

JLab PAC48 Meeting
August 10-14, 2020

Status of Hall B

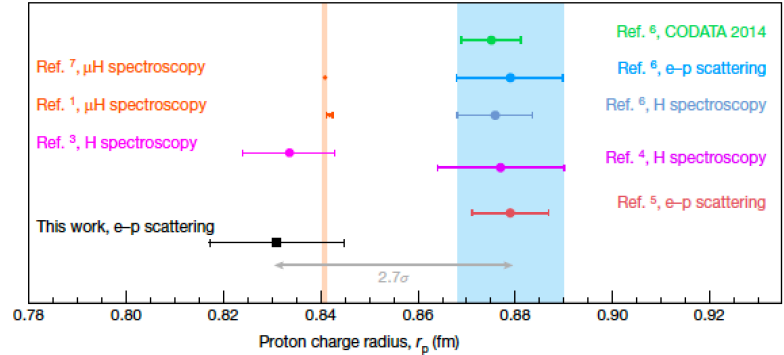
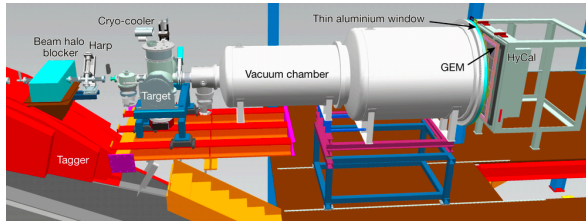
Marco Battaglieri
Jefferson Lab

Hall B highlights

- **CLAS I2 physics runs:**
 - RG-A (13 proposals, 139 PAC days)
 - RG-K (3 proposals, 100 PAC days)
 - RG-B (7 proposals, 90 PAC days)
 - RG-C (BONUS, 42 PAC days)
- **Continued flow of results from Hall B (CLAS+PRAD+HPS+PRIMEX..)**
 - > 230 physics papers in peer reviewed journals (> 14,000 citations)
 - 5 papers in **Nature**, 1 paper in **Science** (+ one submitted)
 - ~2,600 conference talks (~1,650 invited)
- **Specialized Hall B experiments**
 - PRAD experiment – results published in **Nature**
 - PRIMEX - results published in **Science**
 - Heavy Photon Search - Analysis of 2016 data ongoing



Nature volume 575, pages 147–150 (2019)



$$r_p = 0.831 \pm 0.007_{\text{stat}} \pm 0.012_{\text{sys}}$$

Article

A small proton charge radius from an electron–proton scattering experiment

<https://doi.org/10.1038/s41586-019-1721-2>

Received: 17 June 2019

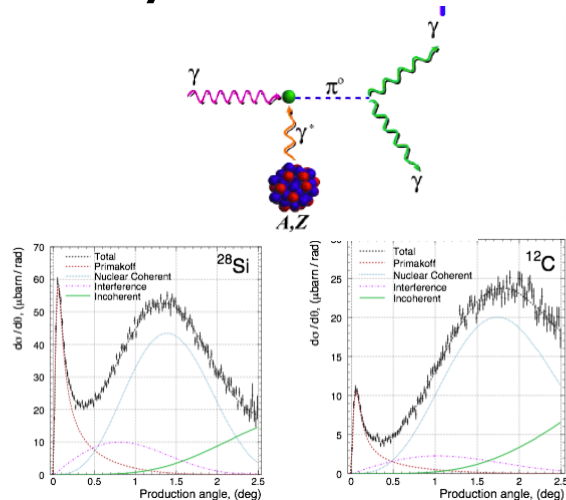
Accepted: 19 September 2019

Published online: 6 November 2019

W. Xiong¹, A. Gasparian^{2*}, H. Gao³, D. Dutta^{4*}, M. Khandaker⁵, N. Liyanage⁶, E. Pasyuk⁶, C. Peng⁷, X. Bai⁸, L. Ye⁹, K. Gnanvo⁹, C. Gu¹, M. Levilain¹⁰, X. Yan¹, D. W. Higinbotham⁶, M. Meziane¹, Z. Ye¹⁰, K. Adhikari³, B. Aljawrneh³, H. Bhatt³, D. Bhetuwal³, J. Brock⁶, V. Burkert⁶, C. Carlin¹, A. Deur¹, D. D'Ef¹, J. Dunne¹, P. Ekanayaka³, L. El-Fassi¹, B. Emmich¹, L. Gar⁶, O. Glamazdin⁶, M. L. Kabir⁷, A. Karki⁶, C. Keith⁶, S. Kowalski¹⁰, V. Lagerquist¹¹, I. Larin^{12,13}, T. Liu¹, A. Liyanage¹⁴, J. Maxwell⁶, D. Meekins⁶, S. J. Nazeer¹⁴, V. Nelyubin¹⁵, H. Nguyen⁶, R. Pedroni⁶, C. Perdrisat⁶, J. Pierce⁶, V. Punjabi¹⁶, M. Shabestari⁶, A. Shahinyan⁶, R. Sitwal¹⁶, S. Stepanyan⁶, A. Subedi¹, V. V. Tarasov¹⁷, N. Ton⁶, Y. Zhang⁶ & Z. W. Zhao¹

- High precision experiment
- New windowless target system
- Use a calorimeter as a spectrometer
- Use e-e scattering to renormalise e-p scattering data
- Very small angle coverage

A Precision Measurement of the π^0 Radiative Decay Width via the Primakoff Effect



RESEARCH **Science 01 May 2020:**
Vol. 368, Issue 6490, pp. 506-509
DOI: 10.1126/science.aay6641

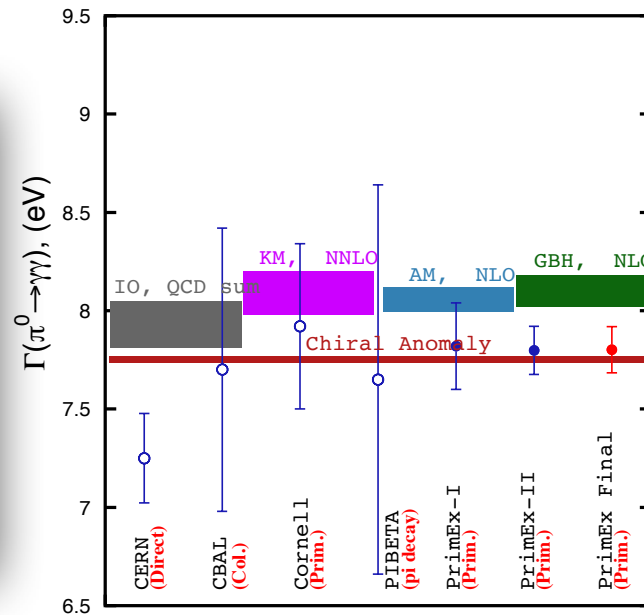
REPORT

NUCLEAR PHYSICS

Precision measurement of the neutral pion lifetime

I. Larin^{1,2}, Y. Zhang^{3,4}, A. Gasparian^{3,4}, L. Gan⁵, R. Miskimen², M. Khandaker⁷, D. Dale⁸, S. Danagoulian⁵, E. Pasyuk⁹, H. Gao^{3,4}, A. Ahmidouch⁵, P. Ambrozewicz⁵, V. Baturin⁵, V. Burkert⁹, E. Clinton², A. Deur², A. Dolgolenko², D. Dutta¹⁰, G. Fedotov^{11,12}, J. Feng⁶, S. Gevorkyan¹³, A. Glamazdin¹⁴, L. Guo¹⁵, E. Isupov¹⁵, M. M. Ito⁹, F. Klein¹⁶, S. Kowalski¹⁷, A. Kubarovsky⁹, V. Kubarovsky⁹, D. Lawrence⁹, H. Lu¹⁸, L. Ma¹⁹, V. Matveev², B. Morrison²⁰, A. Micherdzinska²¹, I. Nakagawa²², K. Park², R. Pedroni⁵, W. Phelps²³, D. Protopopescu⁴, D. Rimal²⁴, D. Romanov²⁵, C. Saigado⁷, A. Shahinyan²⁶, D. Sober²⁵, S. Stepanyan⁹, V. V. Tarasov⁷, S. Taylor², A. Vasiliev²⁷, M. Wood², L. Ye¹², B. Zihlmann², PrimEx-II Collaboration†

The explicit breaking of the axial symmetry by quantum fluctuations gives rise to the so-called axial anomaly. This phenomenon is solely responsible for the decay of the neutral pion π^0 into two photons ($\gamma\gamma$), leading to its unusually short lifetime. We precisely measured the decay width Γ of the $\pi^0 \rightarrow \gamma\gamma$ process. The differential cross sections for π^0 photoproduction at forward angles were measured on two targets, carbon-12 and silicon-28, yielding $\Gamma(\pi^0 \rightarrow \gamma\gamma) = 7.798 \pm 0.056(\text{stat}) \pm 0.105(\text{syst.})$ eV, where stat. denotes the statistical uncertainty and syst. the systematic uncertainty. We combined the results of this and an earlier experiment to generate a weighted average of $\Gamma(\pi^0 \rightarrow \gamma\gamma) = 7.802 \pm 0.052(\text{stat.}) \pm 0.105(\text{syst.})$ eV. Our final result has a total uncertainty of 1.50% and confirms the prediction based on the chiral anomaly in quantum chromodynamics.



Theory and Experiments

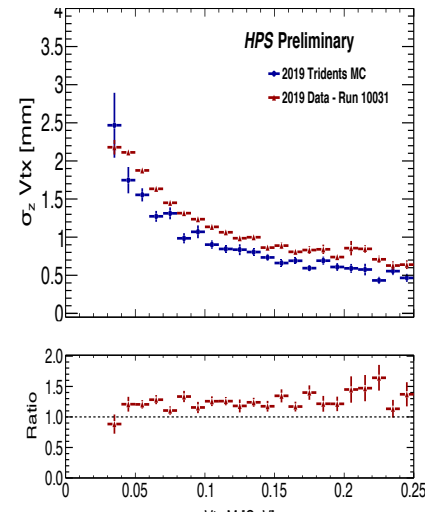
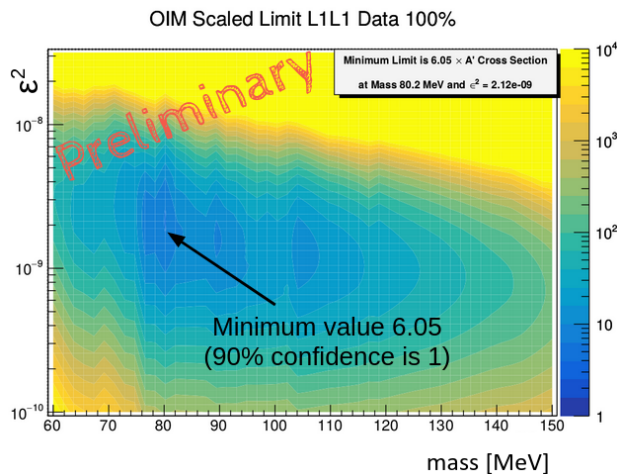
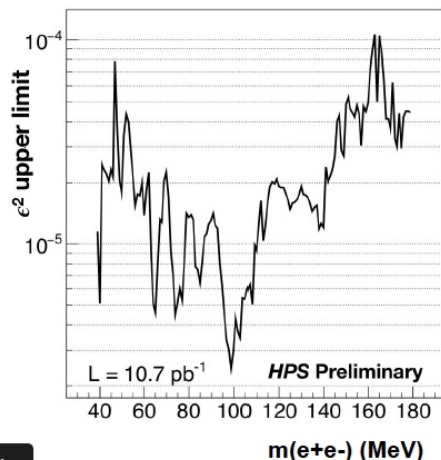
- Precise measurement of π^0 two-photon decay width
- Precise test of chiral symmetry and anomalies
- PrimEx (PrimEx-II) data analysis is completed. Paper submitted to Science past summer (2019).
- The paper with the PrimEx final results accepted for publication in Science



Heavy Photon Search

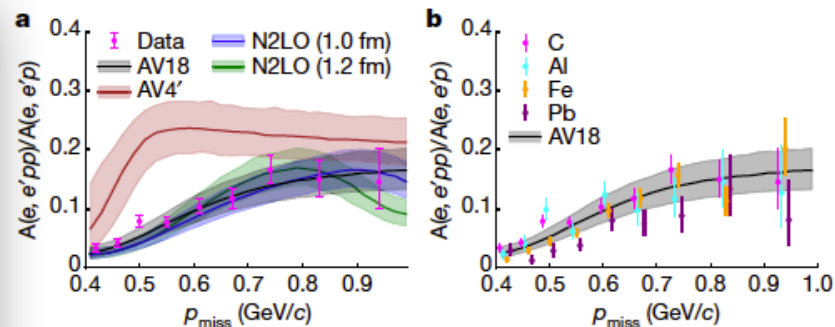
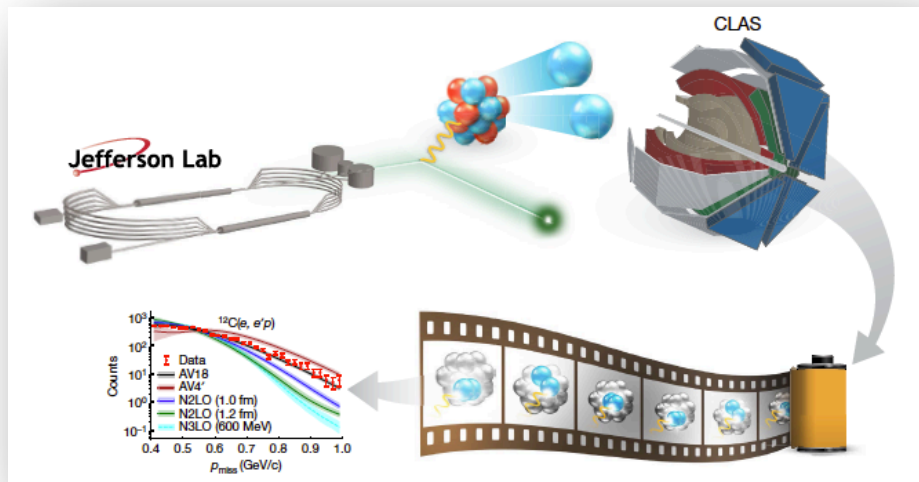
Hall B

- HPS (remote) collaboration meeting held on May
- Jeopardy: submitted a request for 107 days to PAC48 (used 45/180 PAC days)
- Data analysis: 2016 data RESONANT and DISPLACED VERTEX analyses have been presented to JLab UG Meeting



- Calibration of 2019 data is ongoing. Detector groups are making a good progress on Ecal, hodoscope and SVT.
- We expect to start the physics analysis of 2019 unblinded data sample in fall.
- Preparation for 2021 run ongoing

Credit: S.Stepanyan



Nature volume 578, pages 540-544 (2020)

Article

Probing the core of the strong nuclear interaction

<https://doi.org/10.1038/s41586-020-2021-6>

Received: 21 August 2019

Accepted: 10 January 2020

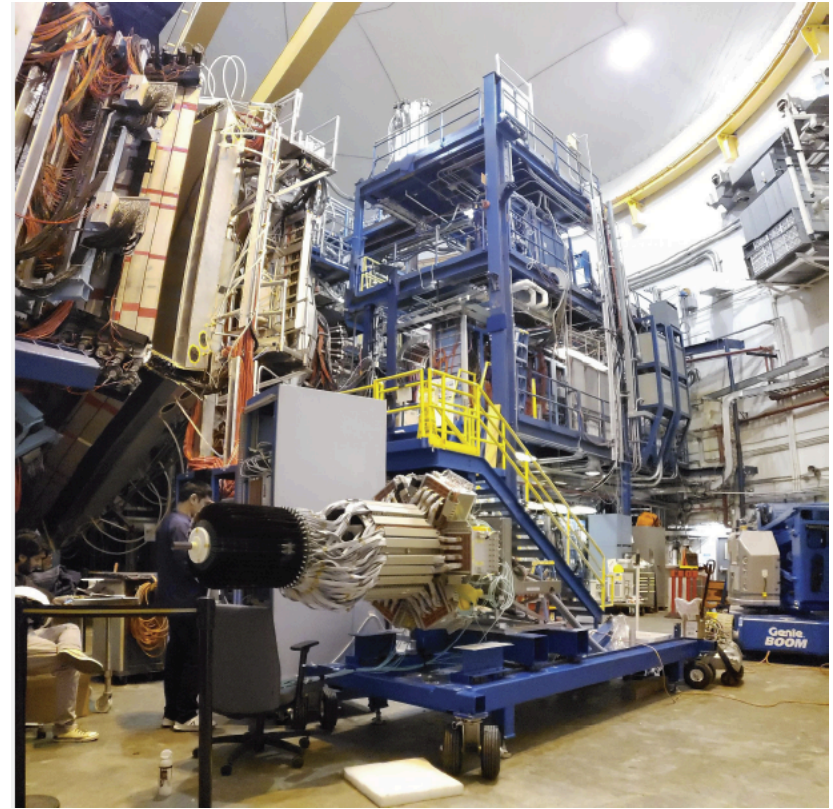
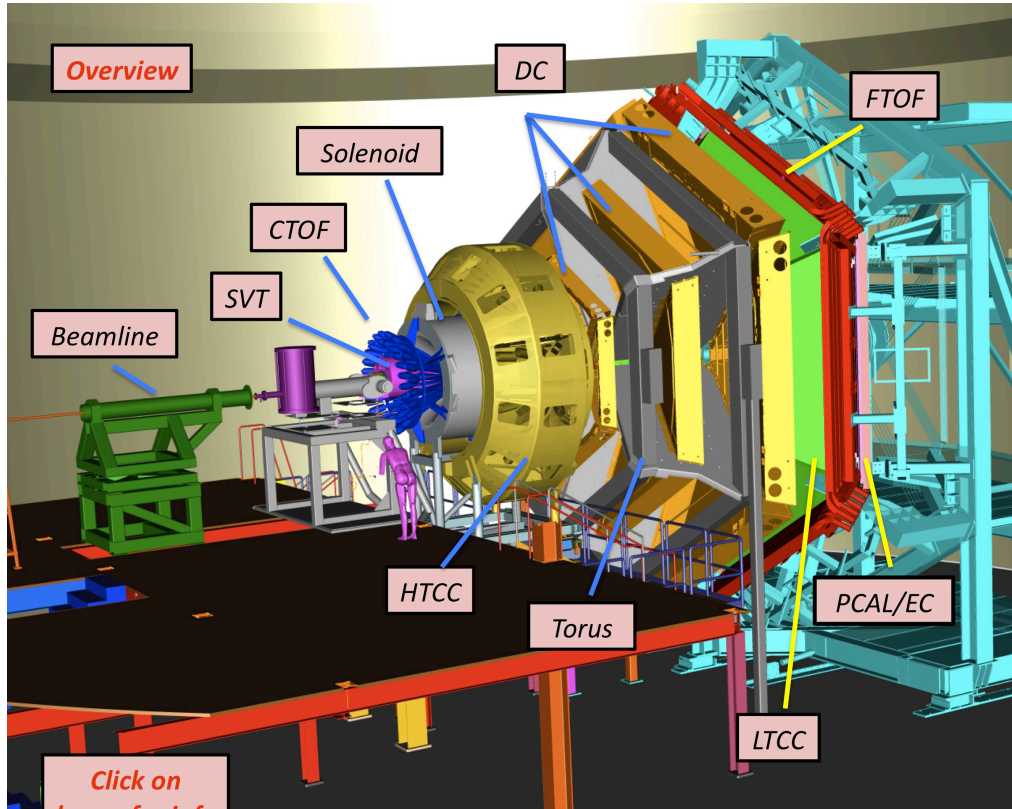
Published online: 26 February 2020

Check for updates

A. Schmidt^{1,3}, J. R. Pybus¹, R. Weiss³, E. P. Segarra¹, A. Hrnjic¹, A. Denniston¹, O. Hen^{1,2,3}, E. Piasetzky¹, L. B. Weinstein⁴, N. Barnea⁵, M. Strikman⁶, A. Liarionov⁷, D. Higinbotham⁸ & The CLAS Collaboration*

The strong nuclear interaction between nucleons (protons and neutrons) is the effective force that holds the atomic nucleus together. This force stems from fundamental interactions between quarks and gluons (the constituents of nucleons) that are described by the equations of quantum chromodynamics. However, as these

- CLAS6 data mining activity
- Electron-nucleus scattering to test nuclear interaction
- Short range correlations up to 400 MeV/c (relative p)
- Transition from spin-dependent tensor force to spin-independent scalar force
- Access to nuclear force in extreme conditions (neutron stars)



– 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
- ~155 mC, ~43% of approved beam time

– Run Group F (BONUS):

- 7 experiments
- 10.2 GeV polarized electrons (+2.2 GeV for calibration)
- Gas-deuterium target +RTPC
- ~49% of approved beam time

CLAS12 data taking

- from Feb 2017 (KPP) to Summer 2020 (physics runs)

– Nuclear targets test (special run):

- 10.2 GeV electrons
- LD2, LHe and Pb targets
- 100% of scheduled time

From PAC47 meeting

- RG-B: Fall'19/Spring'20 collected 25% of assigned beam time
- Nuclear target test was successfully performed
- RG-F: Spring'20 collected 50% of assigned beam time
- RG-F is currently running, expecting to complete the program by September'20

RG-A

Proposal	Physics	Contact	Rating	Days	Group	Equipment	Energy	Run Group	Target
E12-06-108	Hard exclusive electro-production of π^0 , η	Stoler	B	80	139	RICH (1 sector) Forward tagger	11	A L.Elouadrhiri	liquid H ₂
E12-06-108A	Exclusive $N^* \rightarrow KY$ Studies with CLAS12	Carman		(60)					
E12-06-108B	Transition Form Factor of the η' Meson with CLAS12	Kunkel		(80)					
E12-06-112	Proton's quark dynamics in SIDIS pion production	Avakian	A	60					
E12-06-112A	SIDIS Λ production in target fragmentation region	Mirazita		(60)					
E12-06-112B	Colinear nucleon structure at twist-3	Mirazita		(60)					
E12-06-119(a)	Deeply Virtual Compton Scattering	Sabatie	A	80					
E12-09-003	Excitation of nucleon resonances at high Q ²	Gothe	B+	40					
E12-11-005	Hadron spectroscopy with forward tagger	Battaglieri	A-	119					
E12-11-005A	Photoproduction of the very strangest baryon	Guo		(120)					
E12-12-001	Timelike Compton Scatt. & J/ψ production in e+e	Nadel-Turonski	A-	120					
E12-12-001A	J/ψ Photoproduction & study of LHCB pentaquarks	Stepanyan		(120)					
E12-12-007	Exclusive ω meson electroproduction with CLAS12	Girod	B+	60					
E12-003B	J/ψ production on deuterium	Ilieva	N/A	(80)					
Days of run (updated August 7 2020)						69 (50%)			

RG-K

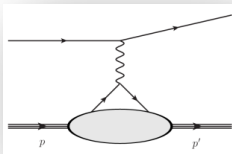
Proposal	Physics	Contact	Rating	Days	Group	Equipment	Energy	Group	Target
E12-16-010	A search for Hybrid Baryons in Hall B with CLAS12	D'Angelo	A-	100	100	Forward Tagger	6.6, 8.8	K Confinement & Strong QCD A. d'Angelo	IH2
E12-16-010A	Nucleon Resonances in exc. KY electroproduction	Carman	A-	(100)					
E12-16-010B	DVCS with CLAS12 at 6.6 and 8.8 GeV	Elouadrhiri	A-	(100)					
Days of run (updated August 7 2020)						12 (12%)			

RG-B

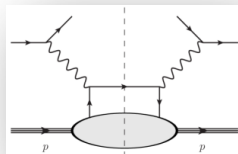
Proposal	Physics	Contact	Rating	Days	Group	Equipment	Energy	Group	Target
E12-07-104	Neutron magnetic form factor	<u>Gilfoyle</u>	A-	30	90	Neutron detector RICH (1 sector) Forward tagger	11	B <u>S.Niccolai</u>	liquid D ₂ target
E12-09-007(a)	Study of partonic distributions in SIDIS kaon production	<u>Hafidi</u>	A-	30					
E12-09-008	Boer-Mulders asymmetry in K SIDIS w/ H and D targets	<u>Contalbrigo</u>	A-	56					
E12-09-008A	Hadron production in target fragmentation region	<u>Mirazita</u>		(60)					
E12-09-008B	Colinear nucleon structure at twist-3	<u>Mirazita</u>		(60)					
E12-11-003	DVCS on neutron target	<u>Niccolai</u>	A	90					
E12-11-003A	In medium structure functions, SRC, and the EMC effect	Hen		(90)					
E12-003B	J/ψ production on deuterium	<u>Ilieva</u>	N/A	(80)					
Days of run (updated August 7 2020)						39 (43%)			

RG-F

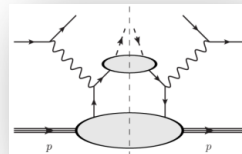
Proposal	Physics	Contact	Rating	Days	Group	Equipment	Energy	Group	Target
E12-06-113	Free Neutron structure at large x	<u>Buellman</u>	A	42	42	Radial TPC	11	F S. Kuhn	Gas D ₂
Days of run (updated August 7 2020)						22 (52%)			



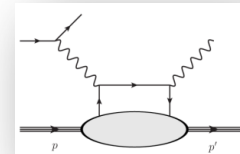
Elastic Scattering



DIS



SIDIS



DVCS

+ J/ψ photoproduction & SRC

E12-07-104	Neutron magnetic form factor	G. Gilfoyle	A-	30
E12-09-007a	Study of parton distributions in K SIDIS	W. Armstrong	A-	56
E12-09-008	Boer-Mulders asymmetry in K SIDIS	M. Contalbrigo	A-	56
E12-11-003	Deeply virtual Compton scattering on the neutron	S. Niccolai	A (HI)	90
E12-09-008b	Collinear nucleon structure at twist-3 in dihadron SIDIS	M. Mirazita	RG	
E12-11-003a	In medium structure functions, SRC, and the EMC effect	O. Hen	RG	
E12-11-003b	Study of J/ψ photoproduction off the deuteron	Y. Ilieva	RG	
E12-11-003c	Quasi-real photoproduction on deuterium	F. Hauenstein	RG (*)	

Deuteron luminosity in nDVCS proposal: 10^{35} cm²/s
Total expected charge for 90 PAC days: 510 mC

• RG-B Fall 2019

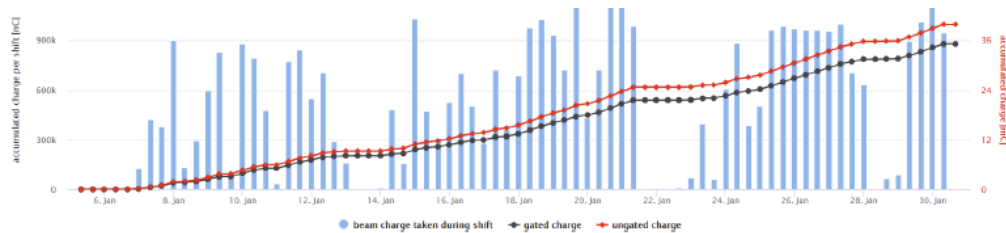
Running conditions:

- 10.4 GeV electrons
- Torus OUTBENDING
- 26mC collected

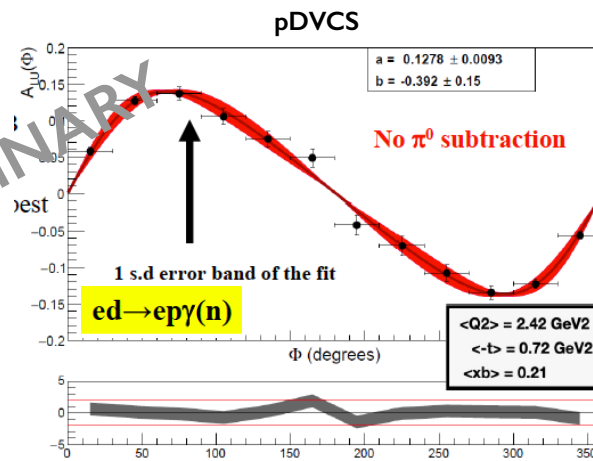
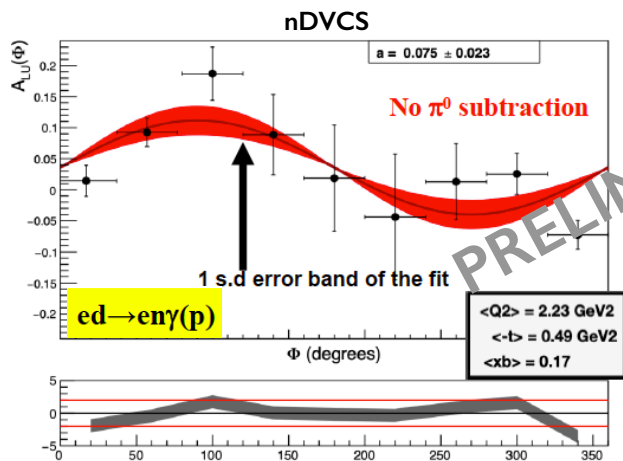
• RG-B Spring 2020

Running conditions:

- 10.4 GeV electrons
- Torus INBENDING
- I_{beam} 40-50nA
- 40mC collected



- 38.9 total PAC days according to ABUs → 43.2% of the approved 90 PAC days
- Accumulated charge: 154.6 mC, 30.3% of the proposed 510 mC

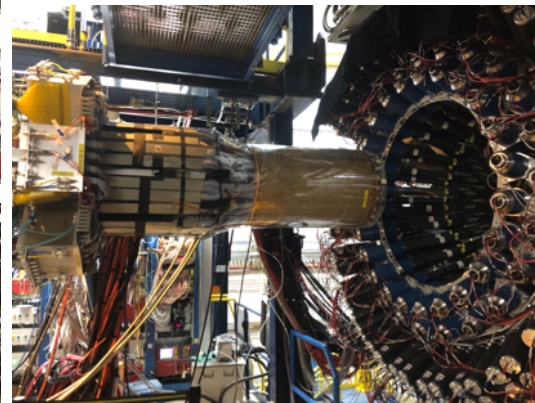
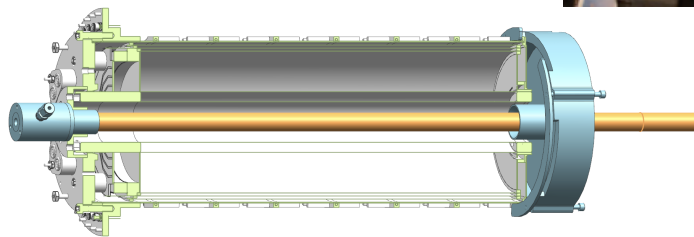
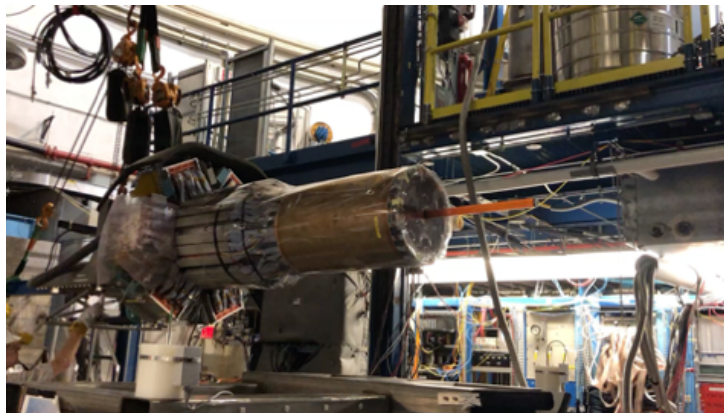
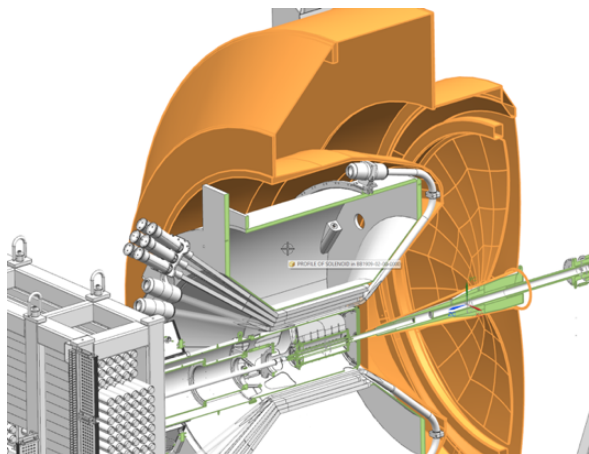
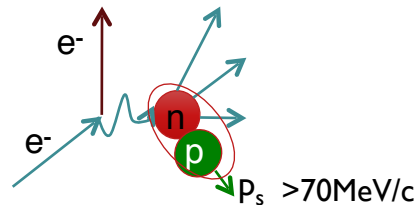


Other ongoing analyses:

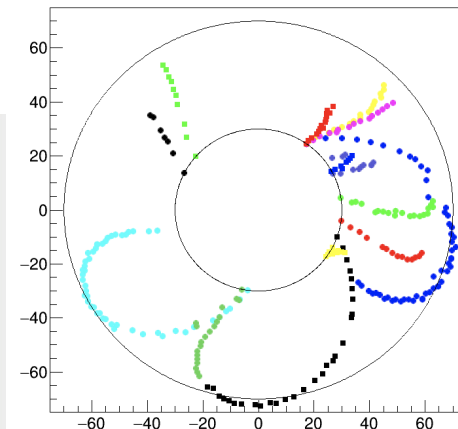
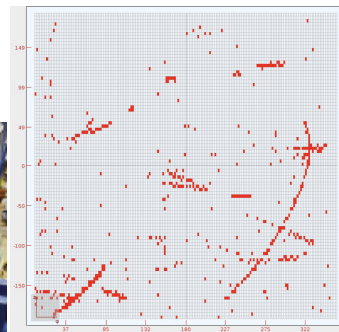
- Coherent DVCS on d (A.Biselli)
- Neutron π^0 -DVMP on d (D.Sokhan)
- G_M^n at large Q^2
- High-x tagged DIS (BAND)

Credit: S.Niccolai, K.Price, A.Hobart

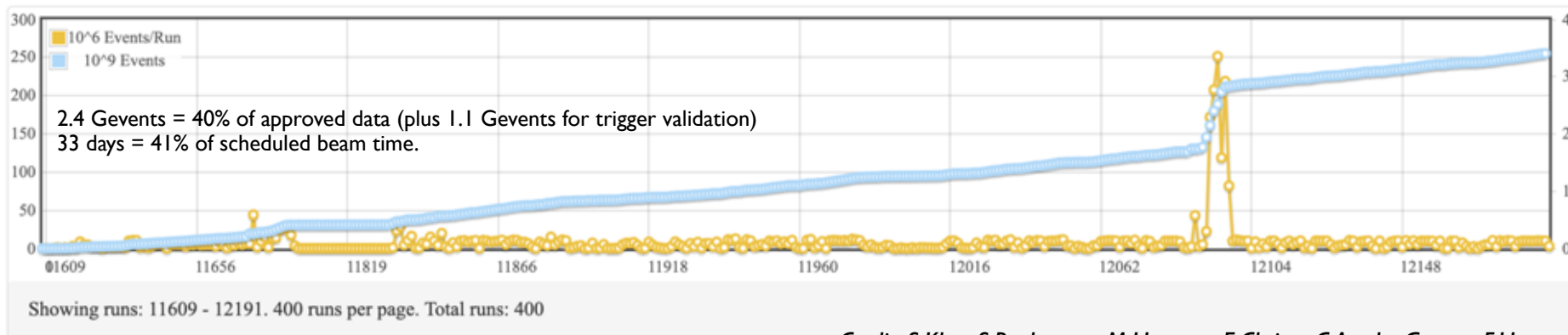
F_2^n/F_2^p ratio by tagging almost unbound neutrons using detection of low momentum protons in a radial TPC



- Installation on time (February 4-9)
- 2.2 GeV calibration data and RTPC commissioning
- Trigger optimisation (roads): 100-200 nA beam current
- 10.4 GeV Production on D2 target
- Issues with HV required RTPC replacement (happened in <5d!!)

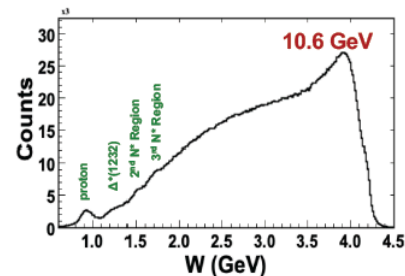
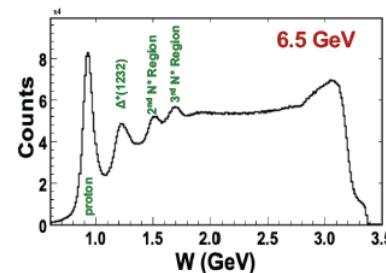
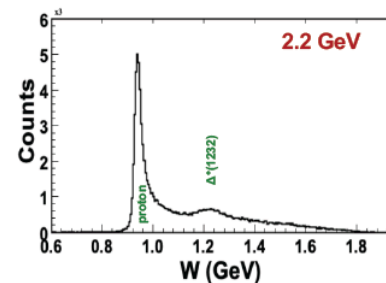
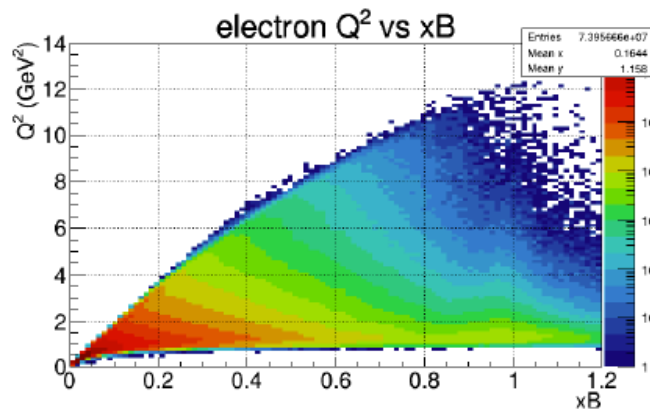
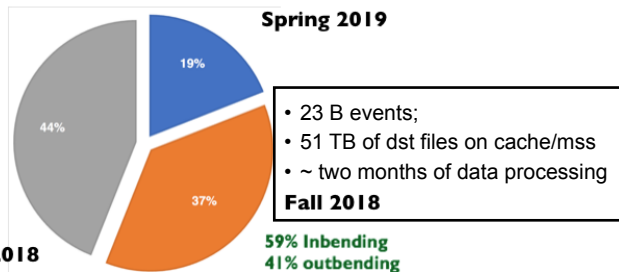


- Prod restarted with 240 nA @10.3 GeV
- Only few days of good data before the COVID pause

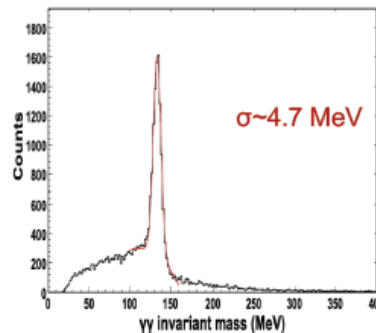
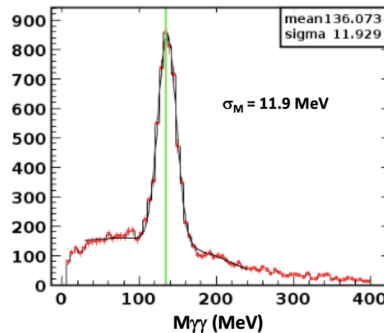
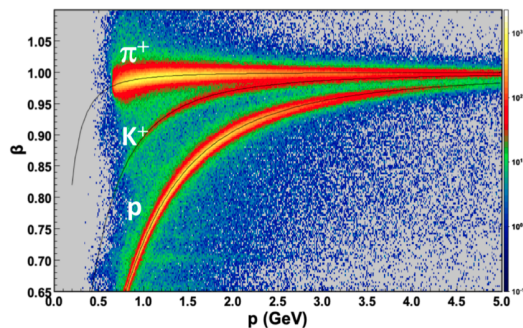


Credit: S.Khun, S.Bueltmann, M.Hattawy, E.Christy, C.Ayerbe-Gayoso, F.Hauenstein

RG-A



- Concluded the first massive cooking on Fall'18 data set (both In bending and Out bending)

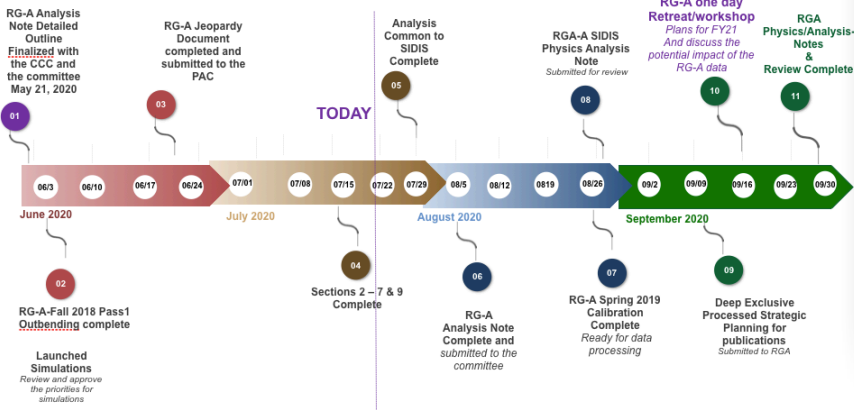


Credit: D.Carman, R.De Vita, Latifa

Toward the first CLAS12 publication

- Initial focus on Transverse Momentum Distribution (TMDs) by SIDIS
- Single hadron (S.Diehl) and di-hadron (C.Dilks) analyses well advanced

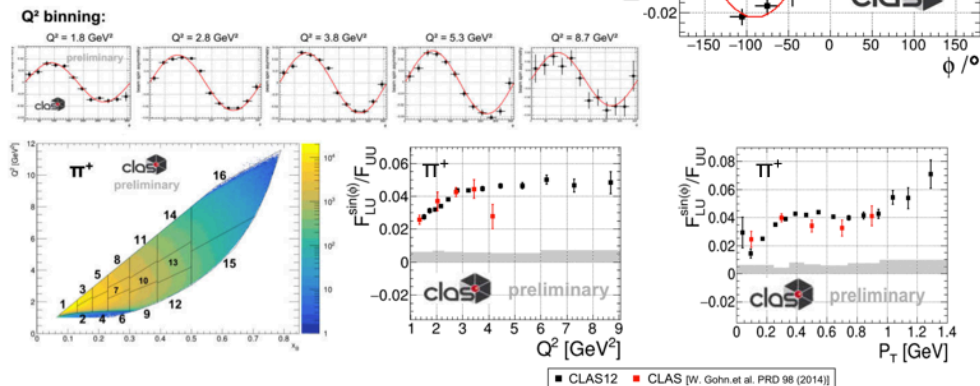
RG-A – Path towards the first publications - Milestones



Physics Results

Beam Spin Asymmetry analysis in single pion production

- Extraction of the structure functions $F_{LU}^{\sin\phi}/F_{UU}$ from polarized electron beam-spin asymmetry in semi-inclusive deep inelastic scattering events for the $e\pi^+X$, $e\pi^-X$ and $e\pi^0X$ modes.
- One and multi-dimensional analysis as a function of kinematic variables (z , $p_{T\perp}$, x_B , Q^2)
- CLAS12 provides a measurement comparable to previous experiments with subsample of available

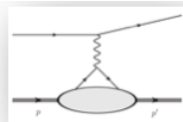


CLAS12 Analysis and Path to Publication

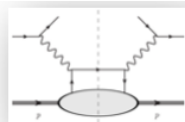
10

Credit: S.Diehl, C.Dielks, Latifa E., V.Ziegler

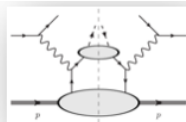
RG-B



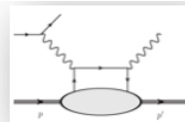
Elastic Scattering



DIS



SIDIS



DVCS

+ J/psi photo-production & SRC



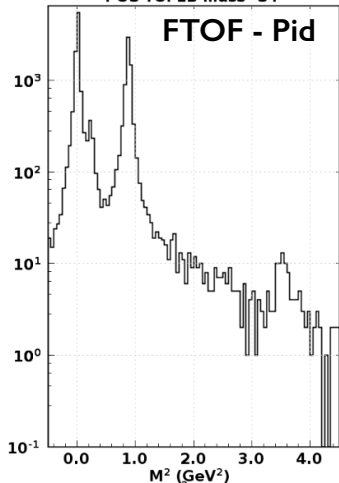
• 43.3 B triggers collected:

- 10.6 GeV (9.7 B)
- 10.2 GeV (11.7 B)
- 10.4 GeV (21.9 B – 9 B are outbending)

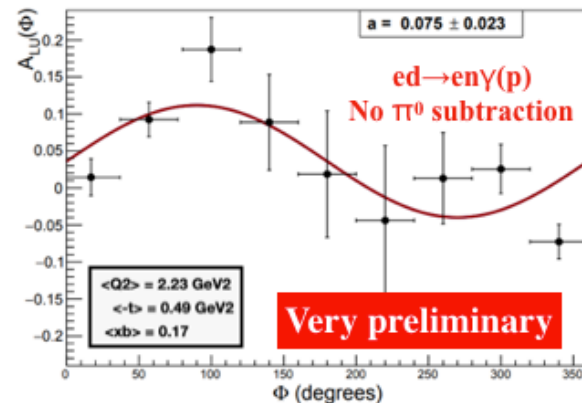
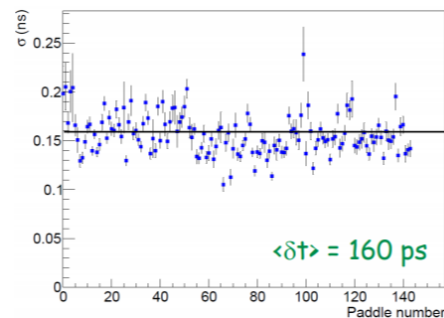
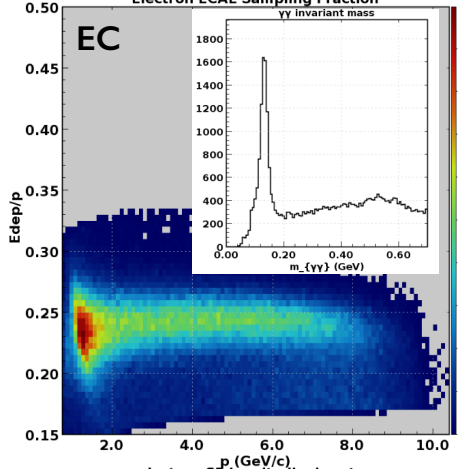
• Average beam polarization ~86% Jeopardy proposal to PAC (51 days)

• Pass I **Spring 19** data **50% done**

POS TOF1B mass² S4



Electron ECAL Sampling Fraction



Ongoing analyses:

- Coherent DVCS on d (A.Biselli)
- Neutron π^0 -DVMP on d (D.Sokhan)
- G^M at large Q^2
- High-x tagged DIS (BAND)

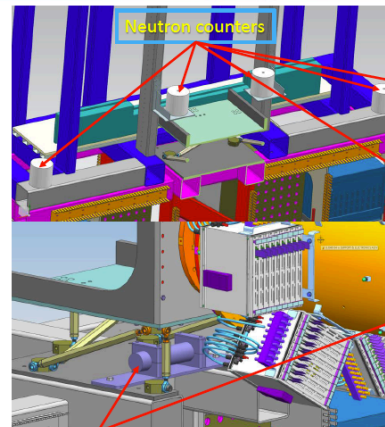
Credit: S.Niccolai

- SVT current increase: 2 times w.r.t.un-irradiated sensors
- ~10 times less vs. the first beam tuning in December 2017 with liquid hydrogen target

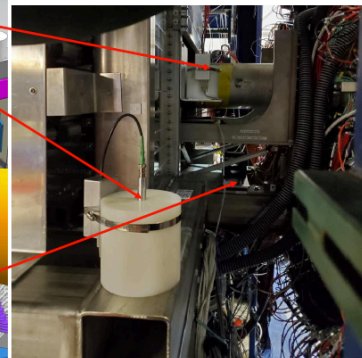
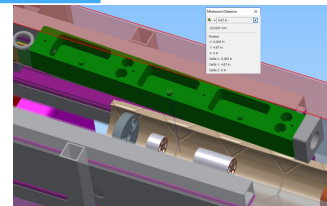
GOALS:

- Measure **occupancies and the leakage currents** in the silicon sensors
- Measure **rates** of CLAS12 detectors
- **Validate simulations** by measuring radiation dose at various locations around the target

- Run Feb 3-6 2020
- Beam energy: 10.4 GeV
- Standard CLAS12 config (no CVT, no BAND)
- 5 cm LD2, 5 cm LHe, 0.125 mm Pb (250 nA , $1.3 \cdot 10^{35} \text{ cm}^{-2} \text{ s}^{-1}$)
- Neutron activation In counters (n) + TLDs (charge) + n, γ monitors
- Run performed with the support of the RadCon Group



Neutron counters



Credit: E.Pasyuk, Y.Gotra



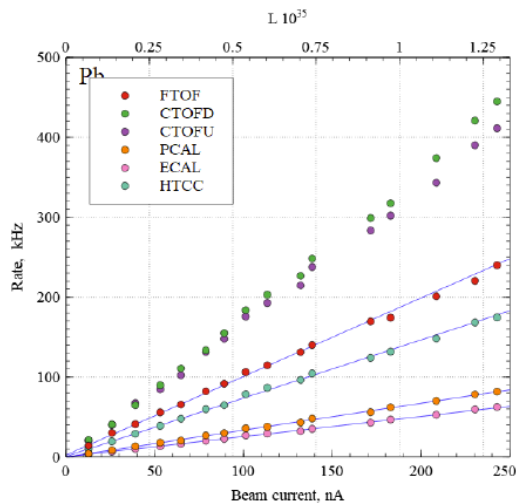
Sample Id	Irradiation Stop	115m Bq	115m unc Bq	116m Bq	116m unc Bq
1 2	2/2/2020 6:17	5.88E+00	1.14E+00	1.26E+03	3.11E+01
3 4	2/2/2020 6:17	1.79E+00	6.10E-01	8.79E+02	2.67E+01
5 6	2/2/2020 11:42	8.01E-01	1.22E-01	1.77E+02	5.89E+00
7 8	2/3/2020 11:42	8.43E-01	2.70E-01	1.96E+02	4.51E+00
9 10	2/6/2020 12:02	2.51E+00	7.64E-01	7.17E+02	1.48E+01
11 12	2/6/2020 12:02	1.92E+00	3.46E-01	6.26E+02	1.37E+01

Credit: E.Pasyuk

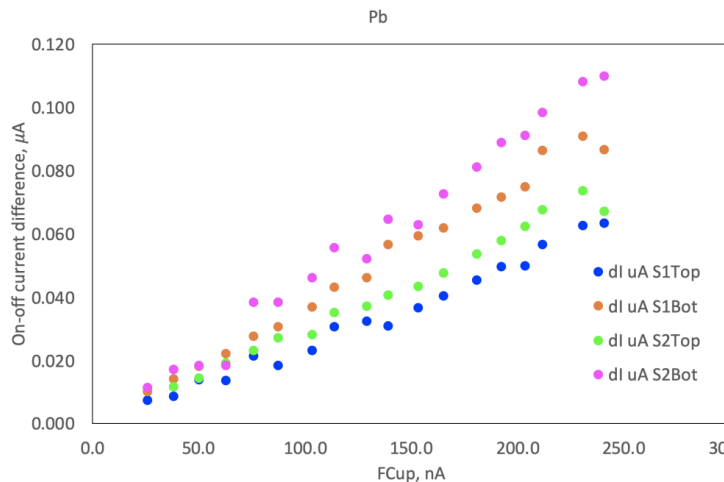
Preliminary results

- Preliminary results presented to the Hall-B TF Friday Meeting (E.Pasyuk)
- Strong and efficient collaboration between HallB and RadCon
- Short report expected by the end of June and the full report expected by August

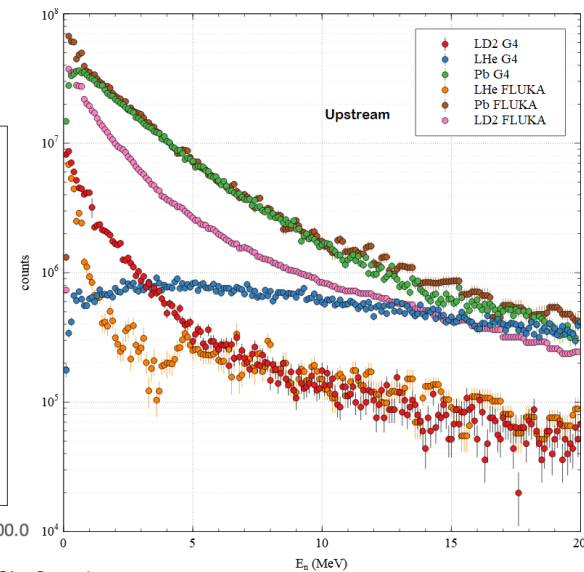
CLAS12 can handle nuclear targets with $L \leq 10^{35} \text{ cm}^{-2}\text{s}^{-1}$



1) CLAS12 detectors rates
Linear behaviour up to >1.5 (Hadronic) L_{Nominal}



2) SVT current
Occupancy as expected from CLAS12 H2 and D2 runs



3) Simulations
Agreement with FLUKA, issues with G4 for light nuclei

– 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
- ~155 mC, ~43% of approved beam time

– Run Group F (BONUS):

- 7 experiments
- 10.2 GeV polarized electrons (+2.2 GeV for calibration)
- Gas-deuterium target +RTPC
- ~49% of approved beam time

CLAS12 data taking

- from Feb 2017 (KPP) to Spring 2020 (physics runs)

– Nuclear targets test (special run):

- 10.2 GeV electrons
- LD2, LHe and Pb targets
- 100% of scheduled time

Plans for FY20

- On June 8 Hall-B resumed operations (MEDCON5)
- Hall-B and CLAS12 ready with RG-F experimental configuration
- On August 1st we had beam on target
- Run few days at low energy ($E=2$ GeV) for RTPC calibration
- RG-F (BONUS) at 10.4 GeV from now to September for 6 weeks to complete the 100% of scheduled data taking
- After September, Hall-B will be down till June '21

CLAS12

- demonstrated to exceed the expected performance
- Room for improvement for alignment, calibrations and efficiency

Data reconstruction

- Started massive cooking of 2y of data
- So far:
 - 13.5B triggers
 - 0.3PB raw → 40TB DST → 25TB skimmed
 - 4M core/hrs processing time
 - 600k jobs processed by JLab farm (SWIF) with 6 corrupted files ...

IT resources

- Docker containers for RecSW distribution
- Off-site resources: OSG + INFN + UK for CLAS12 simulations

Machine Learning for CLAS12

- Tracking: speed (6x)
- Clustering
- RecSW handles both conventional and AI algorithms (validation)
- Expected improvement in efficiency and resolution
- Future: on-line reconstruction

Credit: V.Ziegler

The CLAS12 Spectrometer at Jefferson Laboratory

Nuclear Inst. and Methods in Physics Research, A

ELSEVIER

journal homepage: www.elsevier.com/locate/nucinst

Contents lists available at ScienceDirect

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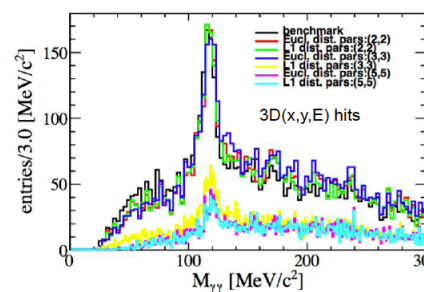
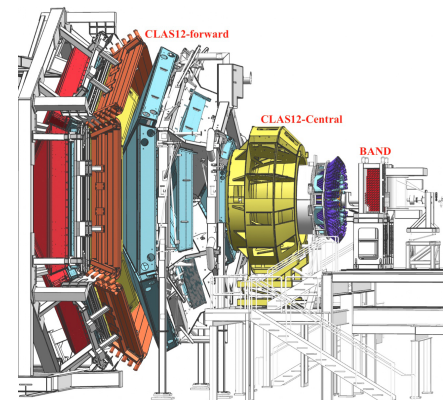
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Double cluster π^0 mass as obtained by an unsupervised hierarchical clustering algorithm implemented in JANA framework by C.Fanelli

Future plans

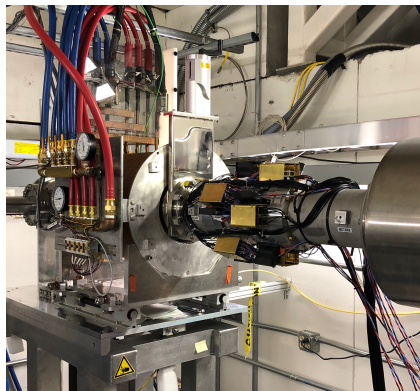
- High Luminosity upgrade: staged approach (TF), requires higher granularity tracker (GEM?)
- Streaming RO: first test in Feb performed using the FT-Cal, application of AI algorithms

• In support of CLAS12 run group (all transverse experiments designated as **High Impact** for Hall B)

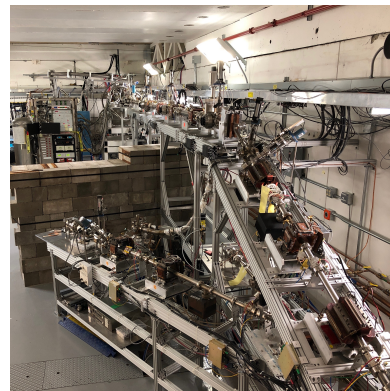
- challenge: transverse holding fields bend electrons into the detector !
- mitigation: small $B \cdot dL \Leftrightarrow$ frozen-spin HD

Original plan (before COVID):

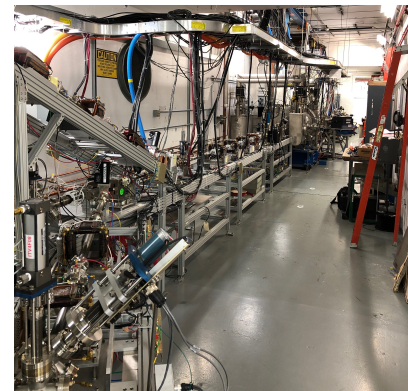
- Run 0 – UITF machine commissioning (cave-1)
- Run 1 – cave-2 & HDice IBC beamline commissioning
- Run 2 – Studies with unpolarized HD
- Run 3 – Studies with *frozen-spin* HD between Mach - August



HDice In-Beam Cryostat



cave-2 elevated beam line



cave-1 with BOOSTER

- New tests planning (boosted by S&T Review recommendation)
- Run 0 started! Booster commissioned up to 2 MeV \Leftrightarrow milestones at 0.5 MeV, 1 MeV, and 10 MeV
- Run 1: cave-2 commissioning (beam line)- target date: August 24th ~16.5 days
- Run 2: run on UNpolarized HD ~16.5 days
- Run 3: run on Polarized HD ~34.5 days

Credit: A.Sandorfy

Task Forces

- Forward tracking
- Central tracking
- New polarised targets
- *Future CLAS12 Hi-Lumi*
- Future CLAS12 PID
- *Future CLAS12 Trigger/DAQ*
- CLAS12 software development
- *AI support to CLAS12 sw*
- CLAS12 data preservation
- Physics analysis framework
- GEMC for streaming RO
- Novel tracking technologies
- BG merging
- RG-L (ALERT) integration
- RG-C support
- RG-M support
- RG-I support
- Regular report on Friday meeting (8/14)
- Documentation available on wiki pages

** These TFs have been recognised of interest for a lab-wide effort*

Who

- 3-4 core group + 1-2 staff contribution (staff + Bridge/Joint associates)
- CLAS12 Users as consultants

How

- Clear charge and defined timeline to complete the study
- Assessment, existing issues, path forward, work-plan to identify timeline and resources needed
- Short report at the end used to steer future resources (human and capital) allocation
- Regular weekly meeting with short presentations (rotating) and focused discussion (Friday's TCB slot? other options?)
- WEB resources for minutes/material
- All staff is strongly encouraged to attend and contribute

■ Schedule

- FY21: long CEBAF shutdown for CHL Cold Box repair
- FY21: 20 weeks (Jun-Oct), 10.9 max E_b , only two RGs that requires low beam energy will be able to run (HPS and RGM)
- FY22 (tentative): polarized longitudinal target
- ... : nuclear targets, transverse polarized target, completion of RGA, RGB, RGK, HPS, ...
- ... : new proposals (PRAD-II, polarized 3He, ...)

* **Caveat:** assuming NO COVID-19 emergency, MEDCON3 status and a reasonable CLAS12 resumption of operations (domestic/international collaborators available)

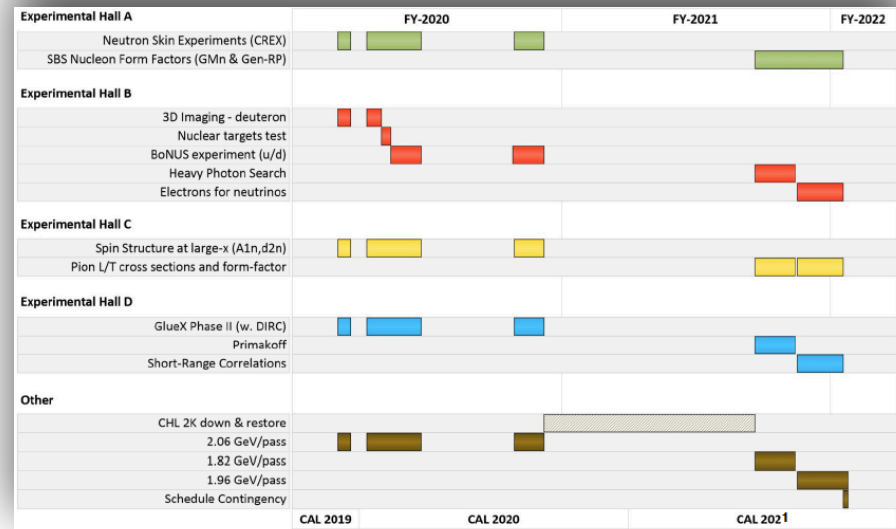
Working on mitigation of long delay:

- Involving RG in scheduling
- Reducing any installation overhead to maxim run efficiency
- Splitting the run time to have at least 50% RG data available
- Providing some sort of priority to RG not running soon

In summary:

... difficult time but:

- Difficult times but JLab is doing the best to complete the experimental program planned for FY20
- Hall-B staff members and collaborators are doing their best to provide data ready for physics analysis



Proposal ID	Hall	Title	Days
Letters of Intent			
LOI12-20-001	B	Measurement of the Neutral Pion Transition Form Factor and Search for the Dark Omega Vector	30
New Proposals			
PR12-20-002	B	A Program of Spin-Dependent Electron Scattering from a Polarized He-3 Target in CLAS12	30
PR12-20-004	B	PRad-II: A New Upgraded High Precision Measurement of the Proton Charge Radius	40
PR12-20-005	B	Precision measurements of A=3 nuclei in Hall B	60
PR12-20-006	B	Precision Deuteron Charge Radius Measurement with Elastic Electron-Deuteron Scattering	40
PR12-20-009	B	Beam charge asymmetries for Deeply Virtual Compton Scattering on the proton at CLAS12	100
		New beam time requested for Hall-B proposal	270
Run Group Additions			
E12-06-106A	B	Nuclear TMDs in CLAS12	0
E12-09-007A	B	Studies of Dihadron Electroproduction in DIS with Longitudinally Polarized Hydrogen and Deuterium	0
E12-09-117A	B	Dihadron measurements in electron-nucleus scattering with CLAS12	0