

*GEn-RP Experiment Plan:
Installation and Run*

Hall A Internal Review

Michael Kohl
Hampton University

Slides: David Hamilton
University of Glasgow

6th August 2019

Experimental Layout

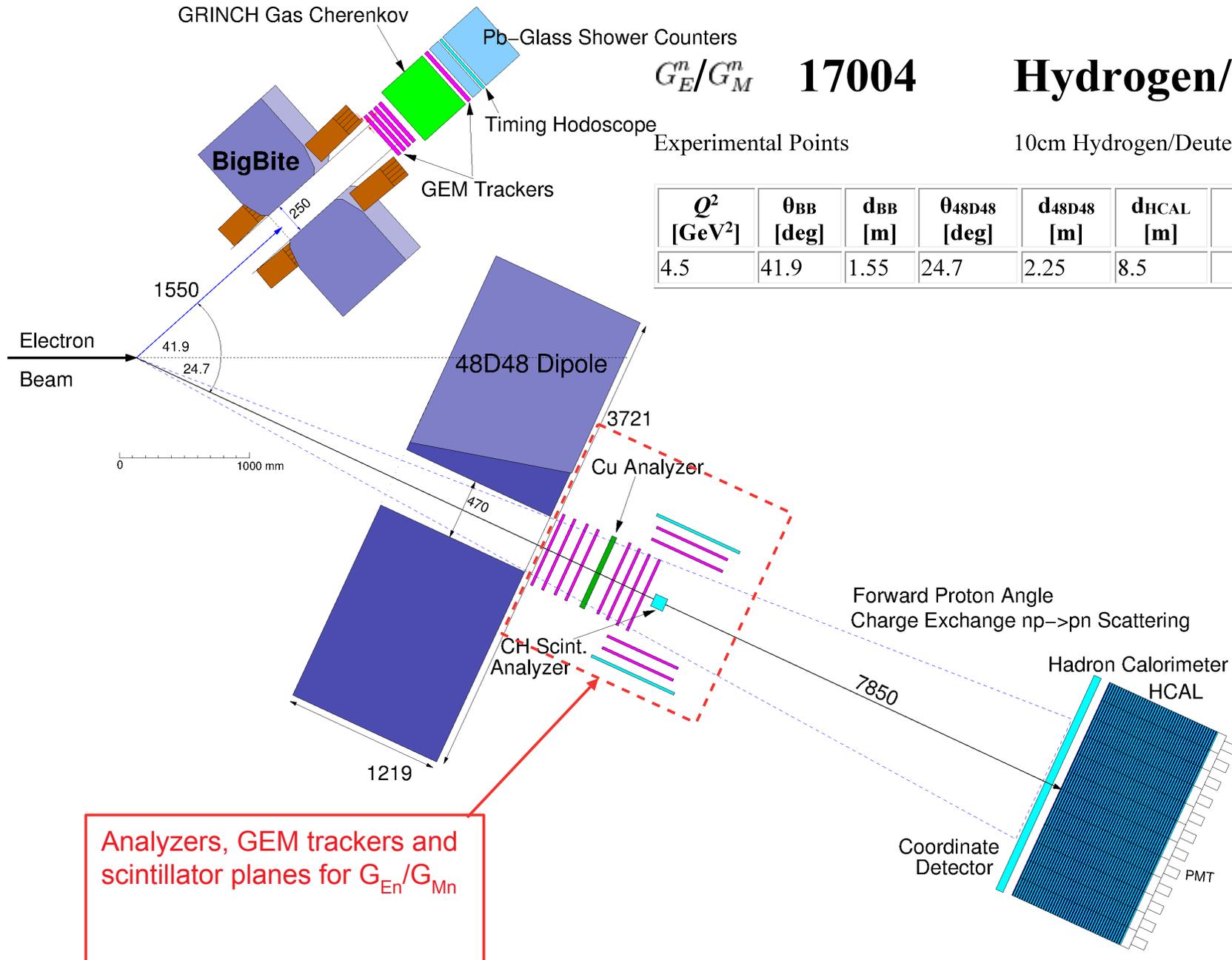
G_E^m/G_M^m **17004**

Hydrogen/Deuterium

Experimental Points

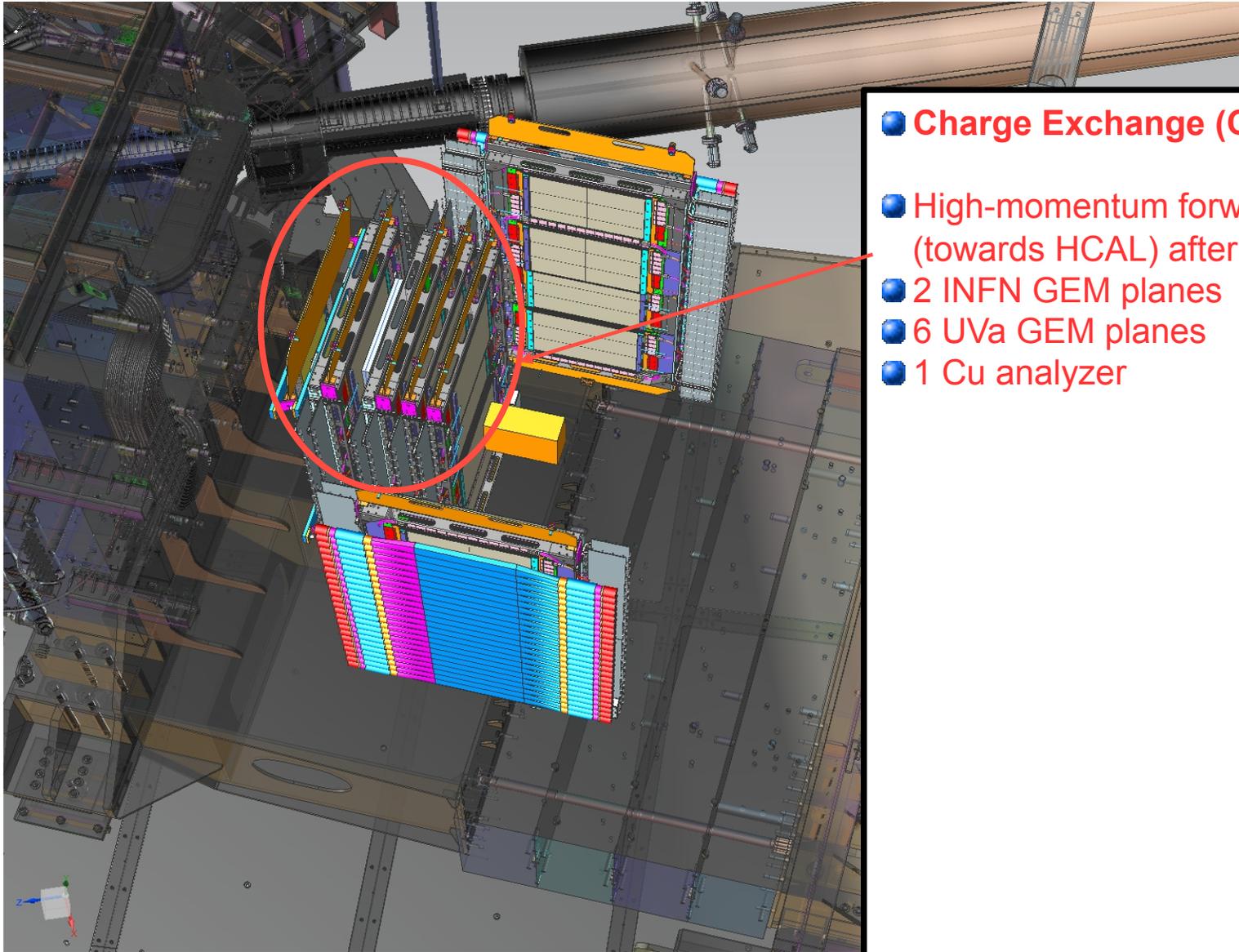
10cm Hydrogen/Deuterium

Q^2 [GeV ²]	θ_{BB} [deg]	d_{BB} [m]	θ_{48D48} [deg]	d_{48D48} [m]	d_{HCAL} [m]	Beam Line Configuration #
4.5	41.9	1.55	24.7	2.25	8.5	3



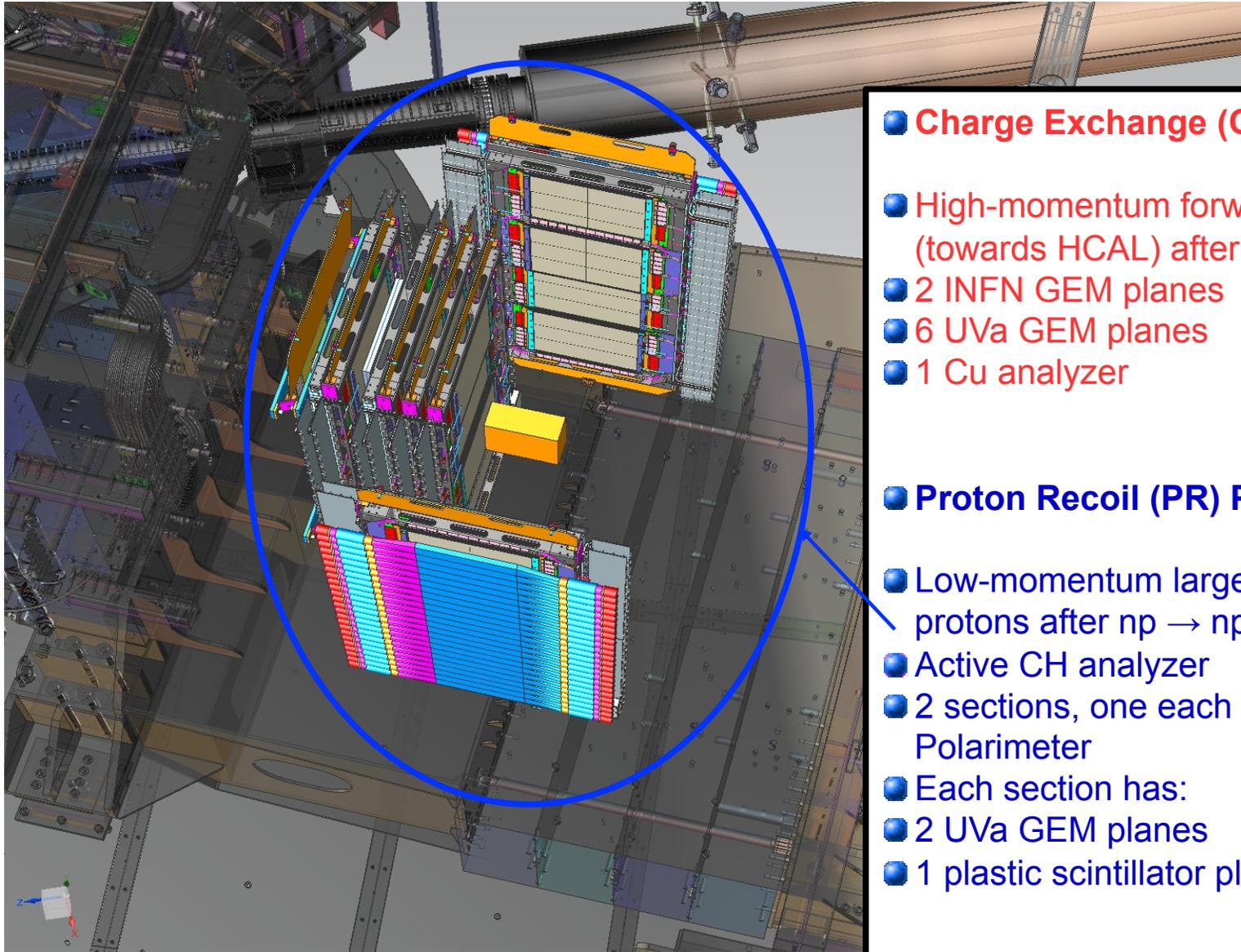
Analyzers, GEM trackers and scintillator planes for G_{En}/G_{Mn}

SBS Neutron Polarimeter



- Charge Exchange (CE) Polarimeter
- High-momentum forward protons (towards HCAL) after CE $np \rightarrow pn$
- 2 INFN GEM planes
- 6 UVa GEM planes
- 1 Cu analyzer

SBS Neutron Polarimeter



● Charge Exchange (CE) Polarimeter

- High-momentum forward protons (towards HCAL) after CE $np \rightarrow pn$
- 2 INFN GEM planes
- 6 UVa GEM planes
- 1 Cu analyzer

● Proton Recoil (PR) Polarimeter

- Low-momentum large-angle recoiling protons after $np \rightarrow np$
- Active CH analyzer
- 2 sections, one each side of CE Polarimeter
- Each section has:
 - 2 UVa GEM planes
 - 1 plastic scintillator plane

Installation

- The GMn and GEn-RP collaborations plan to have all components of the polarimeter installed on the SBS carriage prior to beam operations.

- Plan to install, cable and test:
 - All SBS GEM layers
 - Both RP side detectors (GEMs and hodoscopes)
 - Active analyzer detector

- In addition, the SBS rear field clamp and analyzer plate will be installed and then removed to "test fit" before beam operations.

- Both analyzers will then removed, but everything else will remain in place for GMn data-taking.

Run Plan

- GEN-RP is approved for 120 PAC hours or 9 calendar days.

- Begin with production data-taking for GMn. Immediately after the $Q^2 = 4.5 \text{ GeV}^2$ kinematic setting, we will switch to GEN-RP (same target and spectrometer angles).

- Install shielding in beamline dipole cutout, rear field clamp and both analyzers (1 shift).

- Run GEN-RP measurement (8 calendar days)
 - GMn will take data with LD2, LH2, LH2 with radiator and dummy target data, which will be useful for GEN-RP.
 - We plan to take additional LH2 and dummy target runs with analyzers in place (1 - 2 shifts).

- Remove rear field clamp, both analyzers and beam-side RP polarimeter detectors (1 shift).

- Switch back to GMn data-taking