



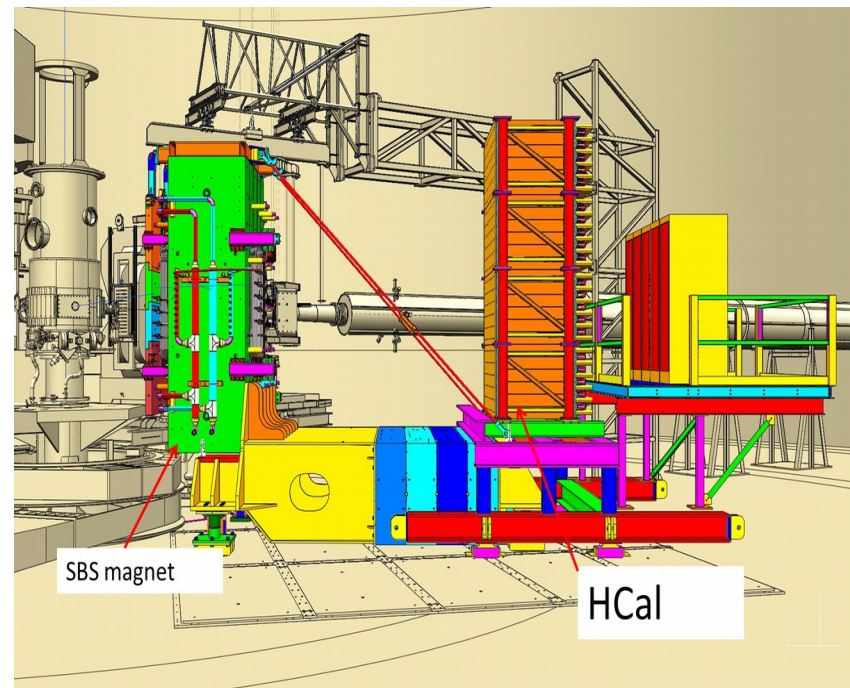
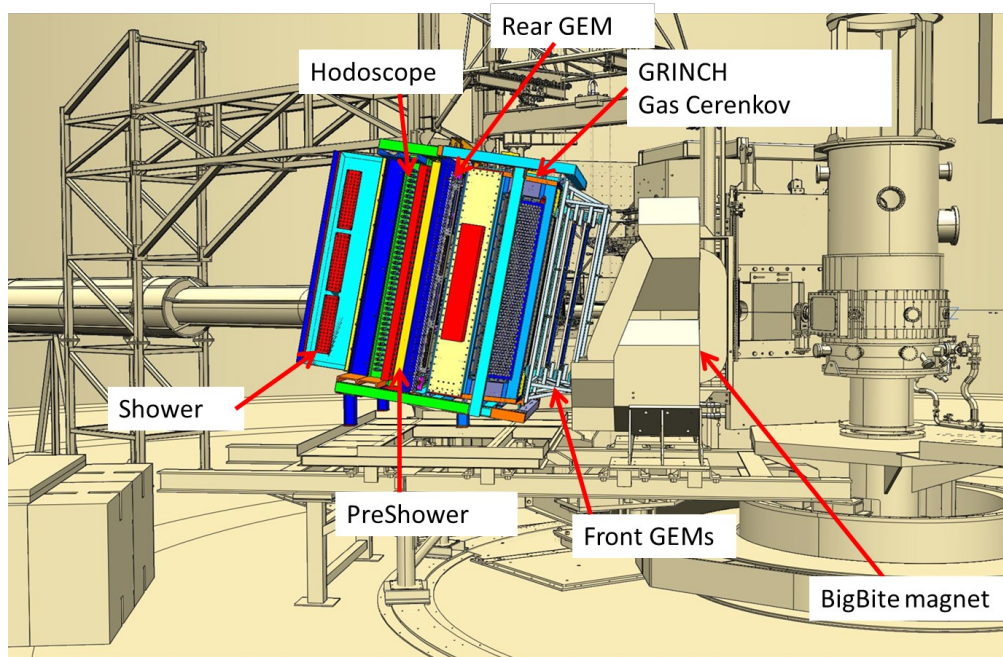
# Status of equipment required for GEn experiment *(non-target part of Charge 2)*

2. What is the status of the equipment required for this experiment towards operation? What is the completion/commissioning schedule and tasks?

Mark Jones

# Overview of GEn detectors

- Same detector setup as GMn experiment
  - BigBite for electrons
  - SBS for neutrons
- Detectors will be commissioned during GMn experiment
- Showing GMn detector configuration in pictures
  - For GEn, HCal at 17m and use the polarized target.



# Equipment Status and Schedule

Equipment	Status
BB GEMs	<ul style="list-style-type: none"><li>• 4 front INFN GEM chambers have undergone cosmic tests in TestLab.<ul style="list-style-type: none"><li>• U/V front chamber has been made by UVA and is undergoing testing.</li></ul></li><li>• Rear GEM chamber assembled and tested with cosmic in EEL<ul style="list-style-type: none"><li>• Test installation of chamber done in 2019, final installation in 11/20</li></ul></li><li>• Will be installed in BigBite frame by March 2021 .</li></ul>
BB GRINCH	<ul style="list-style-type: none"><li>• Installed in BigBite frame.</li><li>• All gas, electronics, DAQ, HV, cables connected and tested.</li><li>• Ongoing optics alignment and calibration. Completed by Jan 2021.</li></ul>
BB Hodoscope	<ul style="list-style-type: none"><li>• All 90 scintillators, PMTs and light guides at JLab.</li><li>• Final mechanical design and upgrade done.</li><li>• 20% assembled and tested(WM and Glasgow students M. Satnik, R. Mariano). Finish assembly mid-Dec 2020.</li><li>• Cosmic testing complete by Feb 2021.</li></ul>
BB Pre/Shower	<ul style="list-style-type: none"><li>• Shower blocks installed in BigBite frame<ul style="list-style-type: none"><li>• Tested with cosmics. Need to replace one block.</li><li>• Upgrading to VXS with FADCs (funding 50% Glasgow/50% JLab).</li></ul></li><li>• New radiation hard PreShower blocks will be installed in November 2020</li></ul>
HCAL	<ul style="list-style-type: none"><li>• All four sub-assembly of HCAL are ready in TestLab.</li><li>• Ongoing cosmic test all HCAL using the full HCAL DAQ setup.</li></ul>

# Detector Scientific Readiness

Equipment	Scientific goal and status
BB magnet	<ul style="list-style-type: none"><li>q vector resolution of 5mr.</li></ul> <p><u>Status:</u> Achieved in previous experiments. Standard optics calibration.</p>
BB GEMs	<ul style="list-style-type: none"><li>95% tracking efficiency and position resolution &lt; 200 um</li></ul> <p><u>Status:</u> Cosmic and beam tests have demonstrated eff and position resolution.</p>
BB GRINCH	<ul style="list-style-type: none"><li>Could be used for offline PID</li></ul> <p><u>Status:</u> Not required for experiment</p>
BB Hodoscope	<ul style="list-style-type: none"><li>Timing resolution &lt; 250ps for TOF with reference to RF.</li></ul> <p><u>Status:</u> Cosmic test have demonstrated timing resolution &lt; 250ps</p>
BB Pre/Shower	<ul style="list-style-type: none"><li>Energy resolution of 8.5% for 1 GeV electrons</li></ul> <p><u>Status:</u> Achieved in previous experiments</p>
HCAL	<ul style="list-style-type: none"><li>Position resolution of 3-5cm (dependence on neutron momentum)</li><li>Timing resolution &lt; 1.0ns</li></ul> <p><u>Status:</u> GEANT simulations demonstrate position resolution. Tests with cosmic rays show time resolution of 0.3 ns which agrees with GEANT simulations. GEANT simulations for neutrons predict 0.75ns.</p>
SBS Magnet	<ul style="list-style-type: none"><li>Need Bdl = 1.7 Tm which is safely within its capability</li></ul>

# Detector Responsibilities

Equipment	Owner	Maintenance	Control during beam operations
BB GEMs	Evaristo Cisbani Nilanga Liyanage	Zeke Wertz Kondo Gnanvo	Zeke Wertz Kondo Gnanvo
BB GRINCH	Todd Averett	Bradley Yale	Bradley Yale
BB Hodoscope	Rachel Montgomery	Ralph Mariano	Ralph Mariano
BB Preshower/Shower	Bogdan W. Arun Tadepalli	Arun Tadepalli	Arun Tadepalli
HCAL	Brian Quinn Scott Barcus	Scott Barcus	Scott Barcus