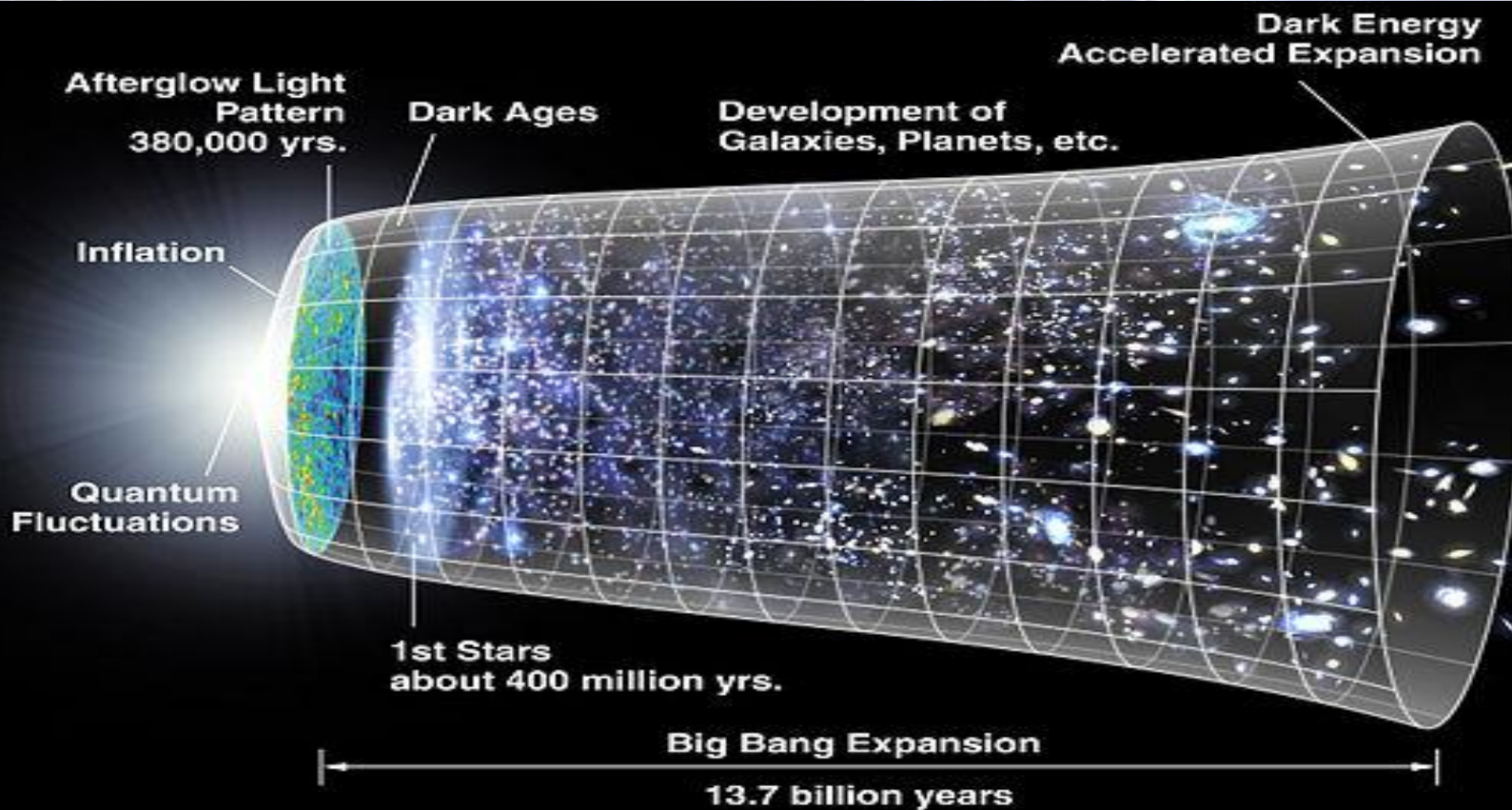


# Digital Content on Discover the COSMOS Portal (May 2012)

- 105,000 Educational Materials on HEP and Astronomy
- 2,000 weblinks
- 500 videos and animations
- 500 Tests and students activities
- 400 Detailed Lesson Plans
- Educational Software and applications
- Training Materials

<http://portal.discoverthecosmos.eu>





[http://www.nobelprize.org/nobel\\_prizes/physics/laureates/2011/](http://www.nobelprize.org/nobel_prizes/physics/laureates/2011/)

## Ingredients for a successful path: The discovery of SN in classroom



A scientist bringing real data and the scientific method to schools

A robotic telescope  
and an innovative  
teacher

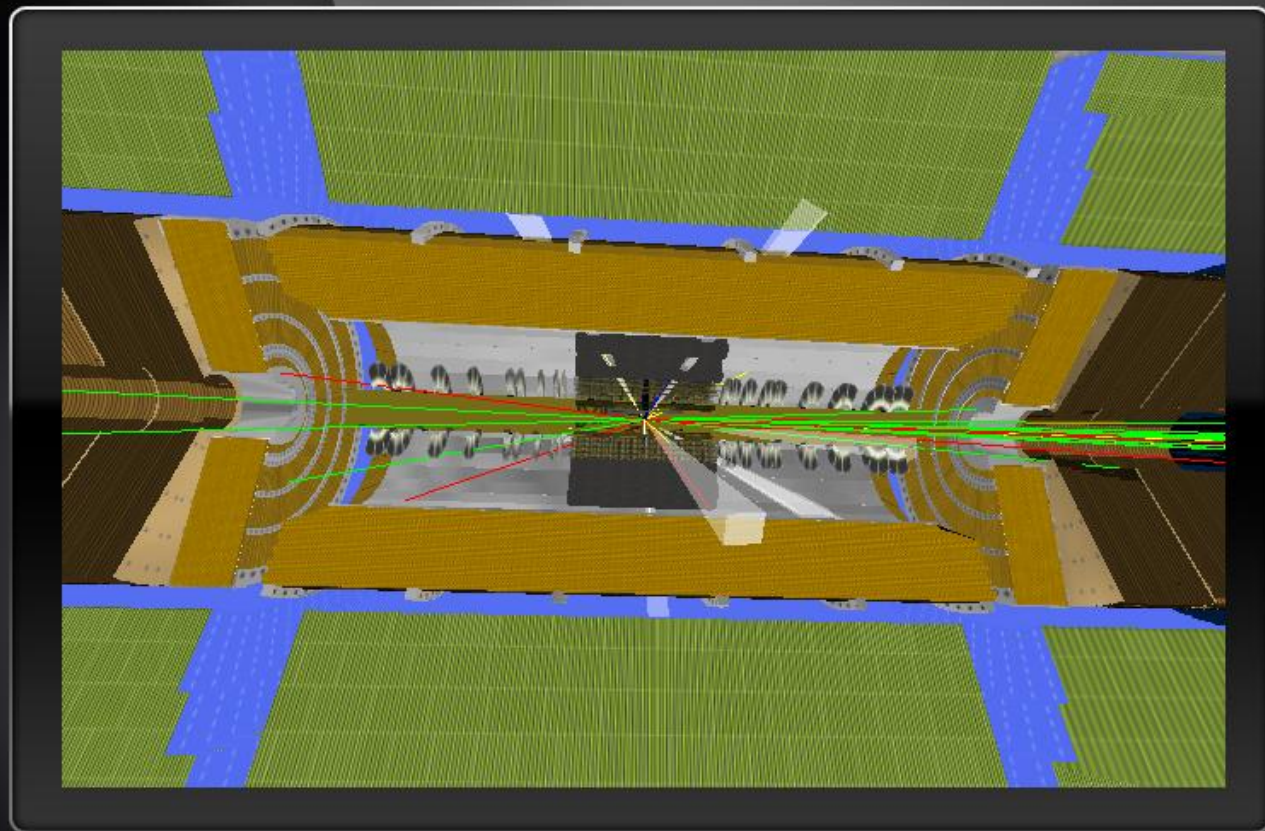


**The outcome: Students producing scientific results while learning curriculum content**



Students that co-authored on the scholarly publications relating to the supernova discovered in 1994 in the Whirlpool Galaxy . The teacher Tim Spuck and the students made news reports around the world.

# Discover Neutrino with ATLAS Data



Detector **Events** Tours

test\_package

**SELECTED EVENT INFO**

	Total	Visible
<b>Tracks:</b>	1485	54
<b>Neutral Hadrons:</b>	63	1
<b>Charged Hadrons:</b>	267	11
<b>Photons:</b>	819	26
<b>Muons:</b>	4	4
<b>Electrons:</b>	332	12

Name	pT

Combine Selected Tracks      Delete Selected Tracks

Name	# Tr	Inv.Mass

**Toggle Event Elements Visibility**

- Electrons     Neutral Hadrons     Muons     Missing Et
- Photons     Charged Hadrons     Jets

**Pt Cutoff**

4167 MeV



amelia
\_ □ ×

AMELIA View Events Help
Close

Detector **Events** Tours

*test\_package*

---

SELECTED EVENT INFO

	Total	Visible
<b>Tracks:</b>	1485	54
<b>Neutral Hadrons:</b>	63	1
<b>Charged Hadrons:</b>	267	11
<b>Photons:</b>	819	26
<b>Muons:</b>	4	4
<b>Electrons:</b>	332	12

Name ▾	pT

Combine Selected Tracks
Delete Selected Tracks

Name ▾	# Tr	Inv. Mass

**Toggle Event Elements Visibility**

<input checked="" type="checkbox"/> Electrons	<input checked="" type="checkbox"/> Neutral Hadrons	<input checked="" type="checkbox"/> Muons	<input checked="" type="checkbox"/> Missing Et
<input checked="" type="checkbox"/> Photons	<input checked="" type="checkbox"/> Charged Hadrons	<input checked="" type="checkbox"/> Jets	

**Pt Cutoff**

●

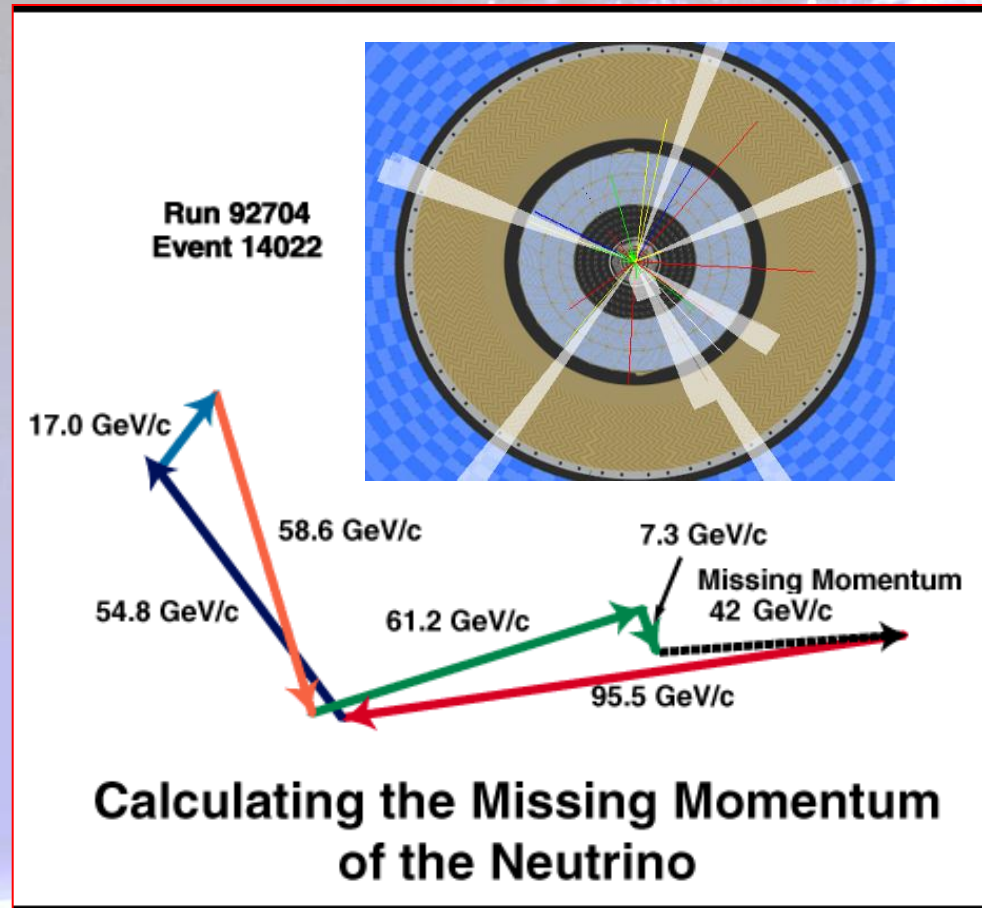
4167 MeV

**Track selection only supported  
in first-person camera mode.**

Start
ATLAS - ...
Amelia
Microsoft...
Science ...
2 amelia ▾
8:38 pm

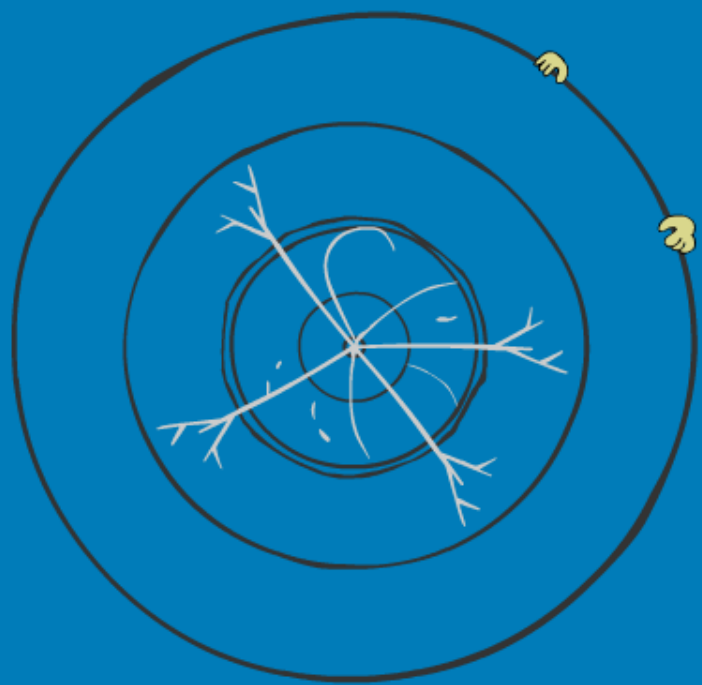


# Conservation of Momentum



Home > Big Bang >

# The Hunt for Higgs

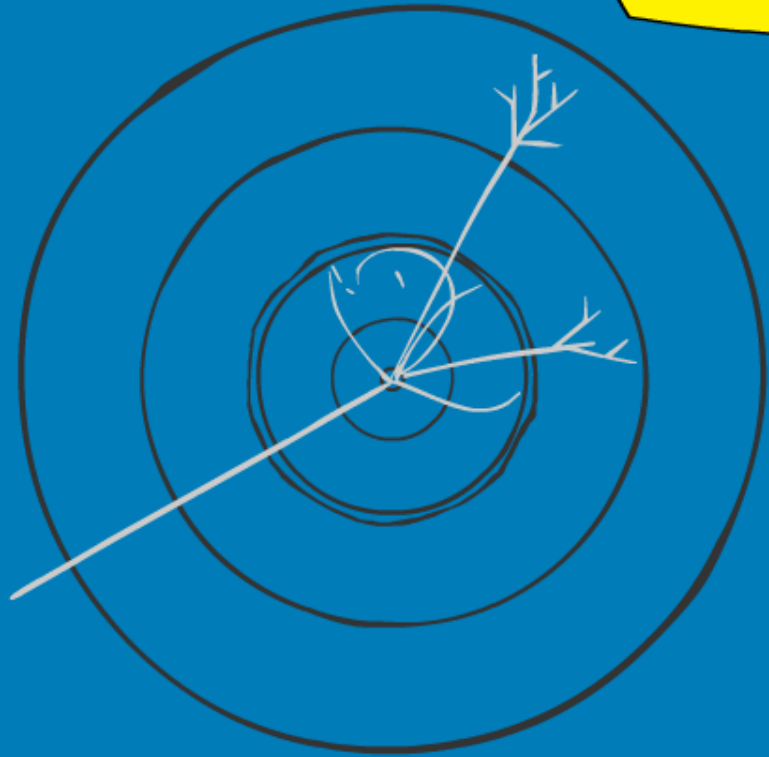


Loading...

[Home](#) > [Big Bang](#) >

- 1
- 2
- 3
- 4
- 5

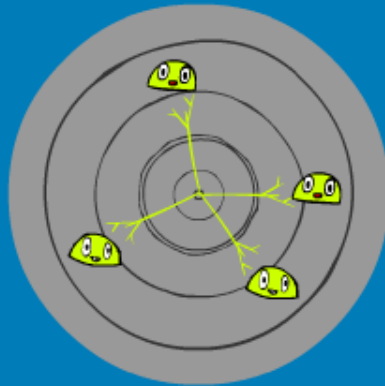
time left  
00:24



Click on the image of a collision to record it.

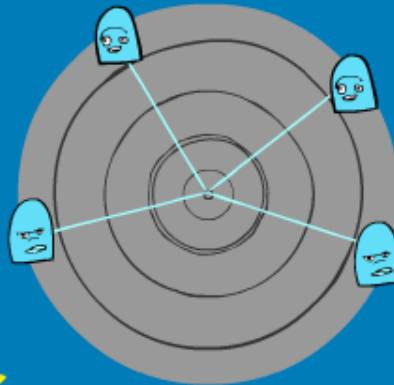
[Home](#) > [Big Bang](#) >

Scientists have some ideas about the **combinations of particles** that Higgs might turn into.



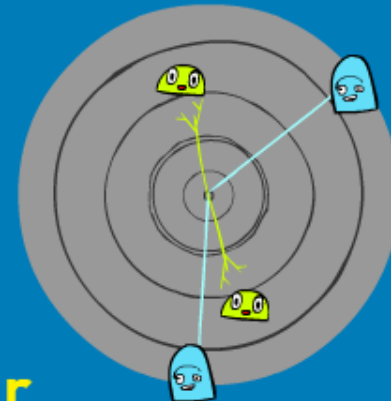
4 electrons

or



4 muons

or

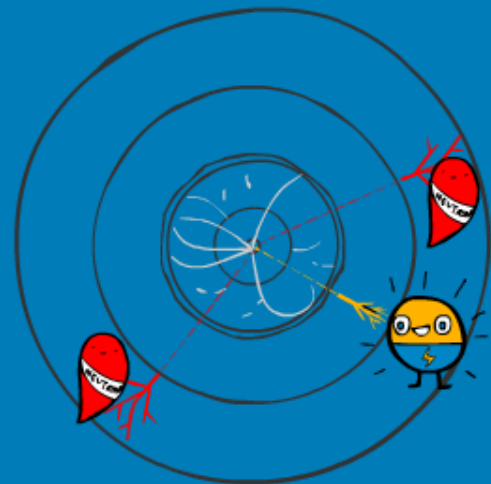


2 electrons + 2 muons

If we see **one of the combinations** they expect, it will mean a Higgs might have been produced.

Home > Big Bang >

### Collision 3



You've picked out all the particles.

Can you **match** the **particles** in your **collision** image with any of the options below?

4 electrons

4 muons

2 electrons + 2 muons

No evidence for Higgs



12



amelia

AMELIA View Events Help

Detector **Events** Tours

### test\_package

SELECTED EVENT INFO

	Total	Visible
<b>Tracks:</b>	1485	54
<b>Neutral Hadrons:</b>	63	1
<b>Charged Hadrons:</b>	267	11
<b>Photons:</b>	819	26
<b>Muons:</b>	4	4
<b>Electrons:</b>	332	12

Name ▾ pT

Combine Selected Tracks    Delete Selected Tracks

Name ▾ # Tr    Inv.Mass

**Toggle Event Elements Visibility**

Electrons     Neutral Hadrons     Muons     Missing Et  
 Photons     Charged Hadrons     Jets

**Pt Cutoff**

4167 MeV

Start    ATLAS - ...    Amelia    Microsof...    Science ...    2 ame...    8:36 pm

amelia
\_ □ ×

AMELIA View Events Help
Close

Detector **Events** Tours

*test\_package*

---

**SELECTED EVENT INFO**

	Total	Visible
<b>Tracks:</b>	1485	54
<b>Neutral Hadrons:</b>	63	1
<b>Charged Hadrons:</b>	267	11
<b>Photons:</b>	819	26
<b>Muons:</b>	4	4
<b>Electrons:</b>	332	12

Name ▾	pT

Combine Selected Tracks
Delete Selected Tracks

Name ▾	# Tr	Inv. Mass

**Toggle Event Elements Visibility**

<input checked="" type="checkbox"/> Electrons	<input checked="" type="checkbox"/> Neutral Hadrons	<input checked="" type="checkbox"/> Muons	<input checked="" type="checkbox"/> Missing Et
<input checked="" type="checkbox"/> Photons	<input checked="" type="checkbox"/> Charged Hadrons	<input checked="" type="checkbox"/> Jets	

**Pt Cutoff**

●

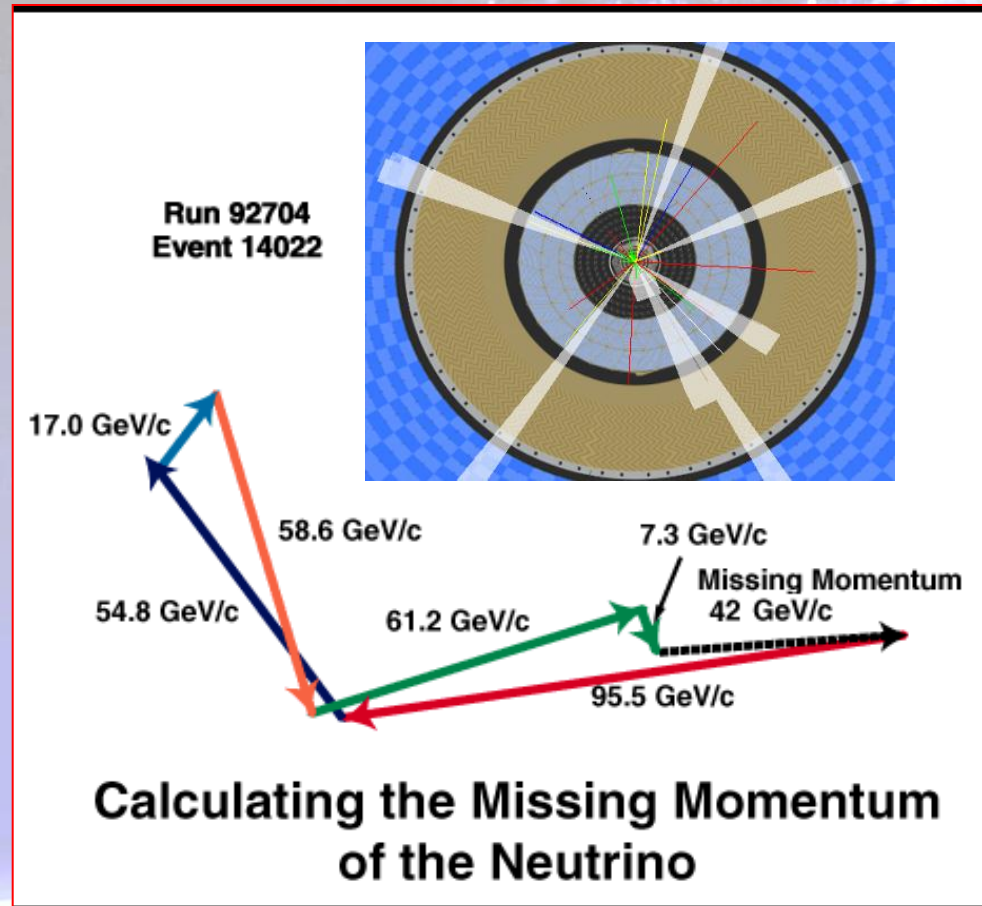
4167 MeV

**Track selection only supported in first-person camera mode.**

Start
8:38 pm



# Conservation of Momentum

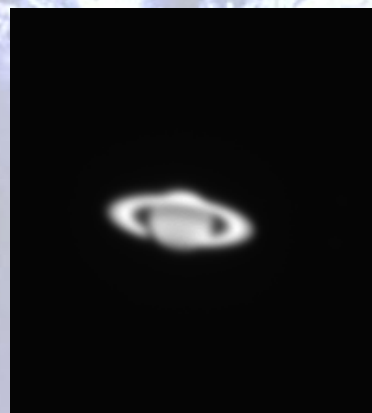


# DISCOVERY SPACE & COSMOS

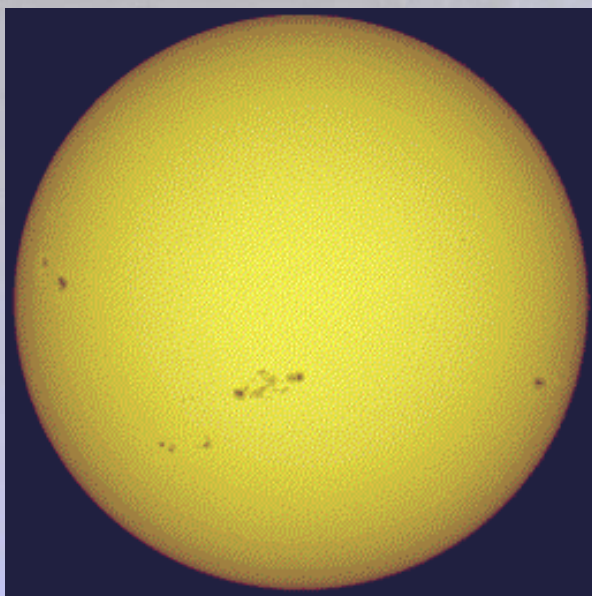
Access to unique scientific resources



# Access to Real Data...



# ...and high quality content





## Access to advanced infrastructures...

Discovery Space

Skinakas Observatory  
Elevation: 82.15ftm  
Latitude: 38°12'47" N  
Longitude: 22°57'38" E  
Elevation: 175ft









STATUS: Tracking

Worked Data

Obsid	RA	Dec	Exposure	Fiber	RA	Dec	Filter	Worked Data
M21-08-1	24 9 2088 483.19 ra	80 42 39 41 14 00" E	180	61587_MIL_SV_3_BANDU_SV_3@ASTEPAN_S61587_B				ASTERISK
M21-07-4	24 9 2088 483.08 ra	80 42 39 41 14 20" E	180	61587_MIL_SV_4_BANDU_SV_4@ASTEPAN_S61587_B				ASTERISK
M21-07-3	24 9 2088 480.98 ra	80 42 39 41 14 30" E	180	61586_MIL_SV_3_BANDU_SV_3@ASTEPAN_S61586_B				ASTERISK
M21-07-2	24 9 2088 356.48 ra	80 42 38 41 14 15" E	180	61584_MIL_SV_2_BANDU_SV_2@ASTEPAN_S61584_B				ASTERISK

# National Schools' Observatory



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-  [Go Observing](#)
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-  [Astronomy](#)
-  [The Study](#)
-  [@stro.club](#)
-  [International](#)



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# High School Teachers Programme 2012

http://support.faulkes-telescope.com/rti\_demo/ - Windows Internet Explorer

http://support.faulkes-telescope.com/rti\_demo/

Faulkes Telescope : RTI Demonstration

**Observation in Progress...**


**Object Name:** M42

**RA:** 5h35'50"

**DEC:** -5°15'21"

**Current Status:** The telescope is processing and downloading your colour image.

**Exposure Progress:**



**Please wait...**


Please wait for the telescope to make the observation you have requested. If at any time you wish to cancel the observation, please press the cancel button below. You will be returned to the sky map where you can start a new observation.

Cancel

**Instructions**

This is the observation progress page. Here you can see how long your exposure will take and the progress of your exposure. This may take some time depending on the filters that you have selected and the length of the exposure. When the exposure is done, a pop-up message will notify you.

**Click OK to continue...**

 <http://www.faulkes-telescope.com>

The observation has been completed. Click OK to view the image.

OK

Done

Internet

100%

# High School Teachers Programme 2012

## July 16<sup>th</sup>, 2012, CERN


http://support.faulkes-telescope.com/rti\_demo/ - Windows Internet Explorer

http://support.faulkes-telescope.com/rti\_demo/

http://support.faulkes-telescope.com/rti\_demo/

Faulkes Telescope : RTI Demonstration

### Your Observation



### Object Details:

Name: M42  
RA: 5h35'50"  
Dec: -5°15'21"

### Picture Details:

Taken by:  
Telescope: Hawaii  
Date taken: 20/12/05  
Time taken: 12:14

[More help....](#)

**New Object**

**Re-expose Object**

### Instructions

Here you will see a preview jpg which is processed by the telescope. After your session can download a larger version of this Jpg or you can have a go at processing your own image from the raw FITS files. These files will be available for download about 15 minutes after your session has finished. If you wanted to re-expose your object, you would click on the Re-expose button otherwise click on the New Object button to select another object.

**Click on New Object to try another method of selecting an object...**

Done

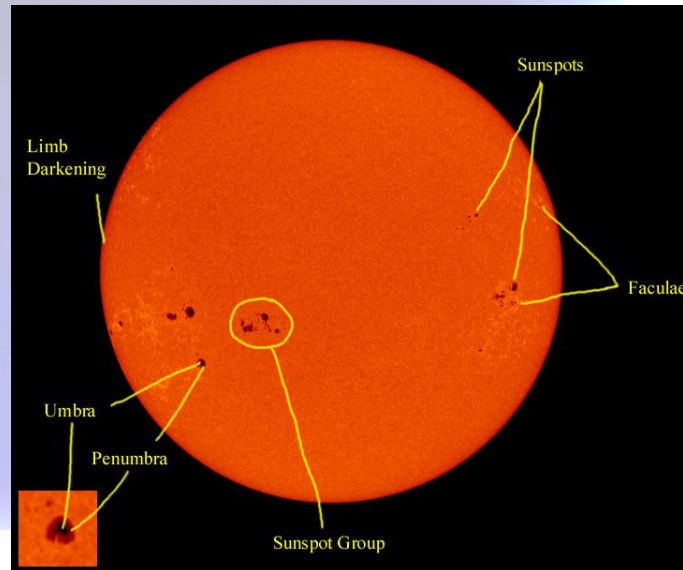
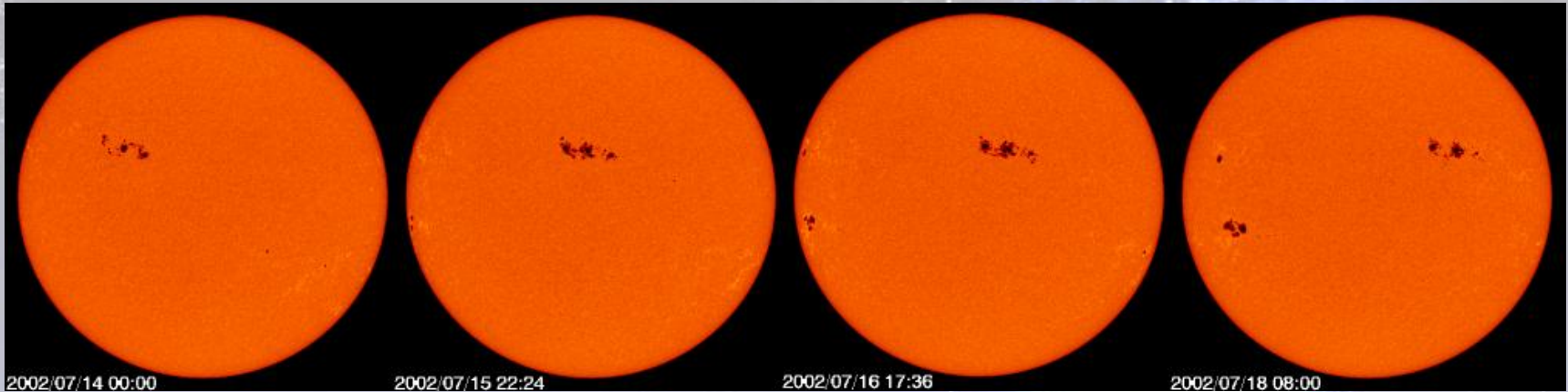
Internet 100%

start

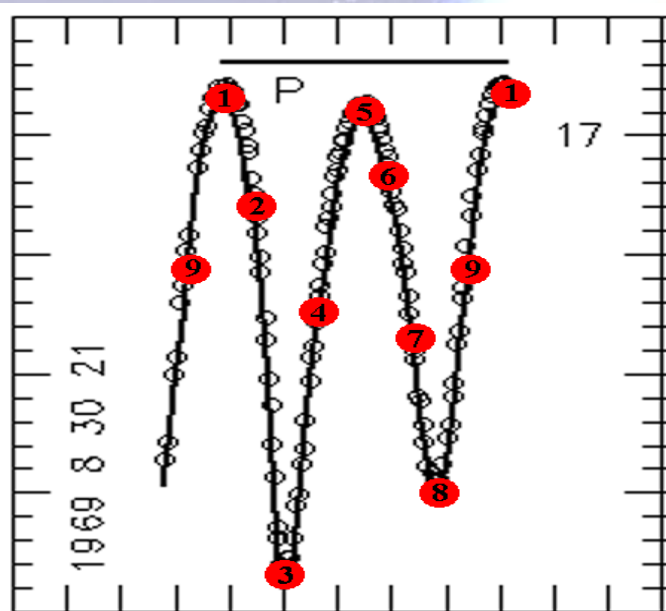
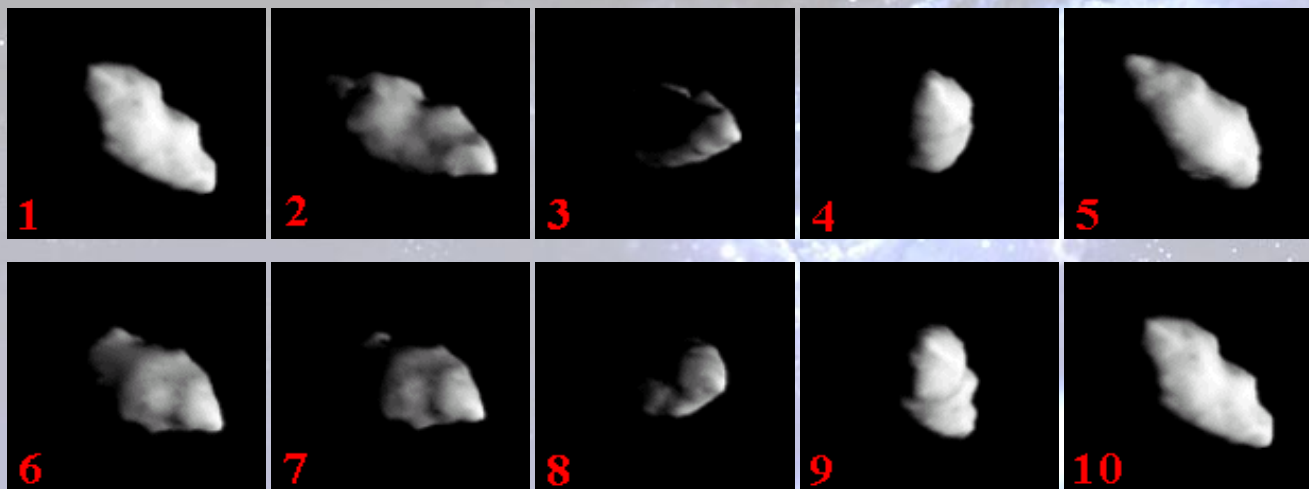
http://support.fau... ESA - Education - ... Inbox - Outlook Ex... Microsoft PowerPo... EN 11:28 µµ



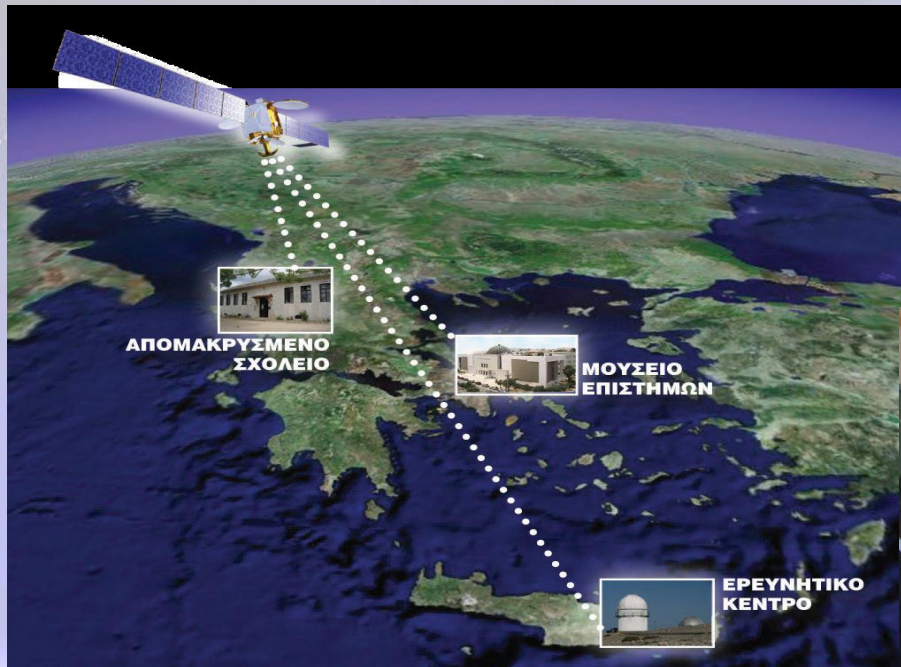
## Does the Sun Rotate?



## Asteroids Rotation



# Creating effective links between schools and the research community



# Effective Community Building

How the world's  
best-performing  
schools  
come out on top

September 2007

"The only way to improve is to improve"

ing

you could define the entire task of (a school) system in this way: its role is to ensure that when a teacher enters the classroom he or she has the materials available, along with the knowledge, the capability and the ambition to take one more child up to the standard today than she did yesterday. And again tomorrow.

## ***Exhibit 21: Japan: Learning communities***

**Enabling teachers to share best practice, learn from each others strengths and weaknesses, and jointly develop and disseminate excellent practice**

### **Lesson study**

Teachers work in teams to analyse and develop model lessons. The study requires each teacher to reflect in depth on their own practice, with the assistance of their peers. The final sample lessons are recorded and distributed.

### **Demonstration lessons**

Teachers demonstrate excellent practice to a wider group of instructors, followed by discussion and feedback sessions. The lessons are used to give each teacher access to examples of excellent practice, to recognise development, and to hold teachers accountable for the quality of their instruction

# Building a community of practice



<http://www.inspirational-science.blogspot.com/>

High School Teachers Programme 2012  
July 16<sup>th</sup>, 2012, CERN

Sharing our experiences

Is the best resource

we can have.





# special emphasis on building a network of the teachers that would form a community of practice.

- **A purpose to believe in:** “I will change if I believe I should”  
The first, and most important, condition for change is identifying a purpose to believe in. In our case, we must persuade teachers of the importance of scientific literature in terms of social value, importance to their students and personal achievement through learning and teaching these important subjects. We must carefully craft a “change story” underlining the benefits that the project can offer to all the involved actors. Furthermore, we must cultivate a sense of community, making the teacher feel part of a cohesive multi-national team. This sense of belonging will prove very important for motivating teachers and asking them to take then next, possibly “painful” steps, of learning new skills.

# special emphasis on building a network of the teachers that would form a community of practice.

- **Reinforcement systems:** “I will change if I have something to win”. From a pure behaviouristic point of view, changing is only possible if formal and informal conditioning mechanisms are in place. These mechanisms can reinforce the new behaviour, penalize the old one or, preferably do both. In our case, we can use informal reinforcement patterns in order to make teachers commit more to our project. A short list of such methods could include competitions, challenges, promoting the best teacher created project or lesson plan, offering e.g. the participation to a summer school as rewards.

# special emphasis on building a network of the teachers that would form a community of practice.

- **The skills required for change:** “I will change if I have the right skills”. A change is only possible if all the involved actors have the right set of skills. In the case of our project, we should make sure that our training program is designed in such a way that teachers acquire all the skills they will need, both technical and pedagogical.

# special emphasis on building a network of the teachers that would form a community of practice.

- **Consistent role models:** “I will change if other people change”. A number of “change leaders” will need to be established, acting as role models for the community of teachers. These very active and competent teachers will be a proof of concept for their colleagues that the change is indeed feasible, acceptable and beneficial for them. To achieve that we will have to identify the high flyers among the participating teachers and pay special attention into motivating them, supporting and encouraging them.

# Collaborative Learning and community development



# Building communities of practice



<http://www.inspirational-science.blogspot.com/>

# Contact Us

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[sotiriou@ea.gr](mailto:sotiriou@ea.gr) and [angelos@ea.gr](mailto:angelos@ea.gr)