Discussion

- Good news: SBS concept, EMFF proposals approval, INFN group experimental work with GEM, SBS/EMFF funding expected to be soon.

- Need to be done urgently:

  per recommendations of the Technical review report

  refine the physics and engineering design, prototype + tests, construction: long list

Built up collaboration around already formulated tasks.
Funding for the technical manpower is in EMFF budget
The postdocs and research scientists support: from universities resources.

Discussion:

- Need to be done: the advanced physics and engineering design, construction …

Spokespeople are the drivers and providers of manpower and all related resources

- GEp(5) has 8 spokespeople (CNU, NSU, W&M, JLab)
- GEn(2) has 3 (UVA, JLab)
- GMN has 3 (CMU, RU, JLab)
- SIDIS has 4 (INFN, CMU, UVa, JLab)
- A1n has 6 (GU, MIT, TU, UVa, JLab)

Total 18, including one postdoc, three JLab staff, and 14 faculty members at UVa, NSU, CMU, W&M, TU, GU

GEM chambers

In view of the very large production of GEM foils and readout PCBs by the CERN workshop, **the Committee strongly recommends to set up a list of specifications and QA acceptance criteria** (e.g. max. leakage currents, inner/outer hole diameter range, max. mask misalignment, etc.) **before the start of mass production this year.** Strict QA rules and documentation of acceptance tests at the institutes receiving the GEM foils and PCB boards should be set up and followed. Depending on the details of the QA requirements, the level of required contingency should be discussed with the CERN workshop. The quality of GEM foils and PCB components during the mass production process has to be closely monitored, and rapid feedback to the CERN workshop should be ensured.

The Committee recommends investigating the possibility to reduce the number of spacer strips between GEM foils which will result both in a smaller dead area and a smaller amount of material.

The Committee also proposes to investigate the possibility to increase the technical personnel for the construction and system integration aspects of GEM chambers and electronics for ST and TT at the University of Virginia.

The cost estimate for the construction of GEM trackers seems to be adequate. The Committee recommends to make sure that the cost estimates for the GEM foils and readout circuits include the contingency for the final yield, based on the QA procedures, and to review the cost estimate for the gas system which seems to be on the low side.

GEM chambers readout

Recommendations:

Noise performance studies of the chamber with UV strip orientation, and therefore varying strip lengths, and an analysis of its impact on resolution and efficiency are of a great importance before the start of mass production. Special tests to estimate S/B performance should be also foreseen for the ST and TT chambers, where four strips are connected into a single readout channel (longer effective strip length mean higher capacitance, i.e. more noise).

In view of the high background levels (~ 500 kHz/cm^2) in the GEp(5) spectrometer, the Committee recommends that the 3-sample readout method of the APV25 be adopted as the default solution for all trackers (FT, ST, TT). This will increase the bandwidth requirement and data rates from tracking stations to the DAQ which, however, seems to be consistent with the plans for the Hall A DAQ upgrade.

The Committee strongly recommends that the response of a GEM detector to low-energy photons should be measured using a prototype detector and electronics.
The results should be compared to the GEANT modeling to confirm that the background levels in the Monte Carlo simulation are realistic. The expected level of occupancy in the GEM detectors, using an APV time window of 250 ns and an average number of strips in cluster per MIP particle ~ 3.5, seems to be exceedingly high.

SBS components, development #1

- **GEM:**

  hardware: design of the chambers, electronics
  beam tests in Hall A
  construction of the labs at Uva, NSU
  $$$ contracts, acceptance checks

  software: MC of the events, data analysis
  track finding, fast logic

  readout and DAQ:

- **Magnet:**

  TOSCA, design optimization (e.g. field at GEM)
  design of the magnet modifications, coils, field clamp
  power supply system from AC to controls

SBS components, development #2

- **HCal:**

  hardware: study of the fast scintillator&WLS
  test of the modules in Hall A
  design of the HCal detector
  $$ contracts, acceptance checks

  readout, HV, and DAQ: design, construction, tests

- **BCal:** see Mark's talk
- BigBite Gas Cherenkov:
  a report on the existing counter, analysis of data
  MC study of the possible versions, redesign

SBS components, development #3

- **RICH** with the aerogel and/or the N2 radiator
  - hardware: *MC investigations*
    - background tests in Hall A
    - design of the front-end for PMTs
    - $$ contracts, acceptance checks
  - readout and DAQ

- preShower for HCal (need in A1n and u/d):
  - MC simulation, rate analysis in A1n
  - design of the front-end, HV, and DAQ

Detector configurations in SBS program

	Front GEM	Polar GEM	Had Calo	Elec Calo	Big Ben	Big Bite	RICH a/gas	BB Calo	preShower (HERMES)
GEP	X	X	X	X	X				
GEN	X(BB)	X(BB)	X		X	X		X	
GMN	X(BB)	X(BB)	X		X	X		X	
A1n+	X (BB)	X	X		X	X	X,gas	X	X
T:u/d	X (BB)	X	X		X	X	X,gas	X	X
SIDIS+	X (BB)	X	X		X	X	X,a	X	
D(e,e'p)	X (BB)	X	X		X	X	*X,a	X	
SRC	X (BB)	X	X		X	X			
e,e'ϕ	X (BB)	X	X		X	X	X,a	X	
A(Q^2)	X (BB)	X	X		X	X	X,gas	X	

What need to be done?

Set a management structure: J. LeRose will take a key role.
Develop the plans: the time line and resources allocation, with the intermediate reports.

Items:

- Design of GEM chamber and electronics: INFN
- Test of … who, where, preparation,
- Beam tests plan for the GEM, HCal
- Analysis development including the MC as recommended by the final review report