Questions from LBNL meeting, Goals for next meeting

- Reminder of "homework" after Hampton meeting
- List of questions that came up at LBNL meeting (not complete!!!)
- Goals for next EICC meeting
- Reminder of our approximate global timeline from 2007 LRP to next LRP
- Related timeline/goals for 2009/10 (also not complete!!!)

"EICC" Proposal to Machine Groups

(was not an official EICC statement, but proposal from Abhay, Richard, Rolf **after Hampton meeting**)

- **eRHIC:**
  1) Back to drawing board given unrealistic demands of the source.
  2) Request staging of 5+ GeV with 10^{32+} luminosity + cost estimates, with appropriate upgrade paths for luminosity and energy (including changing the RF/optics of the RHIC machine).

- **ELIC:**
  1) 1.5 GHz seems unrealistic, 0.5 GHz may be doable.
  2) Request polarization tracking with full lattice.
  3) Request consideration of staging options, if any.

In addition, request both for estimate of achievable vacuum levels asap.

Not all are finalized yet, but Machine Groups have followed up (thanks!) and have made good progress.

EICC Goals for LBNL meeting

- **Accelerator Working Group:**

  Provide an estimate of achievable vacuum levels for the IR's of eRHIC/ELIC such that beam-related background levels can be estimated.

- **ep Working Group:**

  Provide resolution estimates for the "central region" (beyond the mentioned 40 degrees of the meeting), and start checking whether the "exclusive" particle species/angle/momentum/ resolution requirements also suffice for the semi-inclusive case.

- **eA Working Group:**

  Provide estimates for particle species/angle/momentum requirements for diffractive processes. This includes a first ad-hoc start of a diffractive generator.

- **Detector Working Group:**

  Provide estimates for field properties of various magnet configurations (solenoid + dipole/toroid, others) and their

Berkeley Meeting – List of Questions

1) Table of physics vs. luminosity/energy requirements (machine parameters are ~3rd dimension): link with rough costs of various staging options.

2) How do gluons affect nuclear structure, hadron structure and interactions. What role does gluon saturation play? Is this transient snapshot of matter relevant for the way nature appears to us?

3) Based on initial magnetic field configuration studies, update detector cartoon and define range of magnetic field values, space for detector (including assembly and maintenance provisions?), vacuum pipe material and diameter, apertures of final focusing magnets, etc. Need map of angle/momentum resolution requirements for scattered electrons, and map of particle type/angle/momentum for particles of interest for diffractive physics, that need to be peeled away from incident ion beam.

4) How much hadronic calorimetry do we need on ion side? Where do jets go and how broad are they. Where do we need muon detection? We do need to add electromagnetic calorimetry for neutral-pion detection, etc.

Berkeley Meeting – List of Questions

6) Consider a strategy to definitely solve the spin puzzle with the EIC.

7) What implications do the EW studies, precision QCD and Beyond the Standard Model studies have for the accelerator/detector design, e.g., on the detection of τ's?

Goals for next EIC meeting

- **Accelerator Working Group:**

  Provide rough estimates of costs for various staging options.
  Finalize ZDR for ELIC (including some references for staging).
  Finalize ZDR for eRHIC staging option.
  Fold in initial detector + vacuum pipe ideas.

- **ep Working Group:**

  Finalize resolution requirements for electron kinematics definition for inclusives physics. Provide resolution requirements for SIDIS physics (flavor decomposition and transverse spin physics, including requirements for sufficient (p_T,ϕ) coverage).

- **eA Working Group:**

  Initial eA science studies for full and staged EIC to define the requirements to access nuclear gluons, energy loss, fragmentation, etc. + Initial studies of science potential of jet physics at an EIC.

- **Detector Working Group:**

  "Finalize" initial studies of magnet configurations and their impact on expected resolutions. Update detector ideas (in cartoon format). Start including detector ideas in ELECTRA.

EIC Timeline – as drafted June 2007

Next LRP in 2012 – Goals of EIC Collaboration

- Goal I: High-level recommendation at next LRP
- Goal II: CD-0 Mission Need before next LRP
- Goal III: Decision on EIC design before next LRP

1) List of FY08 pre-R&D needs 2007
2) Start Detector Working Group Meetings 2007
3) Strengthen world-wide EIC collaboration 2007
4) Finalize Detector Requirements from Physics 2008
5) Revised/Initial Cost Estimates for eRHIC/ELIC 2008
6) Brochure on EIC science case 2008
7) Investigate Potential Cost Reductions 2009
8) Establish process for EIC design decision 2010
9) Conceptual detector designs 2010
10) Further development of EIC science case 2011
11) R&D to guide EIC design decision 2011

EIC Timeline – as drafted June 2007

Next LRP in 2012 – Goals of EIC Collaboration

- Goal I: High-level recommendation at next LRP
- Goal II: CD-0 Mission Need before … RP
- Goal III: Decision on EIC desig… LRP

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11) R&D t… ue EIC design decision 2011

We are running behind, but have started making good progress along the anticipated timeline. To be fully ready by next LRP, need anticipated for more detailed timeline, including accelerator tasks, detector concept development, physics simulations, refining science case, etc.

Related Timelines/Goals for 2009/10

- Detector cartoon to be updated after this meeting, then bounced off WG convenors for further initial input. Then put on EICC web pages for general input by EICC.
- Detailed timeline of accelerator tasks, detector tasks, physics broadening efforts, refining science goals, collaboration meetings, etc., all the way to next Long-Range Plan has been drafted, will be bounced off larger audience soon.
- 1st EIC Advisory Committee meeting on February 16, 2009.
- Next EICC meeting in Europe (@GSI?) in May/June 2009, organized by Dietrich von Harrach and Andreas Schaefer.
- CERN Courier article on Electron-Ion Collider plans and science, possibly linked to electron-ion collider community meeting at GSI in May/June 09?
- Scientific American article on the role of gluons in nuclear structure, hadron structure and interactions, and the role of gluon saturation in 2009 (Raju Venugopalan et al.).
- One-week workshop on EIC science at INT/Seattle from October 19-23, 2009 (sandwiched in 3-month INT Fall program on JLab/12-GeV science)