The Road

to

“Snowmass”

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Collaboration Meeting–Catalina
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Outline

• Introduction
• What we know so far
• Where do we want to be?
• How can we get there?
• What else should we be doing?
• Summary
Introduction

• Preparations are under way now for a “Snowmass” meeting
  — organized jointly by DPF and DPB

• The meeting should be in “non-extravagant” venue
  — not yet known whether Snowmass is sufficiently non-extravagant
    ○ seems like it ought to be...there's not even much O₂ there!
  — there are other potential sites if Snowmass cannot limbo under the extravagance bar

• Tentative dates are June 30–July 21, 2001
  — this clearly depends on the venue
  — don’t buy tickets just yet!

• We have 1 year to get ready
What We Know So Far

• Information here comes from Chris Quigg via Andy Sessler
  — as interpreted by me ⇒ high-level rumors

• There is a draft charge circulating
  — DPF is happy with it
  — DPB has not yet responded but is expected to soon
  — it should be circulating more widely soon

• Intent that this meeting be inclusive of all particle physics
  — will not focus only on the biggest new machines

• Important that meeting not take on character of a “shootout”
  — no word yet on plans for metal detectors
What We Know So Far

• Primary purpose of the meeting is to reconstitute HEP as a community
  — by implication, this is not presently felt to be the case
  — not much of a stretch to think that HEP’s lack of funding success in recent years is related to this issue

• Intent to choose young convenors
  — future to be defined here is really theirs
  — they tend not to be conditioned by “old scars”

• Hope to engage the world HEP community in the process
  — but priority is to get the U.S. HEP community’s act together
    ○ agenda will be set domestically

• Logic is that U.S. HEP cannot really interact effectively with the international community until they get their own ducks in a row
What We Know So Far

- The HEPAP subpanel that we were expecting has been deferred
  - realization that process for choices of this magnitude should be more deliberate
    - nobody wants a winner-take-all battle to break out
- Steering committee to be in place by the end of June
  - group will first convene at Columbus DPF meeting to discuss Snowmass plan
- Thereafter, working groups will be constituted by Fall
What We Know So Far

• The various machine collaborations will be essential ingredient in defining what options are possible for HEP community

  — one goal: determine a sensible R&D plan to reach the stage where informed decisions can be made

    ◦ “sensible” ⇒ explicit time lines and levels of effort called out

  — preference for adequate R&D on several fronts instead of a premature decision that starves all other options

    ◦ this view seems good for us

• Bottom line for us:

  — Snowmass ’01 will be a watershed event

  — it will be an opportunity to make the physics case for a Neutrino Factory

  — it will be an opportunity to make a case for a focused, well-supported machine R&D program

  — it will be an opportunity to have a level playing field
Where Do We Want To Be?

- Views expressed here are my own, to stimulate thought and discussion
  - not blessed by MC leadership

- We need well-thought-out and defensible R&D plan
  - identification of key issues
  - plan of attack for each
  - identification of required resources
    - funding
    - effort (which places, which people)
      - credibility demands that we have mainly dedicated people
Where Do We Want To Be?

• We need some well-documented R&D accomplishments

  — for two reasons:
    
    ○ demonstration of some **specific technical solutions**
    
    ○ demonstration our **capability to carry out** whatever R&D program we propose

• A few specific successes will go a lot farther than a long list of “work in progress”

  — but, both are needed
Where Do We Want To Be?

- We need a **machine concept** in reasonable detail ("mini-ZDR")
  - this should describe a **full-capability machine**
  - it should describe an **“evolutionary” plan** to get there
    - **starting from entry level** facility
    - **capable of useful physics** at each stage
    - with an **upgrade path without long downtimes** between steps
  - it should **address cost and schedule** at a level of detail sufficient for sensible discussions with the community
    - but it cannot and should not aspire to be a true CDR at this stage
    - nor should it pretend to be
      - cost and schedule will be more top-down than bottom-up
Where Do We Want To Be?

- Concept **should not be tied** to a Muon Collider
  - but it **should address pushing us closer** to realization of such a future
  - community and funding agencies see this potential as the “pot of gold”
    - accelerator designers should also think this way, even if the future is far away
      - increasing the LHC energy is not much of a vision of the future
      - mankind did not get to the moon by being timid
  - we are **surely not in a position to promise** a future Muon Collider
    - neither are we in a position to completely ignore it
Where Do We Want To Be?

- We need a **physics case** in convincing detail
  - including evolutionary approach if this is appropriate
    - must give clear and plausible picture of **ultimate physics reach**
      - this is really what we are “selling” to the community
  - evaluate “risk” of existing or planned facilities or programs doing entry level work before we begin
    - **Physics Study** already completed is a strong step in this direction
      - needs some time to percolate through community and then be refined/updated as appropriate
      - **community buy-in on this topic is critical**
        - there can be differing views on the importance and priority of the physics, but its validity should not be in question
Where Do We Want To Be?

- We need a **detector concept** to correspond to the physics case we make
  - this can be evolutionary if it makes sense to do it that way
  - this part has gotten short shrift to date
- Increasing community interest and involvement in this area seems like a good strategy
How Can We Get There?

• Our time frame is one year from now!

• Results from Feasibility Studies I and II should be combined to provide a Neutrino Factory machine concept
  — time frame for this is tight, but possible

• Preferable to describe a single facility, not two
  — but evolution from entry level (or even pre entry level) to a high end facility has merit and should be described
    o describe facility then indicate constructing it in stages, each with physics output
  — envision report comparable to Snowmass ’96 document
    o report should be technical and not include costs
How Can We Get There?

- Report should have one section that addresses relationship of facility to eventually building a Muon Collider
  - in the spirit of proof-of-principle
  - not to promise that the facility we describe will be upgradable to a collider
    - but to say that it is a necessary first step toward that ultimate goal
How Can We Get There?

- **Identify set of R&D goals compatible with our resources and Snowmass time frame**
  
  — simulations
    
    - **complete simulation of front end** (at least to entrance to RLA-1)
      
      - channel must have adequate performance (transmission and emittance reduction), including error effects
    
    — **MUCCOOL**
      
      - demonstrate **805-MHz RF cavity operating at high gradient in a solenoid**
        
        - cavity design features should be compatible with those envisioned for cooling channel
      
      - demonstrate **thermal performance of LH$_2$ absorber cell with a beam**
      
      - demonstrate that **cooling codes correctly predict existing experimental data on straggling and multiple scattering**
How Can We Get There?

— Targetry
  - carry out successful beam test on a selected target

— Other hardware
  - test 201-MHz SCRF cavity at high gradient

• To ensure we stay on track, identify people to steer toward the selected goals
  — not necessarily the same people responsible for overall R&D efforts
    - if we lose focus on these short-term goals we won’t complete them
    - if we focus only on short-term goals, overall R&D effort will suffer

• We need to work to create a focused R&D plan including resource needs (funds and effort)
  — requires engineering involvement from the R&D groups and Labs
  — Project Office will coordinate this but cannot generate it alone
How Can We Get There?

• How do we handle costs?
  — maybe not needed at this stage
  — if they are, provide a few-page White Paper that discusses costs for each stage
    ○ something modeled after the Feasibility Study I cost discussion
  — this issue cannot be decided this soon
  — important to assume we may need something at Snowmass
    ○ refining our concepts and the costs that go with them ought to be done in parallel with other activities
What Else Should We Be Doing?

- If not too late, we should secure a role for some *MC* members on Steering Committee
  - at the least, make sure there are convenors chosen from among us

- Spokesperson and Associate Spokespersons should make this high priority now
  - things are moving fast

- We should explore ways to expand interest among detector designers and builders to augment this design activity
  - a strong grassroots physics interest strengthens our case

- We should continue to be proactive in publicizing our R&D efforts widely

- We need to augment *MC* with full-time people and young scientists
Summary

- Snowmass ’01 affords an excellent forum to present the case for a Neutrino Factory to the community
- It offers the opportunity to level the playing field
- Our goal at this stage is to be considered a real option for HEP
- The *MC* must chart its course very soon and then stick to it
- Our R&D plan must be well-conceived and have realistic resource requirements
- The foundations are in place and we must now build on them