Town Meeting Concerns

- The Subpanel report was tightly focussed on physics-direction. This talk is on other concerns raised at the Town Meetings.

- Many of the "town-meeting concerns" are:
  - ▷ Highly inter-related
  - ▷ indirectly connected to the physics choices
  - ▷ *Complex and hard to solve!*

- As a member of the subpanel, Barry Barish asked me to compile a list of issues
  & challenged me to brainstorm for solutions. I'll put forth ideas some ideas...

- 3 questions/issues which were raised several times:
  - ▷ Long Time scales
  - ▷ Accelerator Physics in Universities
  - ▷ Non-traditional High Energy Physicists

- But what I really hope is that HEPAP will establish "study-groups" tasked with developing today's ideas and finding more solutions.

Issues of Long Time scales

- Some of the related questions/issues raised:
  - How do we address interesting physics surprises in an expedient manner?
  - How do we provide good analysis problems to attract and keep good young people?
  - How can students/postdocs/Jr. Faculty gain experience on all aspects of experimental HEP (design, hardware, software & analysis)?
- An ongoing program of small, short-turn around experiments. How can that be encouraged?
- Is the approvals process too slow?
  (Related to the P5 discussion)
- For junior members of the field,
  possible paradigm we could encourage...
  - **design/building/software/calibration on future machines/detectors**
  - **plus software for/analysis on past experiments.**

  Again, not a complete sol'n, but this could help!
- HEP experiments are rarely "fully mined" ... why?
  It is much easier to get funding for construction than analysis!
  - Partly the priorities of funding agents.
  - Also partly a bias in members of the field
    which is reflected in peer reviews.
- Option 1: Recommend funding to maintain core analysis groups.
  Recommended by past subpanels, apparently to little effect...

- Option 2: make "old" data available.
  once an experiment is declared "completed"

- There are already examples...
  - ▷ *Quaero* is an example (D0, LEP expts?, Zeus?)
    However, this doesn't give access to raw data.
  - ▷ SDSS data base is an example
    (data-sharing from large facilities is required in astrophysics?)

- Will cost resources (people and $) from labs, experiments

- But it will also give back to the community:
  - ▷ Partial sol'n to long-time scale problem
    Goodwill with young physicists
  - ▷ Demonstrates our commitment to fully mining the physics from the data
    Goodwill with funding agencies/government
  - ▷ Plus, Large data-base design/data-handling is a way that HEP "pushes technology"
    Goodwill with industry/general public

HEPAP could recommend studies of:

- the system by which experiments are approved, looking for suggestions for streamlining.
- methods for making "old" data widely available and usable for analyses.

Issues of Accelerator Physics at Universities

- Some of the related questions/issues raised:
  - How do we attract more students & postdocs to accelerator physics?
  - How can we establish accelerator physics more firmly in physics departments at the universities?
- Issues-behind-the-issues:
  - **Funding**
  - Defining/identifying suitable research initiatives
  - Support from Nat'l labs for Univ. initiatives is crucial
- The ICAR and NICAD Models are very exciting:
  - ICAR demonstrates states will invest substantial sums
  - NICAD means D.o.Ed now invests in accelerator physics
  - Both are young but thriving programs that deserve notice!
- Building on the ICAR/NICAD paradigm...
  - Establish similar joint-funded (state/DoE/DoEd) initiatives
  - Aim for six around the country near Nat'l labs
  - Aim for one or two at universities which set "intellectual fashion."

- Might bring in new funding in the short term from DoEd, states. In the long term might lead to a push to expand "the box".
- It will certainly give back to the community:
  - ▷ It will provide a steadier, stronger supply of accelerator physicists
    Crucial to the long term
  - ▷ It will open up new opportunities for young people
    Goodwill with young physicists
  - ▷ Many scientific communities will benefit (not all of the programs need be strictly HEP!)
    Goodwill with our nearest neighbors in science

HEPAP could study methods for organize six(?) new centers, starting with and extending beyond the ICAR/NICAD models.

Issues of Non-traditional High Energy Physicists

- Some of the related questions/issues raised:
  - How do we attract more women and minorities into physics, and especially High Energy Physics?
  - How can undergraduate institutions be productive members of HEP collaborations?
- Why do I think these are related?
  - At this point most HS physics classes have 50/50 gender split
    We lose women at the undergrad level.
  - Undergrad institutions have a substantially higher fraction of women and minority professors than research institutions.
  - Top-down is a practical approach.
    The first step down is undergrad education
  - Undergrad institutions have more women and minority majors than research institutions.
- If we integrate undergrad profs into experiments we may address both issues at the same time.
  - Pro: a large pool of talent, many with HEP backgrounds
  - Pro: Once involved in an experiment, they are a *big help* with guiding undergrad research.
  - Con: present three months/year and that is all
    Teaching loads are often 2 or 3 courses
  - Con: undergrad institutions often don't "appreciate" off-campus research
- What's needed?
  - More methods for providing research support to ugrad profs
  - Methods for providing communications equipment to small colleges
  - Convince colleges of the intellectual value.

- One idea: building on "CoURSE at MiniBooNE" and "Undergrads Underground" ideas
  - ▷ A spring semester at a lab for u'grad profs and students
    An 8-month immersion program in research.
  - ▷ U'grad Courses will be taught at the labs
    (new way of teaching, not removing prof from teaching!)
  - ▷ Convince labs to hire one person who teaches courses in spring and does research for remaining 8 months?
    (This frees the u'grad professors to oversee student research and pursue their own projects.)
  - ▷ Needs a critical mass of ugrad institutions on any one experiment
- Might bring in new funding in the short term from Education Division at NSF?
  In the long term might lead to a push to expand "the box".
- It will certainly give back to the community:
  - ▷ It will provide a steadier, stronger supply of women and minority physicists
    Diversity has value
  - ▷ It will open up new opportunities for young people
    Goodwill with young physicists
  - ▷ Many scientific communities will benefit
    (not all of the students will continue in HEP)
    Goodwill with our nearest neighbors in science

HEPAP could study development of a DOE-NSF joint plan to enfranchise undergrad faculty.

List of *social* (not monetary & not programmatic) issues/questions raised at town meetings, in no particular order and paraphrased:

- How can students/postdocs gain experience on all aspects of experimental HEP (design, hardware, software & analysis) given the long timescales?
- In a large collaboration, how can the personal impact of physicists (at all levels – from student to senior faculty) be better identified?
- In the era of long-time scale experiments, what efforts/changes must we make to facilitate the survival of junior members in this field?
- In a large collaboration how can small colleges and universities make a notable contribution?
- How can we foster input from young physicists in the on-going planning process?
- How do we attract more students (undergrads, 1st yr grads) to HEP and accelerator physics?
- How can we establish accelerator physics at the universities?
- How do we address the growth in years-to-Ph.D and years-to-permanent position?
- How can we increase cultural diversity (women, minorities) in the field?
- How can we enable "non-traditional" HEP-members (undergrad professors, undergrad students, high school teachers, high school students, etc.) to have a real impact in experiments?
- How can we strengthen the university HEP programs?
- How can HEP improve its "image" within departments and on campuses?
- Are the subcommunities ("EW", "QCD", "neutrino", etc.) within traditional high energy physics becoming balkanized?
  If so, how do we remedy this?
- How do we encourage a sense of community spirit? How do we discourage "political shenanigans"?

- How do we improve interactions with our "nearest neighbors" in physics? (astrophysics, nuclear physics, detector physics, ...)
- How can we, as US-based scientists, have a really big impact on detectors/accelerators and on analyses which are based in foreign countries?
- There are "DOE institutions" and "NSF institutions." Can we break down this artificial division?

A list of programmatic issues raised (aside from specific choice of next machine):

- Should difficult experiments be duplicated if they are not very expensive?
- How do we accommodate the calls for both large and small experiments?
- Are phenomenologists sufficiently valued? Should we nurture this arena of research? How?
- Is a greater investment in lattice QCD called for?
- How much of the base program should go to a next machine?
- Will the base program be used for contingency on the next machine?
- Should we have a "National PAC"? If so, what size of program should be referred to this group?
- Are our arguments for our program strong/focussed enough to convince Washington that we should build a next machine?