

Global Strategies for Science Communication

XVI^{me} Rencontres de la Vallée D'Aoste

March 2002

Judith Jackson, Fermilab



"We are with you."

September 12, 2001

Dear Judy,

I want to say that we are all with you in these days. I myself can't find the right words to express my feeling after this terrible September 11....Judy, from my point of view NOW it's absolutely important that we HEP outreach people round the world will meet as soon as possible, not only to figure out how to help international particle physics stay alive, but also how we, in our field of activity, can set visible footprints for the significance of peaceful collaboration across all borders.

Petra



A new era

- The science of particle physics has embarked on an extraordinary 21st century voyage of discovery that promises to revolutionize the way we understand the nature of the universe.
- To realize the promise of that voyage of discovery, we must also create a revolutionary new 21st century vision of strategic science communication.

Communication opportunities



- Extraordinary science is just ahead in particle physics.
- The tools of particle physics—accelerators and detectors—push the frontiers of advancing technology.
- Particle physics is a completely international field—physics without borders.

More opportunities



- After 40 years of experience, particle physicists are good collaborators.
- Momentum is gathering for some form of world laboratory.
- Particle physicists do understand the need to change the way they communicate.

Communication challenges



- The excitement of particle physics is hard to communicate.
- We have chosen a field that requires very expensive tools that only governments can fund.
- Our science is international, but our science communication is not.

More challenges



- Collaborations produce great physics —but not always great communication.
- The obstacles to a world laboratory are (mostly) not technical challenges but human issues.
- Particle physics does not come from a culture of communication.

Particle Physics? Huh?



- The excitement of particle physics is hard to communicate.
- Jack Marburger: "From time to time the discoveries of new particles and new symmetries...have made headlines, but they never fascinated the public the way supernovas, black holes and pulsars did."
- What have you done for me lately?

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- We have chosen to devote ourselves to a field that requires very expensive tools.
- Champagne taste, Pepsi-Cola pocketbook
- Every day, something happens in Washington that influences the U.S. ability to do high-energy physics in the coming year.
- DC staffer: "Can't you do something for a billion? A billion I could do for you."



Change in funding from FY2000 to FY2002



We're in this together.



- Our particle physics collaborations are international, but our particle physics communication is—usually—local.
- Every lab and every region communicates for itself.
- When CERN sneezes, Fermilab gets a cold.

Collaboration¹ Communication



- Collaborations produce great physics—but not always great communication.
- No good deed goes unpunished.
- We are big science.





Good news or bad for CDF and HEP?

THE NEW YORK TIMES SCIENCE TUESDAY, FEBRUARY 5, 2002



they hope) teenting with hadden

Not everyone agrees that the exbeasts. periment, which tank years to complete, is definitive. Dr. Michael E. Peskin, a theorist at the Stanford Linear Accelerator Center in California, called the paper "a major advance" in the art of particle hunting. but he noted that the analysis was based on a number of assumptions like the nature of the particles that ghrinos decuy into - that might turn

out to be mistaken. But the champions of the experiment stand by their conclusions. "Theorists write hundreds of papers arguing about what is and is not possible in SUSY." Dr. Lykken said, "but I think we are getting the bottom line correctly here."

Having found to trace of the particles in neurby terrain, the researchers will now reach further out. The

data analyzed for the hum were from the first ran of the Tevatron, finished in 1996. It took another three years to make sense of the results and two more to double-check the details and write it all up. Next comes Run 2 at which the accelerator will be cranked to a slightly higher energy and run with a brighter beam.

"If it is there, we are going to find " Dr. Spirepuits sold. If it isn't, then the spatight moves on to the Large Hadron Collider at CERN, the European researcher center in Geneva. when the collider begins operating several years from now, it will sur-

pass the Tevatron as the world's largest accelerator.



The Fermilab experimenters are

seeking squarks and "glumes," the hypothetical twin of the glaon, which makes quarks stick together to form protons, steutrons and other familiar particles. Had they found a glaino, it might have been front page news. "SUSY's are a whole other half of the universe," said Dr. Henry J.

Frisch, a University of Chicago physicist. "Finding them would certainly

Lykken said, "you have also succeeded in manufacturing dark mat-

ter in the laboratory." Most important, perhaps, SUSY's would fill a gaping theoretical hole. One of the great unanswered questions is why particles have mass. In a simpler world they would all be weightless like photons. But there is believed to be a particle called the Higgs that interacts with the others and bestows them with their various

at Fermilab. Furneled through nearly a thousand miles of labyrinthine wires and cables, the signals were scrutinized for the patterns theorists believe SUSY's make. A mark of how intricate these experiments are is the number of coan-

thors on a typical paper -- 486 on the gluino report, the sames and institutional affiliations sprowling across more than a third of the six pages. The tradition is to recognize every-

for "lightest supersymmetric parti-cles." Finding them, the theory 2005, means there must have been glamos. But the L.S.P.'s thestselves are also maddeningly clusive, speeding from the scene unnoticed. They can be inferred, however, by the holes they leave behind - the "missing energy" they carry away. All things being equal (and they never quite are) particles from the collision of the accelerator beams would fan out in every direction like a bery asterisk. Any gaps in the pattern could mean L.S.P.'s and, thus, ghanos.

Matters are complicated by the fact that energy can be missing for more mundane reasons. There are inevitably flows in the detector called cracks or holes - that show up as gaps. And other less exotic particles, like neutrinos, can also

cause leaks. To make sure she had accounted for these factors, Dr. Spiropulu did

something unusual in particle phys-ics - a blind analysis much like those in drug experiments. Using banks of computers, she spent years tooking only at data where no one expected SUSY's to be. This taught her how to identify and "subtract out" phenomena that could manquerade as gluino events.

To guard against bias - seeing pictures in the clouds - the period of data in which theorists hoped to find gluines was kept hidden until the very end. Dr. Spiropula vividly remembers the day she finally "opened the bex" to see what was inside. Sitting in her office with some of the godparents, she pressed a button on her laptop and the final calculations began.

What world laboratory?



- Technical issues we can solve, but what about the human issues?
- Politics, economics, sociology ...and communication.
- "If physics issues had forced us to put accelerators into space, we would have solved these issues long ago." --Albrecht Wagner



We're no NASA.

- Particle physics does not come from a culture of communication.
- U.S. funding agencies such as NASA and NSF have communication built into their missions and into their funding. Not the Department of Energy, the "home" of most U.S. particle physics.
- "Outreach" and "strategic communication": What's the difference?

Up from the hinterlands



• "Today the frontiers of the large and the small—of astronomy and astrophysics—remain unconquered. ...We can no longer expect that society will benefit materially from the phenomena we discover in these remote hinterlands...."

Jack Marburger, Science Advisor to President Bush

• To have the kind of future that all of us want for particle physics, we must change the way we communicate.

We can change.



- We can learn to communicate strategically in particle physics.
- We can begin now to think about communication in a different way.
- We can influence our futurebut not by "business as usual."

We can change.



- Think strategically.
- Tell the REAL story of particle physics.
- Tell our human stories without fear of death at the hands of our colleagues.
- Make communication part of our experiments and projects.
- Make our communication as collaborative as our experiments.

Think strategically.



- What are our objectives?
- Who are the key audiences?
- What is our message?
- How can we get our message across to the key audiences?

The REAL story.

- Not just another boson on a particle chart, not merely one more riff on the Standard Model, but a revolution in understanding nature.
- The science of matter, energy, space and time.







More than particles





We are big science.

Fermilab

meson production.



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Every author has a story.

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Fermilab

FERMILAB-Pub-01/349-E December 2001

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Who knew?

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Tell our human stories.

- We are good collaborators, but we are also individuals with individual human stories.
- Reporters need plot and character to create interesting stories for their readers.



Build in communication.



- Remember BTeV. Don't wait until trouble finds you.
- Make communication part of your experiment's scientific goals from the beginning. (This will not be not easy.)



Communication without borders.

We need international physics communication to support international physics collaboration.





Communication without borders

- December 6-7, Hamburg: DESY, SLAC, CERN, Gran Sasso, Fermilab Brookhaven met to form an international collaboration for HEP communication
- Now: Also KEK, Berkeley, Jefferson Lab

Communication without borders



- International Collaboration for Science Communication
- World "image bank" on common website
- Press release coordination
- Staff exchanges
- Communication on the agenda at physics conferences (!)

Finally!



A good graphic representation of the difference between direct and indirect CP violation, courtesy of Phil Schewe at the American Institute of Physics.

Put it in the bank! (The World Image Bank of Particle Physics)





A website for all of us?



Communication without borders



"Not only to help international particle physics stay alive, but also how we, in our field of activity, can set visible footprints for peaceful collaboration across all borders."

