Next Steps

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DPF / Fermilab

Summer Study on the Future of Particle Physics

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Thanks!

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Follow the NPSS link at http://snowmass2001.org

Thanks!

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Wonderful Things Have Been Happening Here

- ▷ We have rediscovered our community and our sense of common destiny.
  Breadth . . . excellence . . . global reach . . . optimism . . . youth . . .

  Special thanks to our Astro/Cosmo/Particle colleagues

- ▷ We have celebrated the astonishing progress and remarkable promise of particle physics, broadly understood.
  No one should miss the conclusion that ours is a community on the move, worldwide.

- ▷ We have taken pleasure in the inventiveness and careful thought of our colleagues who dream, design, and build accelerators and the components that make them possible.

- ▷ We have mixed: T working groups; the example of Tor and Reinhard . . .

- ▷ We have engaged with each other's aspirations and significantly advanced a number of ideas.

Some Goals for Snowmass 2001

- ▷ Survey our aspirations for particle physics over 30 years.

  DPF preparing illustrated survey of grand themes.

- ▷ Assess the current state of development of accelerator protoprojects and advanced accelerator research, and understand the investment we must make (financial and human capital) to bring the most promising lines to maturity.

  DPB preparing Snowmass Accelerator R&D Report.

- ▷ Look beyond our immediate goals for measurements and searches to contemplate the shape of a more complete, more ambitious theoretical framework. How should theoretical vision shape our experimental goals?

- ▷ Examine the importance of scale diversity for a healthy and productive future.

- ▷ Educate ourselves about the full range of possibilities before us.

  We must know enough to judge critically, to improve the arguments, to articulate our goals effectively. HMOs in E1 – E6.

- ▷ Listen carefully to our young colleagues, who will help create our common futures.

  Young Physicists Forum

- ▷ Take advantage of opportunities to interact with the HEPAP Subpanel.

  Technical work carried out at Snowmass will undergird the recommendations the subpanel makes.

- ▷ Consider the international dimensions of what we hope to achieve.

  International lab directors
  Global Accelerator Network Discussion
  Reports from ECFA and Japan HEP Planning Committees

▷ I believe we must articulate a comprehensive vision of particle physics (and the sciences it touches) to make our case effectively to ourselves, to other scientists, and to society at large.

At the same time, we have a special responsibility to examine the prospects for the most ambitious accelerators, which are major drivers of our scientific progress.

If we judge the science to be rich, and if we can make the cost and technical risk attractive, we will want to pursue all the leading possibilities: linear colliders, hadron colliders reaching far beyond the TeV scale, muon storage ring, and muon collider.

The vision we present should include the scientific promise of all these instruments, and a strategy for deciding what, where, and when that includes the organic R&D investment we will need to evolve the right set of instruments to serve our science.

- Thanks to the work of many people, the moment is upon us to probe, shape, and judge the idea of a linear collider as a possible next big step for particle physics.

  Evaluating a linear collider and working to define a scientifically rich, technically sound, fiscally responsible plan is a homework problem for the entire community.

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At Snowmass 2001, a widespread feeling has emerged that the world community should move urgently to construct a TeV-scale linear collider as an international project.

These are ambitious machines and significant challenges remain: we must be certain of the costs and we must take the measure of technical risks. A phase change is needed to complete the design and development promptly.

In the United States, another phase change is needed *soon* in the commitment of experimental physicists to the linear collider program.

A few people have done valuable work, but outside the US, *many more people* have done much more comprehensive work.

US participation in a linear collider will not be decisive without the engagement of a large and energetic cadre of superb experimenters to hone the physics case, participate in parameter choices, and work side-by-side with the machine builders. *If you wait, it will not happen!*

It is also time for closer cooperation among physicists in different regions on linear collider issues: to coordinate R&D, to develop a unified physics document, and to make the scientific case to the governments of the world—perhaps an International Linear Collider Users Group?

When you go home . . .

- ▷ Continue to think about what you have heard and done at Snowmass.
- ▷ Talk with your particle physics colleagues about what you have seen and heard and done here. Arrange seminars to share the Snowmass 2001 experience with all your students and colleagues.
- ▷ Write your advice to the HEPAP subpanel; If you wrote long ago, reread your letter to see how your thinking has evolved.
- ▷ Write up your Snowmass 2001 work by October 15 using the LaTeX template. Details from http://www.slac.stanford.edu/econf/C010630/ and Norman Graf. CD-ROM?

When you go home . . .

- ▷ Talk with your colleagues in other fields of physics and astronomy about Snowmass 2001. Share your enthusiasm! Give a colloquium early in the school year about the future of particle physics.
- ▷ Talk with your colleagues in other fields about their excitement and aspirations. Help your students appreciate the exciting futures all across physics and astronomy.
- ▷ We've heard at Snowmass 2001 from many gifted, articulate, and inspiring colleagues: Invite them to visit your department. Hire them!
- ▷ No department is whole without some presence in experimental particle physics, particle theory that engages with experiment, accelerator physics, astro/cosmo/particle physics, string theory (to speak only of our immediate neighborhood).

Mike Holland's "Insulting" Questions

- ▷ Members of Congress, Congressional Staff, and White House Staff are busy people.
  Their first response to any request is, "No."
  If you go away and never come back, they gave the right answer.
  Their second response to any request is, "You don't have a plan."
  If you go away and never come back, they gave the right answer.

- ▷ Sometimes our friends ask hostile questions to learn whether we have answers they can use when they are asked hostile questions.

- ▷ Some people in Washington and some scientists do not have our interests at heart. We must not let them seize the agenda and frame the debate, but when they ask easy questions for nefarious purposes, we should leap to give compelling answers.

  - Does particle physics require accelerators?
  - What is the value of particle physics to other sciences and to society?

- ▷ Snowmass communications workshops brought together public affairs professionals from many laboratories (US and abroad) and particle physicists. *Important starts!*

Ask More of the United States Government

- The will to join together and undertake challenging and important causes is little in evidence . . . This is an aberration in American history, and we must change it.
- In a time of unparalleled prosperity, every section of every appropriations bill seems to begin, "Because of severe budgetary constraints . . ."
- We are still waiting for the peace dividend . . .

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What Can We Do?

- You must demand better! The public believes in science and exploration . . .
  . . . and we are asking audacious questions that engage the public imagination.
- Basic research (and not only particle physics) is a superb investment on many levels. Don't be timid (but be sensible) . . .

  Many people are dining out on the World Wide Web, an unprogrammed dividend of a tiny fraction of the world's investment in particle physics.
- Like every individual, every nation must decide what constitutes a meaningful life. Share your passions and your dreams, and lift the eyes of those who govern!