

# First Announcement



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# FFP11 Paris Conference

6-9 July 2010, APC laboratory

Denis Diderot Paris7 University, Paris, France

<http://ffp11.gie.im>

The 11th annual international meeting “Fundamental Frontiers of Physics” which will be held at Paris Diderot university's campus, is dedicated to interdisciplinary issues in fundamental physics.

**W**ith the formulation of the theory of general relativity by Albert Einstein, the universe in the 20th century has become a physical object all aspects of which are subject to investigation. Later thanks to Hubble discovery, cosmology has become a truly scientific discipline. Today, Cosmology becomes a precious and unique experimental laboratory where fundamental theories of physics can be tested, from general relativity to the physics of elementary particles in energy ranges highly unlikely in our Earth laboratories.

Modern Physics is perhaps at the beginnings of a new era. The combination of experiments and observations with a renewal of the basic principles of physics (concerning, eg, gravitation, quantum physics and their overlapping), provide a very active field of research, with the hope of answering some of the most complex and profound questions about our Universe.

In this meeting will gather many of the prominent experts in these fields to confront their work, and to draw future perspectives.

## **The Symposium develops around five themes:**

1. Big Bang Cosmology / Dark Energy
2. Dark Matter/Astroparticles
3. Particle physics and Fundamental Interactions
4. From Intrication to Quantum Information and Quantum Gas
5. Epistemology, History of Physics

## **Dark matter and dark energy**

Among the several questions to which this science has to find an answer, one of the most important concerns the energetic content of the Universe. The exact knowledge of what the Universe is made of and in which amounts, would allow not only to determine its age, its past and future evolution, but also to address from a scientific point of view the question about its finiteness or its final end. This is because the evolutionary history of a universe for a given geometry admits

only a particularly fixed energetic content. It is this equivalence between the energetic content and the space-time properties of the Universe that lead cosmologists to make some of the most mysterious and promising discoveries in the history of modern science: the existence of dark matter and dark energy.

Dark matter and dark energy are a challenge for astronomy both from an observational and theoretical point of view.

What is dark matter and dark energy? These two big questions, which for their complexity and depth, broad scientific impact and beyond are part of the subjects of the events that we aim to organize.

### **Particle physics and Fundamental Interactions.**

Indeed, at present, the strong, weak, and electromagnetic interactions are accounted for within the framework of the standard model. This model correctly describes experiments up to the highest energies performed so far, and gives a complete description of the elementary particles and their interactions down to distances of the order of  $10^{-18}$  m. Nevertheless, it has serious limitations, and attempts to overcome them and to unify the forces of nature have been only partly successful. Moreover, these attempts have left standing fundamental difficulties in reconciling gravitation and the laws of quantum mechanics. Today, we've two serious programs trying to understand this unification, String theory (full unification) and Loop Quantum Gravity.

### **From Intrication to Quantum Information and Quantum Gas**

It has been recognised recently that the strange features of the quantum world could be used for new information transmission or processing functions such as quantum cryptography or, more ambitiously, quantum computing. These fascinating perspectives renewed the interest in fundamental quantum properties and lead to important theoretical advances. On the experimental side, remarkable advances have been achieved in quantum optics, solid state physics or nuclear magnetic resonance.

### **Astroparticle physics**

Astroparticle studies elementary particles of astronomical origin, and their relation to astrophysics and cosmology. It is a relatively new field of research emerging at the intersection of particle physics, astronomy, and cosmology. Its rapid development has led to the design of new types of infrastructure. In underground laboratories or with specially designed telescopes, antennas and satellite experiments, astroparticle physicists employ new detection methods to observe a wide range of cosmic particles including neutrinos, gamma rays and cosmic rays at the highest energies. They are also searching for dark matter and gravitational waves.

### **Epistemology, History of Physics**

Nowadays, similarly as in past, many fields of human activities are influenced by physics knowledge, research methods in physics, physics view of world. It relates also to culture in wide understanding, namely philosophy, morality, art, education etc. For example, one

can say students and their teachers in all countries are training to see nature by "physics eyes" (by science eyes, in general). So any changes in epistemological fundament of modern physics or in character of physics have to affect culture.

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### Scientific Program

The scientific program will consist of Plenary Lectures to be held from 6<sup>th</sup> July to 9<sup>rd</sup> in July and Workshops which will involve parallel sessions of contributed talks and poster sessions from 8<sup>th</sup> (after noon) to 9<sup>rd</sup> (morning), 9<sup>rd</sup> July afternoon will be consecrated to conclusion of the conference. After the conference, all contributions will be published after a referee process by the Advisory Scientific Committee.

### List of of plenary speakers (confirmed):

Costas Bachas, Jeremy Butterfield, Jean Dalibard, Michel Devoret, Ruth Durrer, John Ellis, Pierre Fayet, Daniel Fournier, Antoine Georges, Philippe Grangier, Gerard 't Hooft, Yannick Mellier, Roger Penrose, Jean-Loup Puget, Pierre Salati, Christophe Salomon, Joseph Silk, John Stachel, Paul Steinhardt, Anton Zeilinger,

### Conference Sessions

1. **Big Bang Cosmology / Dark Energy**
2. **Dark Matter/Astroparticles**
3. **Particle physics and Fundamental Interactions**
4. **From Intrication to Quantum Information and Quantum Gas**
5. **Epistemology, History of Physics**

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- S. Vydelingum : [Sarodia.Vydelingum@apc.univ-paris7.fr](mailto:Sarodia.Vydelingum@apc.univ-paris7.fr) (contact information)

### Important Dates:

First Circular: February 8<sup>th</sup>, 2010

Second Circular: Mars 1<sup>st</sup>, 2010

Registration opens: February 12<sup>nd</sup> 2010

Deadline for early registration: MPay 15<sup>th</sup>, 2010

Deadline for submission of abstracts: June 15<sup>th</sup>, 2010

Deadline for registration: June 25<sup>th</sup>, 2010

Final information to participants: July 2<sup>th</sup> 2010

Arrival of participants and registration: July 5<sup>th</sup> 2010

The meeting working dates: 6<sup>th</sup> July – 9<sup>rd</sup> July 2010

Deadline for manuscript submission: December 1<sup>st</sup> 2010

## **REGISTRATION AND ACCOMMODATION:**

Registration will open on February 12<sup>nd</sup> 2010; details will be given in the 2nd Circular.

For participant registered before May 30<sup>st</sup>, 2010: **250 Euros**

For participant registered after May 30<sup>st</sup>, 2010: **295 Euros**

The conference fee (250 Euros) covers conference materials, a free copy of the proceedings, admittance to the entire scientific program, refreshments during the session breaks.

For fellow local (France) researchers, professors and assistant-professors, the registrations can be made individually or through their laboratories. The registration fee is 120 Euros for which you must add the cost of the official dinner in case you attend this dinner.

For accompanying persons, the registration fee is **60 Euros**.

- There is a **95 Euros** special price for students, proceedings non included

Accommodation: Paris is a very popular place at this time of the year! Details will be given in the 2nd Circular

## **Pre registration:**

For administrative purposes, it will be of use to the LOC to have contact details of participants as soon as possible. Thus if you are planning to attend "Frontiers of Fundamental Physics Conference", we would be grateful if you could please forward the following details by e-mail to [Sarodia.Vydelingum@apc.univ-paris7.fr](mailto:Sarodia.Vydelingum@apc.univ-paris7.fr)

*Title, surname, forename, address, e-mail address, telephone number, fax number, parallel session.*

Or go to the website: <http://ffp11.gie.im/Subscription>

## **Contacts:**

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## **Conference Secretary:**

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Further details relating to the conference will be published **at WEB page of the conference:**  
<http://ffp11.gie.im>