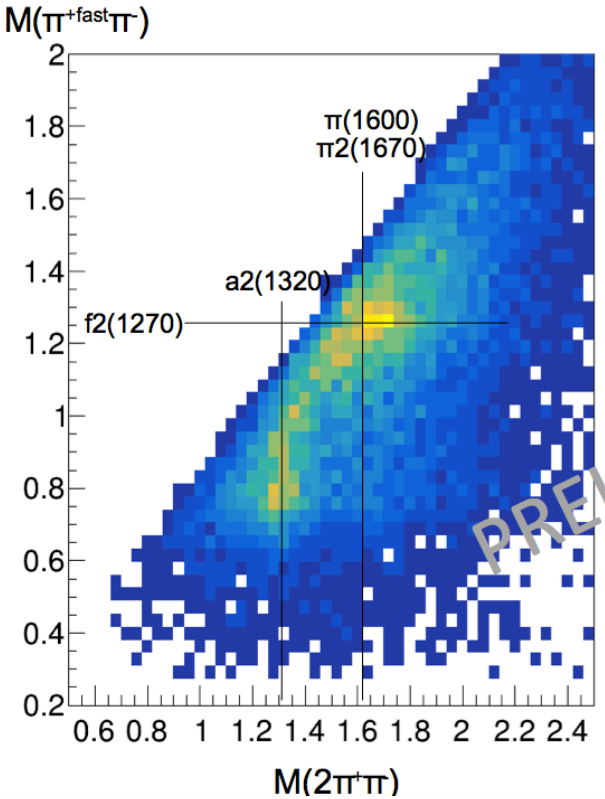
- Energy and angular acceptance match or exceed design ranges
- Initial energy calibration based on elastic electrons at 2.2 GeV: 3.3 % resolution @ 2 GeV now being extended and consolidated @ 10.6 GeV
- Timing resolution on spec

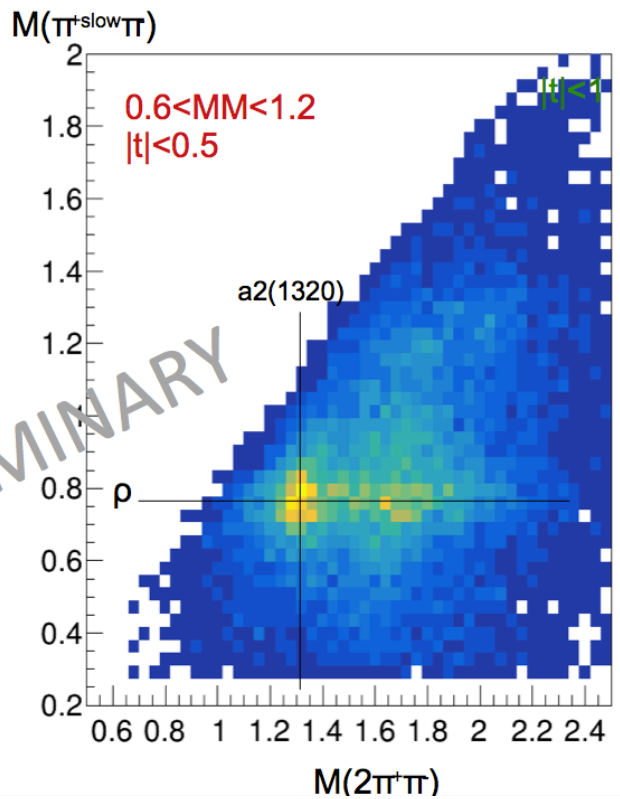
MesonX

First analysis results for one of the golden channels for hybrid meson searches

$$\gamma p \rightarrow \pi^+\pi^+\pi^- n$$



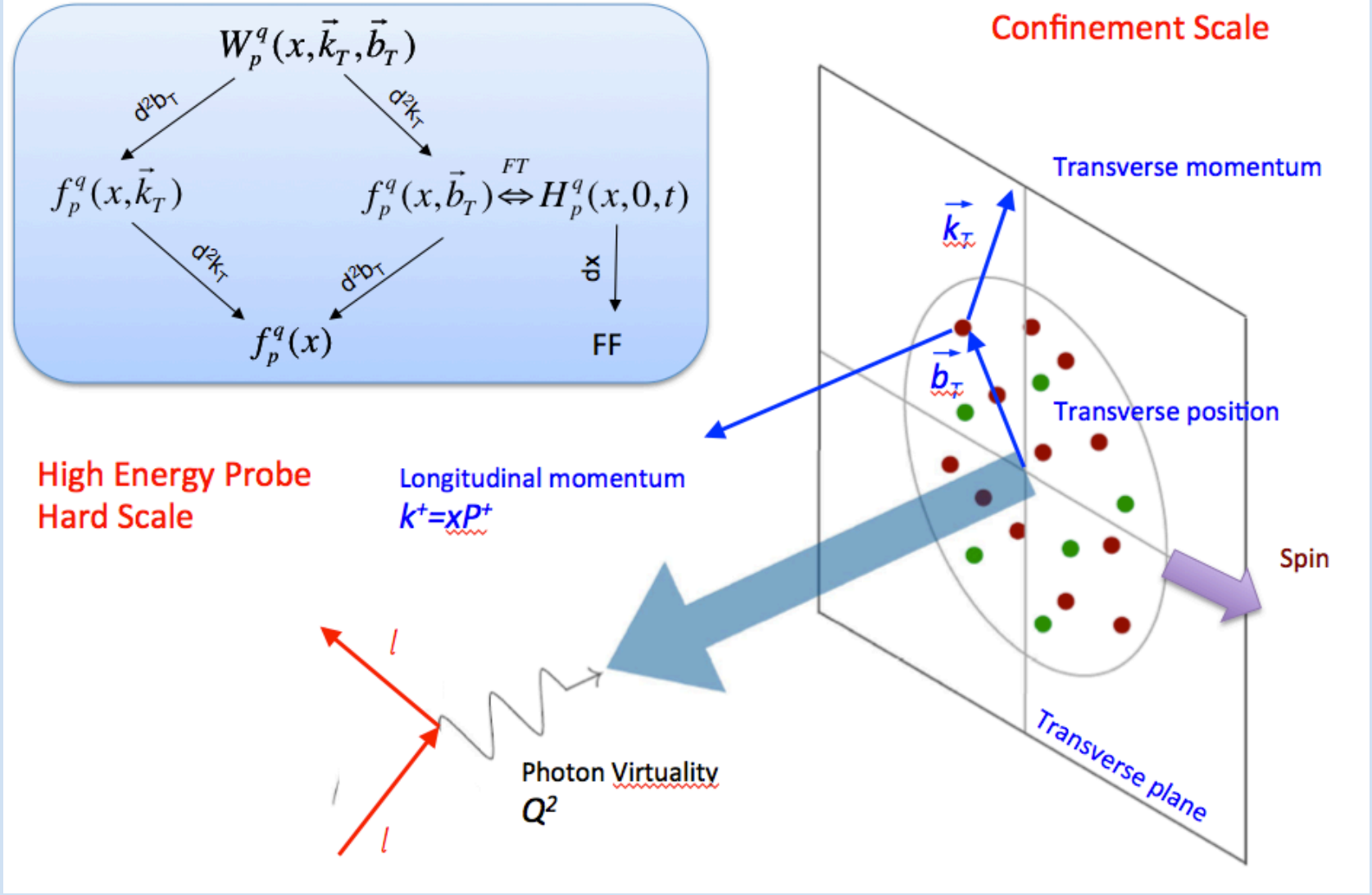




PRELIMINARY

Nucleon Tomography

JLab12 able to provide x 1000 luminosity (vs HERMES) at large x



RICH Project Status

Coordination: INFN-FE

Contributors: INFN-FE,LNF,RM1,BA,GE, JLab, ANL, GWU, Duquesne U., UCONN, Glasgow U, UTFSM (Chile), KNU (Korea)

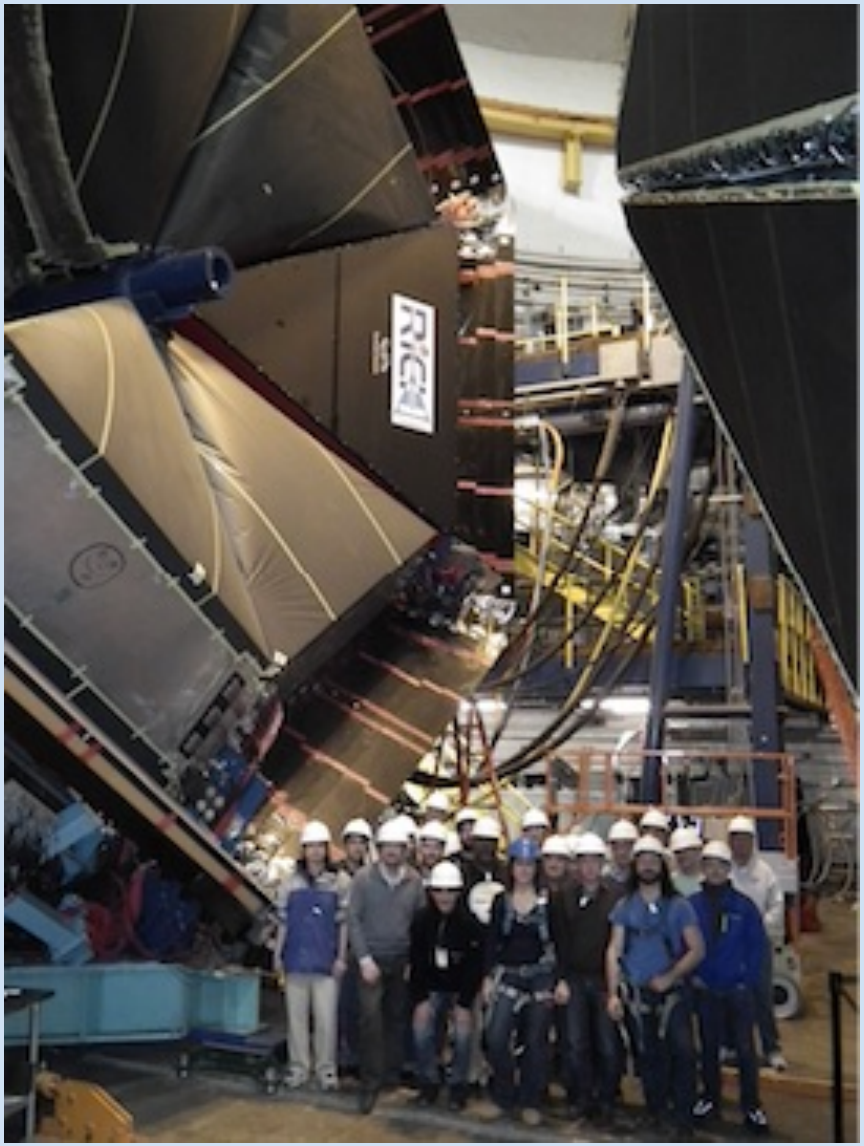
RICH 1st Module Installed in January 18

Commissioning during CLAS12 engineering run

Physics runs since February 18:
- RGA: 10.2-10.6 GeV on LH2
- RGK: 7.5 GeV on LH2
- RGB: 10.2-10.5 GeV on LD2

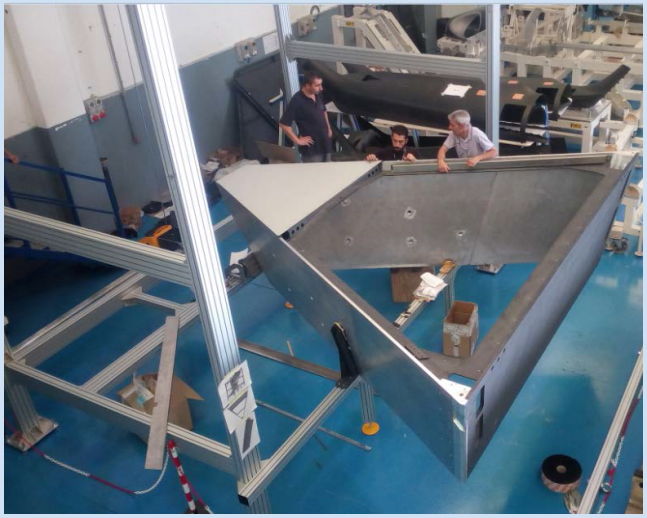
RICH 2nd Module Construction ongoing
Module expected to be ready in 2021

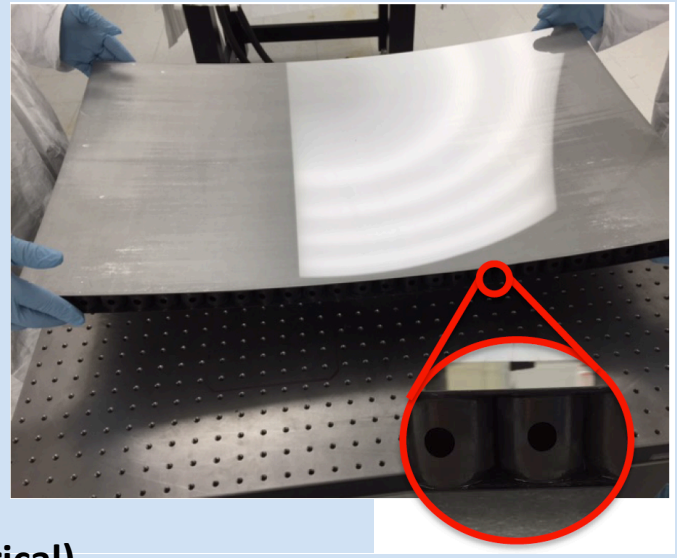
Supported by premiale CLASMED



RICH Advances

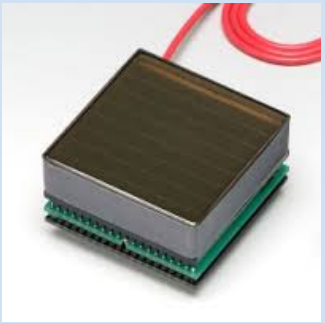
Aeronautic technology for structure
to maximize lightness and stiffness. Trapezoid of composite materials: CFRP inside acceptance, Al outside

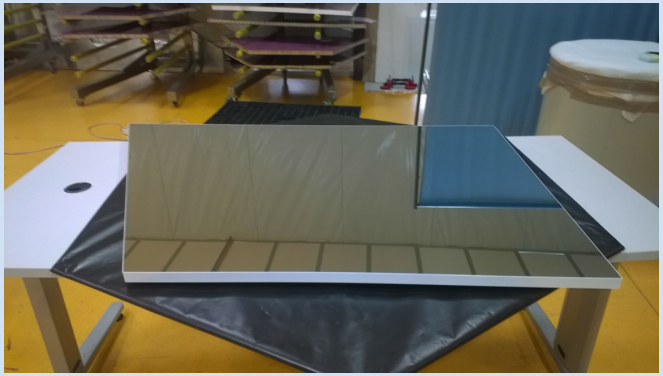




Carbon Fiber Mirrors (spherical)
to maximize lightness and stiffness. Consolidate technology (HERMES, AMS, LHCb) but ~ 30 % material budget reduction

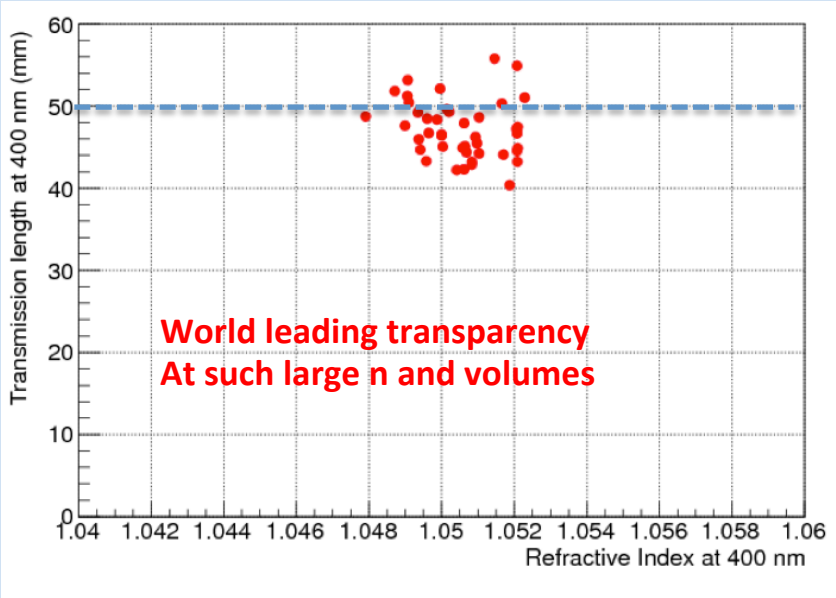
Photon Detector
First use of H8500/H12700
flat panel multi-anode PMTs
64 pixels on a 5x5 cm^2 area

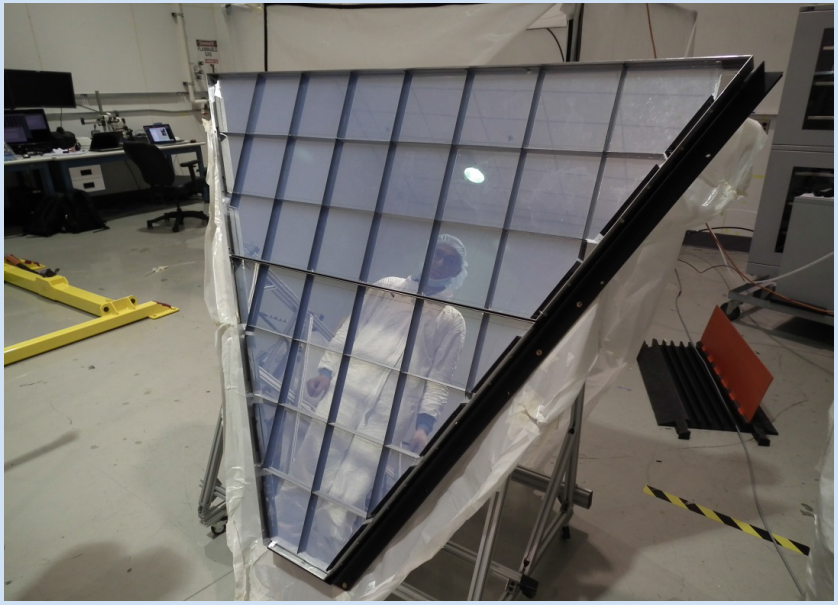


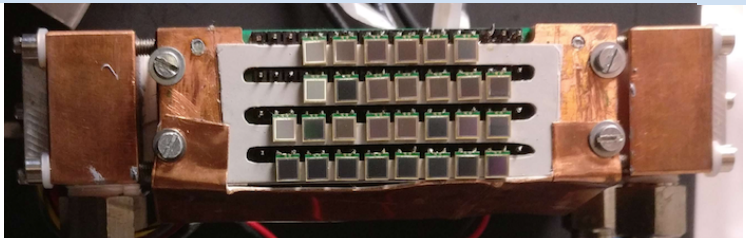


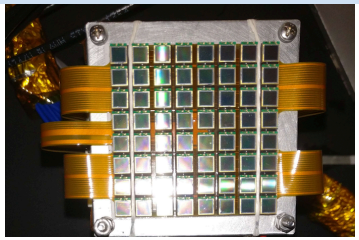
Glass-Skin Mirrors (planar)
Innovative technology never used in nuclear exps.
~ 1/5 cost for squared meter vs CFRP

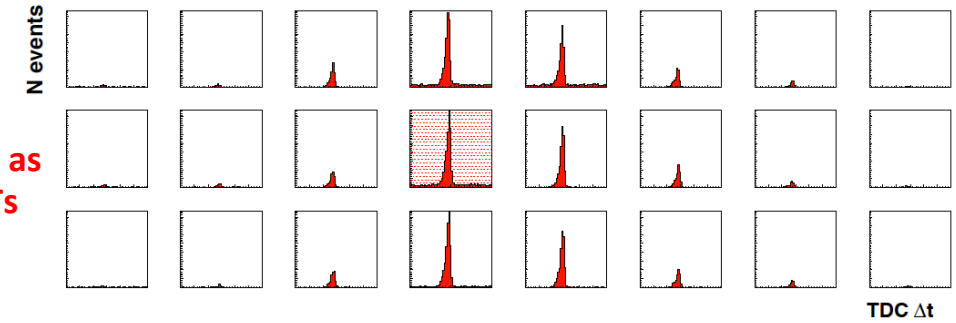
RICH Advances



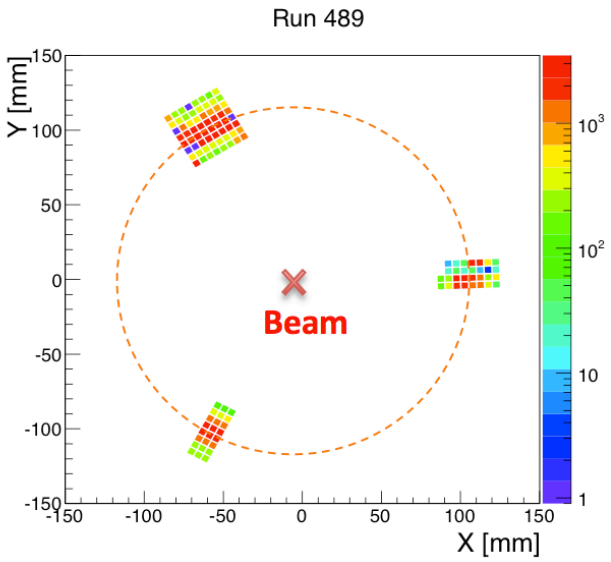






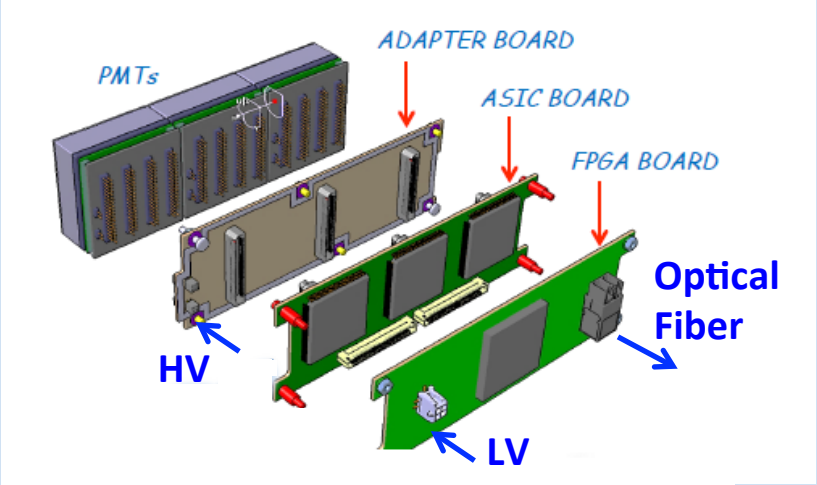


Cooled SiPM as good as PMTs



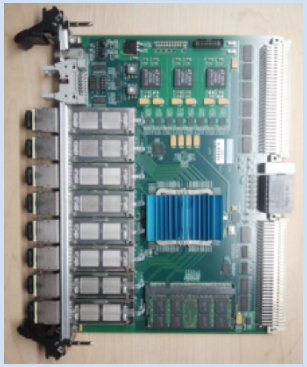
Readout Electronics

Compact (matches sensor area)
Modular Front-End (Mechanical adapter, ASIC, FPGA)
Scalable fiber optic DAQ (TCP/IP or SSP)
Tessellated (common HV, LV and optical fiber)

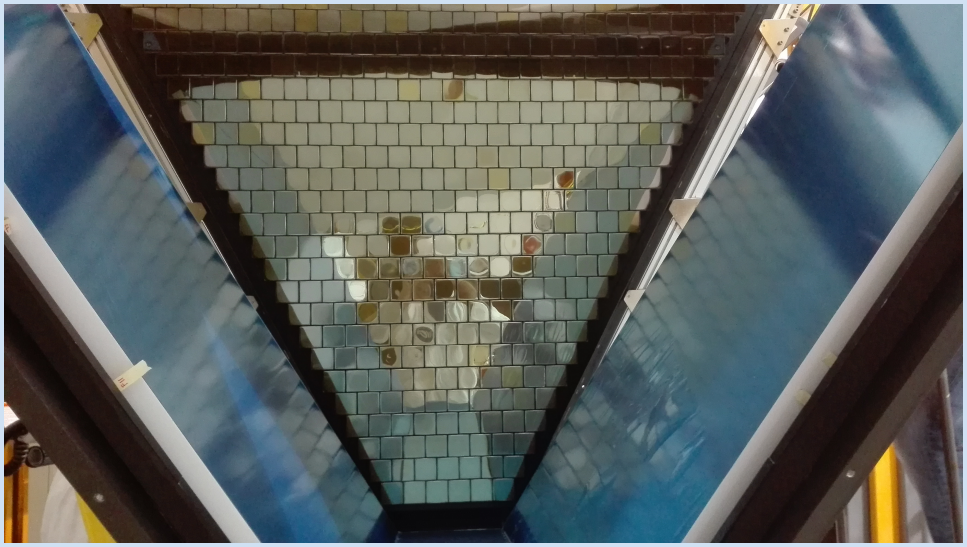


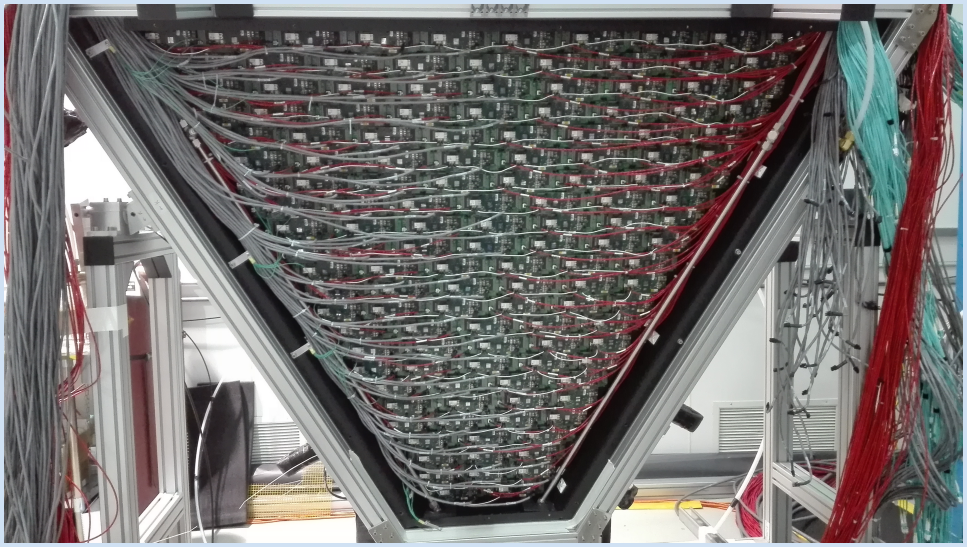
Applications:

- Gluex DIRC
- EIC R&D
- SOLID
- Medical Imaging
- Homeland Security



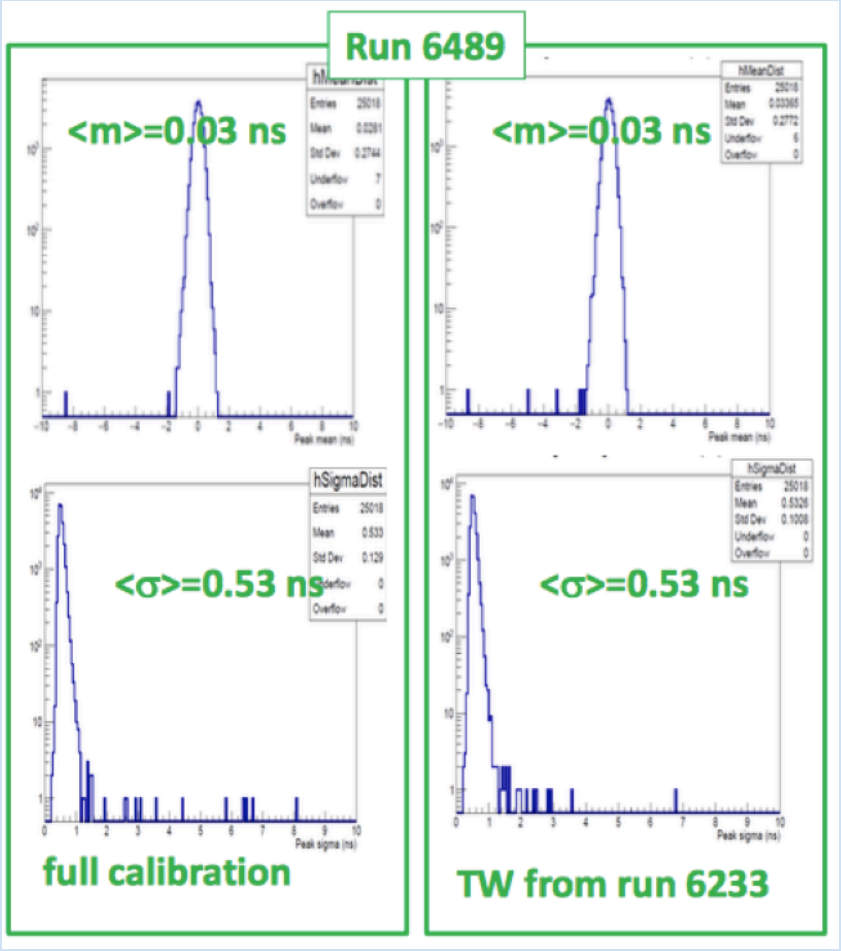
SSP Fiber-Optic DAQ





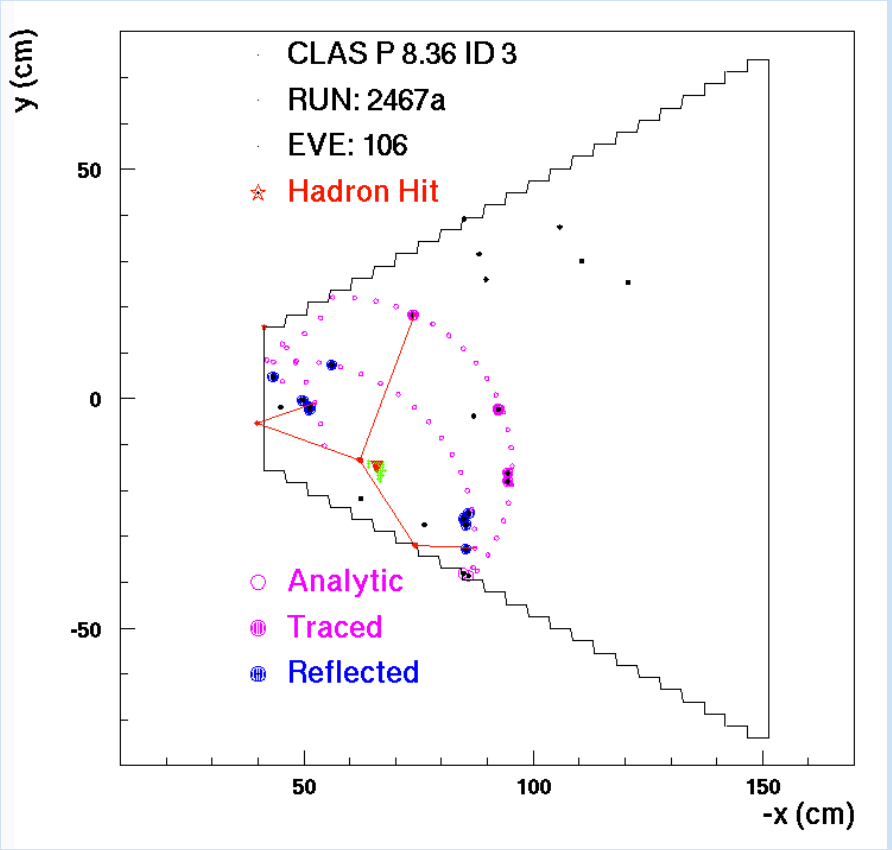
RICH Performance

Time resolution better than specification (less than 1 ns)



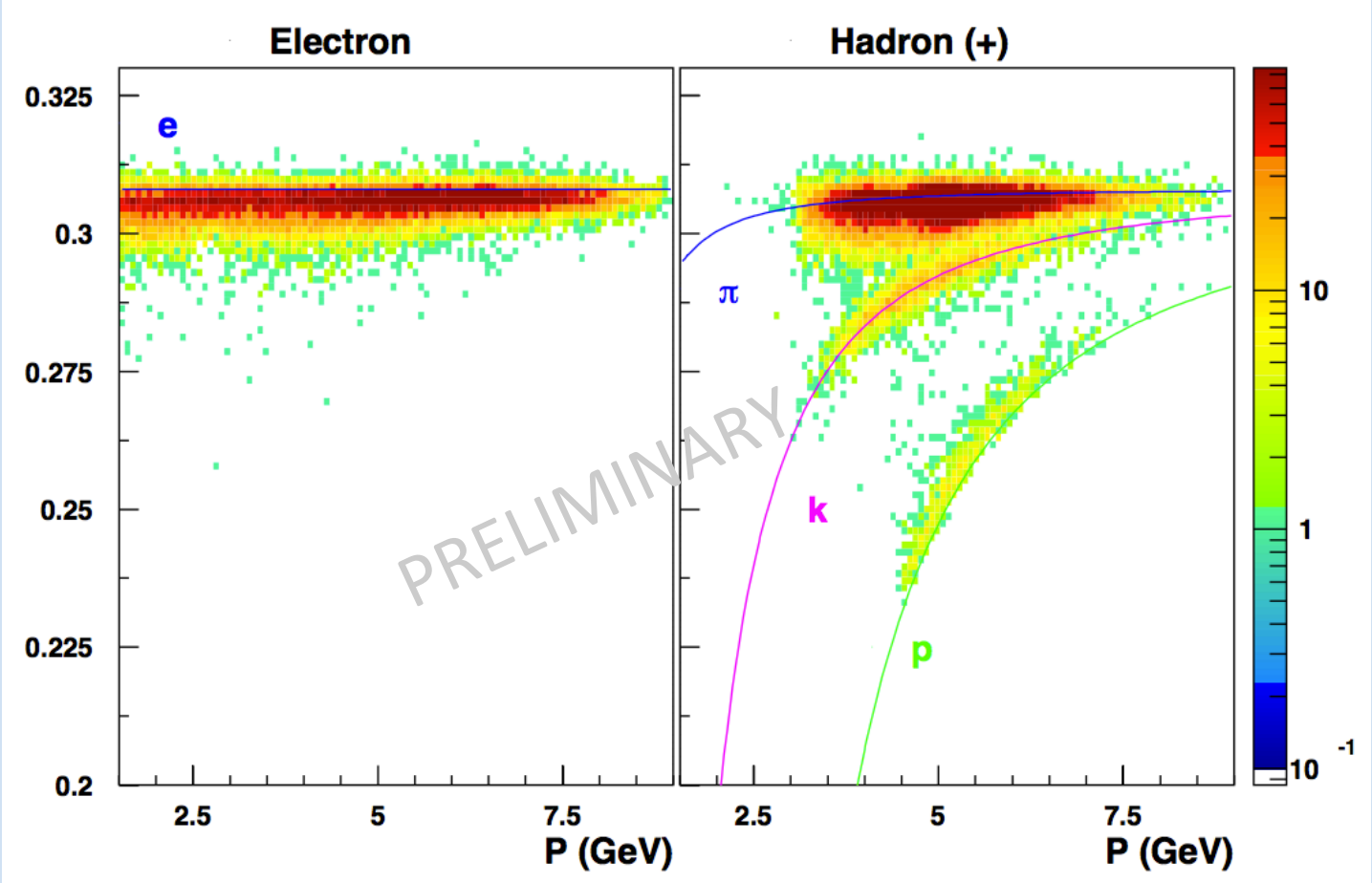
Discrete direct ray traced analysis to get a Cherenkov angle estimate for each photon for detailed PID optimization

Fast ~ tens of μs per event



RICH Hadron Separation

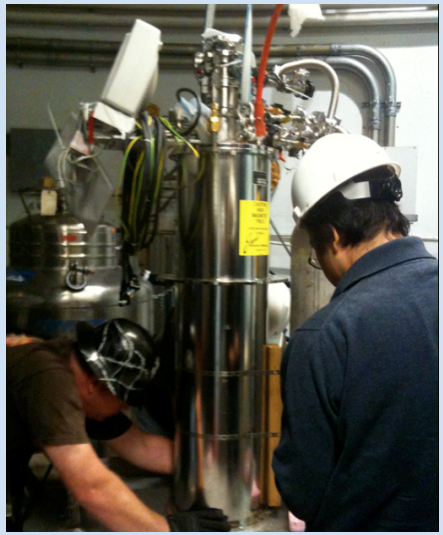
Hadron separation, direct photon, RGA data, raw alignment

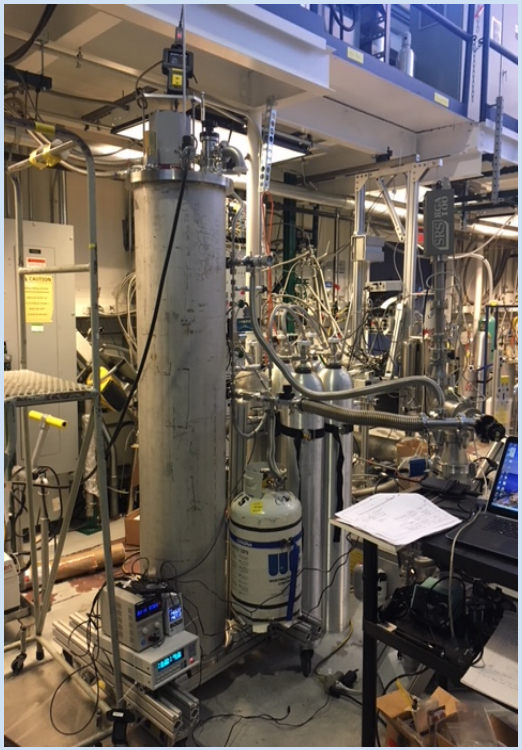


HDice: Frozen Spin Polarized Target

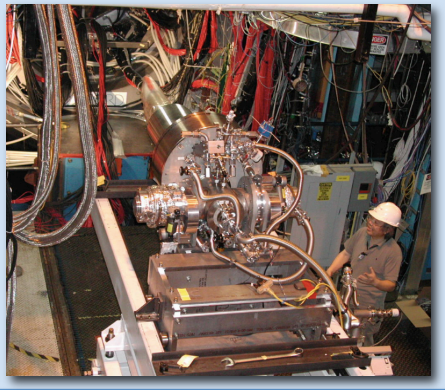
Polarized targets of solid HD in frozen spin mode.
Longitudinal and Transverse Polarizations: up to 60% H or 35% D.
Physics program rated as High-Impact by PAC41

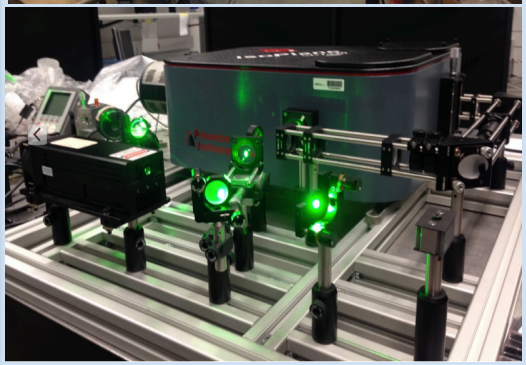
Advantages:
- ✓ Dilution factors ~ 1
- ✓ Low holding magnetic fields



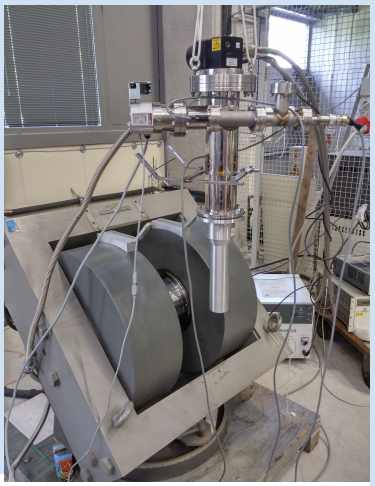


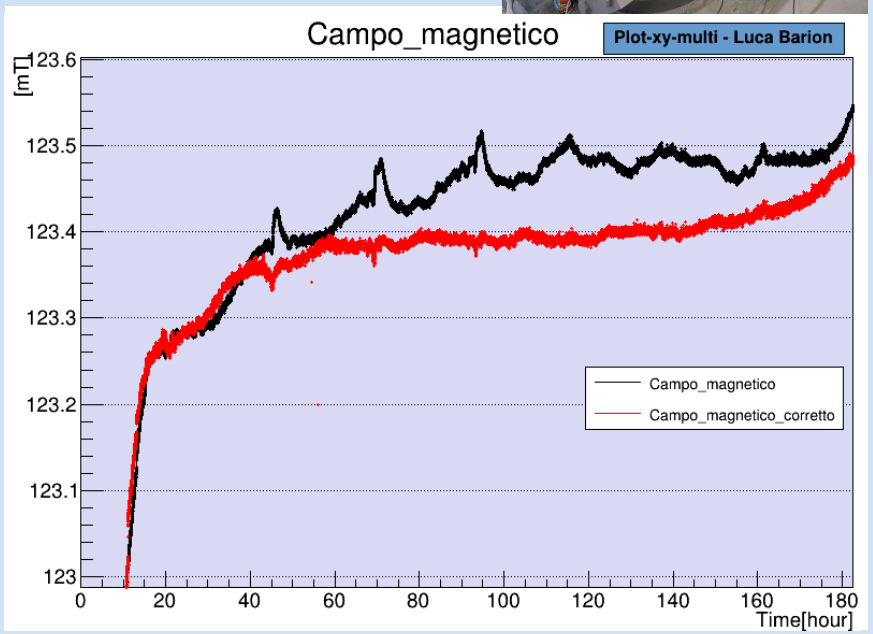
RM1: dewars & cryostats
HD gas purity by Raman distillation and analysis





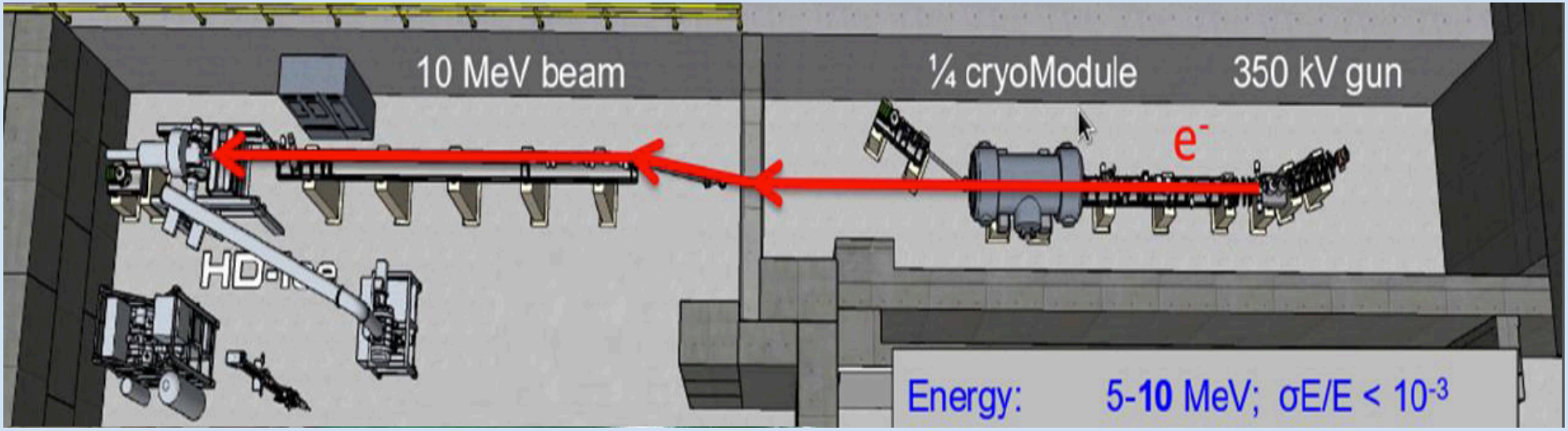
FE: frozen B field on a bulk SC MgB_2 magnet



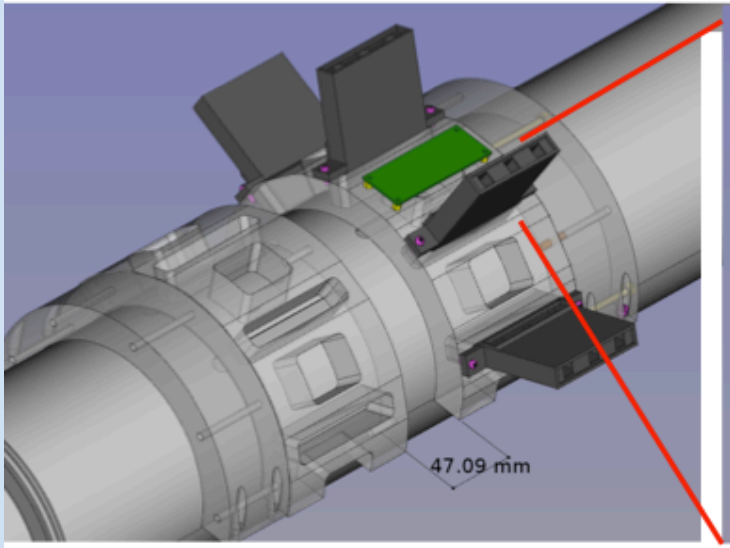


HDice Test Beam

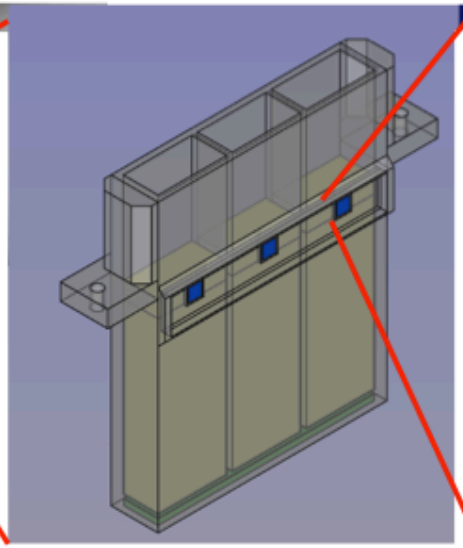
In preparation at UITF JLab with beam halo monitor made by INFN



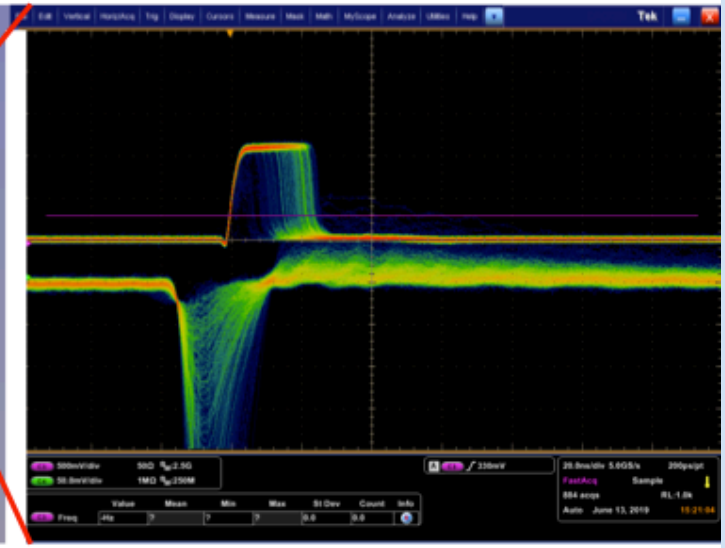
UITF beam halo monitor



Scintillator + SiPM units

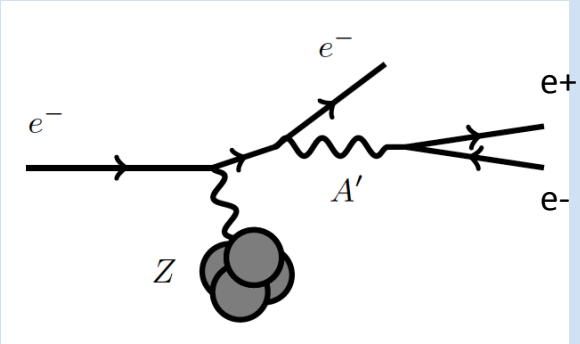


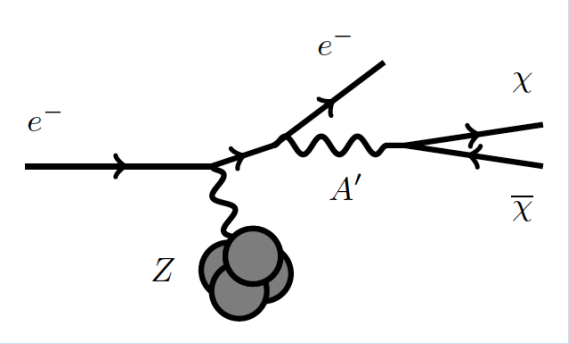
SensL fast output discrimination

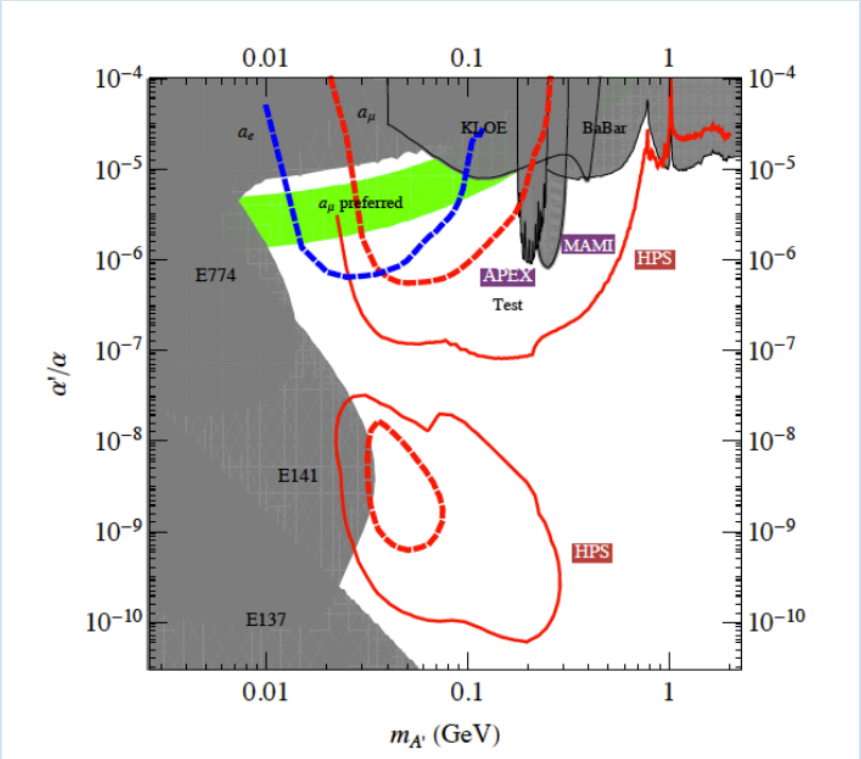


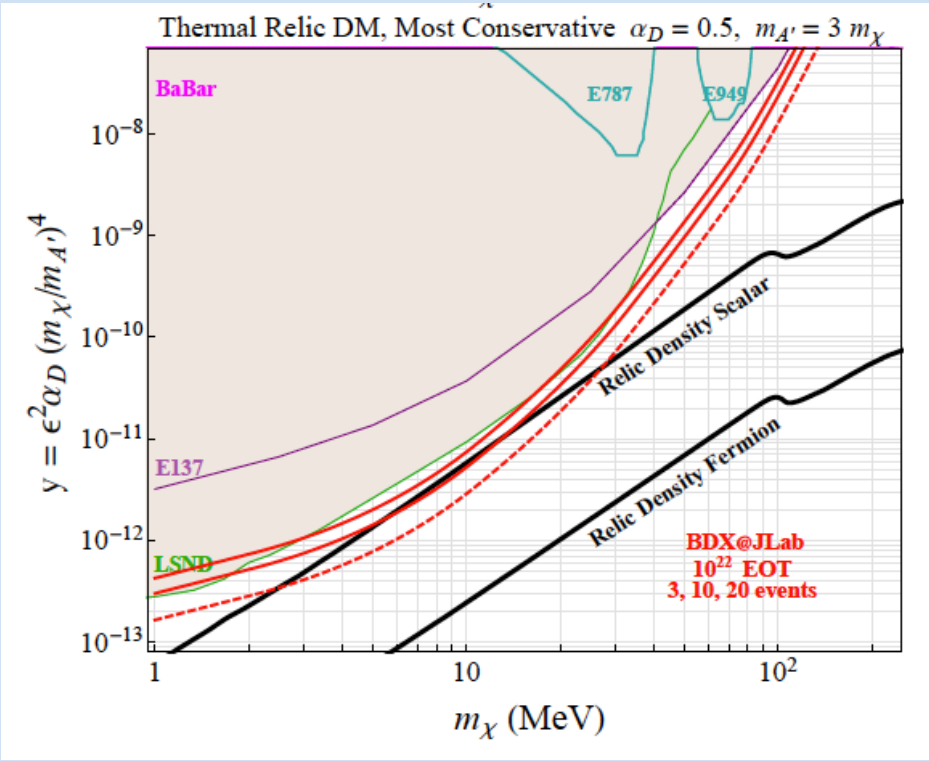
Dark Sector

CEBAF intense high-energy electron beam allows to cover unexplored regions





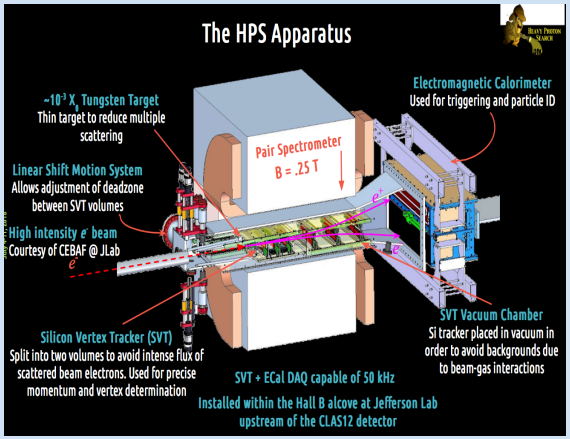


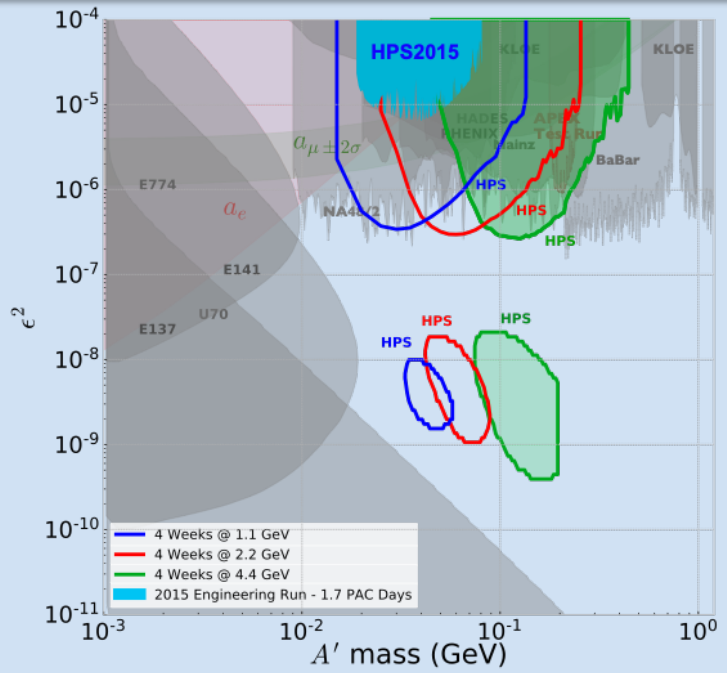


HPS News

2019 was a year of intese activities for the experiment

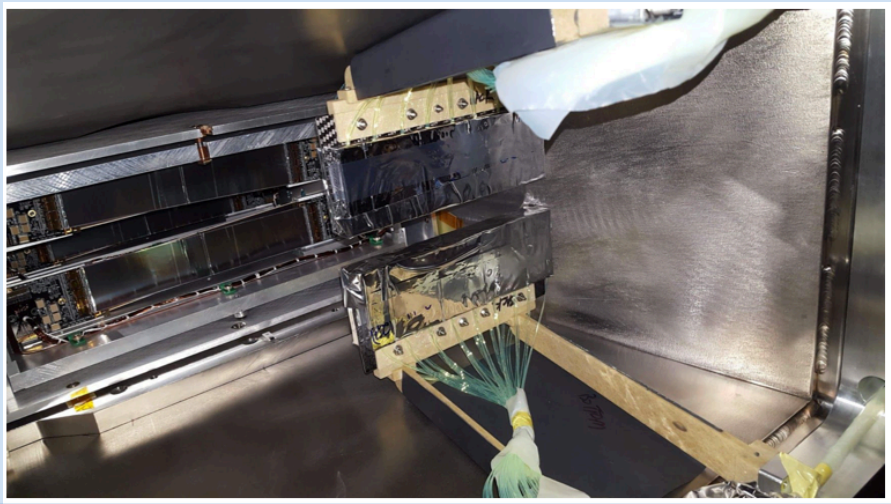
Long data taking
(July-September)
at beam energy of 4.5 GeV



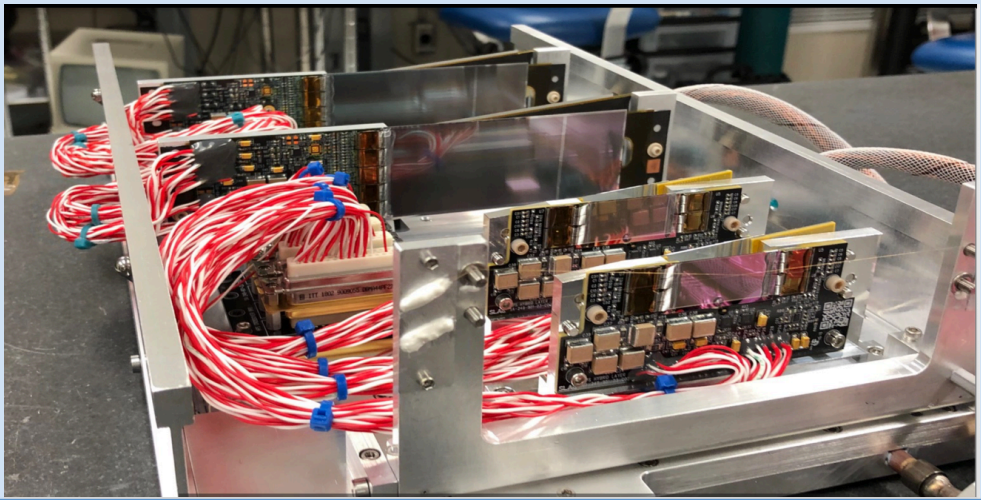


Hardware upgrades:

A new detector (Hodoscope) made by plastic scintillators installed between the SVT and the Ecal
Goal: increase by ~x2 trigger efficiency

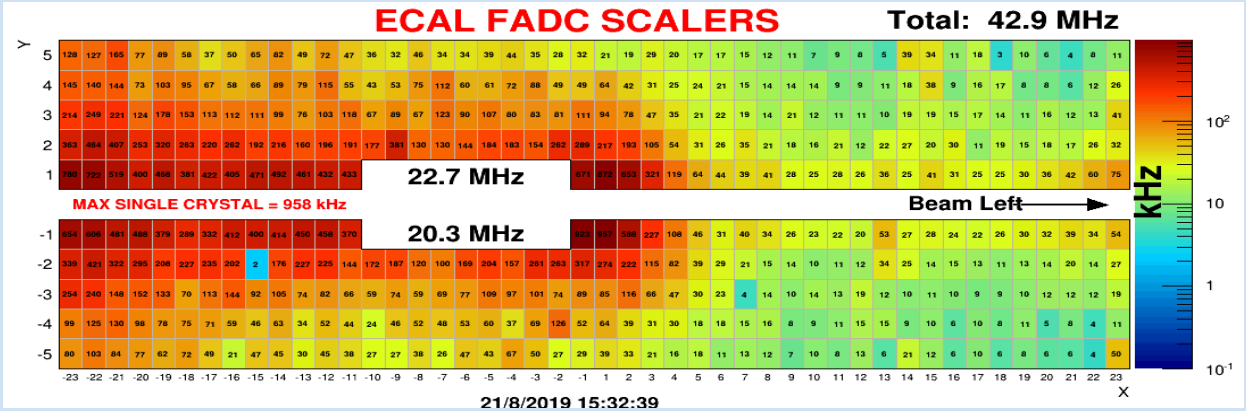


Additional SVT layer added closer to the target to improve vertex reconstruction and tracking



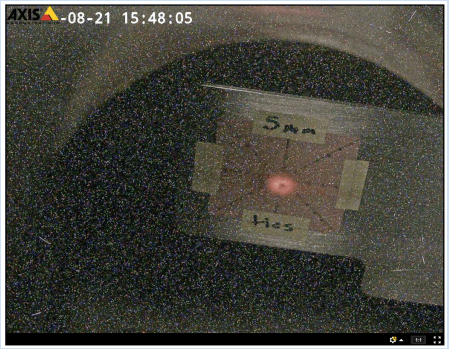
HPS 2019 Run

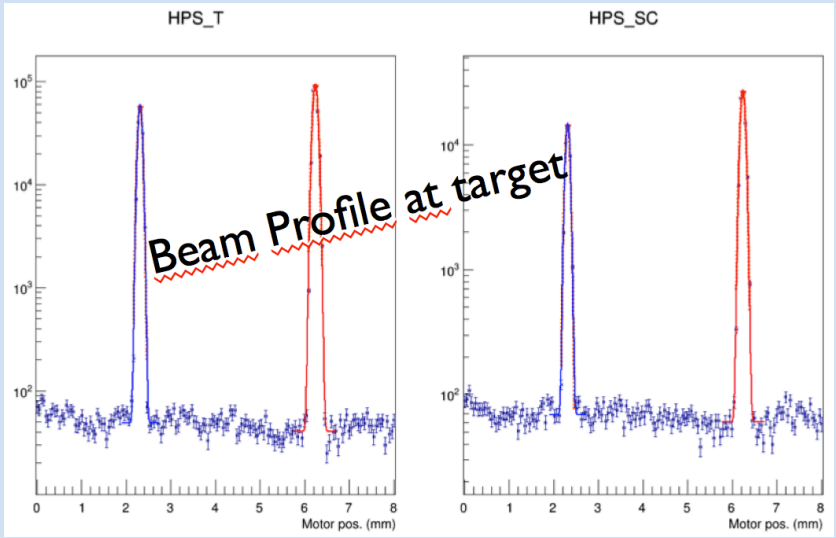
- Ebeam: 4.55 GeV wit beam current: ~100 nA on W target
- Long period of running. Planned from Jun. 13 to Aug. 21 Extended to Sep. 9
  (basically to retrieve ~2weeks of beam down due to power outage in the accelerator)
- More than 300 mC of data collected, we expect to cover new territory in the mA'-epsilon



Intense beam tuning during the running period led to excellent beam quality

Vertical beam width is 21.7 μ m



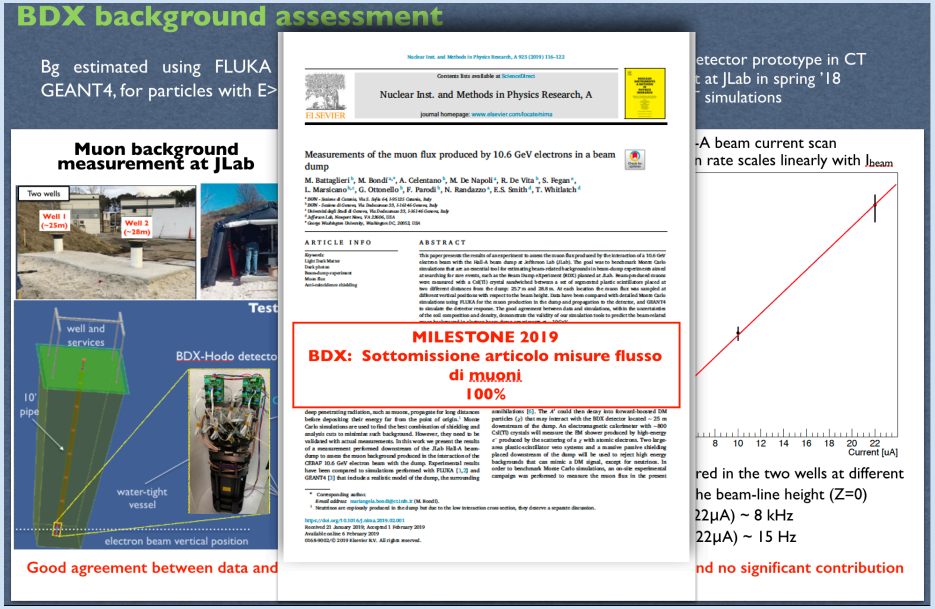


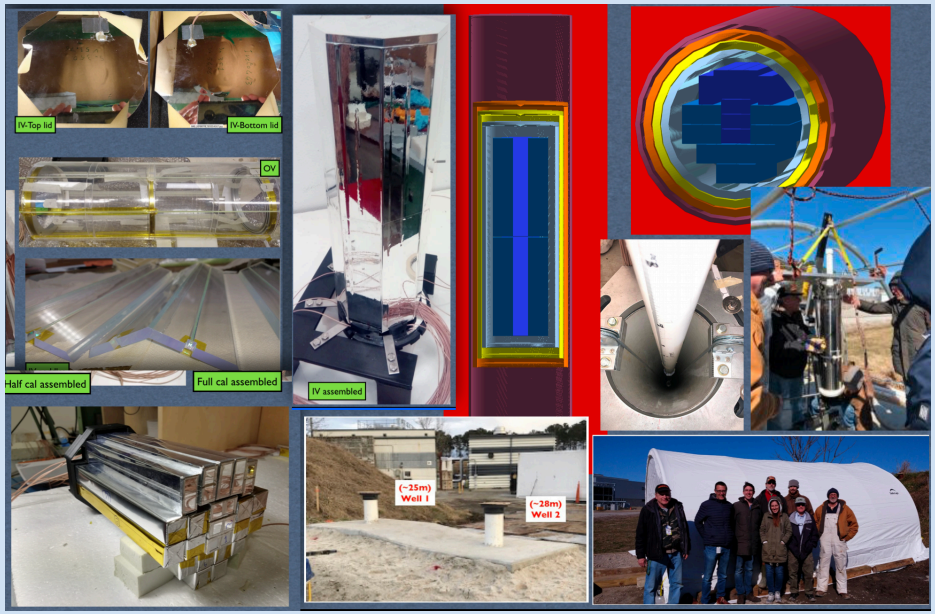
BDX Activity

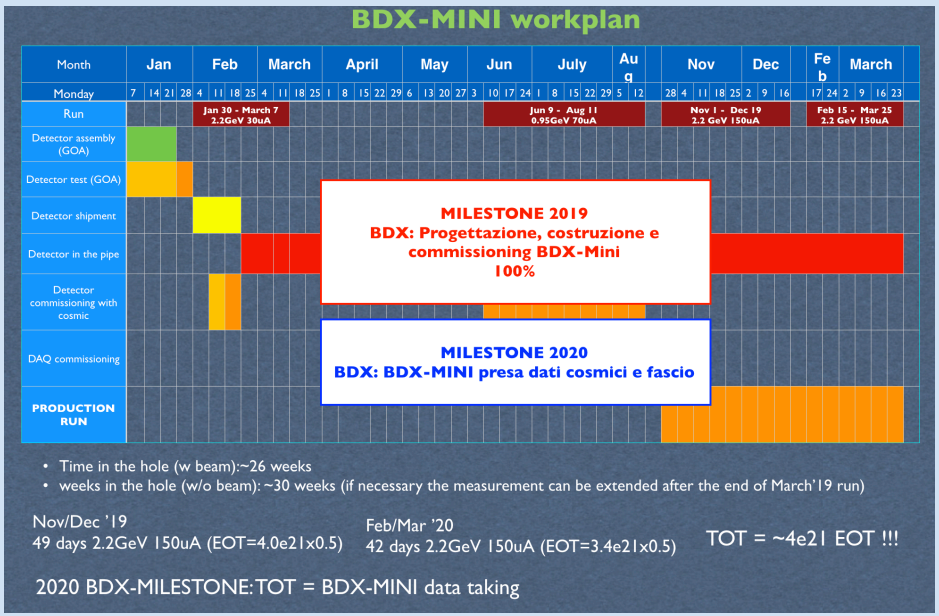
Involved INFN units: CT,GE,PV,RM1,RM2

Current activity (July 18 – July 19)

* Background assessment
* BDX-Mini installation
* BDX WaveBoard v1.0 test at Jlab
* BDX-DRIFT proposal for PAC47
* DOE Funding Opportunity Announcement







BDX Activity

Involved INFN units: CT,GE,PV,RM1,RM2

Current activity (July 18 – July 19)

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* BDX-DRIFT proposal for PAC47
* DOE Funding Opportunity Announcement

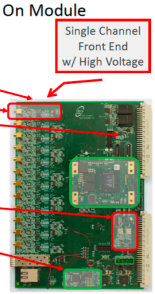
Streaming RO test at JLab

DAQ architecture and front-end inherited from **KM3NeT** experiment

Trigger-less front-end system WaveBoard:
- ADC sampling (14 bit, 250MHz)
- **zero-suppression** (L0 trigger) @ 0.3 p.e. threshold
- sampling window is **time-variable**
- all non-zero data forwarded (**all data to CPU-farm**)

The *WaveBoard* digitizer board

- The board is based on a Commercial-Off-The-Shelf (COTS) System On Module (SOM) mezzanine card hosting a **Zynq-7030**
- There are 12 analog front end channels
  - 6 dual-channel ultra low-power ADCs (**12/14** bit up to **250MHz**)
  - Pre-amplifier on board: **selectable gain** (either 2 or 50)
  - **HV** provided and monitored on-board
  - pedestal set by DAC
- Timing interfaces:
  - PLL to clean, generate, and distribute clocks
  - External clock and reference signals
  - White Rabbit enabled board
- ARM-M4 controls on-board peripherals (ADCs, DACs, PLL, ...)
- On board peripherals:
  - High speed: GbE, SFP, USB OTG
  - Low Speed: serial, I2C, temperature monitor

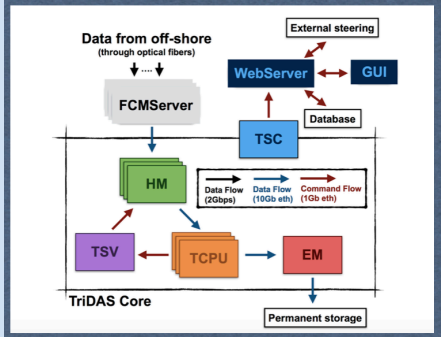


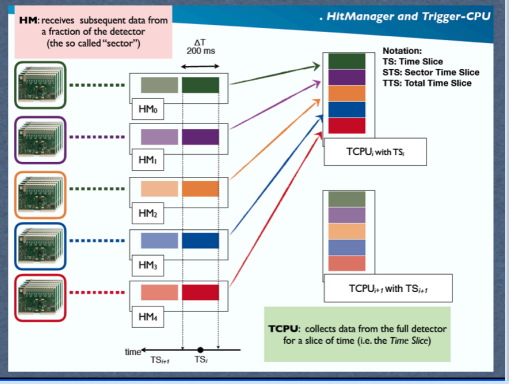
Credit to F.Ameli

Streaming RO test at JLab

DAQ architecture and front-end inherited from **KM3NeT** experiment

Trigger-less Data Acquisition System (TriDAS)
- **Scalable** Event Building architecture
- DAQ scalability relies on **network** scalability

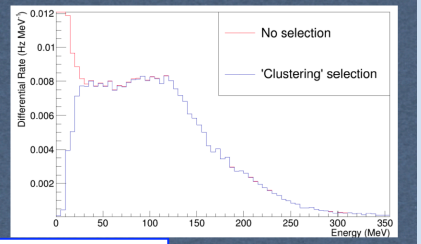


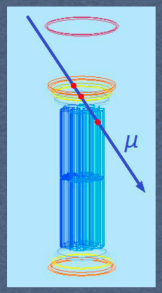


Credit to T.Chiarusi

Comparison between triggered and triggerless data

- Clustering
  - L2 "clustering" selection trigger
  - Online: few MeV thresholds on E_{tot} and E_{seed}
  - Same cuts applied offline to unselected events
  - Trigger efficiency found to be ~100 %

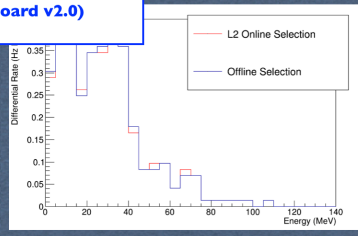




Select events … os can be used to identify cosmic muons

MILESTONE 2020
BDX: Test e commissioning BDX elettronica Streaming RO (WaveBoard v2.0)

- Online trajectory selection trigger
- Conditions on veto topology and SiPM charge distribution
- Online selection has comparable efficiency to offline analysis



- Plans for 2020: build the WaveBoard v2.0 and test at JLab with BDX-MINI/beam

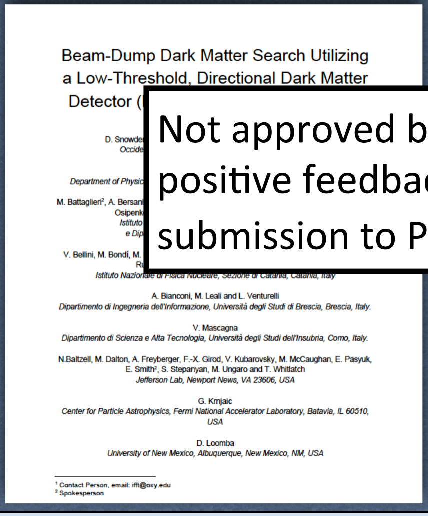
BDX Activity

Involved INFN units: CT,GE,PV,RM1,RM2

Current activity (July 18 – July 19)

* Background assessment
* BDX-Mini installation
* BDX WaveBoard v1.0 test at Jlab
* BDX-DRIFT proposal for PAC47
* DOE Funding Opportunity Announcement

BDX-DRIFT proposal


Beam-Dump Dark Matter Search Utilizing a Low-Threshold, Directional Dark Matter Detector (

A. Bianconi, M. Leali and L. Venturelli
Dipartimento di Ingegneria dell'Informazione, Università degli Studi di Brescia, Brescia, Italy.

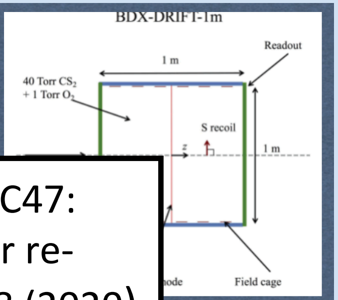
V. Mascagna
Dipartimento di Scienza e Alta Tecnologia, Università degli Studi dell'Insubria, Como, Italy.

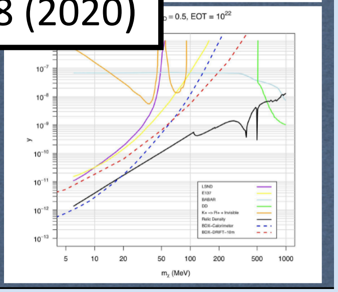
N.Baltzell, M. Dalton, A. Freyberger, F.-X. Girod, V. Kubarovsky, M. McCaughan, E. Pasyuk, E. Smith[2], S. Stepanyan, M. Ungaro and T. Whitlatch
Jefferson Lab, Newport News, VA 23606, USA

G. Krnjaic
Center for Particle Astrophysics, Fermi National Accelerator Laboratory, Batavia, IL 60510, USA

D. Loomba
University of New Mexico, Albuquerque, New Mexico, NM, USA

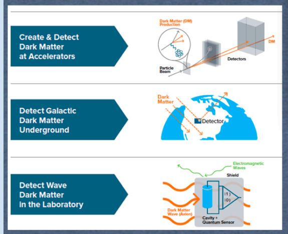
[1] Contact Person, email: ifft@oxy.edu
[2] Spokesperson

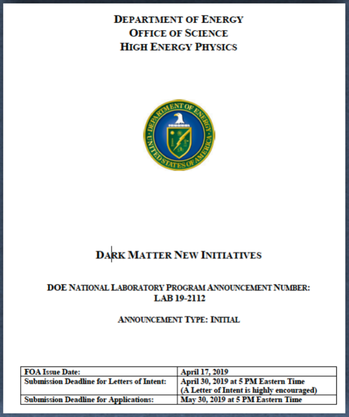




Not approved by PAC47: positive feedback for re-submission to PAC48 (2020)

DOE Founding Opportunity (FOA) Dark Matter New Initiatives




DEPARTMENT OF ENERGY
OFFICE OF SCIENCE
HIGH ENERGY PHYSICS

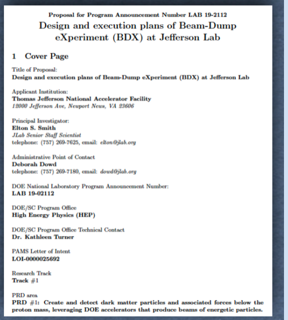
DARK MATTER NEW INITIATIVES

DOE NATIONAL LABORATORY PROGRAM ANNOUNCEMENT NUMBER: LAB 19-2112

ANNOUNCEMENT TYPE: INITIAL

FOA Issue Date:	April 17, 2019
Submission Deadline for Letters of Intent:	April 30, 2019 at 5 PM Eastern Time (A Letter of Intent is highly encouraged)
Submission Deadline for Applications:	May 30, 2019 at 5 PM Eastern Time

- BDX presented a LOI and Proposal
- Proposal submitted by JLab
- The most part of money will go to Lab's personnel
- Evaluation result expected soon


Proposal for Program Announcement Number LAB 19-2112
Design and execution plans of Beam-Dump eXperiment (BDX) at Jefferson Lab

1 Cover Page

Title of Proposal: Design and execution plans of Beam-Dump eXperiment (BDX) at Jefferson Lab

Applicant Institution: Thomas Jefferson National Accelerator Facility

Principal Investigator: Elton S. Smith

Administrative Point of Contact: Deborah Dowd

DOE National Laboratory Program Announcement Number: LAB 19-02112

DOE/SC Program Office: High Energy Physics (HEP)

DOE/SC Program Office Technical Contact: Dr. Kathleen Turner

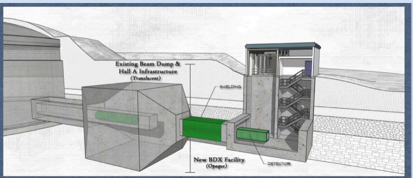
PAMS Letter of Intent: LOI-0000025692

Research Track: Track #1

PRD area: PRD #1: Create and detect dark matter particles and associated forces below the proton mass, leveraging DOE accelerators that produce beams of energetic particles.

- Only design and experiment work plan (no construction!)
- Up to \$2M, in 1y-2y
- Selected projects will access to funds for construction (up to \$10M-\$15M) in 2021
- Results announced in FY19 (expected)

DOE Founding Opportunity (FOA) Dark Matter New Initiatives

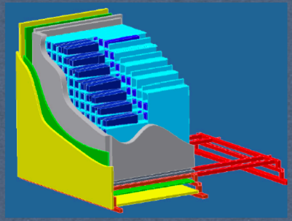


- Design of the new Hall
- Shielding optimisation
- Detector integration

- Total request: \$1.15M
- Toal time: 20 months

- If approved the BDX Collaboration will support JLab to design the facility (including shielding) and integrate the BDX detector

- In the **next 2y** JLAB12 propose to build the first BDX detector module and write the BDX-TDR to be ready for the construction FOA in 2021 (estimated request \$4.5M)
  - Borrow ~100 CsI(Tl) BaBar crystals
  - Procure veto's plastic scintillators, sipm
  - Mechanics and services
  - Procure custom electronics (WaveBoard 2.0) to instrument the module
  - Assemble the module and test it



INFN 2020 funding request subject to FOA approval

BDX Activity

Current activity (July 18 – July 19)

* Background assessment	NIM published!
* DOE Funding Opportunity Announcement (FOA)	Proposal submitted!
* BDX-Mini installation	BDX installed and tested with cosmics!
* BDX WaveBoard v1.0 test at JLab	Test performed and presented to WS/Conf!
* BDX-DRIFT proposal for PAC47	New proposal submitted to PAC47!

Current activity (July 19 – July 20)

* BDX-Mini run	Take low energy data to get a decent reach
* FOA activity	Coordinate the work with JLab resources
* BDX WaveBoard v2.0	Construct and test
* BDX 1st module construction	If FOA approved, towards BDX-TDR in 2021

JLab12: News

Richieste calcolo al TIER1 – CNAF Prima volta di JLab12
Parte del piano di computing del Laboratorio: data-processing al JLab, MCs decentrati
Investimento per i prossimi ~ 3 anni. Su un totale non-LHC di 96 keuro:

5000 HSO6 50 keu
50 TB disco 7 keu

Progetto Europeo "Probes" per mobilita' dei ricercatori Italia-USA in collaborazione con
Gli utenti del Fermilab e' entrato nella "Reserve List" (primo fra i non finanziati)

1/2 rivelatore (MaPMTs) del RICH-II finanziato dal JLab a seguito di un MRI non finanziato
(MRI major research infrastructure della NSF)

Nuove regole di accesso al JLab (richiesto CV e prova di essere dipendente ente ricerca)

Incontro con rappresentanti NSF (e DOE) all'Ambasciata d'Italia nell'ambito
del 13th Meeting per la Cooperazione Scientifica e Technologica fra Italia e USA
(NSF = National Science Fundation)

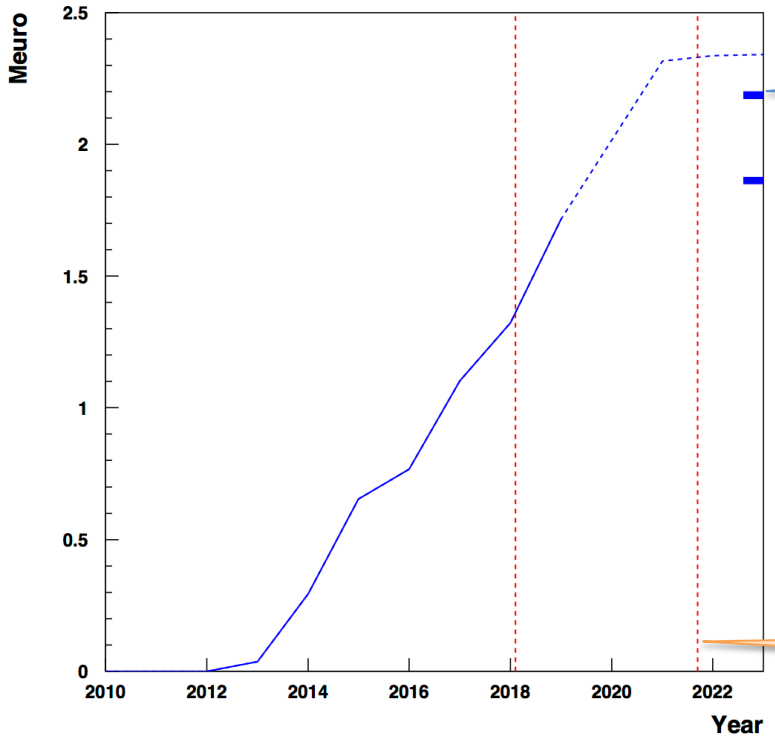
Milestones 2019

Milestones Concordate		
Data	**Descrizione**	**Completamento**
30-03-2019	HPS: Sottomissione articolo di fisica dati 2015	100 %
30-06-2019	POLTARG: Disegno nuovo holder per mappatura campo con doppio magnete Waiting to open the cryostat to check dimensions	90 %
30-06-2019	RICH: Completamento software di tracciamento per la ricostruzione degli eventi	100 %
30-06-2019	BDX: Progettazione, costruzione e commissioning BDX-Mini	100 %
30-06-2019	FT: completamento calibrazioni del primo run di fisica	100 %
31-08-2019	Tracker: Completamento caratterizzazione con cosmici delle 4 camere in commissioning presso JLab	100 %
31-12-2019	RICH: Inizio costruzione struttura meccanica secondo modulo	100 %
31-12-2019	POLTARG: Test fotosensori, disegno e realizzazione dell'HALO COUNTER Halo counter being assembled	80 %
31-12-2019	BDX: Sottomissione articolo misure flusso di muoni	100 %
31-12-2019	HCAL: Completamento dell'acquisizione dei moduli per la piattaforma mobile di HCAL Purchasing orders being finalized	70 %

Funding Plan

(All but ME)	2018 Assigned	2019 Assigmed	2020 Expected	2021 Expected	2022 Expected
Tracker (Hall-A)	25	15	20	15	10
FT (HallB)	20	20	15	10	10
RICH (HallB)	220	194	300	300	20
HCAL-J (HallA)	30	30	20	10	10
PolTarg (HallB)	45	60	60	70	170
HPS+BDX (HallA+B)	70	37	75	75	170
Calcolo (HallA+B)	-	15	-	-	15
Hyper + WACS (Hall-A)	-	-	-	20	40
Total (HallA+B)	410	371	490	520	445

Bilancio RICH CLAS12



Premiale 2013
Project Budget

Premiale 2013
MIUR Budget

Installazione

Second Module Plan (FY)	19-1	19-2	19-3	19-4	20-1	20-2	20-3	20-4	21-1	21-2	21-3	21-4
Mechanics												
Aerogel												
Mirrors												
Electronics												
MAPMTS												
Services in Hall												
Assembling + Installation												

INFN JLab Shared

Polarized targets

Milestones 2020

Milestones Proposte	
Data	**Descrizione**
30-06-2020	BDX: BDX-MINI presa dati cosmici e fascio
31-12-2020	BDX Test e commissioning BDX elettronica Streaming RO (WaveBoard 2.0)
31-12-2020	POLTARG: Completamento apparato di misura della resistenza dei bersagli polarizzati al fascio di elettorni.
31-12-2020	RICH: Completamento produzione aerogel
30-06-2020	RICH: Inizio produzione fotosensori secondo modulo
31-12-2020	HCAL-J: Apparato pronto per l'installazione in sala A
30-06-2020	CLAS12: Presentazione risultati preliminari sulle asimmetrie di spin del fascio in reazioni esclusive e semiinclusive alle Conferenze di settore.
30-06-2020	FT e RICH primo modulo: Processamento dati primo run di fisica
30-06-2020	FT e RICH primo modulo: Sottomissione articolo tecnico (costruzione e prestazioni).
30-06-2020	Tracker: Tracciatore GEM integrato in BigBite e pronto per l'installazione in sala A
30-06-2020	Tracker: Completamento caratterizzazione tracker al silicio 30/12/2020

GEM Track Efficiency

Results from April 2019 cosmic run

- Track efficiency (3 hits out of 4 chambers) estimated from hit efficiencies reasonably good (in cosmic occupancy); efficiency improved by 5% in Aug/2019 thanks to new modules

- Reconstruction of high multiplicity events will benefit of 2 u/v strip chambers, under design within the SBS collaboration

Gap between GEM modules (by design)