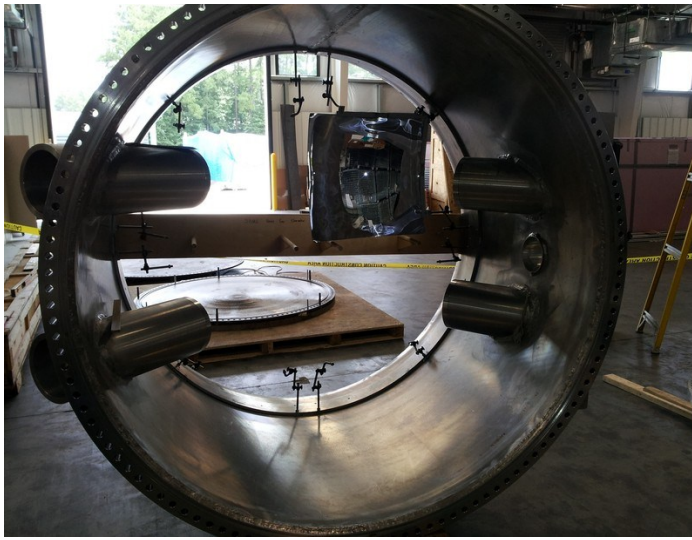
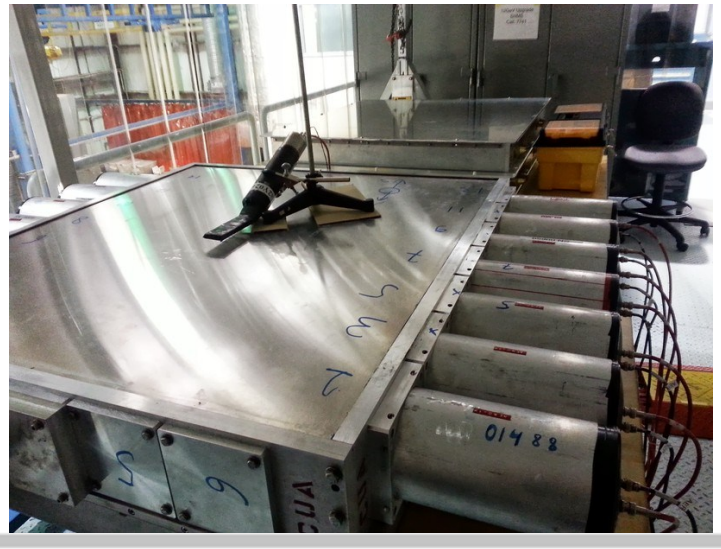
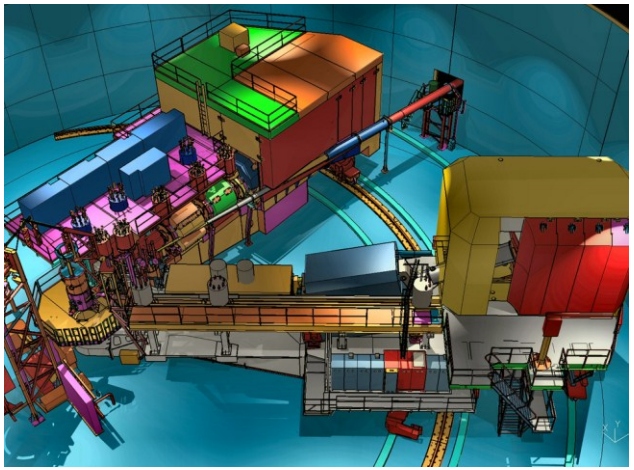


UGBOD Meeting January 13, 2015

Stephen Wood





Publications and Students

Separated Response Functions in Exclusive, Forward $\pi^{\pm}$ Electroproduction on Deuterium Phys. Rev. C **91**, 015202 (2015) (from Fpi data)

Primary Beam Steering Due to Field Leakage from Superconducting SHMS Magnets JINST **9**, T11002 (2014)

The HKS Experiments at JLab Hall C and the New Spectroscopy of $^{12}_{\Lambda}$B Hypernuclei Phys. Rev. **C** 90, 034320 (2014)

The Q_weak Experimental Apparatus NIM arXiV:1409.7100

In the pipeline: Qweak+ancilliary measurements, more hypernuclear, inclusive electron scattering, super-rosenbluth, RCS

Recent Ph.D.: Chunhua Chen (HKS), Adesh Subedi (Qweak), Amrendra Narayan (Qweak), Nuruzzaman (Qweak)

SHMS

SHMS Structure complete

Services (Power, LCW, AC) installed

signal, HV install in progress

Magnet power supplies tested, DC cables

ready for Q1 and HB

Cryogenic system ready for Q1 and HB

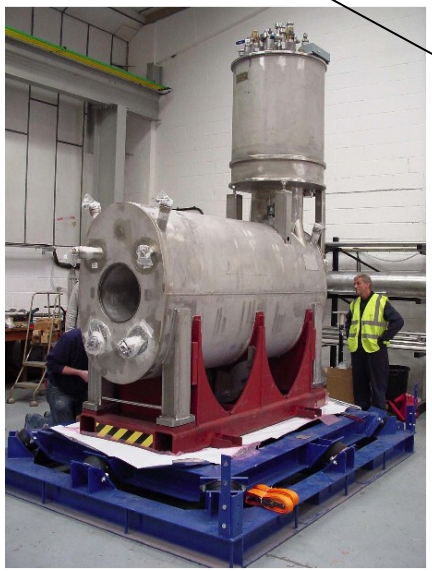
Steel for Q2, Q3, Dipole installed

Q1 delivery today

readiness review

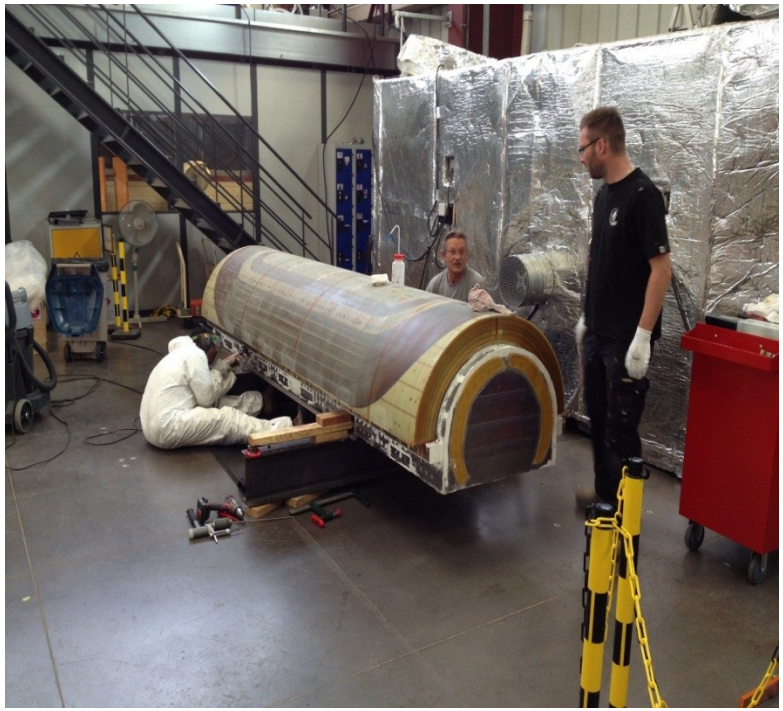
next week

HB delivery in spring



Q2, Q3, Dipole

Dipole coil #1 out of mold



Coils wound and vacuum impregnated.

Assembly into cold mass.

Q2/Q3 Winding

Q2 winding almost done

SHMS

SHMS Preshower and Shower Counter installed

Testing with Flash ADC DAQ

Detector mounts installed

Detector frames being assembled on site

Hall C Beamline: 6 GeV → 11 GeV

Modify Compton polarimeter for operation at 11 GeV

- Raise chicane
- Replace vacuum chambers
- Replace dipole poles - map

Repair Møller polarimeter

- New coils for big quads
- Acid flush small quad
- Map all quads

Make beabeamline downstream of Møller ready for 11 GeV

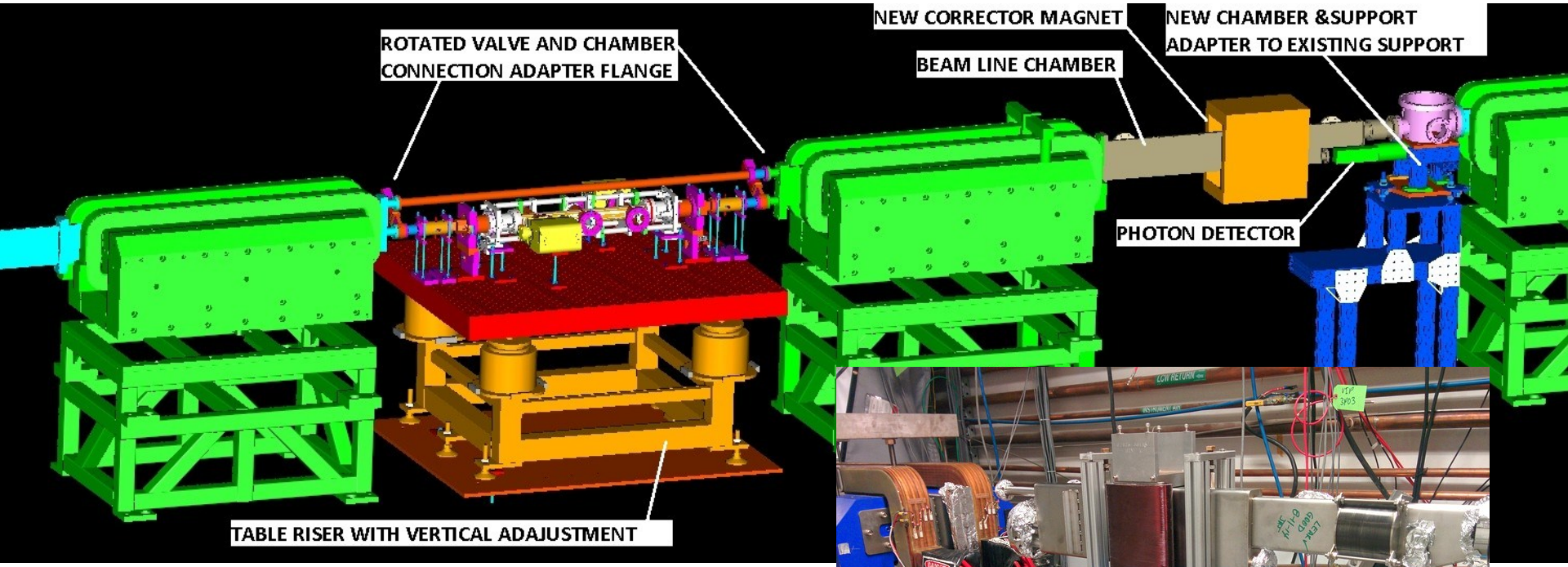
- Fast raster
- Larger magnets for 17 mm vertical chicaned

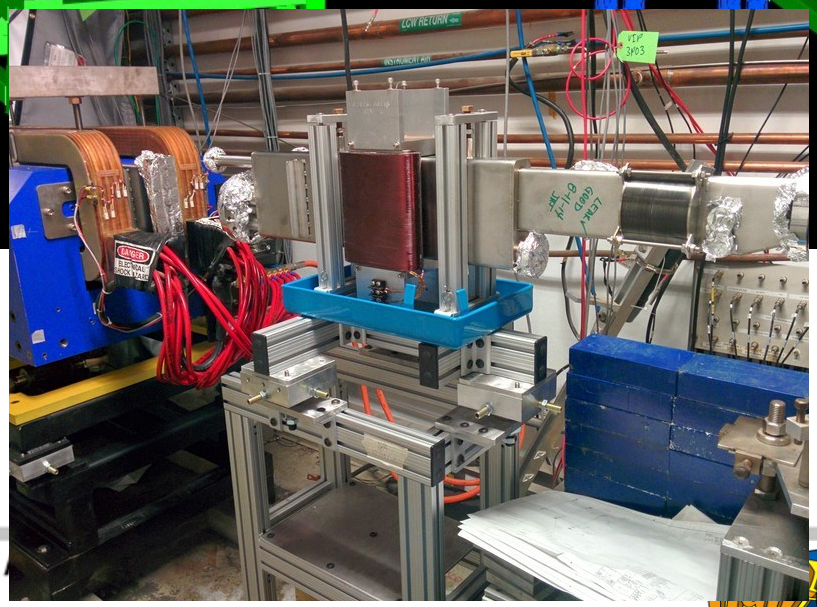
Mechanical installation by end of summer 2015 – still controls/software work

Updated 12 GeV Compton design

Project Manager: Dave Gaskell - Design: Paulo Medeiros

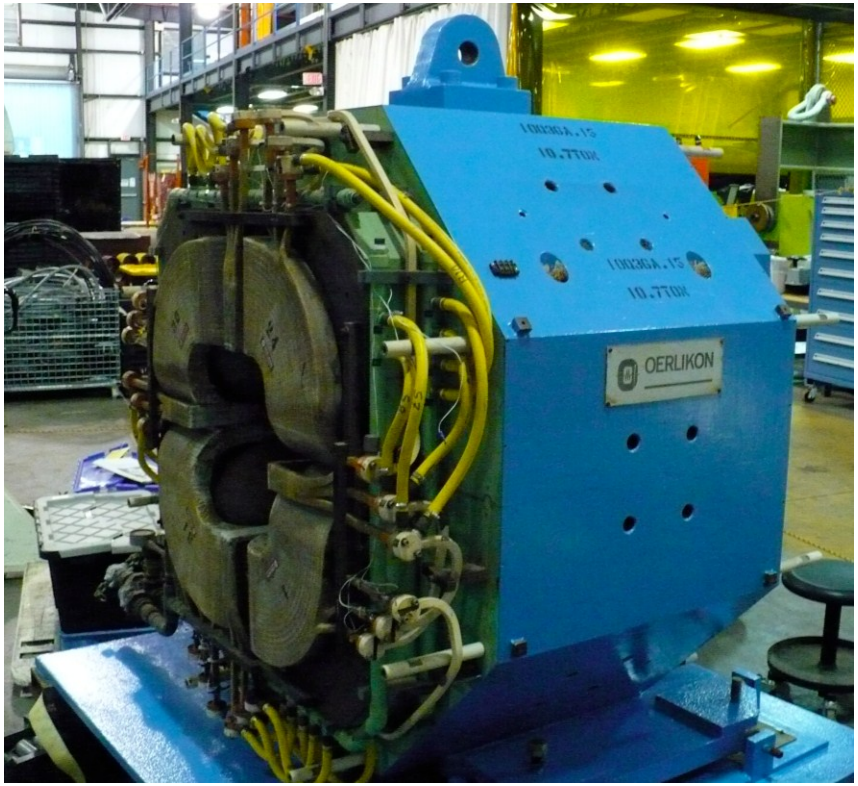
with a lot of input from Engineering and Ops (John Musson and Jay Benesch in particular)

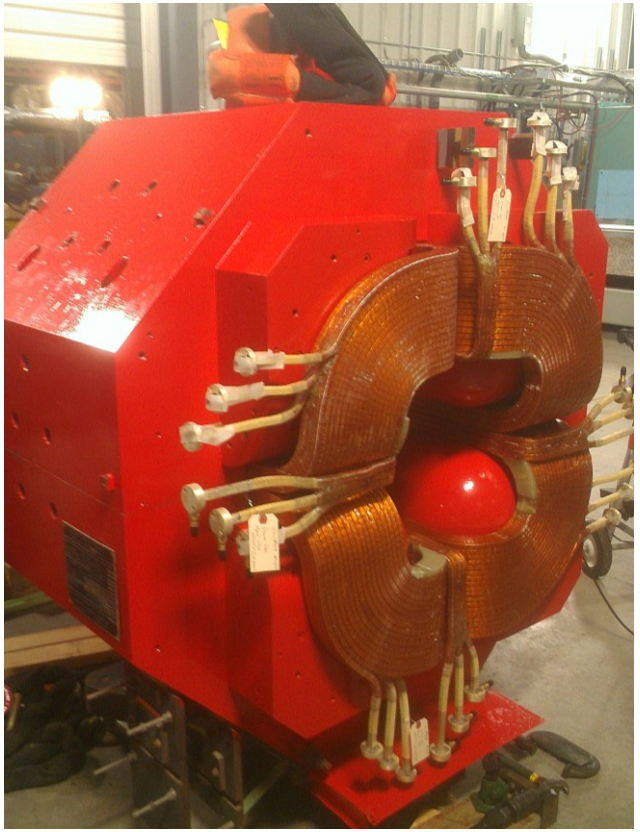




- Magnets re-installed on new supports
- New Laser table support
- New custom correctors and stands

Møller Quadrupole Refurbishment





In addition to installing new coils, MAG_TEST performed full refurbishment of both quadrupoles (sand off rust, paint, new water hoses, etc.)

Hall C Analysis Software Upgrade

FORTRAN ENGINE analysis code being replaced with C++/ROOT analyzer

Based on Hall A analysis software

- Ease sharing of software and people with Hall A
- Easier to reuse code between HMS & SHMS
- Likely easier and more natural to add new detectors (done often in Hall A)

Status

- Code, “hcana”, managed with “git” on github.com
- Supports CTP like parameters and reports. Hall A cut and histogram definition package similar to CTP
- DC Tracking code ported, Shower counter, hodoscopes, Cerenkov
- Basic support for most HMS/SOS detectors and spectrometer optics
- SHMS support needs new shower code and Flash ADC support

Number	Experiment	Grade	App. Days	Cond. Days	Non-standard Equipment
E12-06-101	Pion Form Factor	A	52		
E12-06-104	SIDIS R	A-	40		
E12-06-105	x>1	A-	32		
E12-06-121	He3 g_2	A-	29		Polarized He3 target
E12-07-105	(e,e'π) Exclusive Factorizaton	A-	36		
E12-09-011	(e,e'K) Exclusive Factorization	B+	40		
E12-09-017	SIDIS P_t	A-	32		
E12-09-002	Charge Symmetry Violation	A-	22		
E12-10-002	F2 @ large x	B+	13		
E12-10-003	d(e,e'p)	B+	21		
E12-10-008	EMC	A-	23		
E12-06-107	Color Transparency	B+	26		
E12-06-110	He3 A1n	A	36		Polarized He3 target
E12-11-002	He4(e,e'pol(p))	B+	37		FPP in HMS
E12-11-009	Neutron Form Factor	B+	50		Magnet + Neutron polarimeter
E12-11-107	EMC d(e,e' backward p)	B+	40		LAD (Hall B TOF bars)
E12-13-007	SIDIS Pi0	A-	26		Neutral Particle Spect.
E12-13-010	DVCS + Exclusive Pi0	A	53		Neutral Particle Spect.
C12-13-011	Deuteron Tensor SF b1	A-		30	Polarized ND3
E12-14-002	Nuclear Dep of R	B	22		
E12-14-003	WACS at 8 & 10 GeV	A-	18		Neutral Particle Spect.
E12-14-005	Wide Angle Pi0 photoprod	B	18		Neutral Particle Spect.
E12-14-006	Initial Stete Coor in WACS	B	15		NPS, Pol NH3
			681	30	

High Impact Experiments (PAC41)

Early running plans – Year 1

2016:

Precommissioning – detector checkout

~25 PAC days – Commissioning "Experiment"

9 days of E12-06-107 search for color transparency

A(e,e'p) only – "easy" coincidence measurement

E12-10-002 $F_2^{p,d}$ structure functions at large x

Momentum scans help understand acceptance

2 days E12-10-108 EMC Effect

Integrate light nuclei with F_2 run,

Point target helps acceptance studies.

3 days of E12-10-003 d(e,e'p)

If time available

Push to lower cross sections

Early running plan – Years 2-3

2017:

E12-09-017 P_t dependence of basic SIDIS cross sections

Push particle ID capabilities of SHMS

E12-09-002 Precise $\pi^+\pi^-$ ratios in SIDIS – Charge Symmetry

Detector efficiencies

E12-09-011 L/T separated p(e,e′K^+) factorization test

Easiest L/T separation

2018:

Choose a “High Impact Experiment”?

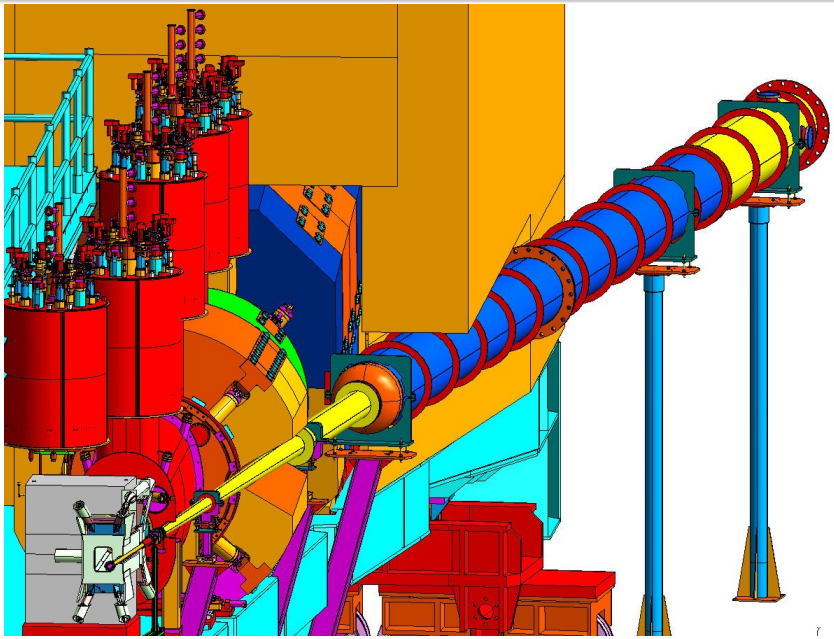
E12-06-101 Pion Form Factor (needs well understood SHMS)

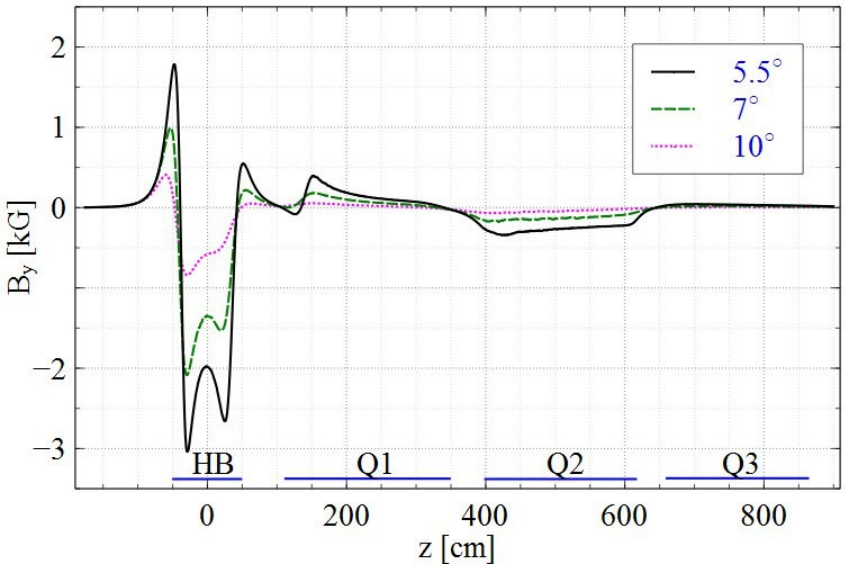
E12-06-105 x>1

E12-06-110 A_1^n (needs high Luminosity ^{3}He)

g_2^n, *GeN?*

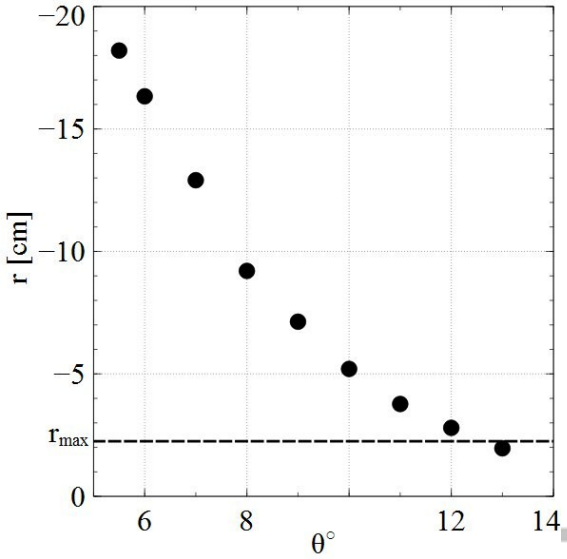
SHMS Fringe Fields





At full momentum and minimum scattering angle, SHMS fringe fields steer beam beyond acceptable region on dump

Most of the steering is from horizontal bender



SHMS Fringe Fields

Beam steering can mitigated (on paper) by iron pipes and wedges. (Moore et.al., JINST 9, T11002 (2014) – arXiV:1406.7856)

Engineering of magnetic shielding starting. Ultimately need HB in hand to understand problem and solution.

Unpowered BE magnet to be installed upstream of target. Prebend of beam could remove ~1/2 of the displacement at dump.

Investigating a designing large bore BPM at end of Hall to monitor post-fringe field position.

First year “25 day commissioning run” SHMS ≥ 10°. Temporary minimal magnetic shielding can be used.