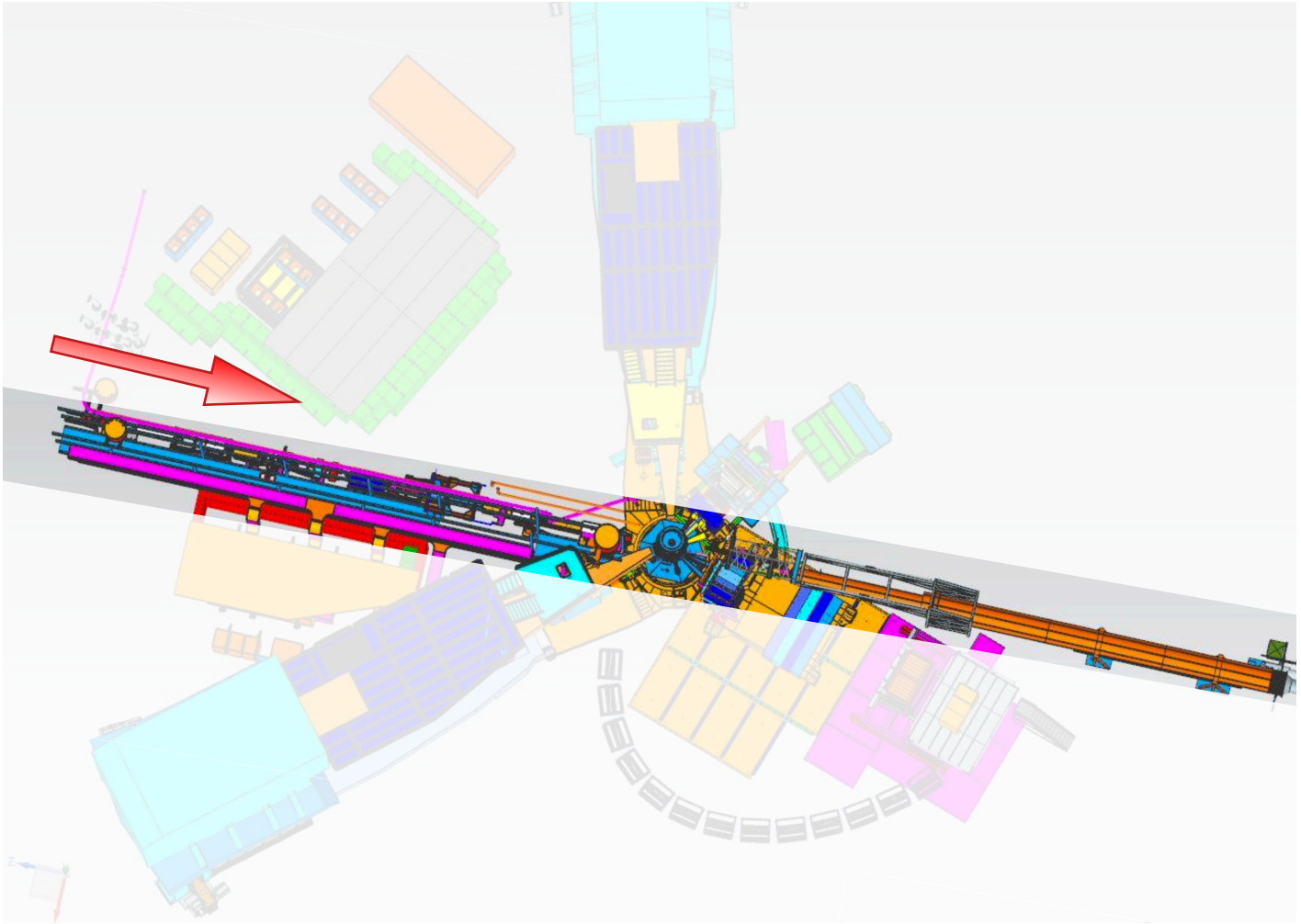
Hall A Beam Line for SBS

SBS Collaboration Meeting

July 14, 2020



David Flay

Jefferson Lab

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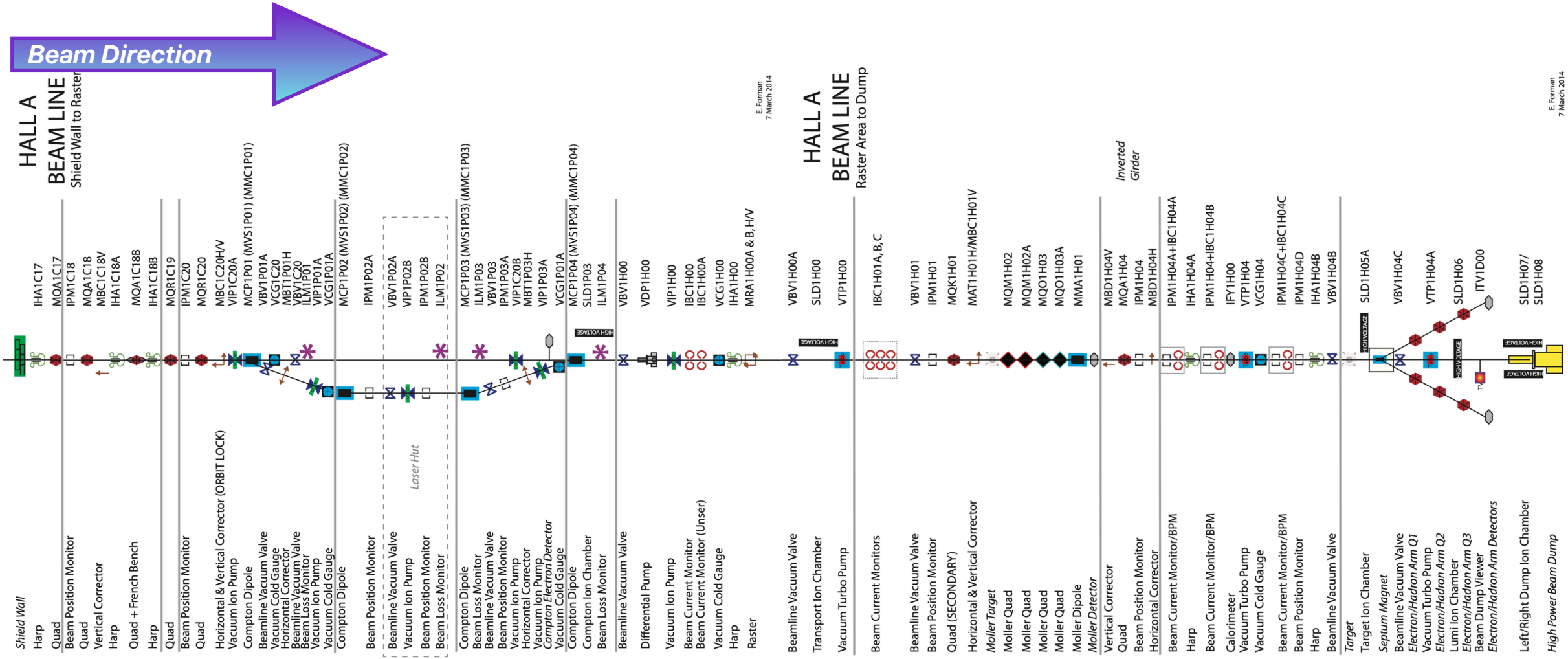
Hall A Beam Line



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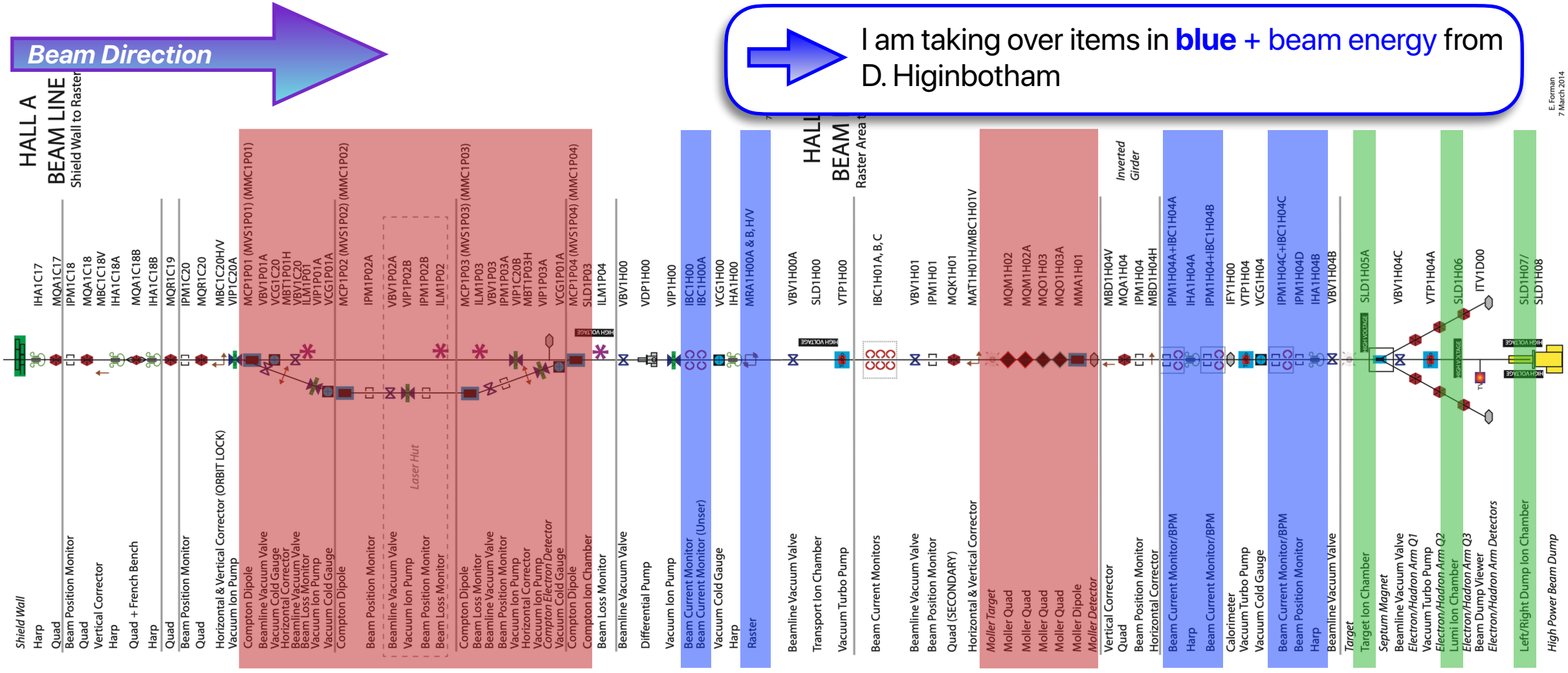
Hall A Beam Line



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SBS Program Overview — From a Beam Perspective

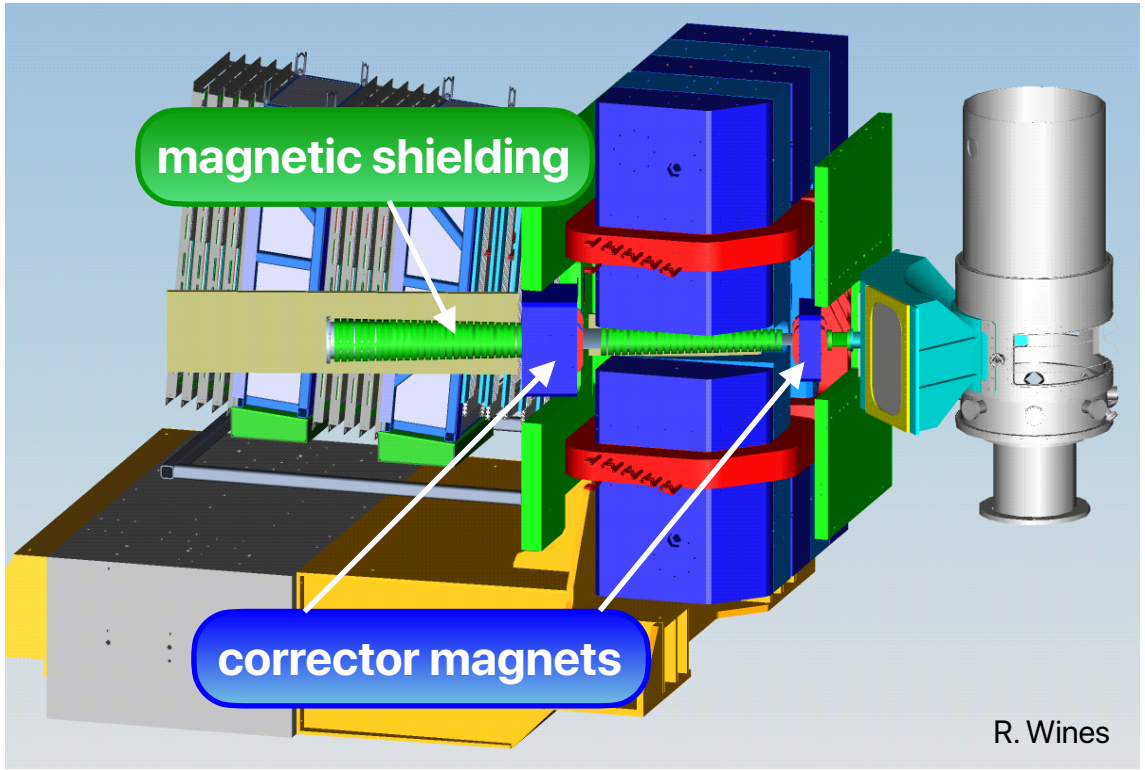
- High-luminosity up to ~10^{39} cm^{-2}/s
- Charge normalization largely cancels in observables
- Raster size driven by high-current operation

EXP	Beam Energy (GeV)	Beam Current (μA)	Max Luminosity (cm^{-2}/s)	Beam Polarization (%)	Beam Pol. Uncertainty (%)	Beam Diameter (mm)	Raster Size (mm x mm)	Target	Charge Normalization Uncertainty	Observable
GMn	4.4, 6.6, 8.8	30, 60	2.8×10^{38}	—	—	0.5	4 x 4	LD2 (15 cm)	—	σ_{unpol} ratios
GEn-RP	4.4	30	1.4×10^{38}	80	5	0.5	4 x 4	LD2 (15 cm)	—	P_t, P_ℓ
GEn(2)	4.4, 6.6, 8.8	60	6.6×10^{36}	85	5	0.5	4 x 4	Polarized ^{3}He (60 cm)	—	Double-spin asymmetries (QE)
GEp(5)	4.4, 11	75	7.5×10^{38}	85	5	0.5	4 x 4	LH2 (30 cm)	—	P_t, P_ℓ

SBS Downstream Beam Line

- Forward angles of SBS dipole (48D48) => exit beam line goes through cut in 48D48 yoke
  - 4 major configurations
- Need to shield exit beam path from stray field lines
  - **Magnetic shielding**
  - **Corrector magnets**
  - Both items in storage
- Will need to commission the correctors once installed
  - Power to nominal current
  - Verify field strength
  - Can we test before installation in hall?

Configuration	Experiment
BL01	GEp
BL02	GEn
BL03, BL04	GMn



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Beam Line Protection Working Group

- Bi-weekly meetings since mid-June with Accelerator & Ops
- Goal is to improve beam line controls to protect targets & infrastructure
  - Improve communication between MCC & experimental Hall(s)
  - Streamline interlock systems and ion chamber calibration procedures

Dave Meekins (Physics, Chair)
Keith Welch (RadCon)
Jerry Kowal (EESSAF)
Jay Benesch (OPS)
Mike Tiefenback (CASA)
Todd Satogata (CASA)
Yves Roblin (CASA)
Paul Vasilauskis (OPSMCC)
John Musson (EESICS)
Gary Croke (OPSSFT)
Brian Freeman (OPSMCC)
Javier Gomez (Physics)
David Flay (Physics)

Summary

- Taking over for Doug on many beam line systems
  - BCM, Unser, BPM, raster
  - Beam energy measurements
- Will be involved with corrector magnet commissioning
- Involved with working group to improve beam line controls