Helping Develop America's Technological Workforce

QuarkNet

The QuarkNet Collaboration

Office of Science
U.S. DEPARTMENT OF ENERGY

K. Whelan, UC-Riverside, Aug 2008

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OR
Just What Have I Gotten Myself Into?

Office of Science
U.S. DEPARTMENT OF ENERGY

K. Whelan, UC-Riverside, Aug 2008

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Goals

- **Scientists as mentors**
- **Teachers as researchers & facilitators**
- **Students as researchers**

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Impact

- **Long-term relationship on teachers' professionalism**

- **Students' opportunities and abilities to engage in scientific investigations.**

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Vision

A lasting community of researchers that includes high school teachers and students as well as physicists

"Doing science."
School science reflects the practice of science. Science is what students DO, not what is done to them.

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- Supports learning by inquiry.
- Provides teachers and students with real research opportunities in particle physics.
- Encourages national and international collaboration among students, teachers and scientists.

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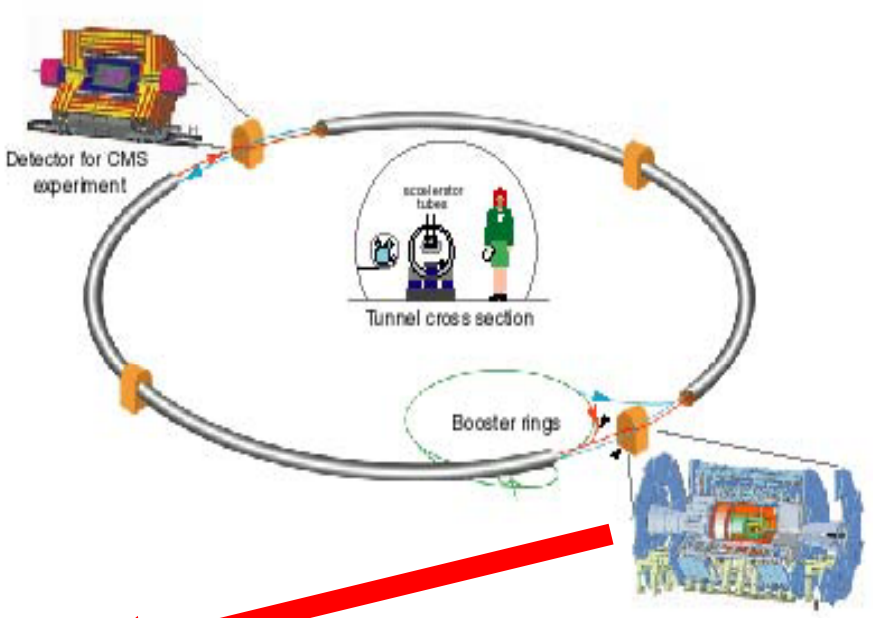
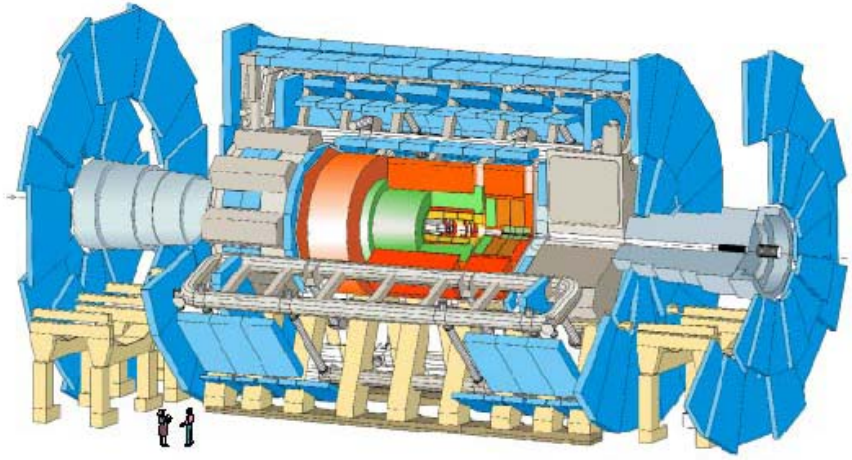
QuarkNet Origins





ATLAS and CMS at CERN

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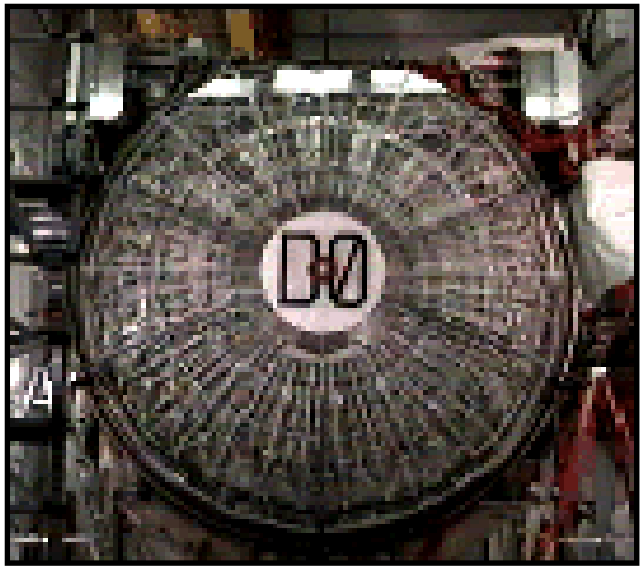
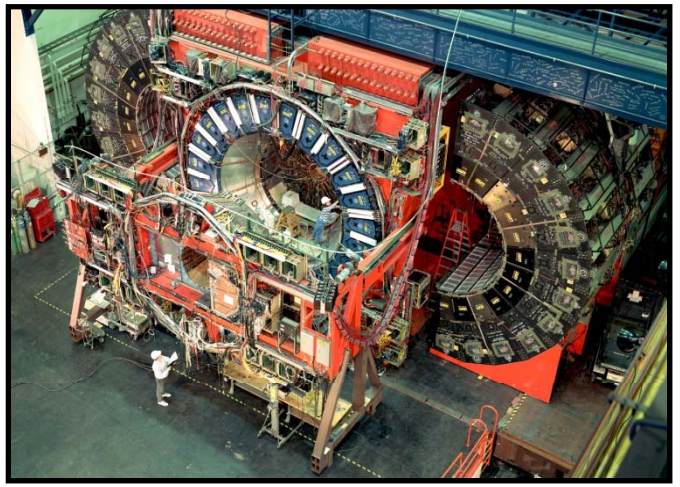
QuarkNet Origins

CDF & DØ at Fermilab





QuarkNet Learning Communities

- **Program**
  - **1-week follow-on program for all teachers (year 3+)**
  - **Optional programs**
    - **Student summer research teams (year 3+)**
    - **Particle Physics Boot Camp (all years)**
    - **Reunions (all years)**
    - **Cosmic Ray Studies (all years)**
    - **Other opportunities to be described later**

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Teachers as Researchers

So..what can teachers do?

- Construct and test detector components.
- Create data sets for students.
- Develop online experiments for students.
- Develop classroom detectors.

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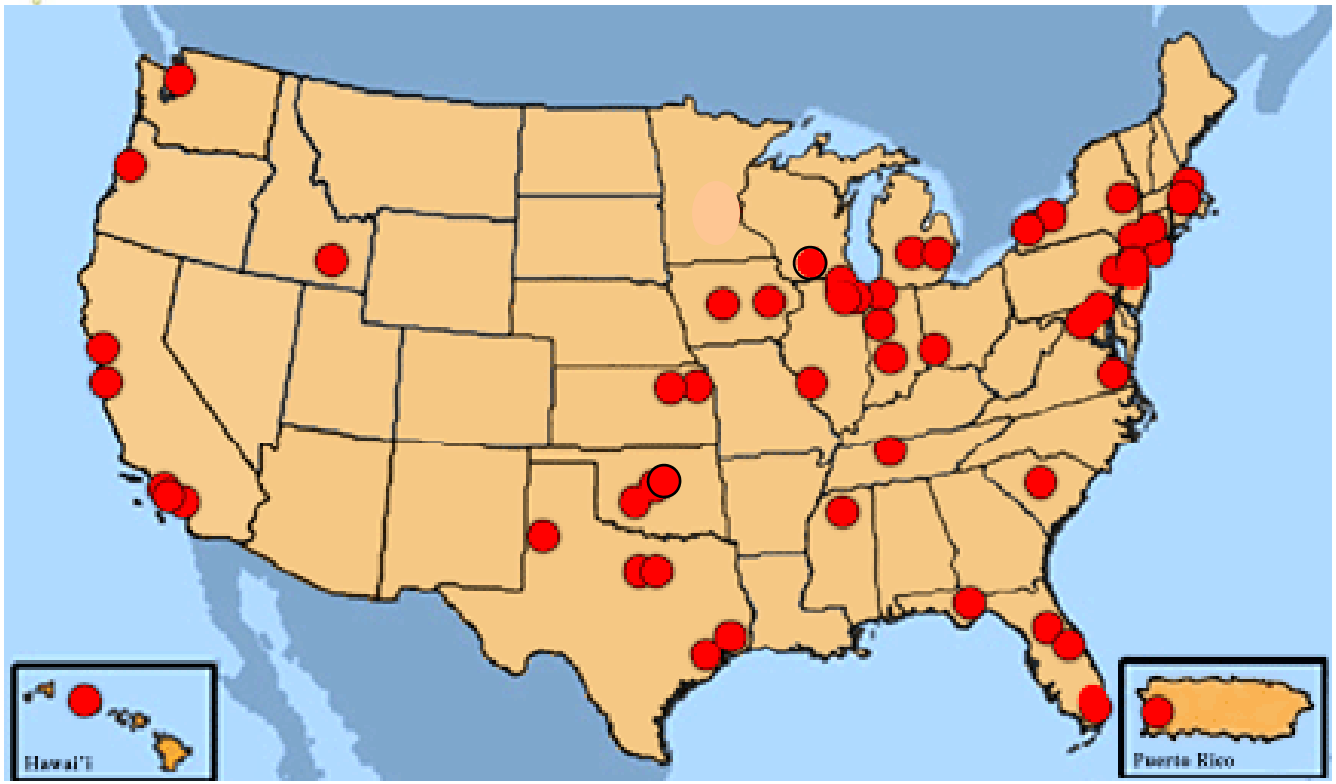
Current Active Centers



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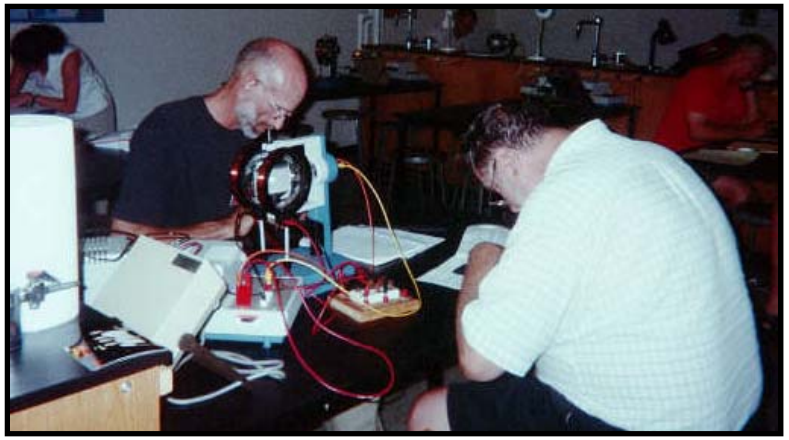
Current Status

- 51 Active centers
- 158 Mentors
- 615 Teachers
- 108 Summer students (summer 2007)



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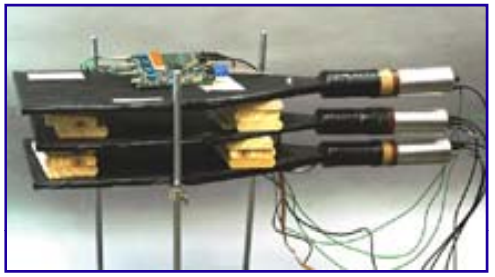
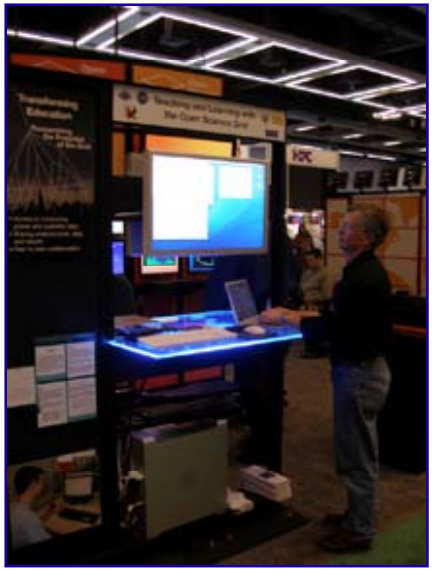
Cosmic Ray Detector



- Teachers' idea
- Several prototypes
- Collecting data led to e-Lab



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Reunions and Opportunities

- LBNL, SLAC/Stanford Reunion, 3/18/2005
- NSTA Reunion at SMU, 4/1/2005
- Fermilab Reunion, 10/7-9/2005
- CSAAPT at College Park, 11/05/2005
- Anchorage AAPT Meeting 1/2006
- Particle Data Group 50th 9/23/2006
- Fellows Program 2007- ongoing

And……

5 teachers sent to CERN in Geneva, Switzerland for a 3 week workshop (2007 and 2008)

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Student Summer Research

- 11 centers with 4 student slots each (avg)

A taste of a succulent future

Astounded by the beauty & simplicity of the particles that define our existence

Continually challenged me

Too much fun

Invaluable Experience

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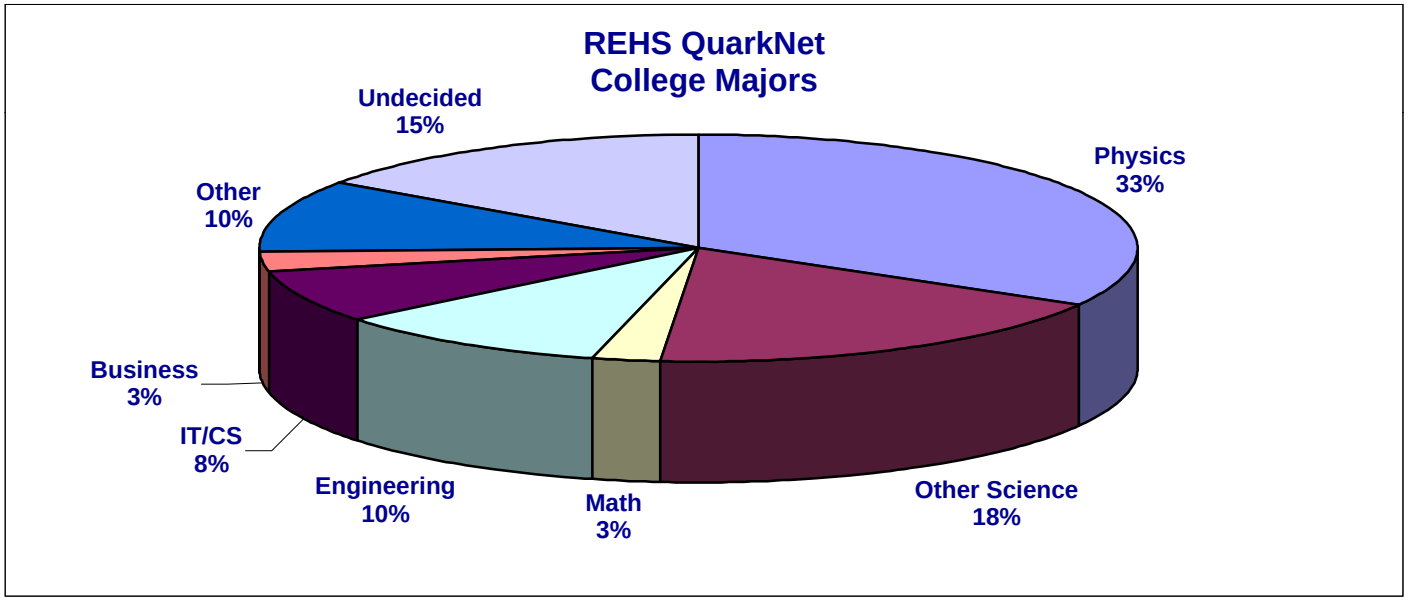
Report on 39 Summer Students



I will be attending the University of Michigan this fall with an intended major of biochemistry and a minor in physics. I really enjoyed my summer and it was a big factor in not only my school choice but my decision to minor in physics. Amanda - 2005

Funding

- NSF ESIE grant
- NSF Experimental Particle Physics support
- DOE High-Energy Physics support
- ATLAS & CMS education support
- Research groups & dept.'s in-kind contributions

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QuarkNet Team

PIs

- Marge Bardeen
- Michael Barnett
- Randy Ruchti

Dan Karmgard, Mitch Wayne

Staff Teachers

Ken Cecire, Hampton U

Bob Peterson, FNAL

Tom Jordan, Florida

Kris Whelan, LBNL

Beth Marchant, Notre Dame

Support Staff

Gayle Millman, LaMargo Gill, FNAL

Anne Zakas, Notre Dame

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What does the future hold? Where does the "Road" go now?

- Renewal of NSF Grant was approved this year
  - 5 year cycle
- Comments from the NSF/DOE review panel were overwhelmingly positive.
  - "QuarkNet is a model for other groups to use"
- New/Additional Directions for QuarkNet

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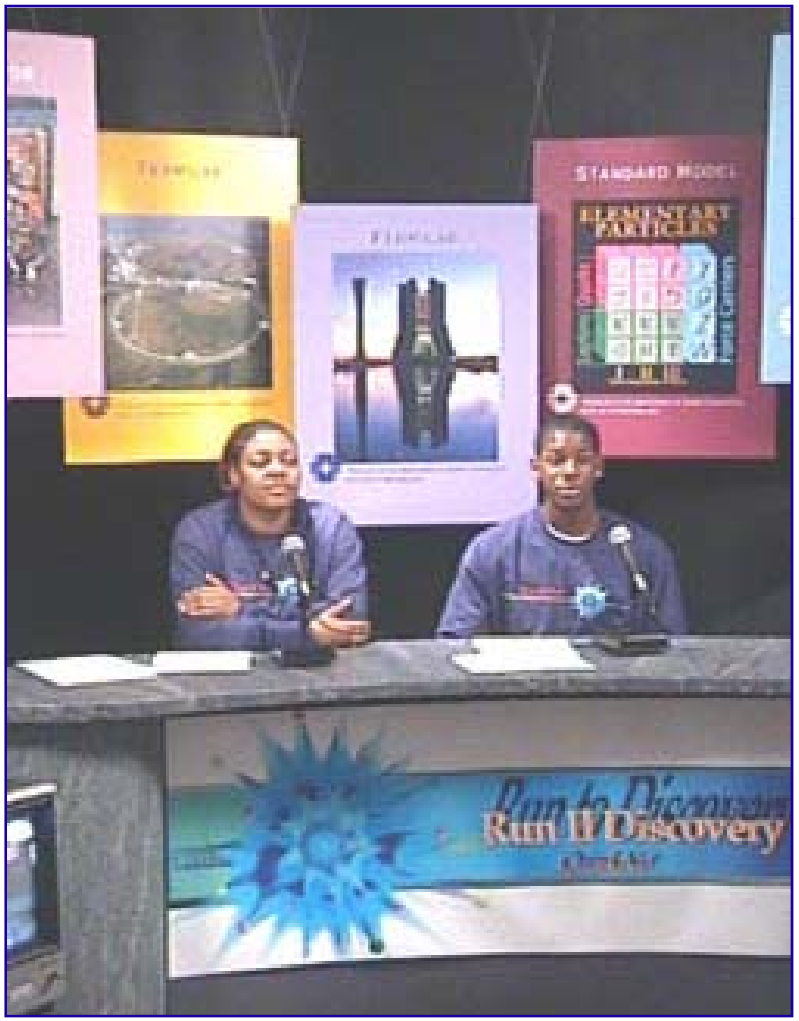
Summary



QuarkNet is:

- A successful program which started in 1999 and continues to grow.
- A long-term program based on the LHC timeline.
- A partnership between physicists and teachers.
- A program that contributes to providing highly qualified teachers in physics classes (NCLB).