



ATLAS Education and Outreach

Michael Barnett
May 2007

ATLAS Projects include (recently completed or under devel):



- **Animated Video clips**
- **Real-life Video clips**
- **Web listing of stories in the newsmedia about ATLAS**
- **Latest ATLAS news headlines**
- **Animated features (Episodes I and II on a DVD with the ATLAS Movie)**
- **Press Kit**
- **Webpages for the newsmedia**
- **Best photos and images of ATLAS webpages**
- **Brochure (and webpage) on applications of work on ATLAS**
- **Brochure (and webpage) on the physics of ATLAS**
- **ATLAS fact sheets and webpages**
- **ATLAS exhibit in Bldg. SX1 (over the ATLAS cavern)**
- **Special events such as Open Day**
- **Program of high school student event analysis**
- **Masterclasses for high school students**
- **Andrew Millington movie (former BBC producer)**

ATLAS products including



- Brochures
- Press Kit
- Posters
- DVDs
- 3D Viewer of detector
- Puzzle with 500 pieces
- T-shirts, hats, jackets

Press Kit



ATLAS for press



ATLAS Press Kit

The ATLAS press kit includes:

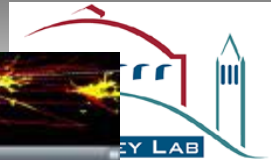
- ATLAS DVD
- ATLAS Fact Sheets
- ATLAS Information
- ATLAS general brochure
- ATLAS Technology Transfer brochure
- ATLAS Technical Challenges brochure
- Other items

Email: atlas.public@cern.ch

[ATLAS Press Webpage](#)

[CERN Press Webpage](#)

Press Page



ATLAS for press

[Latest Press Release](#) [All Press Releases](#)

National Geographic story: World's largest superconducting magnet up and running.

[ATLAS Press Kit](#) Click for the ATLAS press kit.
Contact: atlas.public@cern.ch

[Latest News](#) The latest ATLAS news.

[ATLAS in the news](#) ATLAS in the news.

[ATLAS Images](#) A collection of ATLAS photos

[ATLAS Video Clips](#) View and download ATLAS video clips.

[Technology Transfer](#) *From Fundamental Science to Everyone's Life.*

[ATLAS Facts](#) ATLAS fact sheets.

[Physics of ATLAS](#) Coming soon...

[ATLAS detector](#)

[Tours of ATLAS](#) How to request a tour (visit) of the ATLAS buildings and cavern.

[Collaboration Map](#) Map of participating countries.

[How ATLAS collaborates](#) How the ATLAS collaboration works.

For further information please go [here](#).

For interviews please contact the [CERN Press Office](#).

Photo of the month

Latest News



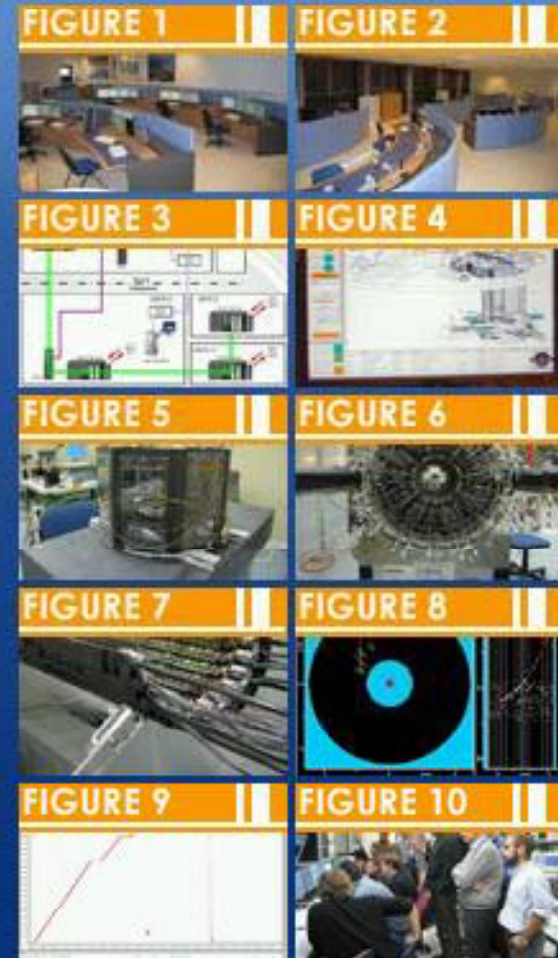
Latest News (December 2006) (but old image)

Development of the ATLAS Control Room

The ATLAS control room will become the brain of the detector operations. At the moment six of the final fifteen stations are already in place. Each station has four monitors, working together as one virtual screen. In addition, important information is visualized on a big wall screen using a projector. At present the control room has one projector in service but is planning to increase that number to 8-9 in the final setup. All this will create quite a pleasant and comfortable working environment. One of the important upcoming milestones will be the combined cosmic rays run monitored from the control room. (Figures 1 and 2) [More on this story...](#)

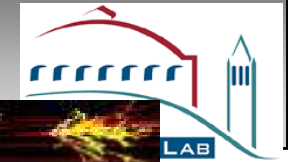
The ATLAS Detector Safety System

The ATLAS Detector Safety System (DSS) has the mandate to put the detector in a safe state in case an abnormal situation arises which could be potentially dangerous for the detector. It covers the CERN alarm severity levels 1 and 2, which address serious risks for the equipment. The highest level 3, which also includes danger for persons, is the responsibility of the CERN-wide system CSAM, which always triggers an intervention by the CERN fire brigade. DSS works independently from and hence complements the Detector Control System, which is the tool to operate the experiment.



M. Barnett – May 2007

ATLAS in the News



ATLAS in the news

ATLAS In the News

Please tell us of other news stories featuring ATLAS by emailing us [here](#).

A Giant Takes On Physics' Biggest Questions	New York Times
Crash Course	The New Yorker
 Le CERN recrée les conditions du Big Bang	TSR
Broken Magnet Highlights Largest Collider's Engineering Challenges	National Geographic
Massive Particle Accelerator Rewing Up	NPR
The World's Largest Particle Accelerator	NPR
Subterranean secrets of the Universe	CNN
How to make science really shine	Telegraph
LARGE HADRON COLLIDER: Having a Blast, Wish You Were Here	Science Magazine
UK teachers set to experience physics up close	Innovations Report
Hunt for the God particle	Cosmos
Teams toil underground to re-create big bang	MSNBC
 Die Nobelpreismaschine	Berliner Zeitung
 Das Universum in der Röhre	Heise Online
 Urknall im Labor	Stern.de
 Höllenglut bei Urknall im Labor	Netzeitung.de

Video Clips – Live and Animated



For newsmedia
For ATLAS talks and presentations
For websites

Posting on YouTube.com



YouTube.com



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Director Videos

[The Heart of Steel](#)
01:30
From: THE DIRECTOR

[THE CONSUMERIST: Tekserve Ad with over \\$60,000 in ipods](#)
00:14
From: consumerist

[Hope Is Emo: Chapter One 'The Words Are Dying'](#)
03:24
From: digitalfilmmaker

[88SLIDE: 'Cinco de Mayo' 5/5/06](#)
01:03
From: 88slide

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[Upload](#) Quickly upload and tag videos in almost any video format.

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Member Login

User Name:

Password:

[Sign Up](#)

Forgot: [Username](#) | [Password](#)

Featured Videos [See More Videos](#)

[Explosion - An improvised synth solo](#)
07:51

MooT BooXLe performing on the Synthesizers.com modular analogue synthesizer. This is not a perfect performance, as it was improvised in one go.

Also functioning in this video are the Moogerfooger CP-251, the Roland Space Echo, and Reason drums.

I was controlling the filter cutoff with a CV pedal.

If you enjoy this video (or if you don't), please ... [\(more\)](#)

Tags: [moot](#) [booxle](#) [improvised](#) [keyboard](#) [bass](#) [analog](#) [synthesizer](#) [synth](#) [electronic](#) [techno](#) [synthesizers.com](#) [solo](#) [performance](#)

Added: 3 weeks ago in Category: [Music](#)

From: [mootbooxle](#)

Views: 57,458

★★★★☆
949 ratings

What's New at YouTube

[Musicians](#)
Are you a musician? [Signup](#) for our new music account or [login](#) to convert your existing account.

[We're Hiring!](#)
Sys Admins, Web Developers and Engineers are wanted within.

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**Enter NBC's [The Office](#)
Make Your Own Promo Contest!**

Video Clips

<http://atlas.ch/multimedia/>



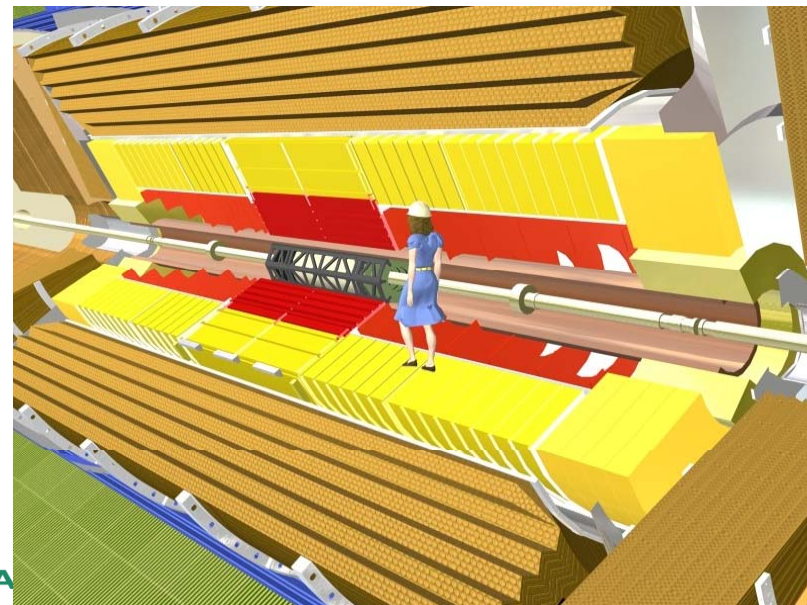
Live

SCT-TRT Insertion
Toroid Lowering (camera on toroid)
Calorimeter centering in toroids
Assembly of Muon Big Wheel
The Black Eyed Peas visit ATLAS
Detector with Ken Burns Effect

Animated

LHC and Collision in ATLAS
Overview (extracted from
Episode 1 animation)
Particle Detection in ATLAS
Animated movie – Episode 1
Animated movie – Episode 2

Clips from ATLAS Movie (14 clips)





The ATLAS Experiment - Episode 1

07:12

Added: 7 months ago
Views: 9,671

★★★★★
39 ratings



The ATLAS Experiment - Episode 2 - Part 1

07:52

Added: 3 months ago
Views: 3,495

★★★★★
12 ratings



The ATLAS Movie' Clip - #1

00:29

Added: 7 months ago
Views: 1,705

★★★★★
1 rating



The ATLAS Experiment - Episode 2 - Part 2

06:17

Added: 3 months ago
Views: 1,550

★★★★★
9 ratings



The ATLAS Movie' Clip - #2

00:29

Added: 7 months ago
Views: 1,301

★★★★★
1 rating



The ATLAS Movie' Clip - #8

00:59

Added: 7 months ago
Views: 1,281

★★★★★
3 ratings



The ATLAS Movie' Clip - #6

00:33

Added: 7 months ago
Views: 1,081

★★★★★
1 rating



The ATLAS Movie' Clip - #12

00:51

Added: 7 months ago
Views: 1,080

★★★★★
2 ratings



The ATLAS Movie' Clip - #10

00:32

Added: 7 months ago
Views: 1,020

★★★★★
2 ratings



The ATLAS Movie' Clip - #3

00:29

Added: 7 months ago
Views: 909

★★★★★
1 rating



The ATLAS Movie' Clip - #5

00:29

Added: 7 months ago
Views: 824

★★★★★
1 rating



The ATLAS Movie' Clip - #4

00:29

Added: 7 months ago
Views: 705

★★★★★
1 rating



The ATLAS Movie' Clip - #11

00:19

Added: 7 months ago
Views: 607



The ATLAS Movie' Clip - #9

00:34

Added: 7 months ago
Views: 576

★★★★★
2 ratings



The ATLAS Movie' Clip - #13

00:25

Added: 7 months ago
Views: 571

★★★★★
1 rating



ATLAS



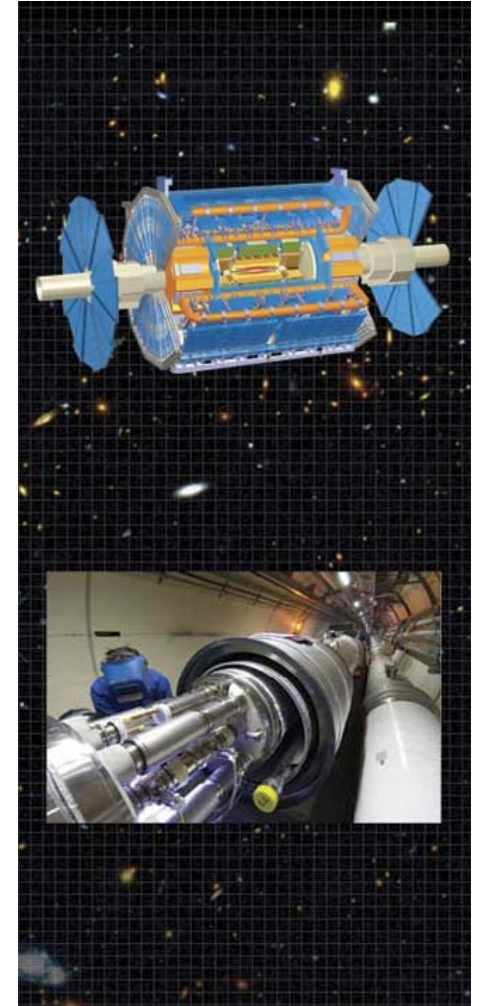
Phone Displays



The ATLAS Event Challenge

- An educational project using ATLAS particle collisions

The ATLAS Student Event Challenge will make high school students part of the ATLAS Experiment by sharing actual ATLAS events with them and giving them the tools to analyze these collision events.



Student Event Analysis (AMELIA)



Interactive event analysis for students and public

ATLAS Multimedia Educational Lab for Interactive Analysis

FPS: 1
X - cam_pos: 1 tar_x: 1
Y - cam_pos: 0 tar_y: 0
Z - cam_pos: 0 tar_z: 0

ID	Type	q	pt	ϕ	η
1	mu+	1	15.18	2.19	0.42
2	gamma	0	0.97	3.53	0.20
3	e+	1	0.72	4.18	-0.44
4	p+	1	0.84	5.79	1.13
5	e-	-1	0.78	5.64	0.31
6	mu-	-1	23.46	0.01	-2.02

Calculations

Send to Track list Get Inv. Mass list

ID	Combination	Inv Mass

Event Detector Multimedia

Show/Hide Particles:

- Electrons
- Muons
- Photons
- Neutrinos
- Other neutral
- Other charged

Pt. Cut: 0.6 GeV

SELECTED TRACK INFO

Name: e-
Charge: -1
Pt: 0.817529
eta: -1.648861
phi: 4.614555

Add to the list

Student Event Analysis (AMELIA)



Interactive event analysis for students and public

ATLAS Multimedia Educational Lab for Interactive Analysis

FPS: 4
X - cam_pos: 1 tar_x: 0
Y - cam_pos: 0 tar_y: 0
Z - cam_pos: 0 tar_z: 0

Event Stats Selected Tracks
Event: Higgs4L_11.0.5_5300_00365.xml

	Total	Shown
Tracks	948	119
Neutral	436	13
Charged	506	33
Photons	291	34
Neutrinos	2	0
Muons	6	4
Showers	92155	0
E_mis	0.00	

Event Detector Multimedia

Show/Hide Particles:

- Electrons
- Muons
- Photons
- Neutrinos
- Other neutral
- Other charged

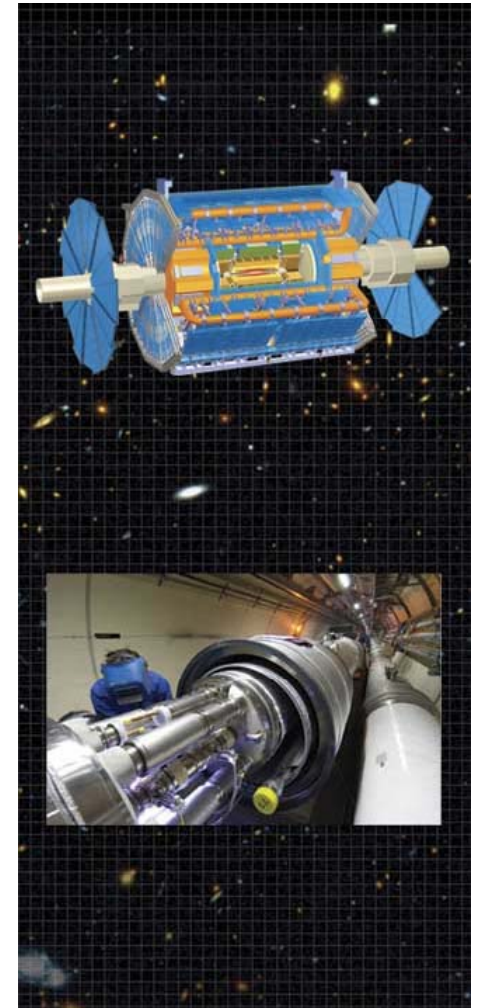
Pt Cut: 0.6 GeV

The ATLAS Event Challenge

- An educational project using ATLAS particle collisions

Analysis Tools and the Grid

ASEC will give students the opportunity to use virtual data tools and techniques to access and analyse both simulated and real ATLAS data, report their results as online posters, and have online discussions about their work with peers through blogs, wiki sites, and other communication tools.



Public webpages: <http://ATLAS.ch>



The ATLAS Experiment

Mapping the Secrets of the Universe



- HOME
- ATLAS Collab.
- For Press
- For Students
- For Physicists
- Science Centres
- Tour of CERN
- eTours
- Detector Desc.
- Webcams
- Images
- Movie
- Multimedia
- Virtual Tour
- Powerpoint
- ATLAS Store
- ATLAS eNews
- Tech Transfer
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Latest News

Latest News

Several teams of various nationalities and countries work together for the ATLAS forward muon detector. For two years, Americans, Chinese, Europeans, Israelis, Japanese, Pakistanis and Russians have been assembling and testing the so-called "Big Wheels".

[All the news](#)

[ATLAS in the news](#)

[Photo of the month](#)

About ATLAS

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 one of the largest collaborative efforts ever attempted in the physical sciences. There are 1900 physicists (including 400 students) participating from more than 164 universities and laboratories in 35 countries. [More...](#)

[How ATLAS collaborates](#)



[Scenes](#) [Portraits](#) [Inside](#)

Features



[eTours](#)



[ATLAS Movies](#)



[Multimedia](#)



[Webcams](#)



[Virtual Tour](#)

Public webpages: Portraits



Virtual Tour



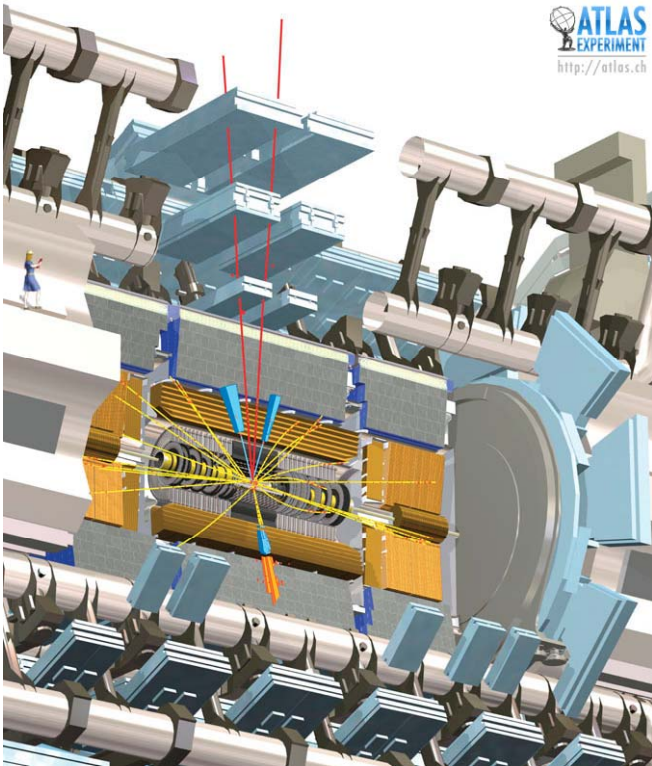
Virtual Tour



ATLAS VIRTUAL VISIT

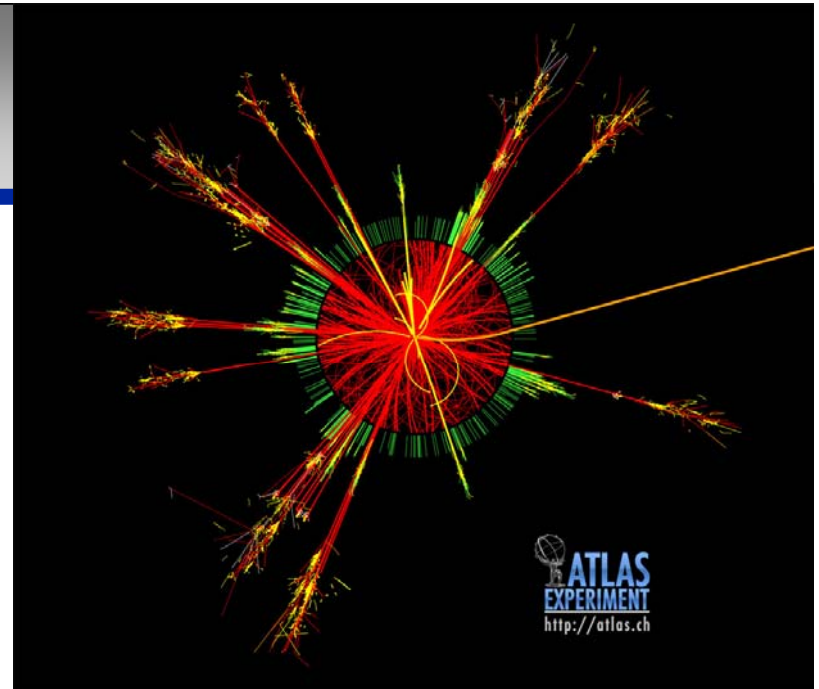
ATLAS Virtual Visit



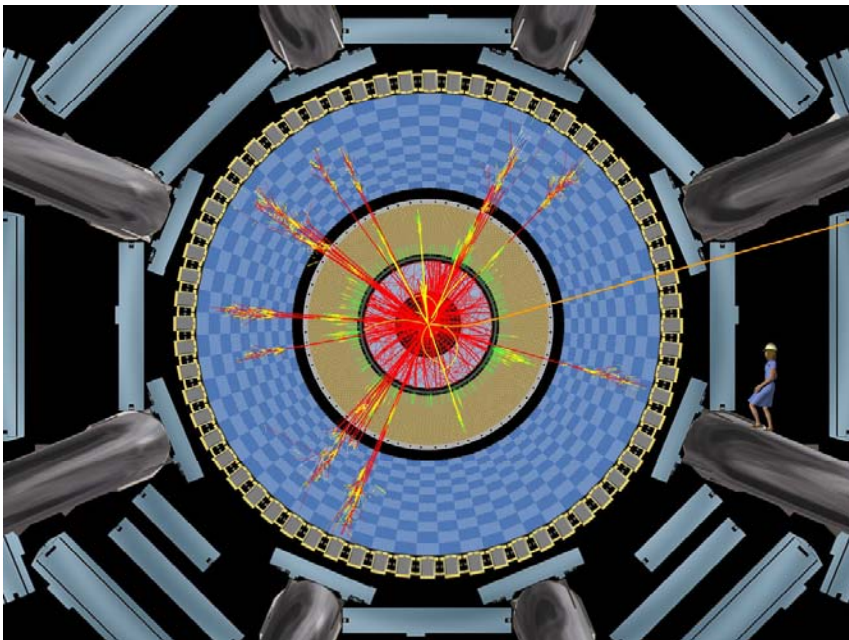


ATLAS
EXPERIMENT
<http://atlas.ch>

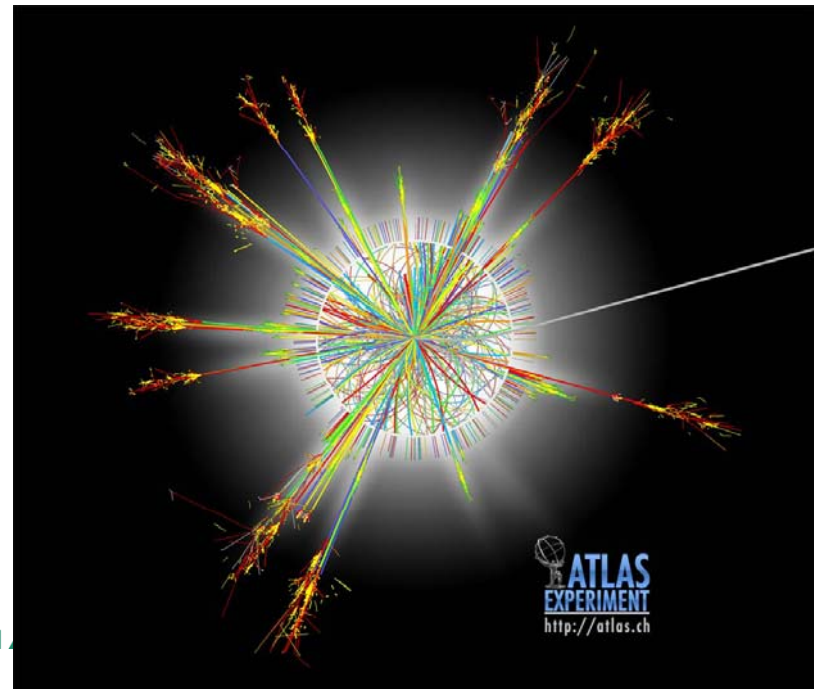
Event Images



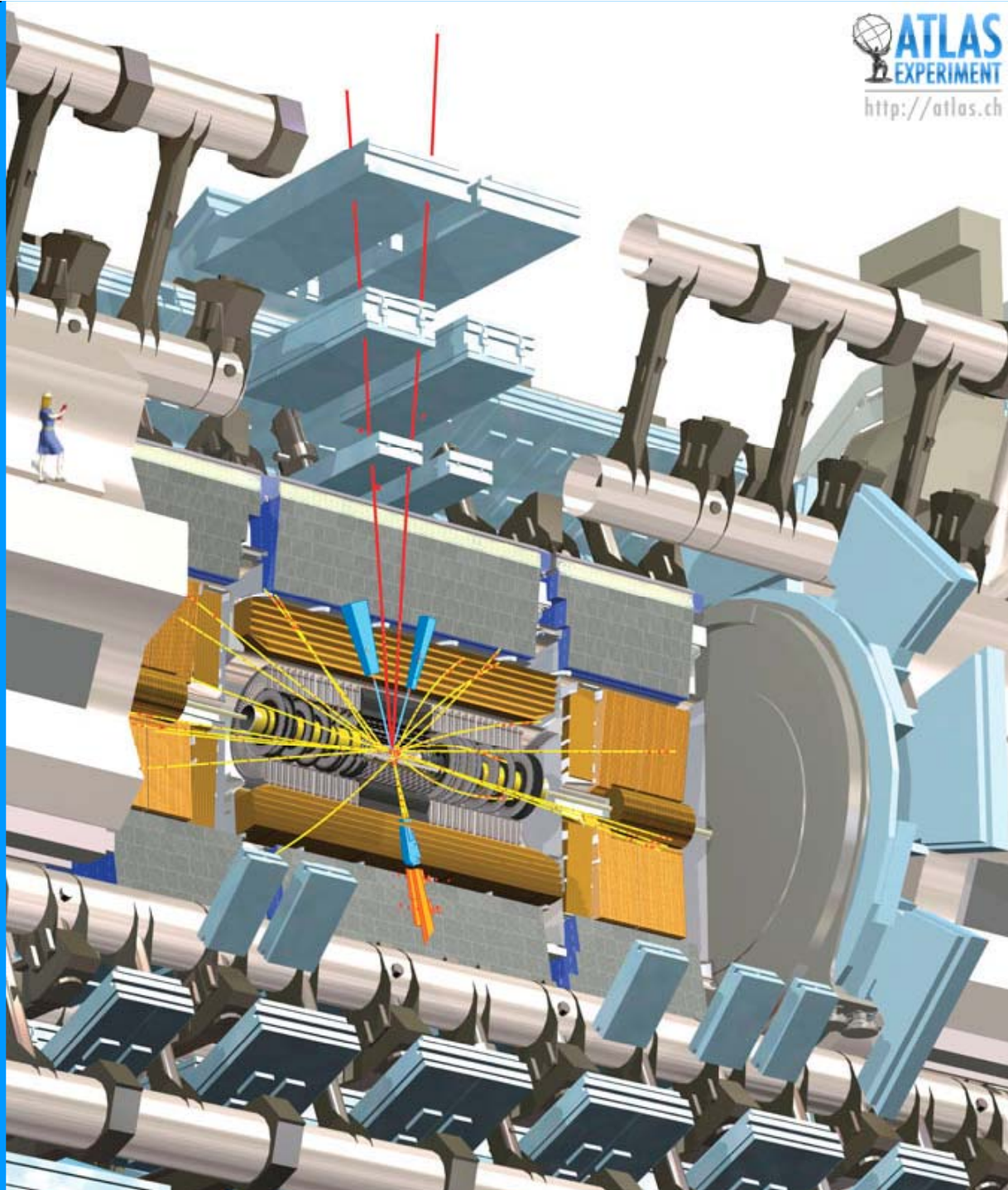
ATLAS
EXPERIMENT
<http://atlas.ch>

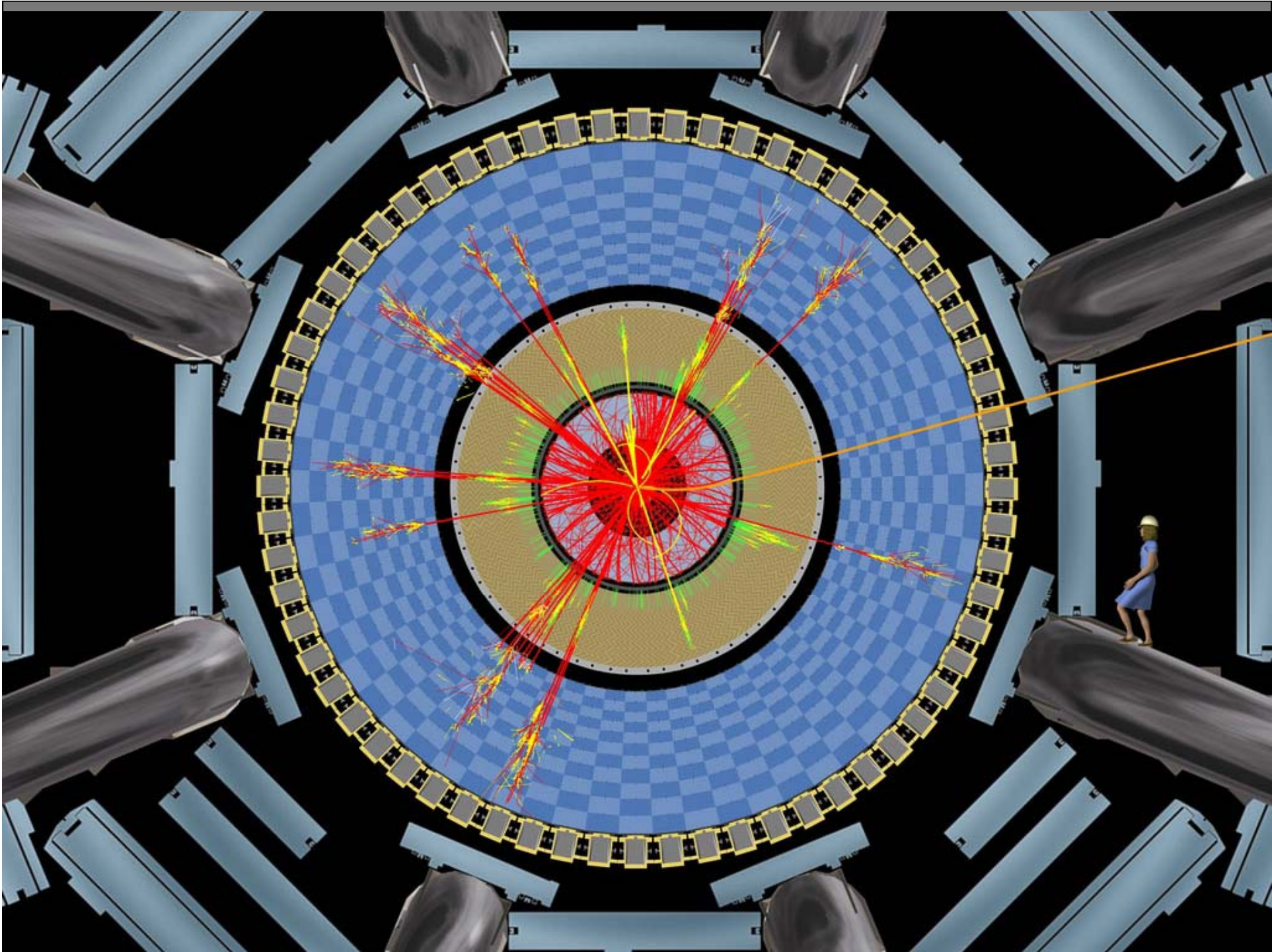


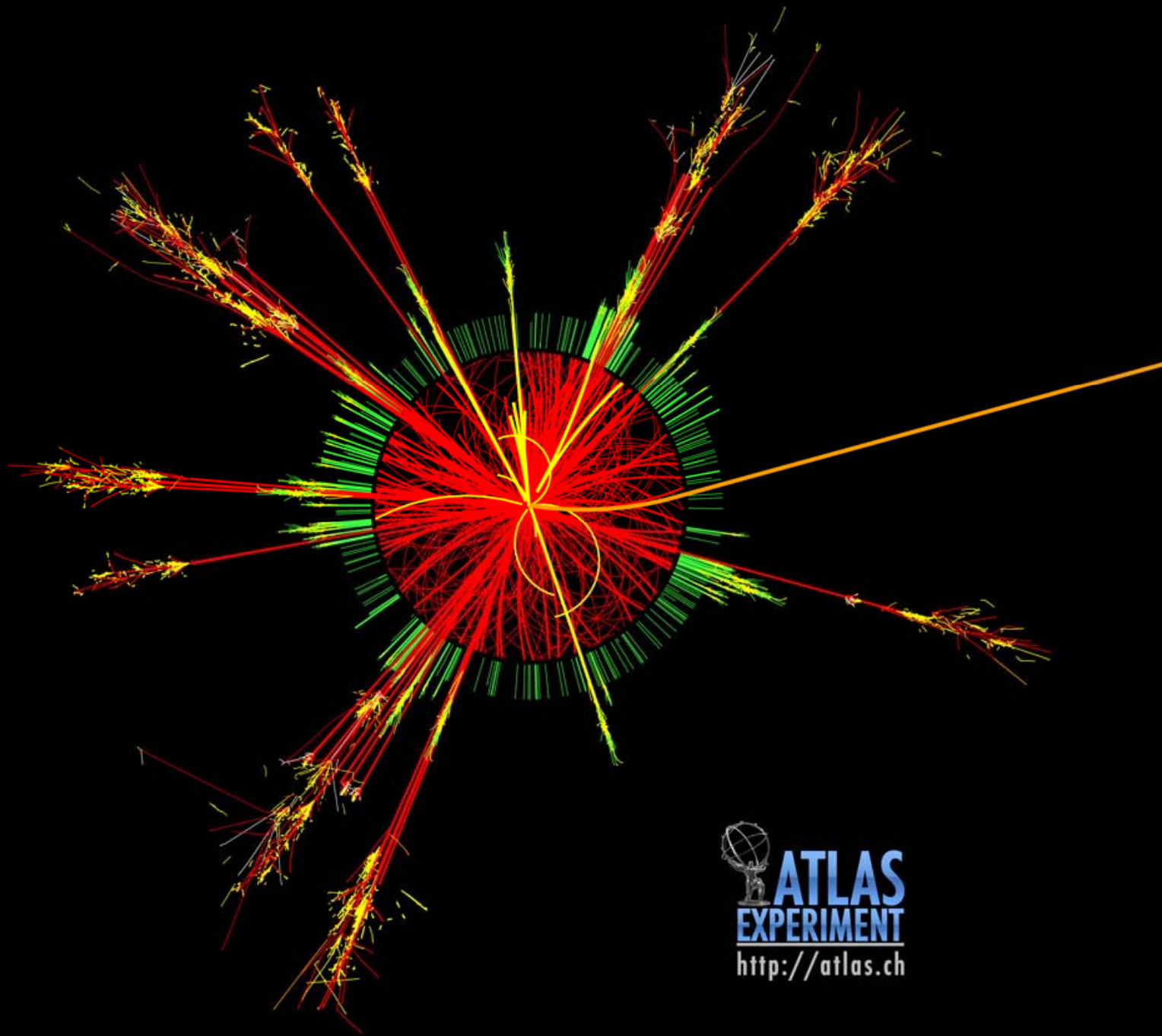
KEY NATION



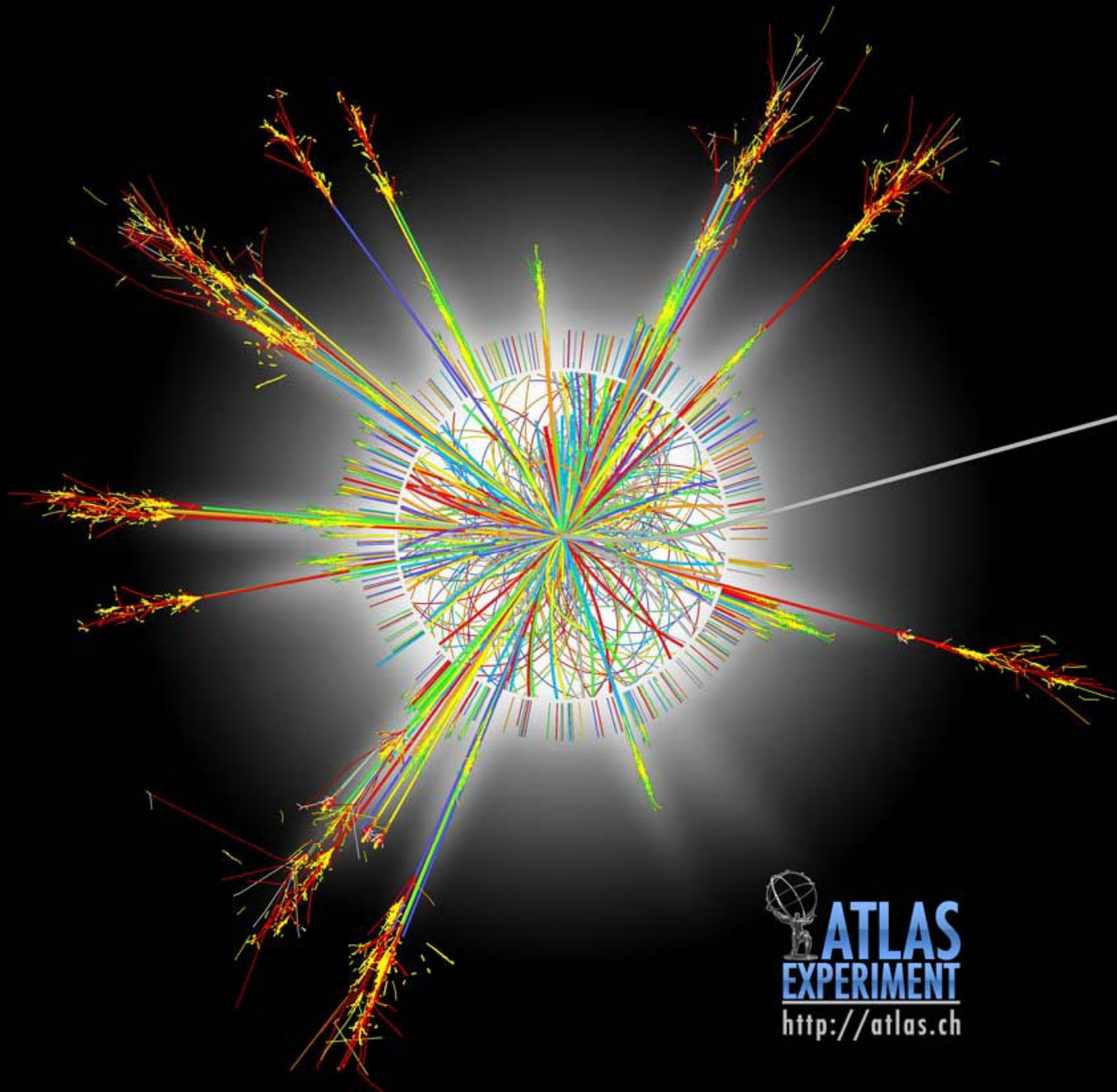
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Brochure (6 pages) and Webpages



From Fundamental Science to Everyone's Life

The ATLAS Experiment

The ATLAS experiment at the CERN laboratory in Geneva is a basic research project that uses state-of-the-art instruments to explore the outer reaches of our understanding of the universe. At the same time as they pursue these fundamental developments, ATLAS scientists are taking the knowledge they have gained in their ATLAS work and applying it in other fields.

Studies have demonstrated that the transfer of knowledge from fundamental research enables high-tech companies to remain on the cutting edge of innovation and generates a variety of social and economic benefits. It also has an important impact on our culture and education. This brochure highlights several examples that show how work on ATLAS is being applied elsewhere.

Medical

New miniature electronic silicon chips have been designed for the ATLAS experiment to track elementary particles close to the collision point of the incoming proton beams. These small pixel semiconductor detectors are characterized by high detection efficiency and low noise, making them ideally suited for X-ray imaging in radiography, protein crystallography and material science. They can detect individual X-ray photons with high spatial precision over a broad energy range with extremely short readout times.

Pixel Matrix with 18 x 100 pixel cells. For comparison a part of a match is shown.

3D mouse skeleton from the PIXSCAN

Multi Picture Element Counters

The innermost layers of the ATLAS experiment will be composed of silicon pixel detectors. Close to 100 million individually amplified detector cells are able to determine and trace the exact position of the charged particles produced in a proton-proton collision. The same type of pixel detector can be used for biomedical imaging when a high spatial resolution is needed, for instance in mammography. The detector simply counts the absorbed X-ray quanta individually, via tiny counters implemented in every pixel. *The method gives a truly digital image of the absorbed X-ray dose.* The radiograph is visible in real time, eliminating the use of a film. Hence a relatively small modification of the ATLAS pixel detector has led to digital radiography.

Digital radiograph of a mouse

Computer Tomography

PIXSCAN is a new method for Computer Tomography (CT). It uses the XPAD, a photon counting detector based on the ATLAS pixel chip. *PIXSCAN improves the contrast for soft tissues and produces up to 400 images in two seconds.* A first prototype has been developed for the examination of small animals. Given the small size of the animal, an extremely high spatial resolution is required. First tomographic images prove the quality of the new techniques. The extremely thin detector can also be used in combination with Positron Emission Tomography (PET). While PET gives the position of the tumour tissue only, the CT image shows the whole organ.

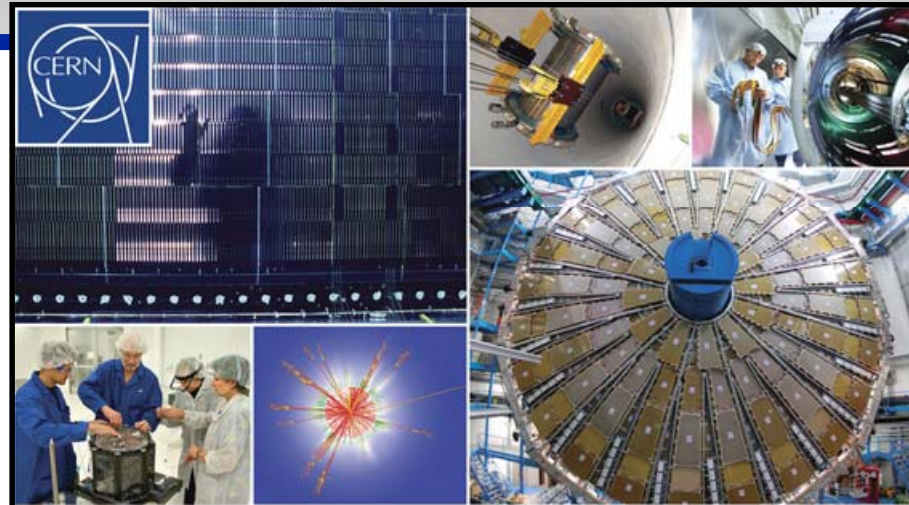
Retina Project

Together with neurobiologists, ATLAS physicists have studied the information that is transmitted from the eye to the brain. The retina is a sophisticated biological pixel detector that converts a visual image into electrical signals, called "spikes". These spikes act as a neural code and communicate the features of an image to the visual centre of the brain. To crack this code, live retinal tissue is examined and a recording system for large-scale neural activity has been developed based on the silicon microstrip detector technology used in the ATLAS experiment. *These experiments help neurobiologists to understand how living neural systems process and encode information and could one day give artificial sight for the blind.*

Solomander retina on 512-electrode array

Section of 512-electrode array

New “Technical Challenges” Brochure (6 pages)



ATLAS

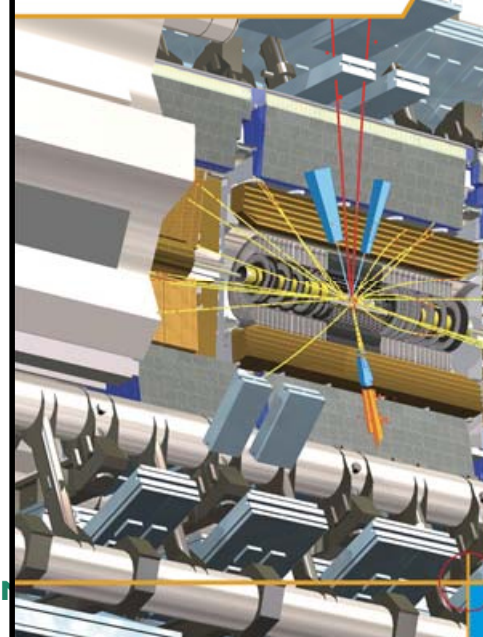
The Technical Challenges

To investigate the fundamental processes of nature at the Large Hadron Collider, the ATLAS scientists have had to design a detector of unprecedented size and complexity. New technologies had to be found for radiation tolerant electronics that consume less power for high speed data acquisition, and for light – yet strong – support structures.

The 46 m long and 25 m high ATLAS detector is one of the most elaborate particle physics experiments ever designed, and is the product of a world-wide effort by over 1900 scientists from 164 universities in 35 countries, working in close collaboration with industry to find solutions to the extraordinary challenges of data taking at the Large Hadron Collider (LHC) at CERN.

ATLAS major components


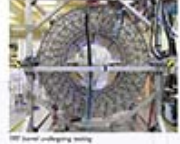

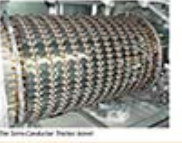
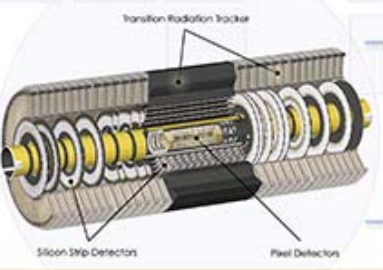



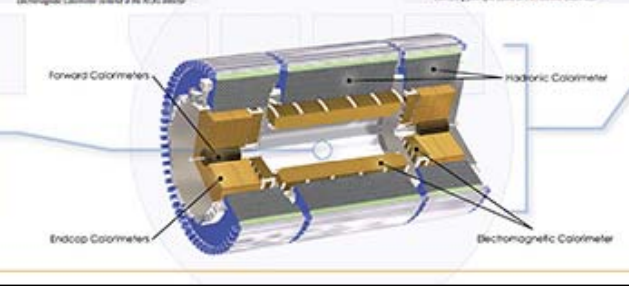





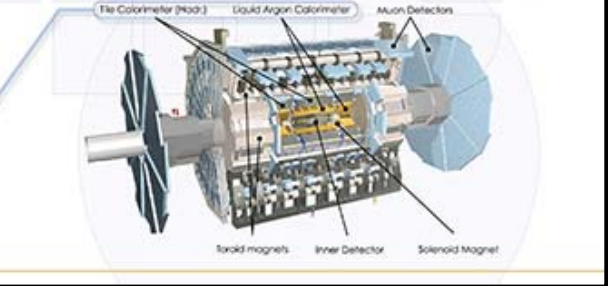
- The Inner Detector
- The Calorimeters
- The Muon Spectrometer
- Solenoidal and Toroidal Magnets
- Data acquisition and Computing



atlas.ch

New "Technical Challenges" Brochure (6 pages)



The Inner Detector	The Calorimeters	The MUON Spectrometer
<p>The INNER DETECTOR is able to measure the tracks of the hundreds of charged particles that are produced in the proton-proton collisions in the middle of the detector every 25 nanoseconds. It consists of concentric layers of tracking detectors, with the highest precision detectors closest to the collision point. The colliding beams produce intense levels of radiation with fluxes of up to 350 000 particles per square millimetre per second, making radiation hardness a top priority for the detector and readout electronics. At the same time, the amount of material in the Inner Detector must be minimized to avoid disturbing the trajectories of the particles. ATLAS scientists have collaborated extensively with scientists and industry around the world to develop radiation-hard electronic detector elements, as well as a very light carbon-fibre support and cooling structure built to tolerances of less than 0.1 mm.</p>	<p>The CALORIMETERS, which surround the inner detector, absorb and measure the energies of most charged and neutral particles produced in the collisions. Energy deposits in the calorimeter are detected and converted to electrical signals that are read out by data-taking electronics. The ATLAS calorimeters consist of many layers of dense plates that absorb incident particles and transform their energies into large "showers" of lower-energy particles. Between the absorber plates are thin layers of particle sensitive detectors that register the particle showers and produce signals proportional to the energy.</p>	<p>The MUON SPECTROMETER is designed to measure the electrical charges and momenta of muons. Muons are particles very much like electrons, but 200 times more massive. They are able to pass through the calorimeter without being absorbed. The trajectories of muons are bent by a second set of powerful magnets (after the solenoid magnet), allowing the charges and momenta to be calculated.</p>
<p>Pixel and Silicon Strip Detectors Further from the collision point is the Transition Radiation Tracker which contains hundreds of thousands of gas-filled "straws" held at high voltage, each with a wire down its axis. Charged particles passing through the straw ionize the gas, producing electrical pulses. The timing of the pulse allows the distance between the particle track and the wire to be measured with a precision of 0.17 mm. Special materials between the straw tubes cause electrons passing through them to produce X-rays, a feature which helps ATLAS to distinguish electrons from other particles.</p> <p>Transition Radiation Tracker Further from the collision point is the Transition Radiation Tracker which contains hundreds of thousands of gas-filled "straws" held at high voltage, each with a wire down its axis. Charged particles passing through the straw ionize the gas, producing electrical pulses. The timing of the pulse allows the distance between the particle track and the wire to be measured with a precision of 0.17 mm. Special materials between the straw tubes cause electrons passing through them to produce X-rays, a feature which helps ATLAS to distinguish electrons from other particles.</p> <p>Central Solenoid The central solenoid is located outside of the Inner Detector. The 5 tonne coil contains 9 kilometres of superconducting wire cooled by liquid helium, and an electric current of 8000 amperes produces a 2 Tesla magnetic field. The powerful magnetic field causes the charged particles to bend. The curvature of these tracks provides important information for determining the momentum and electric charge of each particle.</p>	<p>The Electromagnetic Calorimeter The Electromagnetic Calorimeter preferentially absorbs and measures the energies of electrons and photons produced in the collisions. It consists of closely-spaced absorber layers of lead and liquid argon as the sampling material. Particle showers in the liquid argon produce ions, which are read out as electric pulses by Kapton electrodes.</p> <p>The Hadronic Calorimeter The Hadronic Calorimeter measures the energies of particles that are not stopped by the Electromagnetic Calorimeter. The absorber layers are of steel, and particle showers are sampled by tiles of scintillating plastic, which emit light when charged particles pass through them. The light pulses transmitted by optical fibres are converted to electronic signals by photomultiplier tubes.</p> <p>Endcap and Forward Calorimeters In the high-radiation-level region close to the proton beams, argon calorimeters with copper and tungsten absorbers are used for hadronic energy measurements. These radiation-hard detectors extend the acceptance of the ATLAS calorimeter to nearly the full solid angle around the collision point.</p>	<p>Monitored Drift Tubes (MDT) MDTs consist of arrays of gas-filled 3 cm tubes with anode wires along their axes at high voltage. By measuring the time for electrons produced by ionization to drift to the wires, muon positions can be determined to 60 µm. In the Barrel, the MDTs are installed as three cylindrical shells. In the End Cap, they form three wheels normal to the axis of ATLAS.</p> <p>Cathode Strip Chambers (CSC) In the inner layer of the muon system where the radiation background is very high, CSC are used to measure the muon trajectories. They are thin arrays of closely spaced parallel anode wires located between narrow metal cathode strips. Ionized gas from muons traversing the chamber produce electrical signals on the strips, allowing position measurements at the 60 µm level.</p> <p>Thin Gap Chambers (TGC) The End Cap contains four layers of chambers with closely spaced wires, placed in a thin gap between resistive plates. The ionization signals from the wires and from external strips are sent to trigger units where data from the different stations are used to identify the presence of energetic muons every 25 ns at each bunch crossing of the beams of LHC. TGCs also furnish coordinates in the non-bending direction.</p> <p>Resistive Plate Chambers (RPC) In the Barrel the trigger is generated by chambers with a narrow gap where ionization by the muon is amplified in a strong electric field to generate signals on external strips. The position of the crossing track is measured with a time resolution of few ns. Three RPC stations are installed together with MDT chambers of the barrel. RPCs also provide second coordinate measurement.</p>
    	   	     

New "Technical Challenges" Brochure (6 pages)



Data Acquisition and Computing

ATLAS is designed to observe up to nearly one billion proton-proton collisions per second, with a combined data volume of more than 60 million megabytes per second. However, only a few of these events will contain interesting characteristics that might lead to new discoveries.

To reduce the flow of data to manageable levels, ATLAS uses a specialized multi-level computing system, the Trigger system, which selects events with distinguishing characteristics that make them interesting for physics analyses.

The Trigger system

The ATLAS trigger system carries out the selection process in three stages. The Level-1 trigger is a massively parallel system of specialized electronics that process a coarse subset of the data from every 25 ns beam crossing interval. A decision to keep the data from an event is made less than two microseconds after the event occurred, and the event is then retrieved from pipelined storage buffers. Of 40 million bunch crossings per second, less than 100 000 pass Level-1.



Calorimeter electronics



Trigger system

The Level-2 trigger is a large array of custom processors that analyse in greater detail specific regions of interest identified by the Level-1 system for each event. In the mean time, the full event data is collected into buffers. Fewer than 1000 events per second pass Level-2, and have their data passed on to Level-3.

The Level-3 trigger is a large farm of CPUs which perform a detailed analysis on the full event data. Less than 100 events per second are left after the Level-3 analysis, and these are passed on to a data storage system for offline analysis.

Computing

Data storage and analysis at ATLAS presents tremendous challenges in software technology and data handling and storage. About one petabyte (one million gigabytes) of data will be recorded each year, and will be shared and analyzed by physicists around the world. The computing resources necessary correspond to about 100 000 year-2005 PCs, situated at many different locations around the world, communicating via the new global data Grid system.



Tib Calorimeter Read-Out Subsystems installation



Working on Trigger components

The ATLAS Collaboration

The ATLAS experiment has been built by a collaboration of scientists at institutions around the world who share the responsibilities of running and maintaining the experiment.

Much of the work on ATLAS is done by small working groups of scientists at their home institutions. Detector components are developed, produced and tested at collaborating institutions before being brought to CERN. At CERN the parts are assembled into larger detector systems and tested, before being installed in the underground cavern. Similarly, the ATLAS data is available to all collaboration members, and ATLAS physicists all over the world pursue analyses on a variety of different physics topics.

The ATLAS experiment provides an excellent environment for the more than 400 students working on the ATLAS project. Graduate students play important roles in the operation of ATLAS and physics analyses, and after receiving their degrees many go on to apply their skills in fields as diverse as science, medicine, industry, government, finance, and journalism.



Collaborating on the ATLAS Experiment at CERN



ATLAS Collaboration

Assembly and Installation

ATLAS is like a giant (seven-storey) 3D puzzle with thousands of advanced detector parts, each of which had to be lowered into the cavern and installed in the right sequence. The ATLAS cavern also contains all the local control and readout electronics, as well as the gas and cooling systems that allow safe operation of the entire detector system.

Starting in summer 2003, hundreds of people working around the clock assembled this puzzle and all of its surrounding infrastructure and control systems. This includes thousands of kilometers of cables, fibres and pipes connecting the support systems to the detectors, requiring thousands of delicate installation and mounting operations. As the detector parts are installed they are connected, tested and operated in situ to ensure that their performance remain uncompromised compared to initial lab tests.



Lowering the Solenoid Magnet into the cavern



Main ATLAS control room

The Challenge Continues...

To answer the new, unanticipated questions that undoubtedly will appear over its long lifetime, the ATLAS experiment will need to be enhanced through system upgrades. ATLAS scientists will continuously follow the progress of technology, taking advantage of new developments to expand and enhance our ability to probe the mysteries of the world of particles.



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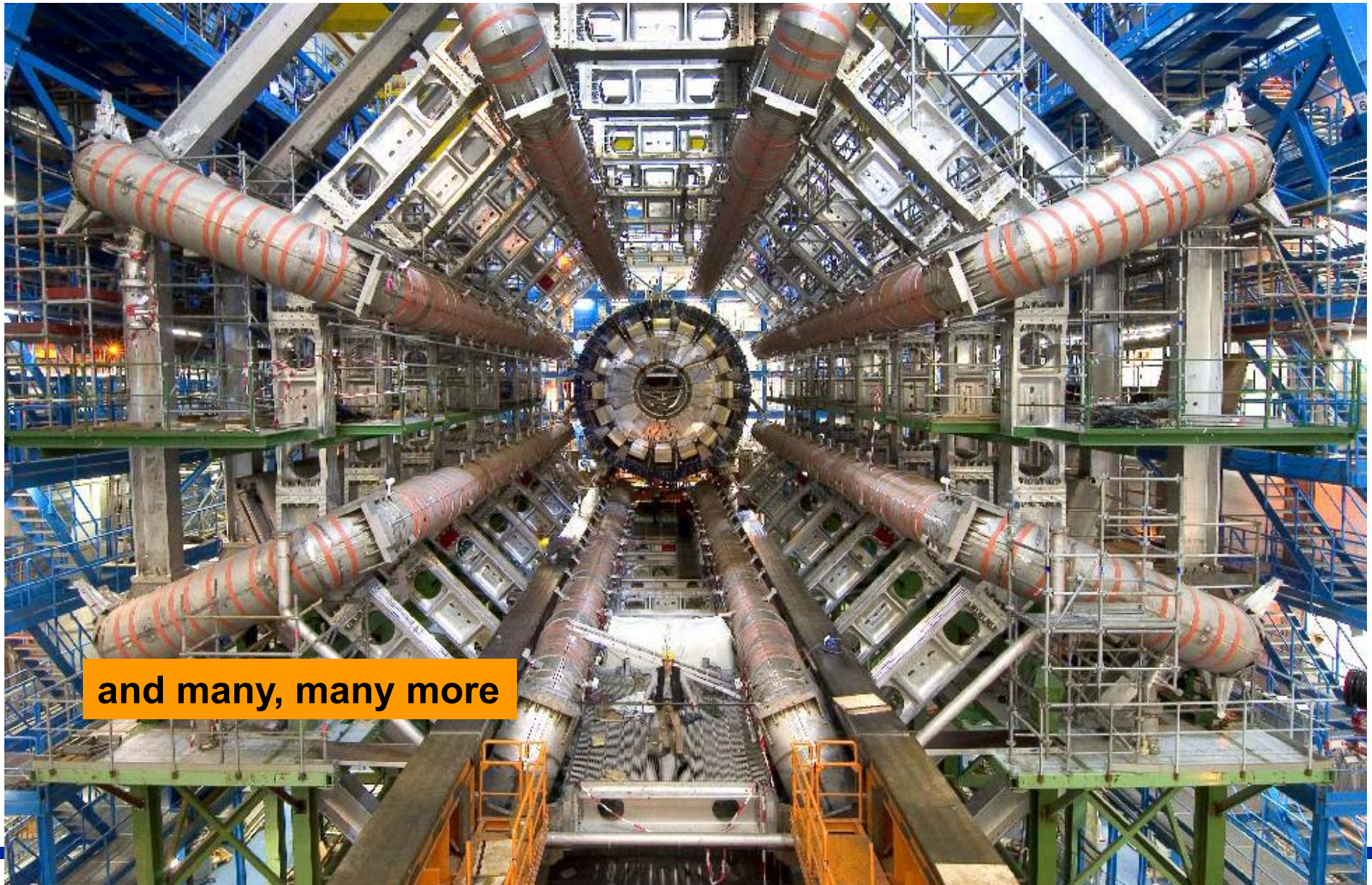
online at atlas.ch

May 2007



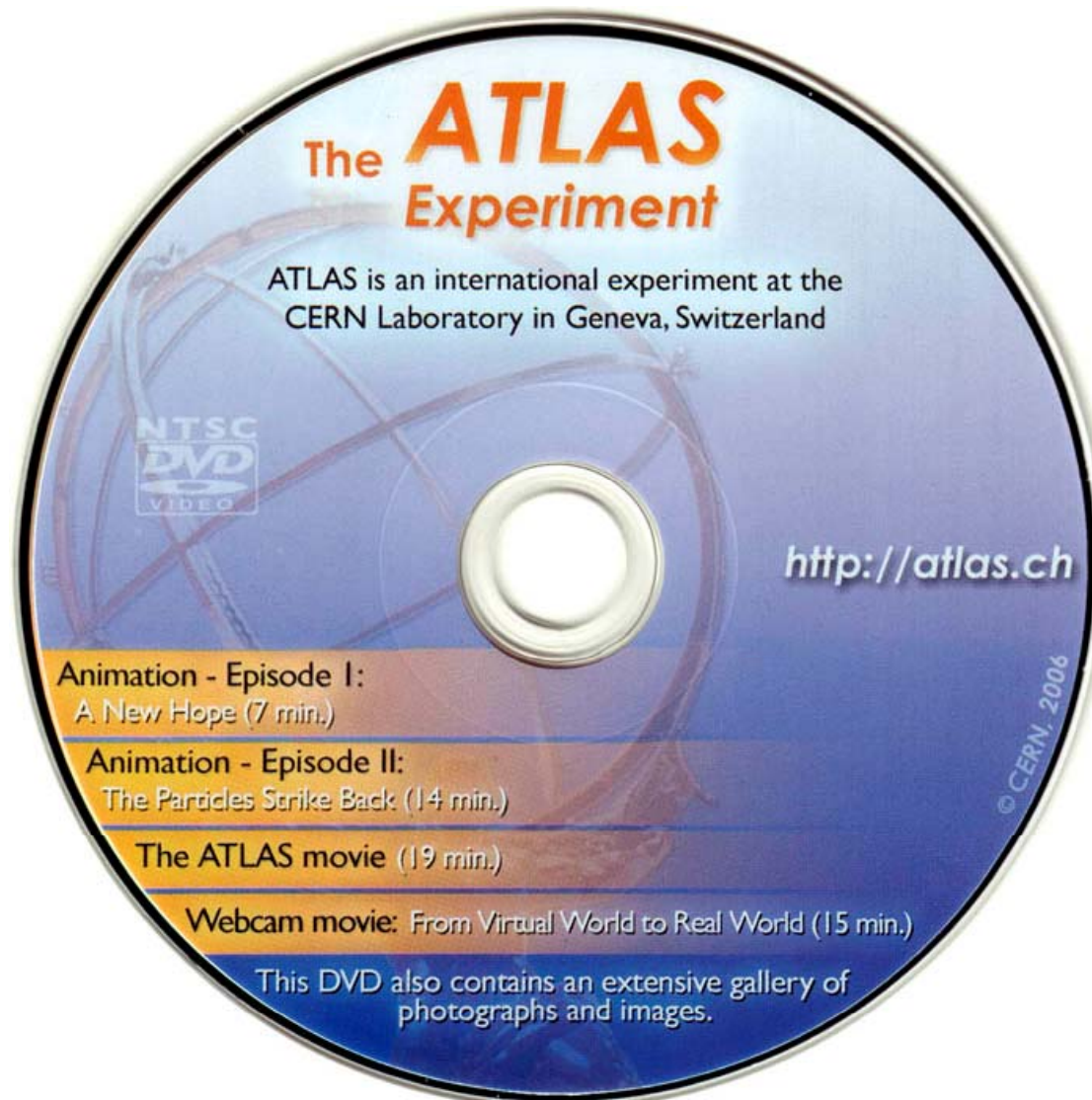
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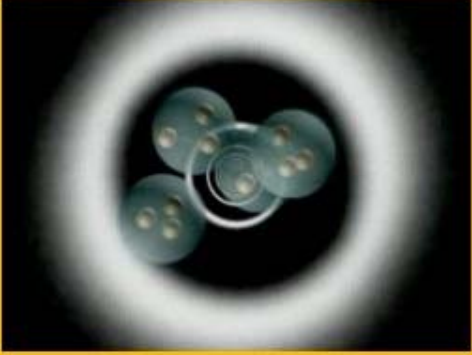
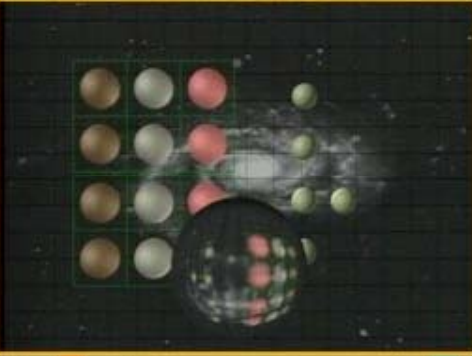
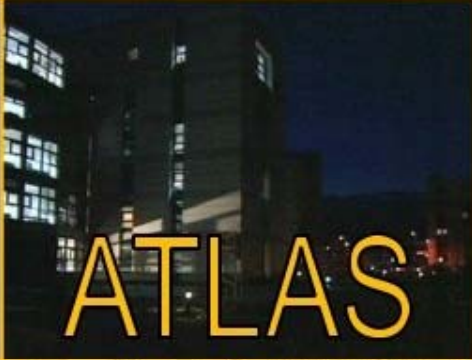
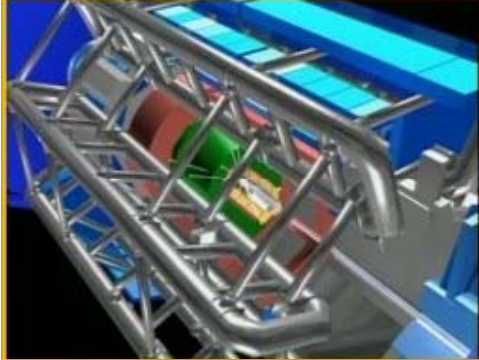
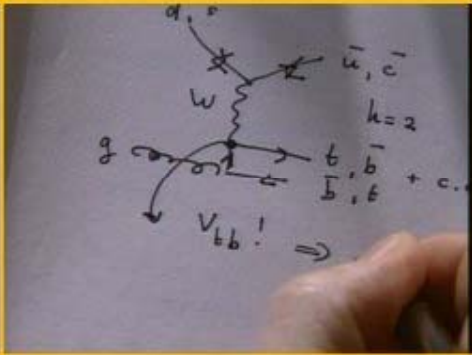
Outreach Photos and Images



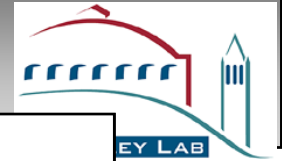
and many, many more

DVD with Movie and Two Animations





Four Gold Medals



Movie made by
**ATLAS Experiment's
Outreach Committee**
has won
four gold medals
at int'l film festivals!

<http://atlas.ch/movie>

Czech, Dutch, English, French,
German, Italian, Japanese, Spanish,
Swedish, Chinese

FILM AWARDS

The prize for scientific films and
the prize for popular scientific films
39th International Festival
"Technology and Art TECHFILM 2001"
Czech Republic

Gold Medal of World Media Festival
Category Documentaries
Research and Science
Hamburg, Germany, 2001.

Trophy 2000 of MIF-Sciences, France
"The Scientific Film Box Office"
Canary Islands



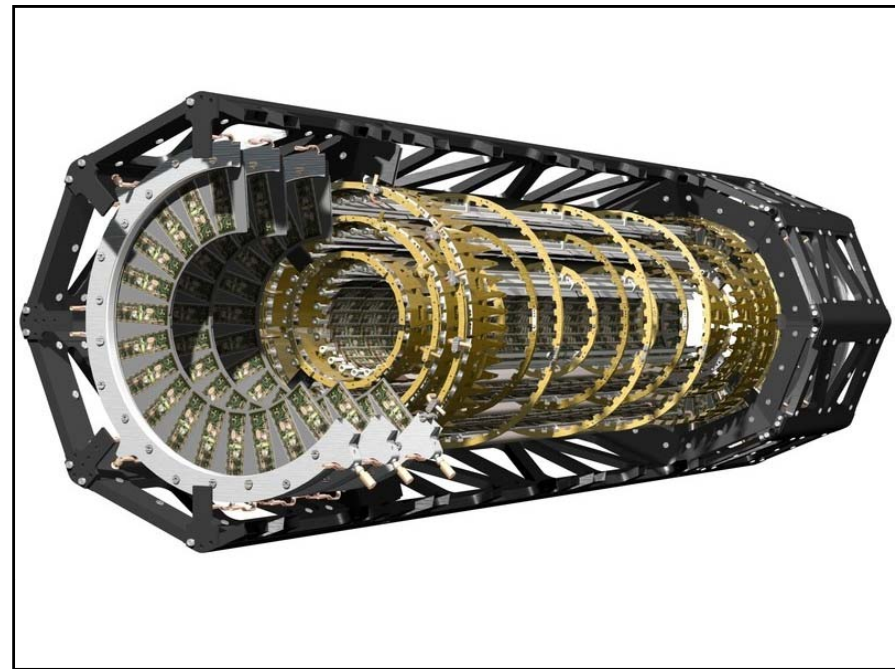
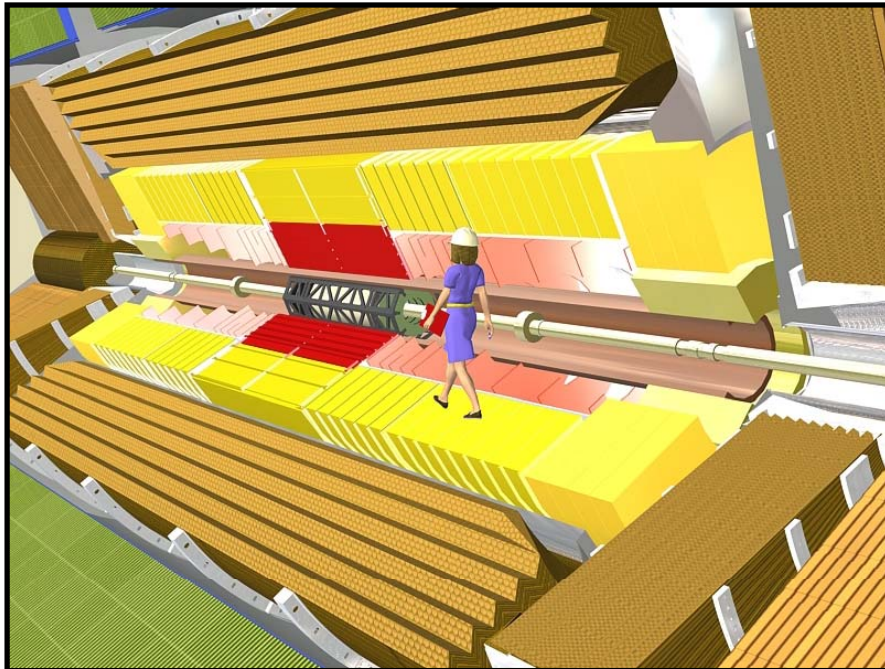
Gold Medal of
Prix Leonardo, 2001
International
Film Festival
Parma, Italy

3D Animation of ATLAS (Episodes 1 and 2)

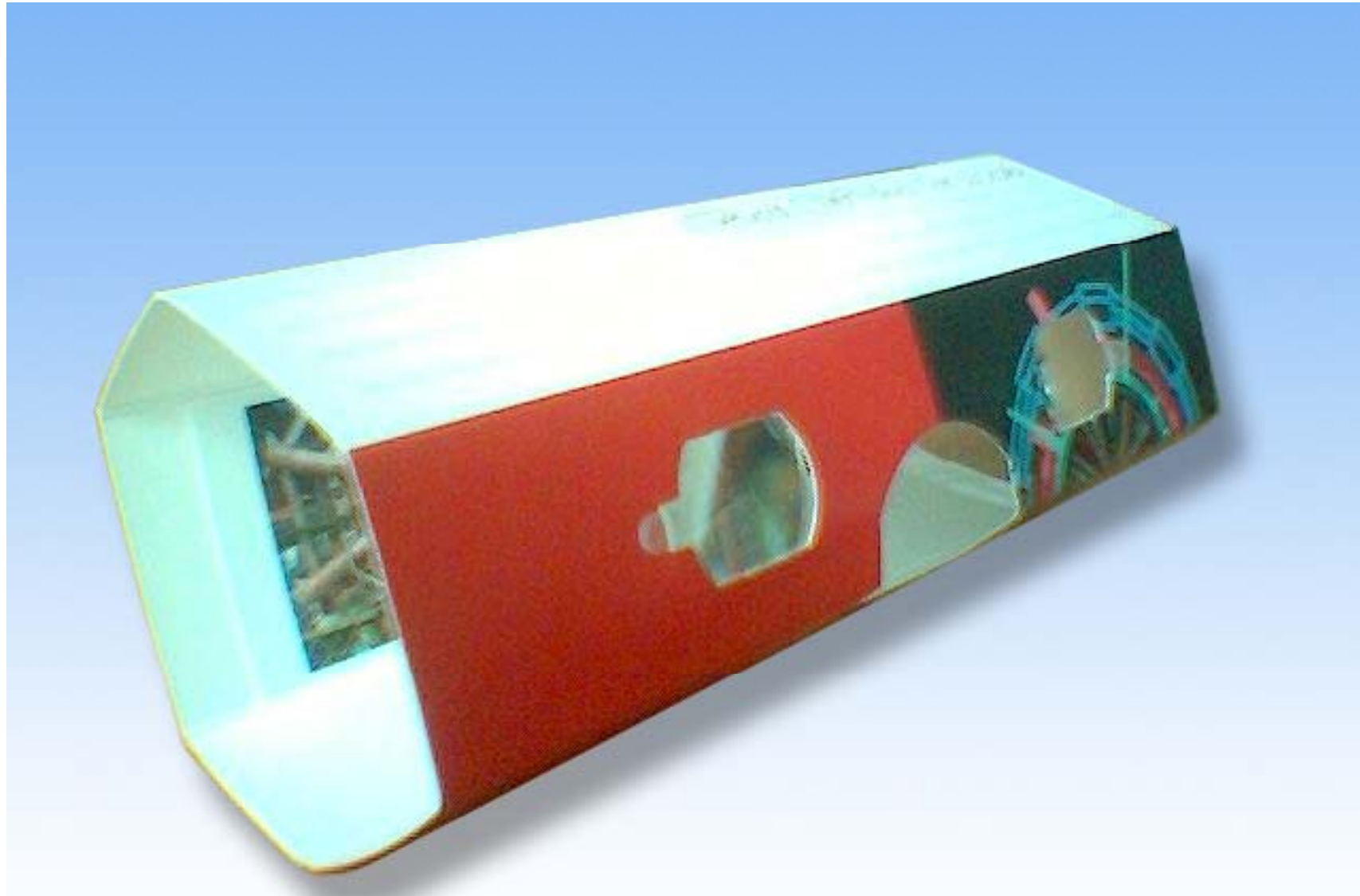


- Construction of ATLAS
- Particles passing through six components of ATLAS
- Physics in ATLAS

Using **red-cyan** glasses



ATLAS 3D Viewer



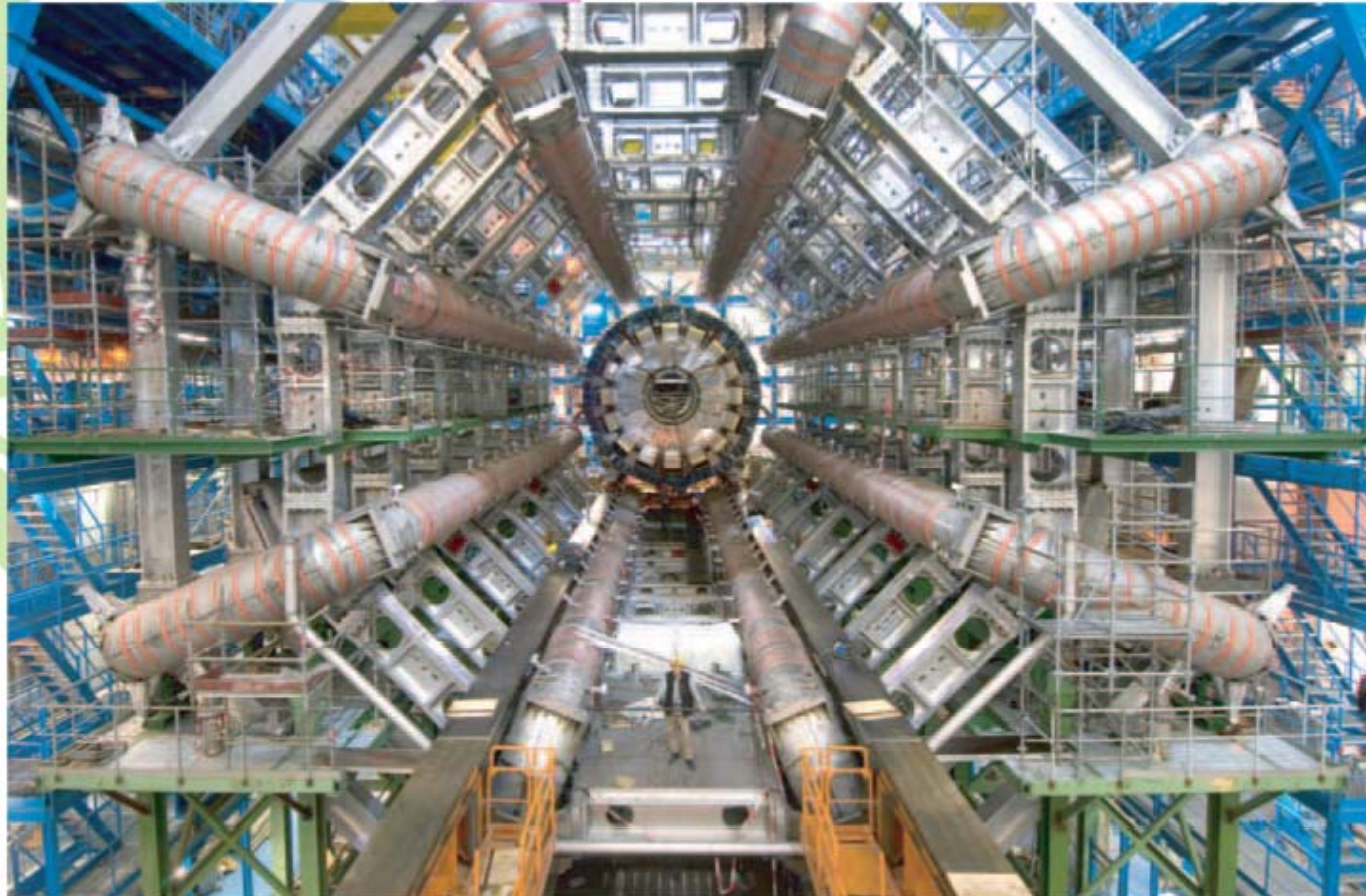
ATLAS Jigsaw Puzzle



European Organization for Nuclear Research

The Atlas Experiment

<http://public.web.cern.ch/public/>



<http://www.atlas.ch/>

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 (including 400 students) participating from more than 150 universities and laboratories in 34 countries. It is a challenge for us to put it together, we hope it will be a real puzzle for you too!

ATLAS est une expérience de physique des particules qui a pour but d'explorer la nature fondamentale de la matière et des forces qui gouvernent notre univers. Avec le détecteur ATLAS, nous espérons faire de nouvelles découvertes grâce à des collisions de plein fouet entre des protons lancés à d'incroyables hautes énergies. Cette expérience constitue le plus grand effort de collaboration jamais entrepris en sciences. Plus de 1800 physiciens et physiciennes (dont 400 étudiant-e-s) venus de quelques 150 universités et laboratoires de 34 pays différents participent à cet effort. C'est un défi de taille d'assembler un tel détecteur, nous espérons que ce sera un vrai casse-tête pour vous aussi!

M. Barnett – May 2007

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