ASPERA

ASPERA this month

June - July 2008

This month

Next meetings

Inauguration of the MAGIC-II Telescope
18-19 September 2008 -
La Palma

European priorities in APP
29-30 September 2008 - Brussels

Romanian National Day
16-17 October 2008 - Bucharest

R&D workshop
28 October 2008 - Amsterdam

News

GLAST reaches the stars

The Gamma-ray Large Area Space Telescope (GLAST) was successfully launched on 11 June 2008. It will explore the Universe at the highest energies, allowing physicists to understand the mechanisms of the violent Universe.

11 June 2008, 18:05 p.m. CEST. The spacecraft for gamma astronomy GLAST easily lifts off the launch pad from Cape Canaveral Air Force Station on a Delta II heavy rocket. After 75 minutes, NASA confirms the successful spacecraft separation and solar arrays deployment. The space observatory, GLAST, is now flying into a circular orbit 550 km above the Earth.

GLAST will observe the Universe as it appears through the highest-energy form of light we receive from all directions in Space: the gamma rays. As a wide-angle eye, GLAST will observe gamma rays with energies in a range running from 10 million to 1000 billion electron volts, produced in stars, supernovae and black holes, but also from the collisions of cosmic rays with the interstellar dust. Hundreds of gamma sources have been discovered up till now, but the high sensitivity of GLAST will reveal up to thousands of them.

Not perceivable by the naked eye, the gamma-ray sky hide fascinating answers to mysterious aspects of the Universe,

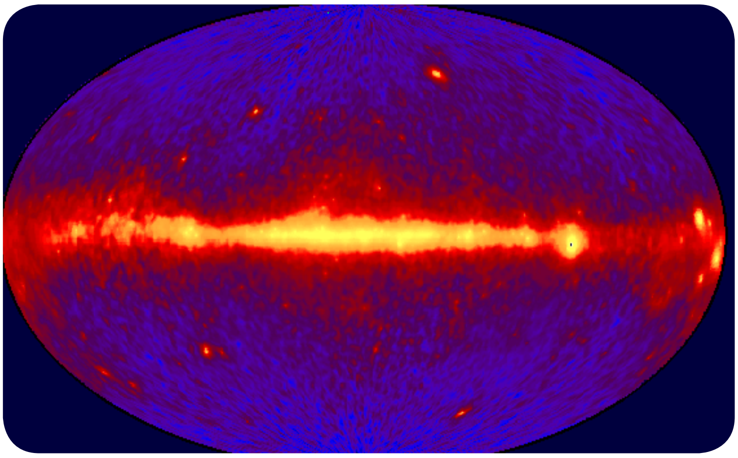
such as powerful explosions known as gamma ray-bursts, super massive black-holes in the cores of distant galaxies, pulsars and the origin of cosmic rays. This is drastically different from the Universe we see under the visible light; the gamma-ray sky appears constantly changing, with objects brightening and flagging in different time intervals.

A live view of the Universe

For this reason, GLAST will enable scientists to observe and study not only the Universe as it is, but also the way it works. This spectacular high-energy gamma-ray vision of an ever-changing Universe could also show what composes the mysterious dark matter, explain how black holes accelerate immense jets of material to nearly speed of light and how solar flares generate high-energy particles. Scientists also expect GLAST to shed light on new and unimaginable laws of physics.

NASA's GLAST mission is an astrophysics and particle physics partnership, developed in collaboration with the U.S. Department of Energy, with important contributions from academic institutions and partners in France, Germany, Italy, Japan, Sweden, and the US.

Europe contributed to GLAST with the construction of its main scientific instrument, the Large Area Space Telescope (LAT). The LAT is where gamma photons convert themselves in matter-antimatter particles that can be detected. By the direction of these particles, scientists will establish which direction the gamma-ray come from and find their origin in Space. The GLAST LAT will survey the Universe over an energy range from 20 million electron volts to over 300 billion electron volts, the upper end of which is a relatively unexplored



credits: View of the gamma-ray sky, as pictured by EGRET, a previous generation of gamma-ray satellite. GLAST will improve considerably the sensitivity and should find thousands of new very high-energy sources. Credit: EGRET

Credits: ASPERA / Alexis Ferrier

area of the electromagnetic spectrum. At lower energies, in the range between 20.000 electron volts to 30 million electron volts, another fundamental instrument within GLAST, the Gamma-ray Burst Monitor (GMB) is dedicated to the detection and study of gamma ray bursts. The joint work of the LAT and GMB will cover a wide energy range, which is important to monitor a constantly changing gamma-ray sky at very different energies and really makes GLAST a unique telescope. "We are sure that GLAST has just started its journey toward extraordinary discoveries which will contribute to change, once again, our view and comprehension of the Universe", said Ronaldo Bellazzini, Italian coordinator of GLAST, working at the INFN section of Pisa.

Jointly with other experiments, GLAST is thus contributing to bringing particle physics into Space. And it is not by chance that it will work contemporary to the LHC, the particle accelerator that will start during this summer at CERN. The study of dark matter in particular will gain a lot from the joint efforts done both in Space and in accelerators: if the particle candidates can explain the dark matter, the supersymmetric WIMP particles could be oppositely created in accelerators to be investigated. And space missions like GLAST will enable us to explain their cosmological meaning, observing their annihilation in gamma rays to confirm they are effectively dark matter. This cooperation will bring many new physics that we can't even imagine yet.

Submitted by Francesca Scianitti (INFN)

Link to the video « GLAST in orbit»: http://viavca.in2p3.fr/news_glast.html

Link to the website of GLAST: http://glast.gsfc.nasa.gov/

ASPERA and ApPEC: Astroparticle physics going global!

An interview with Michel Spiro, Director of the National Institute for Nuclear and Particle Physics (IN2P3) in Paris and new Chairman of the Steering Committee of ApPEC, talked to Dirk Lorenzen after the ApPEC meeting in Geneva on 20 June 2008.

credits: IN2P3

What is the difference between ApPEC and ASPERA?

ApPEC (Astroparticle Physics European Coordination) is the assembly of the funding agencies for astroparticle physics. It was created about seven years ago. We expect that it will last as long as the field of astroparticle physics. ASPERA is a European research area network instrument, supported by the European Commission. It aims to help in producing a well-instructed and coherent roadmap for astroparticle physics for the next 10 years, and to set up coordination mechanisms. ASPERA's work is then used by ApPEC to make decisions towards a coordination of the field.

What is the status of the roadmap process?

There are about 7 to 10 very large projects presented for the next 10 years. We realise that if we try to go through all these projects, then we will probably need extra funding. This has been evaluated by ASPERA. We would need a progressive increase of the budget for investment in astroparticle physics, reaching a factor of two after 10 years.

Very likely Europe will have a hard time to get the full funding of these projects. Any way out?

The increase of funding expected for the future is of the same level as what happened in the past 10 years. It is then not unreasonable to follow such a way, for such a promising field! But we are already thinking of a joint programme, not only with the European countries but also with Asia and America. Indeed, they have the same science questions and the ideas behind the projects to answer these questions are more or less the same. So we should now start to keep in touch with the other regions, in particular with US and Japan, as well as other countries, in order to see how we can have a global approach to the big projects in astroparticle physics.

How would such an international approach look?

We now have plans to initiate a process through the global forum of the Organisation for Economic Cooperation and Development (OECD). OECD has already set up a system in order to look for large projects in the fields of nuclear physics and particle physics. We are trying to convince – hopefully together with America and Asia – OECD, that this is the right time to do that for astroparticle physics as well. I will be in charge of trying to contact the other regions in order to recommend to OECD in September a global science forum in astroparticle physics. We are considering the possibility that on top of ApPEC we should have a more global committee, including the US and Japan and other countries.

What needs to be done in Europe before this takes place?

We are considering both joint programmes and the global programmes. To launch these big projects, you need to have a targeted R&D. For this R&D you don't need a large amount of funding, but it has to be well coordinated and well targeted. We think of this as a kind of a common pot in Europe with a common review committee in order to focus and coordinate the R&D in Europe for these larger projects.

Will you set priorities within the list of projects?

No, we will keep this list. The first step will be to fund the R&D for these big projects, as there are still some technical challenges to investigate. Secondly, we want to see which countries are interested in which projects and how much they plan to fund each of them. Then we have to add this up – that's what I call joint programming. We have to see how we could optimise the overall programme. Most likely we will not have enough funding for all projects. Then we will have to approach the other regions, America and Asia, and see whether we can satisfy all the requests together.

What will astroparticle physics look like in 10 years time?

It will consist of more and more very big projects in large collaborations and will be starting to enter the global approach. That was done a long time ago in particle physics. Astroparticle physics will most likely follow the same path.

Submitted by Dirk Lorenzen

Website of ApPEC: http://www.appec.org/