

Pierre Binetruy
Working close to the Horizon
or
facing the paradoxes of the « firewall »



« Un moment magique: l'obstacle a crevé, la pesanteur se traite de haut. La montagne est surmontée, la muraille démurée. Le lieu borné n'a plus du tout d'autres bornes que la feinte prolongée de l'horizon. Deux versants se sont écartés avec noblesse pour laisser voir, dans un triangle étendu aux confins, l'arrière-plan d'un arrière-monde » V. Segalen

Horizons



- 1996 Theory and praxis
 - GDR SUSY
- 2004 Space frontier
- 2005-2006 The two infinities:
 - APC
 - APPEC
- 2010 Origins: PCCP
- 2012 Earth and Universe
 - UnivEarths
- 2014-2016 Art and Science
 - Squaring the Circle
 - Universe 2.0

Paris Centre for Cosmological Physics

QUESTIONS
of
HORIZON

<http://www.pariscosmo.fr>

Paris, 4 - 5 December 2014

UnivEarths

Université Paris Diderot
Amphi P.G. de Gennes 12/4
Auditorium Biopark 12/5

Organizers :
P. Binétruy
A. Helou

« You realize the boundaries
only when you cross them »
Wittgenstein (probably)



<http://terascale.in2p3.fr/GDRsusy/GDR-old/index.html>

The involvement of IN2P3 with Space and CNES



- PLANCK (APC, LAL, LPSC) at the turn of the century

Then

- FROM STEFANO VITALE . I found my first contact with Pierre! Moving, I must say.

Can't believe he is not with us anymore, Ciao, Stefano

From: Pierre Binetruy <Pierre.Binetruy@th.u-psud.fr>

Subject: French involmment in LISA

Date: 26 February 2004 at 17:36:28 CET

To: vitale@science.unitn.it

Dear Prof. Vitale,

I am the director of a new French Institute "Astroparticule et Cosmologie » (APC) which starts in January 2005 with its activities centered around particle astrophysics and cosmology.... We have identified LISA as a long-term goal for our new Institute and are thinking about ways to join the European effort...

- Le 24/09/2004 à 16:55, Bonneville Richard a écrit :
cher Stavros

Concernant LISA PF, nous sommes saisis d'une demande des Suisses de prendre en charge certaines de leurs activités. Ca concerne en fait divers projets, dont LISA PF. La direction du CNES tient beaucoup à régler ce contentieux franco-suisse. La contrepartie pourrait être d'inclure des scientifiques français dans le team LISA PF. Qu'en penses-tu ?

Creation of APC in 2005

Inauguration 2006



[https://webcast.in2p3.fr/container/inauguration du laboratoire in2p3 astro Particule et cosmologie](https://webcast.in2p3.fr/container/inauguration%20du%20laboratoire%20in2p3%20astro%20Particule%20et%20cosmologie)

Creation of APC in 2005



From the
private visit
to Louvre
during the
APC
Inauguration

Peter Sloterdijk described (*Regeln für den Menschenpark*) the evolutionary necessity to create a ring of protection around the fragile, e.g. the mother and the child, a clearing (Lichtung) to keep away the animals with already formed big teeth. Permitting thus neoteny, since innovation begins with the lack of adaptation while developing new skills, which if exposed from the first moment to the violence of already trained animals would not survive.

Compare to the definition of the "Manuscript" of his PhD and the "fairies" Nannie and Susy

Inauguration 2006



Too early for
a picture
where we all
look in the
same
direction

Hans Blumenberg (Arbeit am Mythos): An interdisciplinary enterprise must assume for some time a lesser precision than this claimed by canonical branches of learning. Among the particularities of these canonical branches is the fact that they are comforted in their self-sufficiency by claiming always a larger precision than what is reasonable to expect and anyway they have obtained this precision by isolating and diminishing the size of the object under study without any theoretical counterpart. Since it does not accept the well defined delimitation of its object, interdisciplinarity starts by giving a slight impression of deception.



The 2
enigmatic
smiles
of
Art
and
Science

Astroparticle and Cosmology at the European scale
ASPERA (2006-2012)
APPEC (2012-2012),and APPEC (2012-)



ASTROPARTICLE PHYSICS
the European strategy

2008 A scientific vision

1. **CTA**
2. **KM3NeT/Icecube**
3. **Auger-Upgrade**
4. **advLGO/Virgo → ET/LISA**
5. **1 ton dark matter**
6. **1 ton $0\nu\text{DBD}$ ν -mass**
7. **ν -mixing & p -decay**

- **CMB**
- **Dark Energy**

ASPERA logo and URL: <http://www.asper-eu.org>



A comment during the presentation . But only 2 have seen a signal..

Well not anymore



From the Nature article

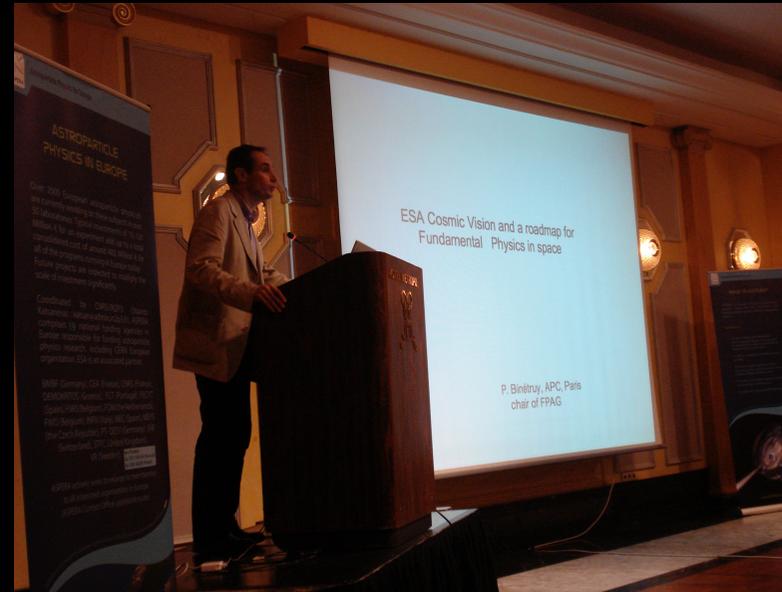
Big discussion 7 or 9 (+CMB, +DE)

The name “7 magnificent” a success ? Large media impact (subliminal message, protect a small village from organised crime...)

Member of APPEC SAC



- APPEC Scientific Advisory Committee 2005-2017



Paris Center for Cosmological Physics APC, LPNHE, LUTh, GEPI, LPTENS



Idées

Idées Tribunes Enquêtes Rencontres Controverses Livres Analyses Editoriaux Chronique

Les leçons du recrutement d'un Prix Nobel américain à Paris-Diderot, par Vincent Berger

Comment l'université Paris-Diderot s'est retrouvée à accueillir un chercheur américain George Smoot, prix Nobel de physique. Autrement dit, quels sont les atouts du modèle français de la recherche ?

2010 Foundation « Physics of the Universe » Chair G. Smoot, Director P. Binetruy

- A fellows program
 - R&D on CMB detectors (KIDS)

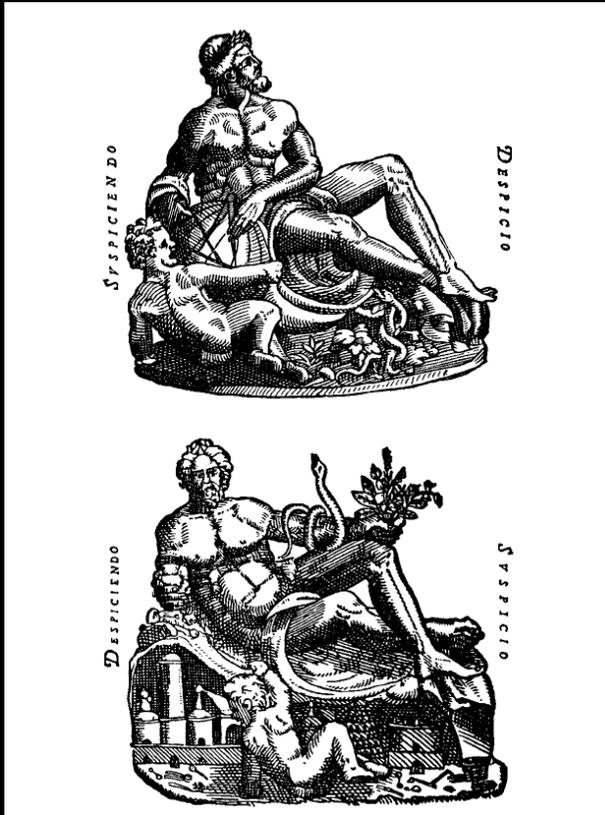


- Education and Outreach
 - « Teaching the Universe » 3 day course to high school teachers
 - MOOC Gravity (P. Binetruy)

- A Conference program
 - e.g. Questions of Horizon December 2014



The LabeX UnivEarths 2011 (APC, AIM, IPGP)



From the frontispiece of
Tycho Brahe's Uraniborg

Interface Geosciences-astroparticle: a new frontier:

- For astroparticle the Geosphere is both the target and the detecting medium: continuous time series data by deploying large sensor networks in hostile environments (sea, desert, underground). High sensitivity instruments for probing very low intensity geological effects, metrology
- Large data manipulation and worldwide networking. Distribution of alerts
- **A convergence central in the current “fusion” of Universities Descartes/Diderot/IPGP**

GEOPHYSICS

Observations and modeling of the elastogravity signals preceding direct seismic waves

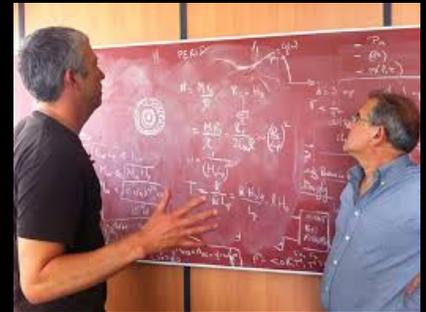
Martin Vallée,^{1*} Jean Paul Ampuero,² Kévin Juhel,¹ Pascal Bernard,¹ Jean-Paul Montagner,¹ Matteo Barsuglia³

After an earthquake, the earliest deformation signals are not expected to be carried by the fastest (P) elastic waves but by the speed-of-light changes of the gravitational field. However, these perturbations are weak and, so far, their detection has not been accurate enough to fully understand their origins and to use them for a highly valuable rapid estimate of the earthquake magnitude. We show that gravity perturbations are particularly well observed with broadband seismometers at distances between 1000 and 2000 kilometers from the source of the 2011, moment magnitude 9.1, Tohoku earthquake. We can accurately model them by a new formalism, taking into account both the gravity changes and the gravity-induced motion. These prompt elastogravity signals open the window for minute time-scale magnitude determination for great earthquakes.

Art et Science



From the Opera cosmique (2009) to Squaring the circle (2014), by Attila Csorgo



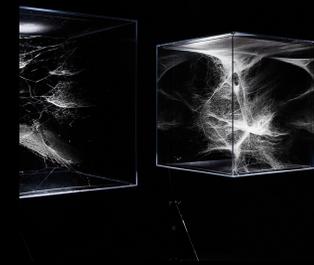
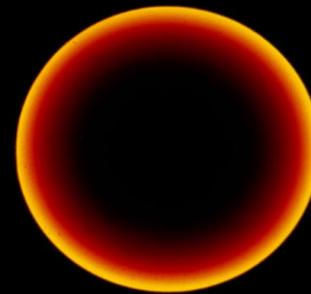
APIF at APC from the newAPPEC Rodamap

Art et Science



Univers 2.0

Univers 2.0 with the grant of the **Fondation Carasso (2016)**. The aim of this project is to initiate an exploration, through a cross-reflection between artists and scientists, of the field that began with the recent discovery of gravitational waves, urgently questioning again the nature of space and time, their texture, the notions of origin and horizon, the role of information circulating in the Universe and its conservation or loss, the role of the human as observer and/or perturbator, more generally the nature of our embedding in the cosmos. In short, the overall image of a Gravitational Universe or Universe 2.0.



« Artists and Scientists are the world's noticers. Their job is simply to notice what other people cannot »
« There are two things that people [are surrounded by and] avoid trying to understand. One is music, and the other is electricity. » Frank Oppenheimer.

Pierre's second Odyssey



Teiresias in the Nekyia, predicted that Ulysses after coming home, he had to leave again for second Odyssey, till he could meet a people that did not know what a roaming paddle (a ski ?) is, and only then he could stop wandering and would make a sacrifice to Poseidon.