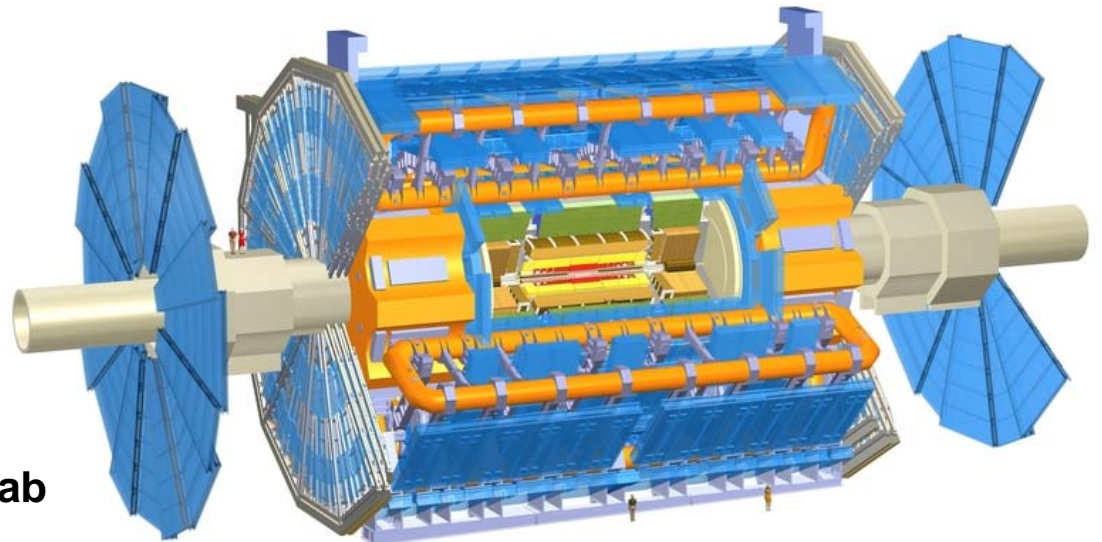


# Outreach in an Experiment with 1800 Physicists

(and 34 countries and 150 institutions)

## The ATLAS Experiment



Michael Barnett  
Lawrence Berkeley National Lab  
August 2004

# ATLAS Education and Outreach Committee

Michael Barnett and Erik Johansson – Co-Convenors  
(an ATLAS-wide elected position)

## Recent activities

- CERN's 50th anniversary and Open House (October 2004)
- ATLAS tours
- ATLAS movie
- ATLAS animated film
- CDROM
- DVD
- Public website
- Event displays

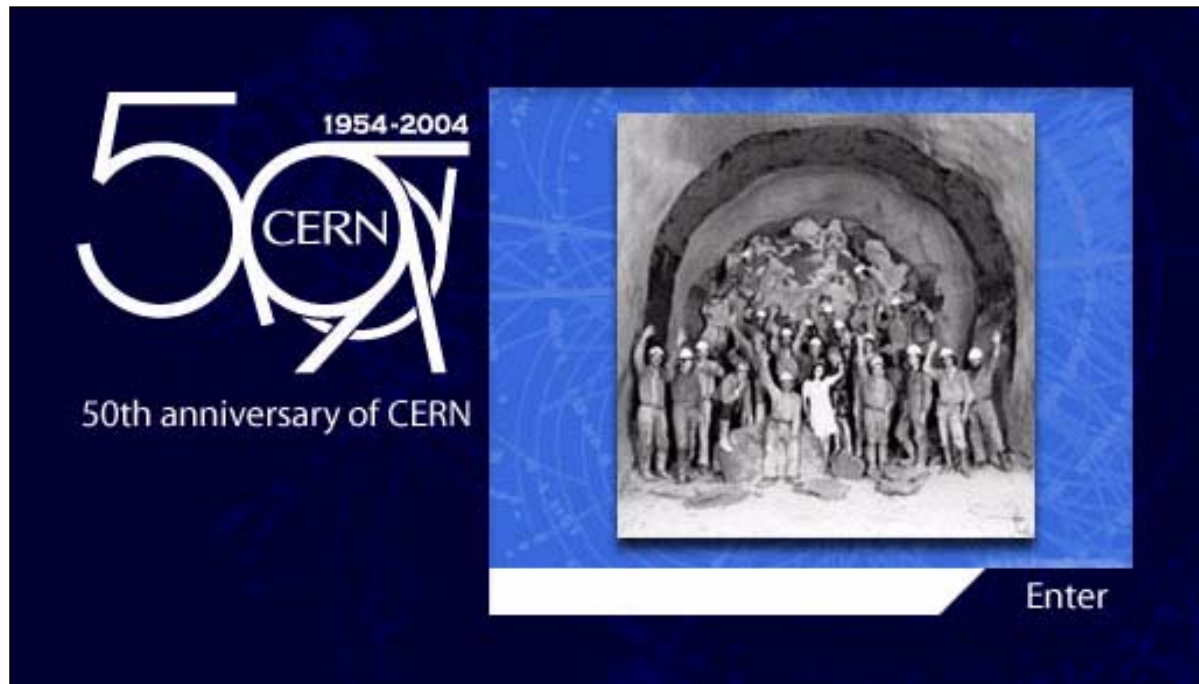
## Not mentioned in this talk:

- Posters
- Public brochure
- Photographs of work in the cavern
- ATLAS physics textbook
- LHC Deck of Cards

# CERN's 50th anniversary and Open House

October 2004

Expect 20,000 people with 50 tour sites.  
Several prime ministers will attend  
a separate event two days later.



# ATLAS Tour Itinerary



**Hall 180**

M. Barnett – DPF Meeting Aug. 2004



**Hall 191**

# ATLAS Tour Itinerary



**The cavern**

# Award-winning ATLAS Movie

Produced by ATLAS Outreach Committee using a professional director. Committee wrote script and outline. Movie is available in ten languages.

Has won four gold medals at international film festivals (in the science category).

Available on CDRom and on Web:  
[atlas.ch/movie](http://atlas.ch/movie)

Will be on DVD .



# Award-winning ATLAS Movie

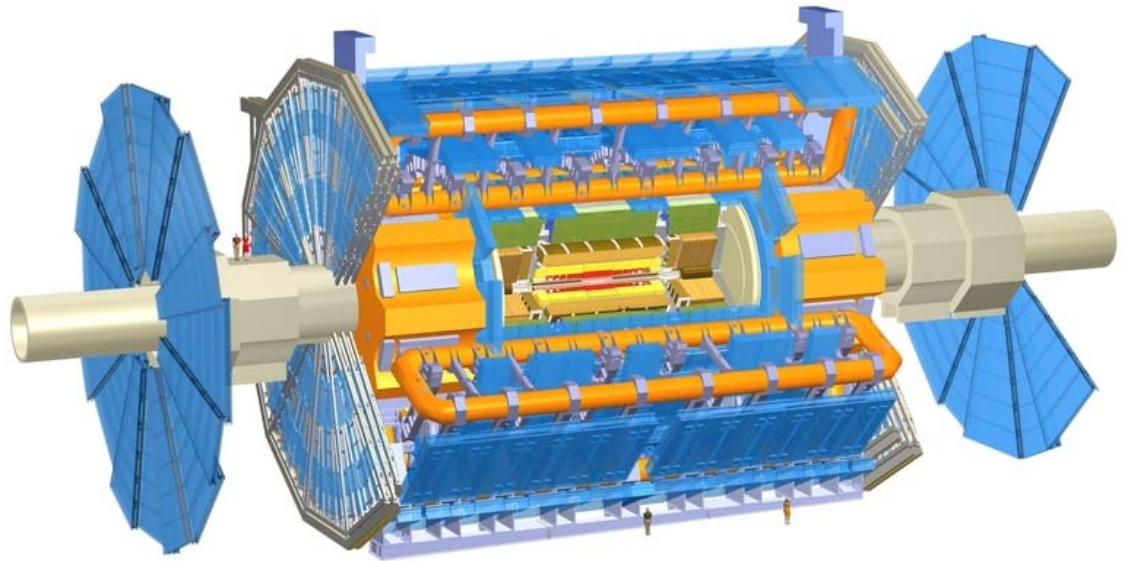
**A 4-minute segment of the  
movie will be shown here.**

# New animated film of ATLAS for the public and students

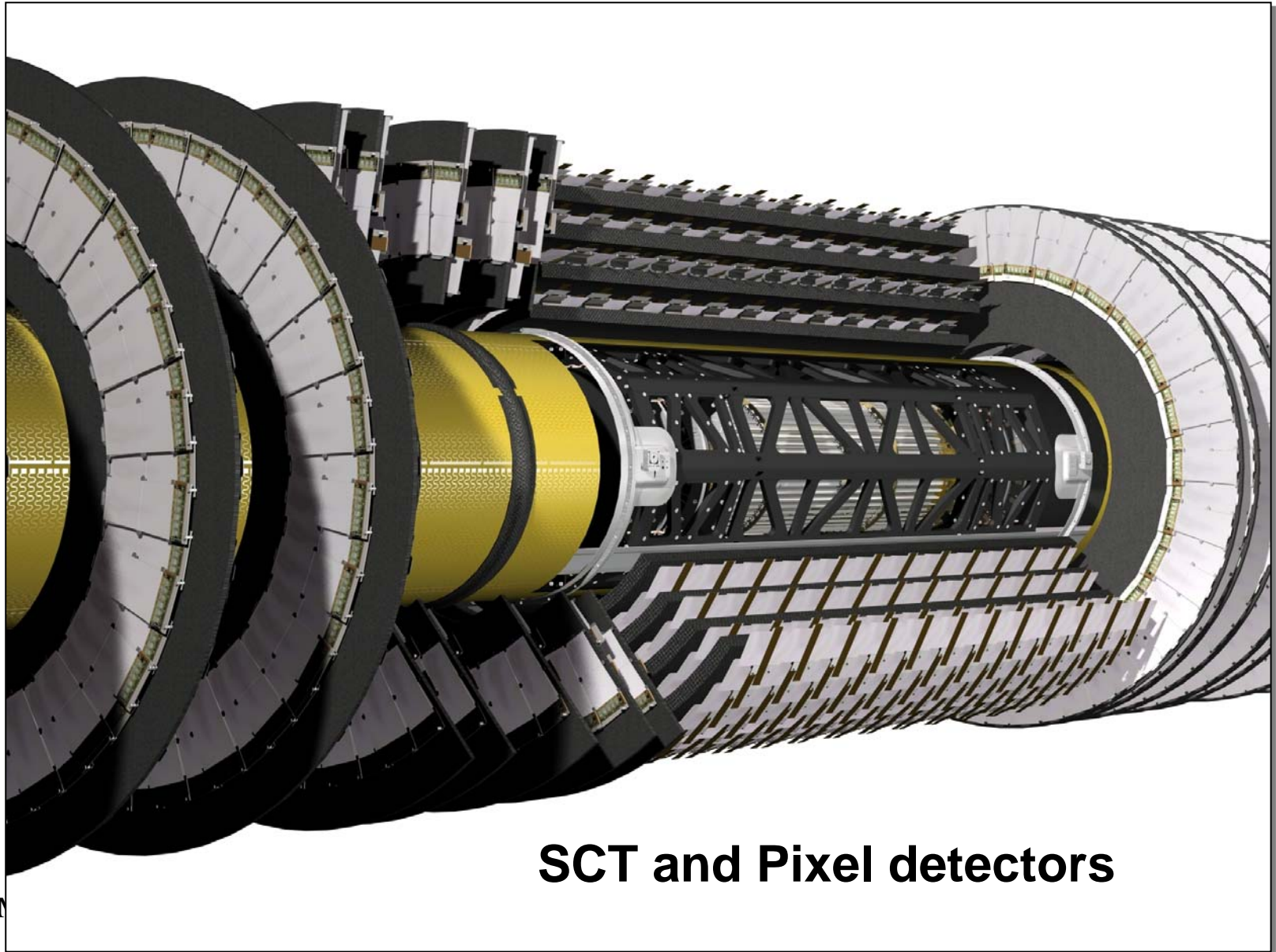
The animation has three sections:

- Assembly
- Particles in ATLAS
- Physics in ATLAS

Portions are completed.

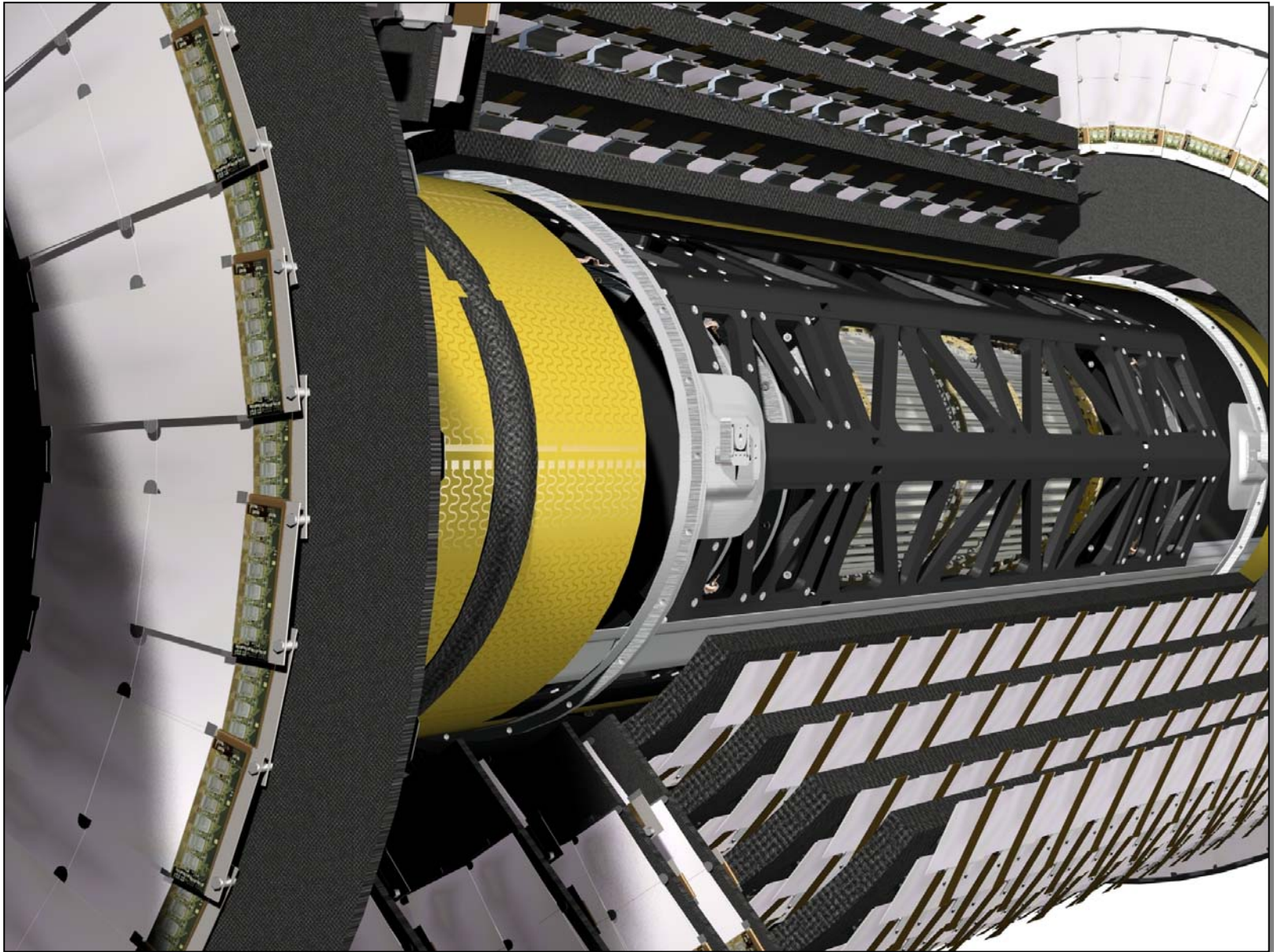


# Image from animated film of ATLAS

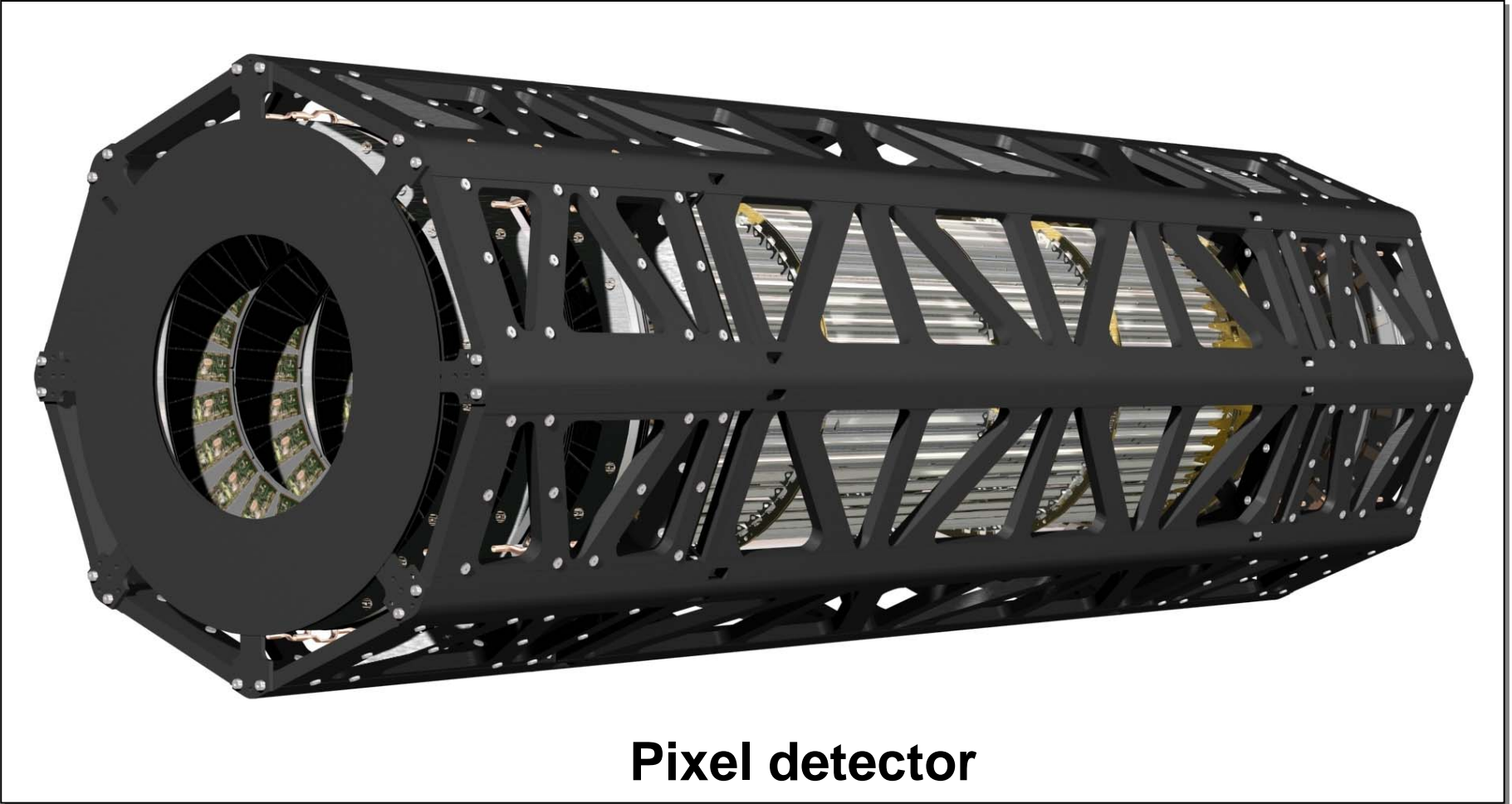


**SCT and Pixel detectors**

# Image from animated film of ATLAS

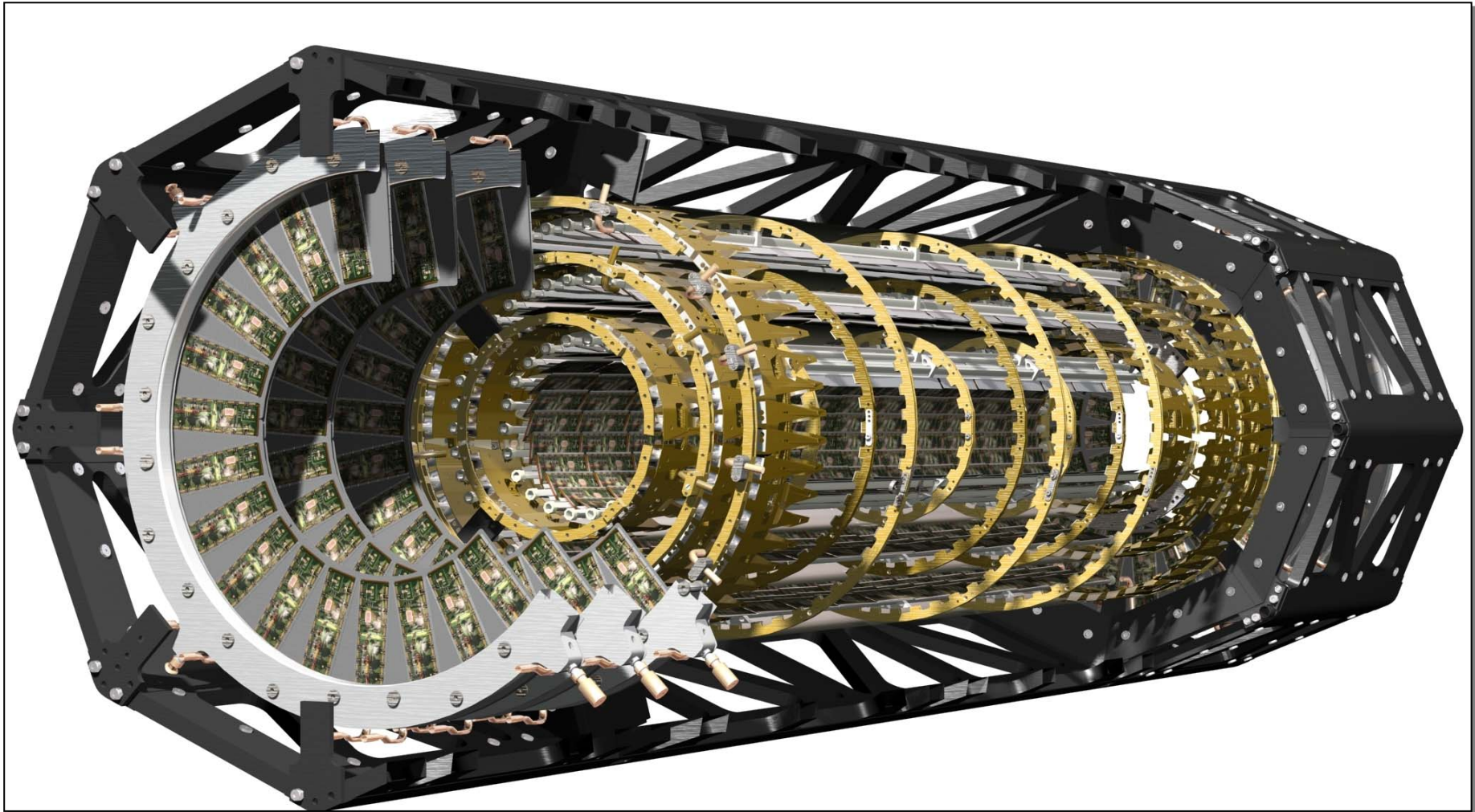


# Image from animated film of ATLAS



**Pixel detector**

# Image from animated film of ATLAS

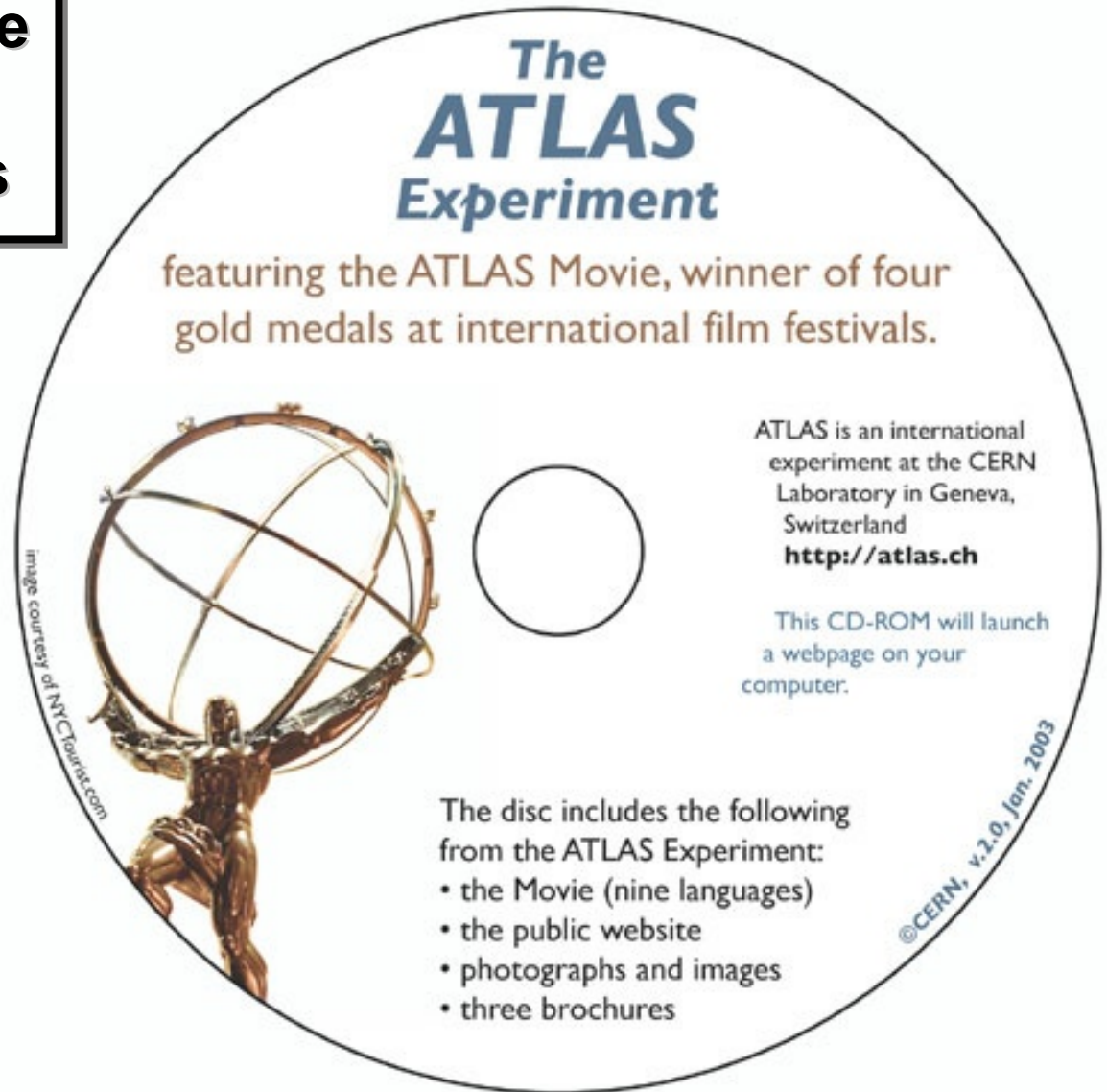


# **New animated film of ATLAS for the public and students**

**A 7-minute segment of  
the animation will be  
shown here.**

**CDROM with movie  
and other ATLAS  
outreach materials**

**Soon:  
DVD of  
ATLAS movie  
and animation**



# Public Website **ATLAS.ch**

Includes animation showing aspects of ATLAS Experiment.

Gives access to ATLAS movie, photos, PowerPoint animations, live webcams, and four “e-Tours”.

## The ATLAS Experiment

### TAKE an eTOUR!

[Introduction](#) [Physics](#) [Experiment](#) [Accelerator](#)

**ATLAS** is a particle physics experiment that will explore the fundamental nature of matter and the basic forces that shape our universe. The ATLAS detector will search for new discoveries in the head-on collisions of protons of extraordinarily high energy. ATLAS is the largest collaborative effort ever attempted in the physical sciences. There are 1800 physicists participating from more than 150 universities and laboratories in 34 countries.  
[More...](#)

**The ATLAS Detector**  
Large Hadron Collider at CERN

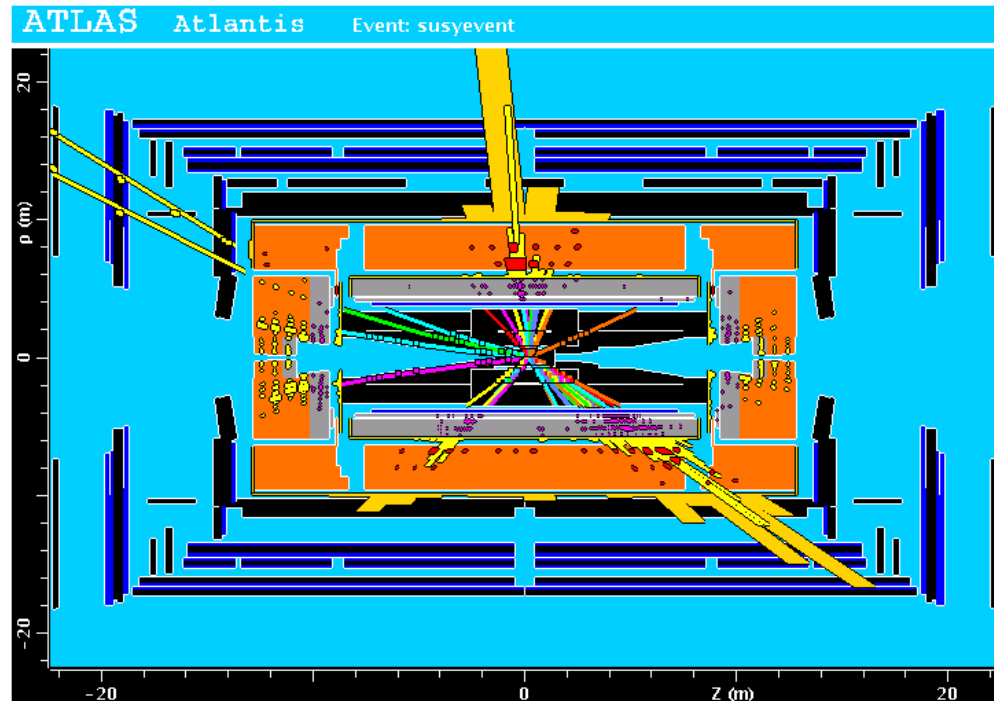
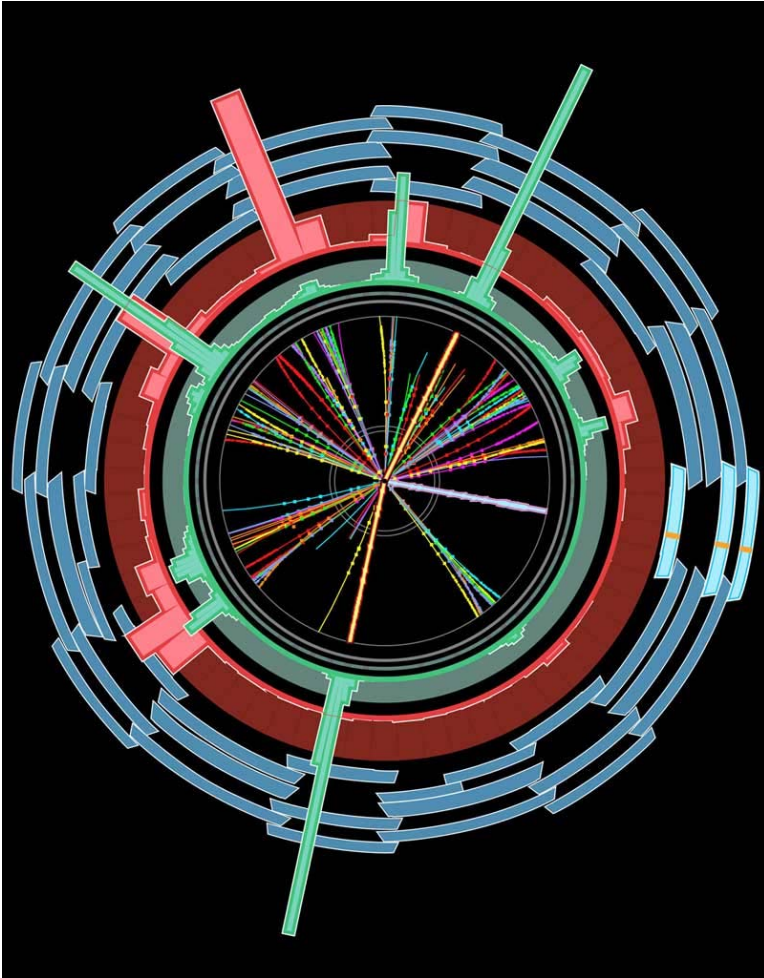
[Start again](#)

[Watch the award winning ATLAS Movie](#) [ATLAS Multimedia](#) [Detector Description!](#)

[ATLAS Collaboration](#) [Education Committee](#) [Glossary](#)

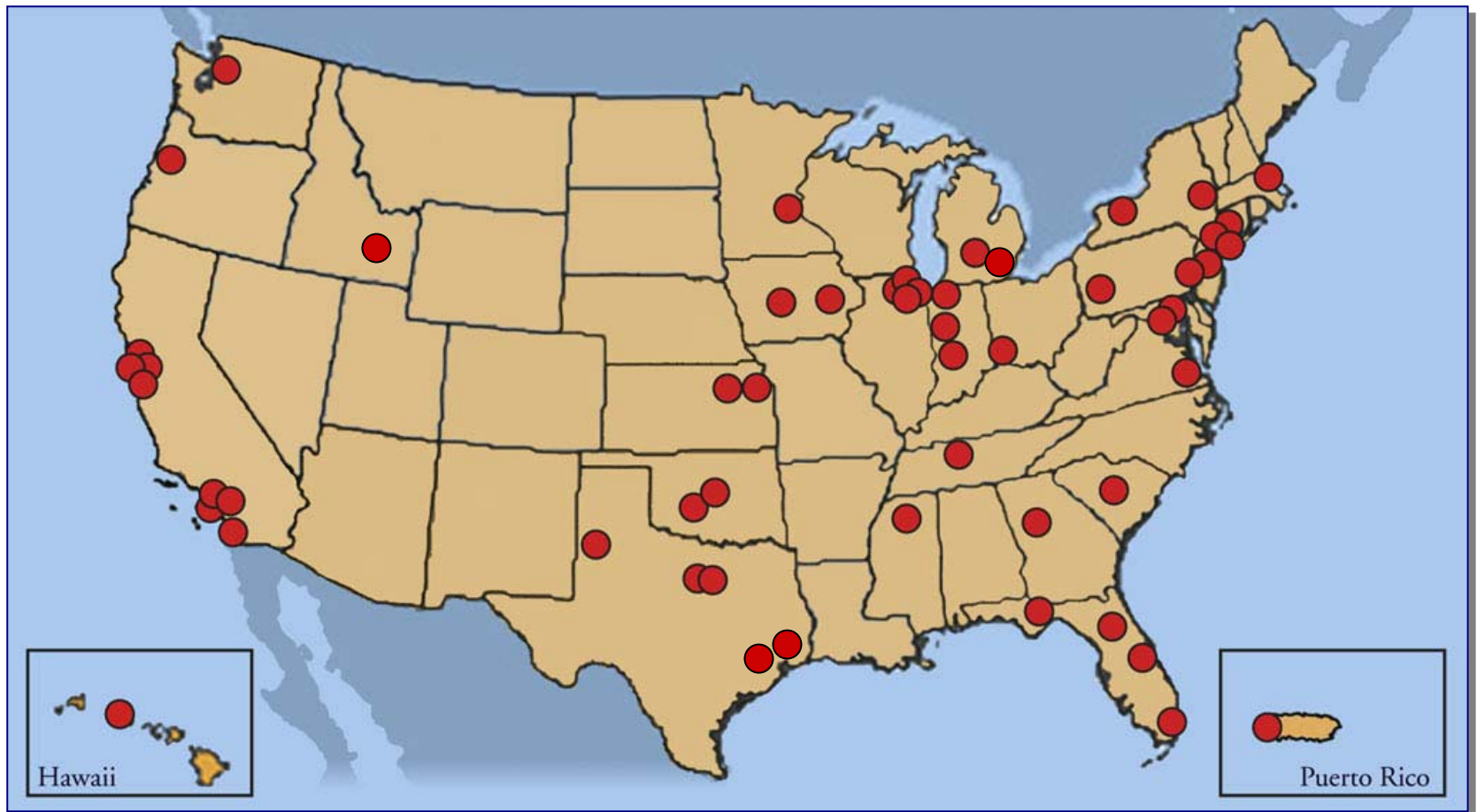
# Event Displays

- Mini-black-hole event
- Supersymmetry event
- Shower development of a pion in Calorimeters
- Animation of a pp collision



# QuarkNet in 52 Communities

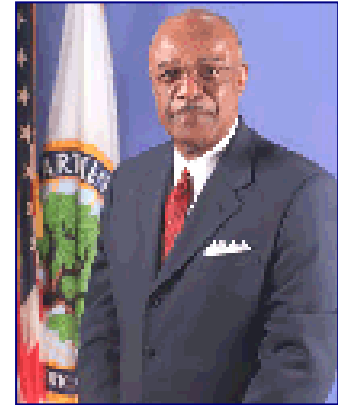
Helping Develop America's Technological Workforce



# Helping Develop America's Technological Workforce

**U.S. Secretary of Education Rod Paige:**

**“We have been relying on the education other countries provide to their citizens. There is something wrong when American schools cannot produce enough good workers for valuable American jobs.”**



**Office of Science Director Ray Orbach:**

**“Where have the Americans gone?”**

**“Our Nation is failing to produce both a scientifically literate citizenry and the kind of workforce we will need in the 21st Century.”**



# Exciting Science

We need to get students excited about science again and involved in inquiry-based learning.

To do that, we need to get scientists and teachers working together.

**QuarkNet does just that !**

# The Focus of Program

Focus of program is to involve in our experiments:

**Teachers:** do research with us and bring that excitement and experience to their classrooms

**Students:** analyze web-data in their classrooms.

**The QuarkNet research experience and Teacher Institute enable teachers to teach basic concepts of introductory physics in a context that students find exciting and rewarding.**



# Students learn fundamental physics as they analyze live online data.

Their research will teach them the fundamentals of:

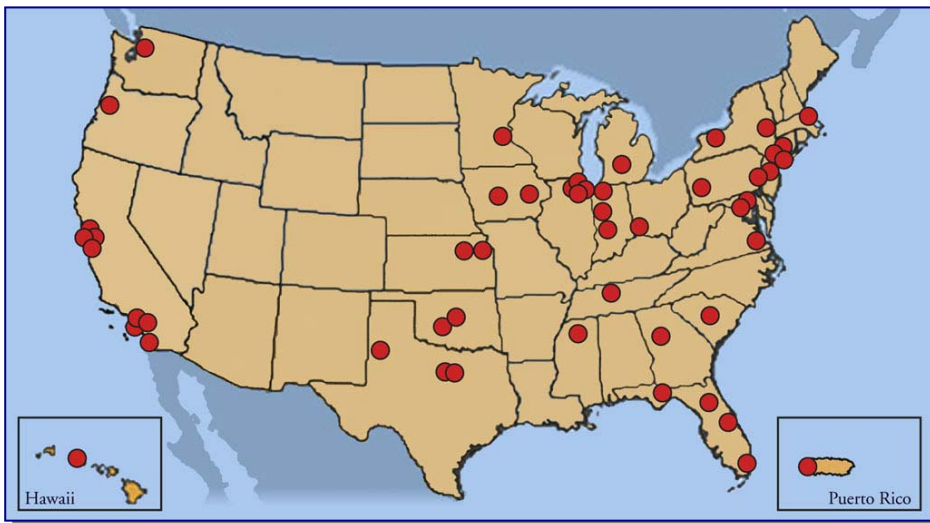
- kinematics
- energy
- momentum
- statistical analyse
- the structure of matter
- and much more



# How QuarkNet Works

QuarkNet sets up “centers” at universities and laboratories involved in physics experiments.

A center has 2-6 physicist mentors and about 12 teachers who work together over many years.



# Students Impacted

**Average teacher has 5 classes with 28 students.  
For 52 centers with 12 teachers each:**

$$52 \times 12 \times 5 \times 28 = 87,400 \text{ students each year}$$

**After ten years, approaching one million students.**

# Impact on Teachers

**Teacher in the "most racially diverse school system in Indiana"**

**“This program has enriched my teaching. I have many resources to tap into now. I have a broader knowledge base as a result of lectures and research.**

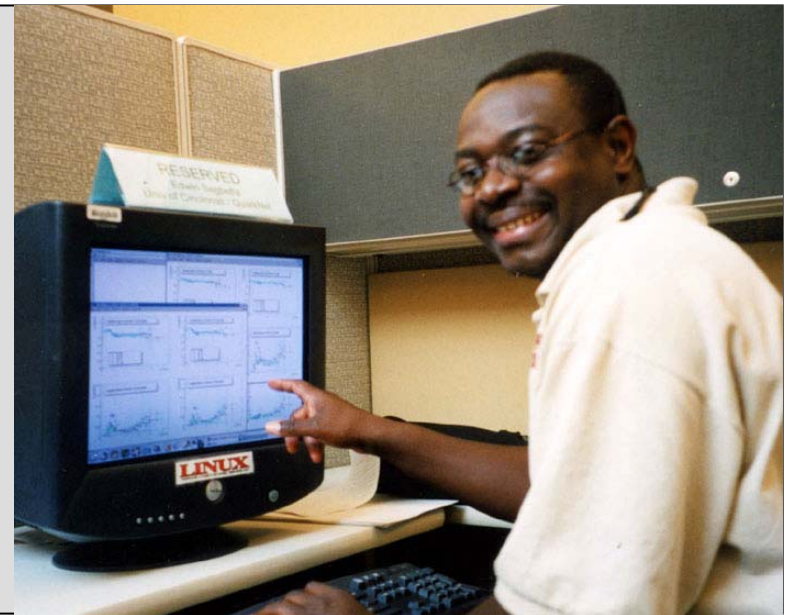
**“I have a warm web of friends across the United States who have the same goals as I do and who are eager to help with encouragement and advice. I feel a part of something larger and I don't feel like I am alone in the classroom any more.**



# Growing New Teachers

Teacher in the "most racially diverse school system in Indiana"

“I have had several students express an interest in becoming a high school science teacher like me because **what we do is so interesting.**”



# Another QuarkNet teacher

Whose students are “mostly minority, low-income kids.”

“Contact with the QuarkNet program has been a terrific boost for them and started a number of students seriously thinking about going to a 4-year college and maybe **pursuing careers in science.**”



# Mentors Learn Too

With the right attitude towards them, you might learn as much from the teachers as they learn from you (on different subjects, though). I did.

Laszlo Baksay, Florida  
International University



# 11 Experiments

QuarkNet enables 11 experiments at 7 DOE labs to incorporate project-specific education and outreach programs .



M. Barnett – DPF Meeting Aug. 2004

# DOE & NSF Funding

## QuarkNet is a Worthwhile Investment

QuarkNet is requesting about **0.08%** of DOE-HEP budget.

If DOE-HEP spends **1%** on workforce development, then QuarkNet would be only **8%** of the total.

QuarkNet will be about **0.1%** of NSF-MPS, and **1%** of EPP.

# Goodwill ambassadors

**These teachers (as well as their students and their parents) are a corps of goodwill ambassadors for particle physics.**