

Welcome to Marseille and to DIS 2013



Centre
de Physique
des Particules
de Marseille

CPPM

UMR7346



© Francis Quintric

A joint CNRS/AMU research lab of excellence

over 150 people strong

**(40 perm. scientists; 35 postdocs and PhD students;
75 engineers, technicians and admin. Staff;
60 visiting scientists from all over the world, each year)**

At the heart of the Universe and Matter

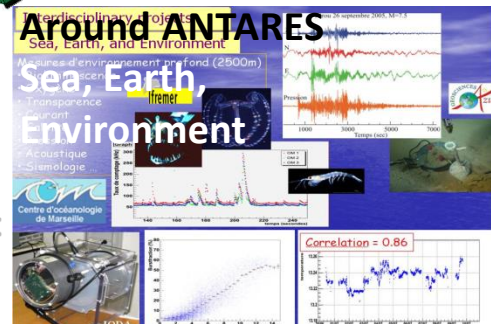
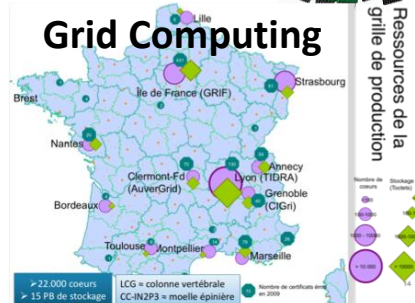
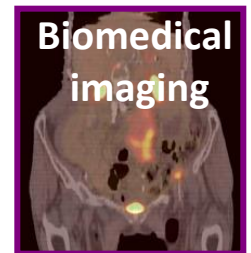
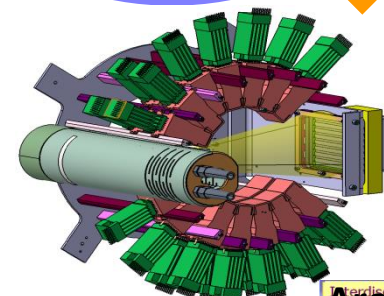
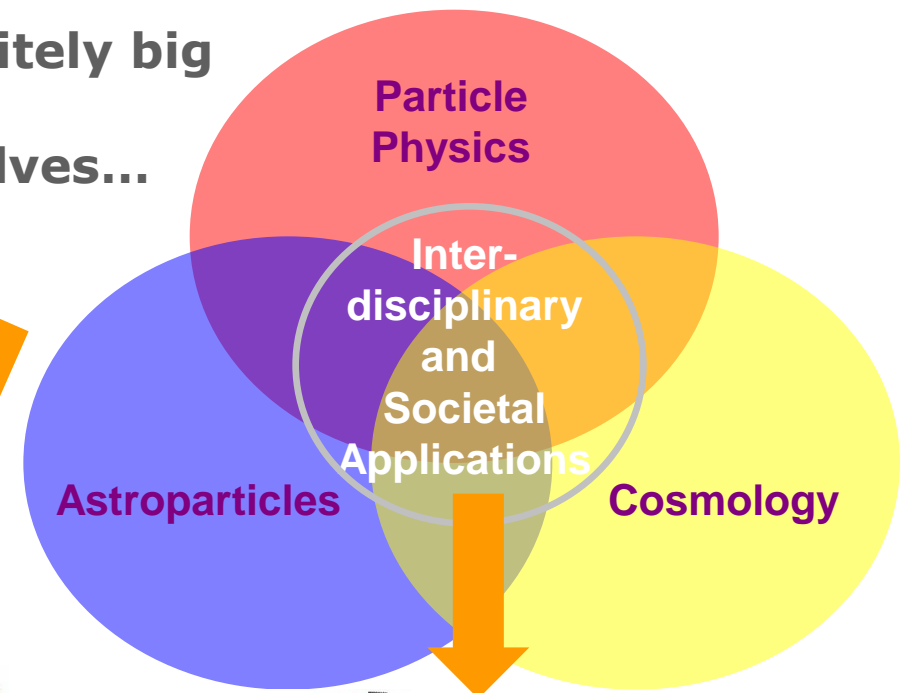
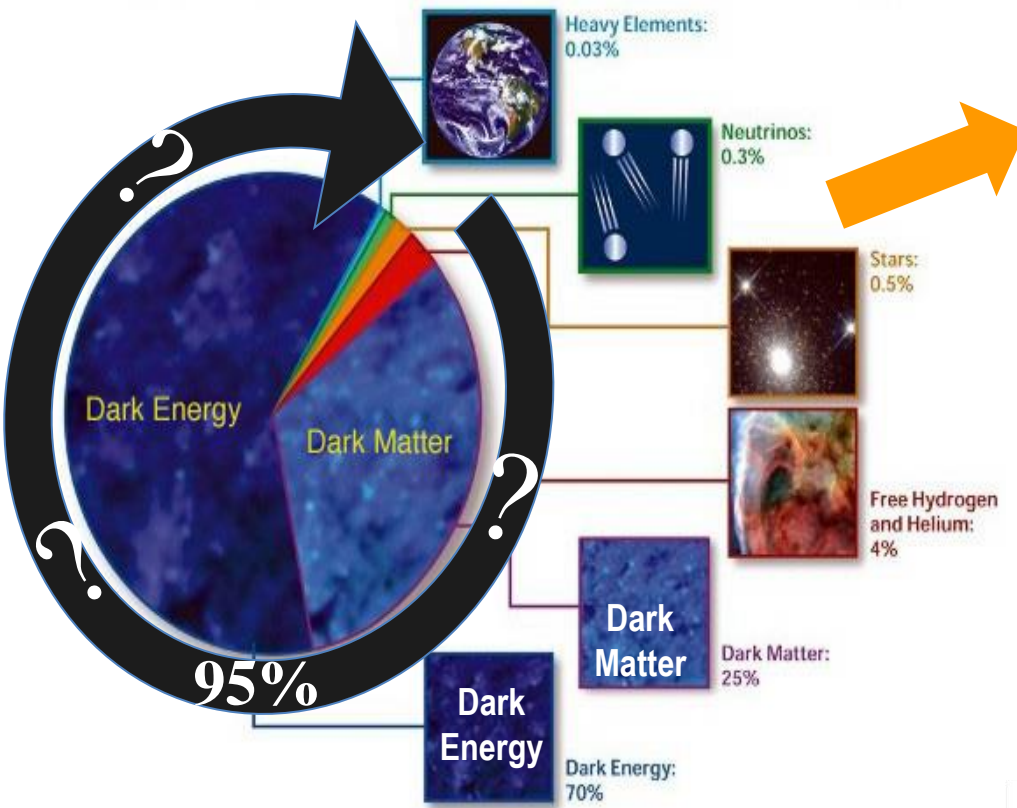


Eric Kajfasz (kajfasz@cppm.in2p3.fr)



Our missions

From the infinitely small to the infinitely big
Understand our Universe,
What it is made of and how it evolves...



**AT
ACCELERATORS**
**H1 @ HERA
(Hambourg)**
 e-p
 319 GeV

**D0 @ Tevatron
(Chicago)**
 p-pbar 2TeV

ON TOP OF MOUNTAINS
 SNLS/SNFactory
 BOSS

LSST

IN SPACE
 Euclid

Characterize Dark Energy
 With a multi-probe approach

LHCb @ LHC/CERN

ATLAS @ LHC/CERN

Search for New Physics

p-p 7 and 14TeV

Width: 44m
 Diameter: 22m
 Weight: 7000t

ATLAS CERN AC - ATLAS V1999

**International
 Scientific
 Collaborations
 all over the Planet**

...

UNDER MOUNTAINS

SuperNEMO

ON HIGH GROUNDS

CTA

**AT THE BOTTOM OF THE SEA
 (-2500 m)**

Neutrino Astronomy and
 multi-messenger approach

ANTARES/MEUST/KM3



ATLAS

EM Calorimeter

Pixel detector

High Level Trigger

Identification: e, photons, and b-jets

Top-quark studies

Higgs boson search and study

BSM Physics search

(SUSY, 4th generation,..)

Upgrades: IBL and Pixel detector

LHCb

L0 muon Trigger

CP violation, ϕ_s measurement

B^0 and B_s rare leptonic decays

Upgrade: 40MHz readout
of the whole detector

ANTARES

2500m

- 900 PMTs
- 12 lines
- 25 storeys / line
- 3 PMTs / storey

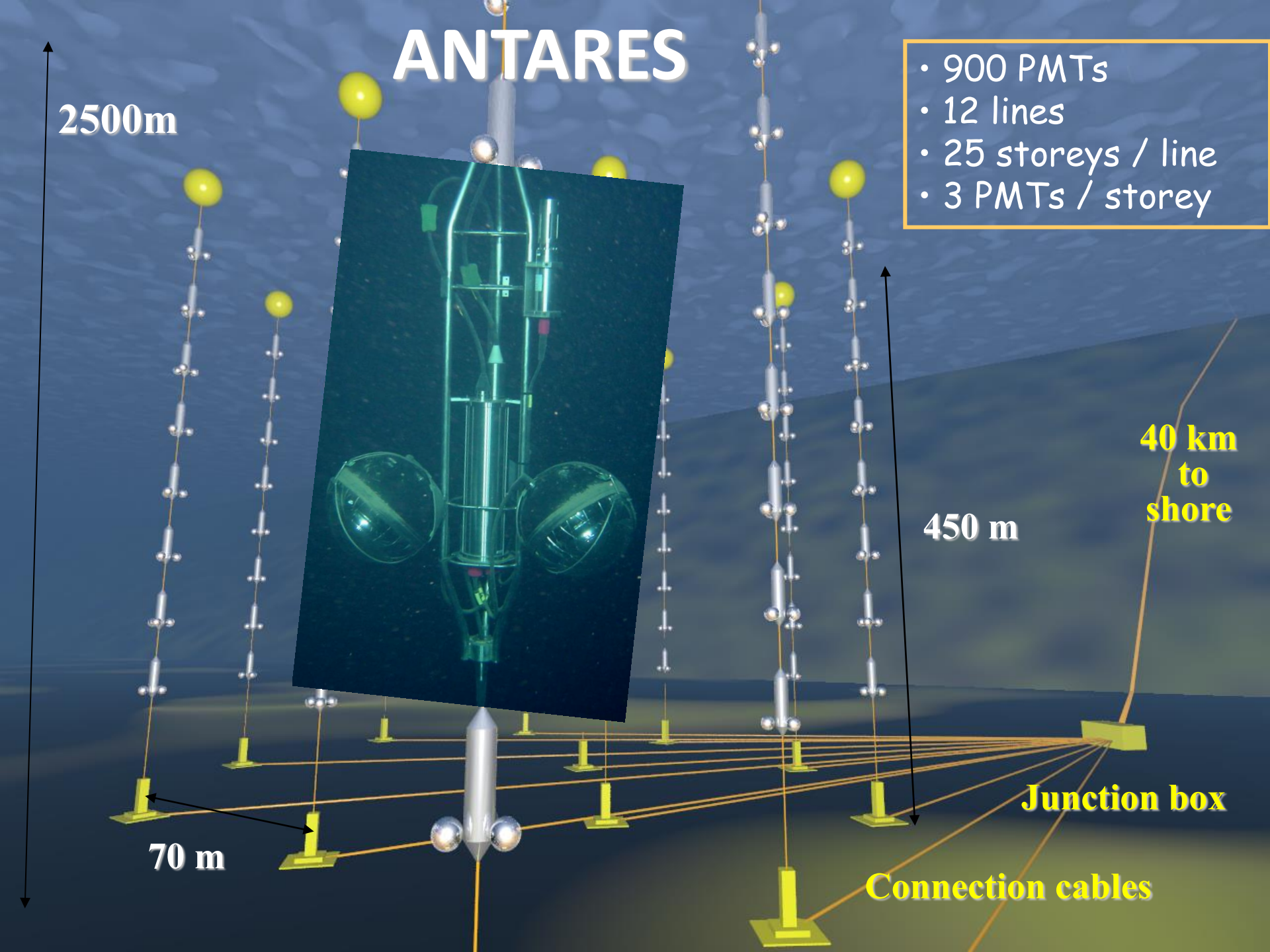
40 km
to
shore

450 m

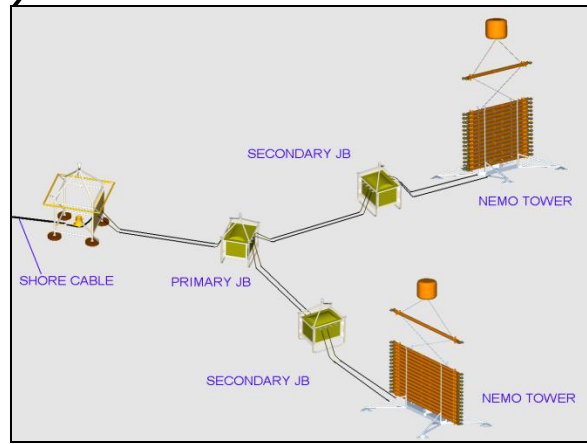
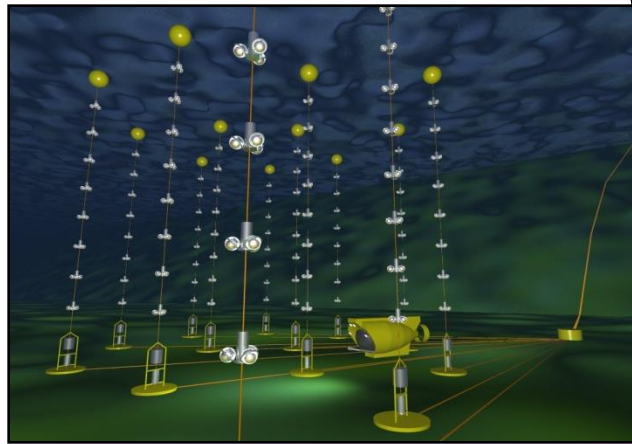
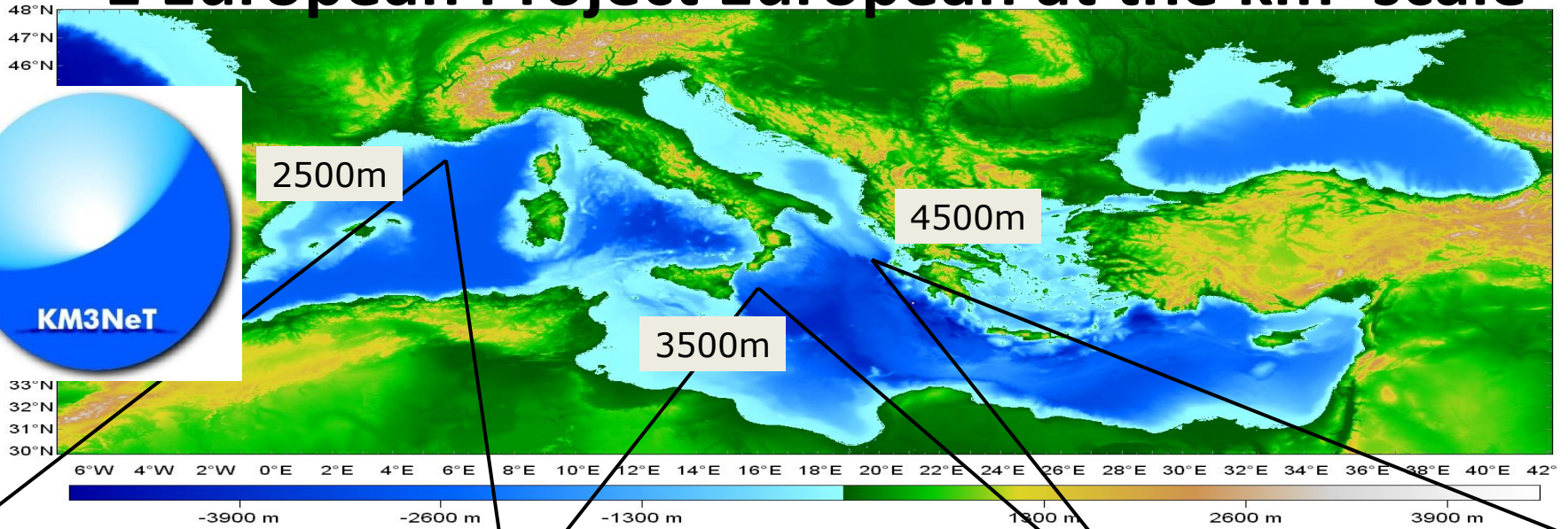
70 m

Junction box

Connection cables

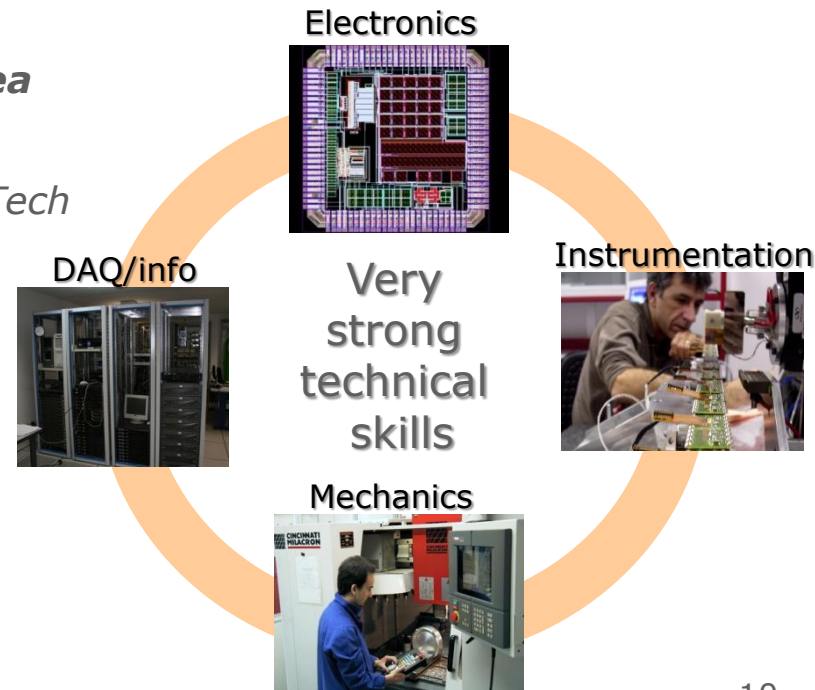


3 Pilot Projects in Mediterranean Sea => 1 European Project European at the km³ scale



Laboratory technical skills

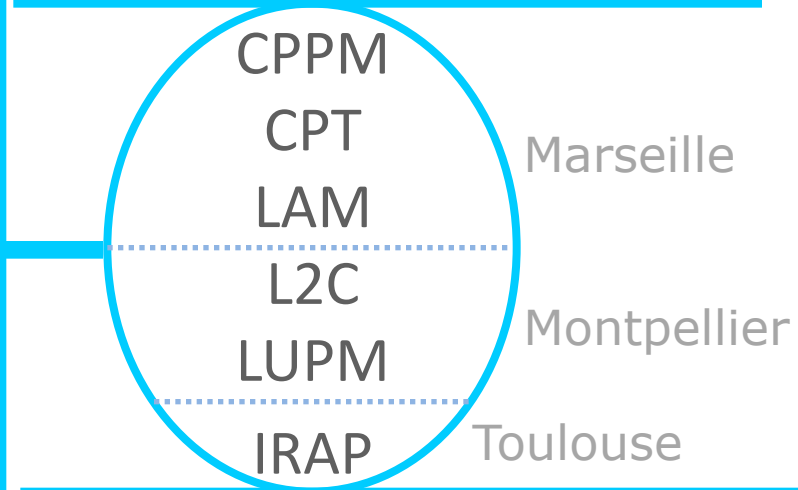
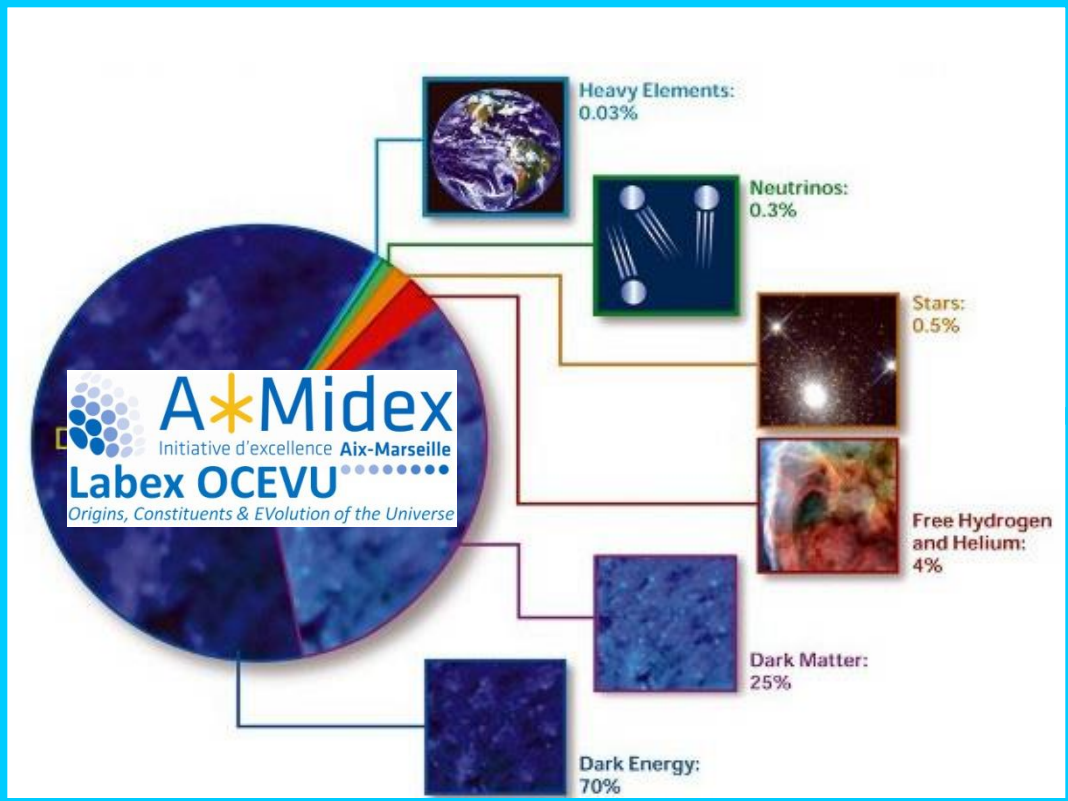
- Recognized technical skills and leadership
 - Micro-electronics (planar and 3D)
 - Pixels detectors for particle physics (ATLAS)
 - Transfer to:
 - X-Ray imaging (imXgam) => **4 patents and startup company**
 - ... but also robotized avionics
 - Fast acquisition (FPGA based) and fiber optics transmission (LHCb)
 - Characterization of IR detectors for space missions
 - Submarine Infrastructures (ANTARES, MEUST/KM3)
 - Equipressure systems
 - Submarine connectors
 - **2 patents and startup company PowerSea**
strong interest from the industry (sustainable energies)
collaboration with EDF, COMEX and Subsea Tech
 - Interaction with Competitiveness Clusters
 - OPTITEC, SCS, Mer PACA, Pégase, Eurobiomed



Investments for the Future Programme

- Labex OCEVU: Origins, Constituents et EVolution of the Universe
 - Selected by an international jury
 - Coordinated by Aix-Marseille University
 - Funded with 10 M€ over 8 years

Partners:
 Aix-Marseille University
 Univ. Montpellier 2
 Univ. Toulouse III
 CNRS: IN2P3, INP et INSU

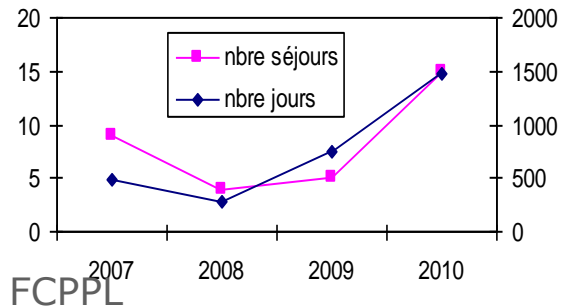


Well defined collaborative projects in:
Research
Education
Transfers and Outreach

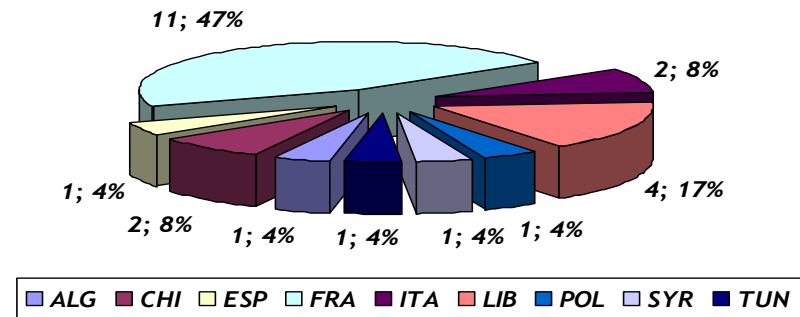
Combine our strengths in:
 Cosmology and (Astro-)Particle Physics
 Observation, experimentation, and theory

Open towards international collaborations

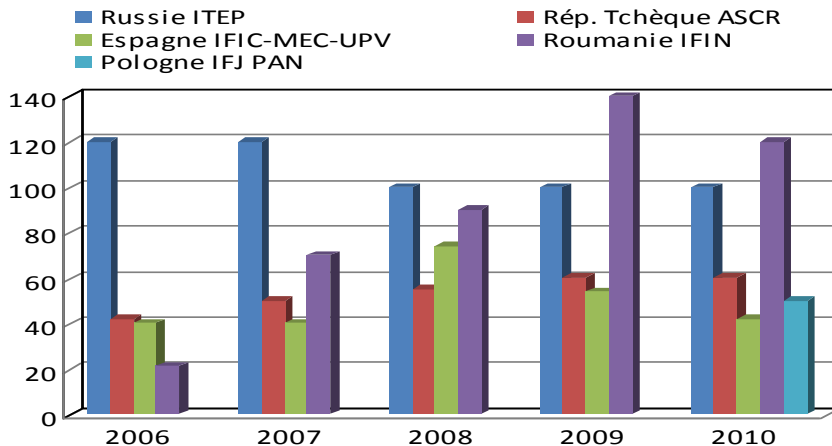
CPPM administrative headquarters of LIA FCPPL
France China Particle Physics Laboratory



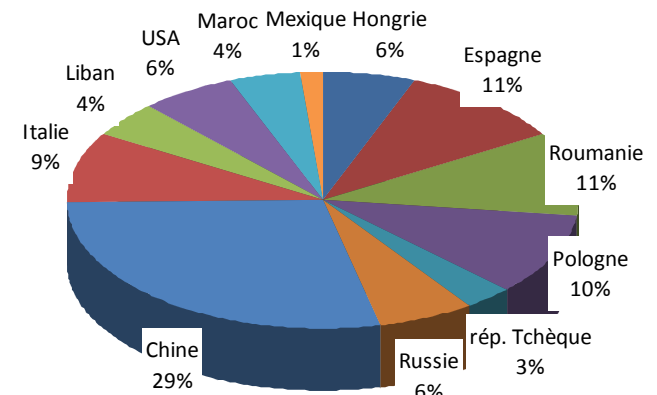
PhD students citizenship



Specific Collaborations
(# of days)



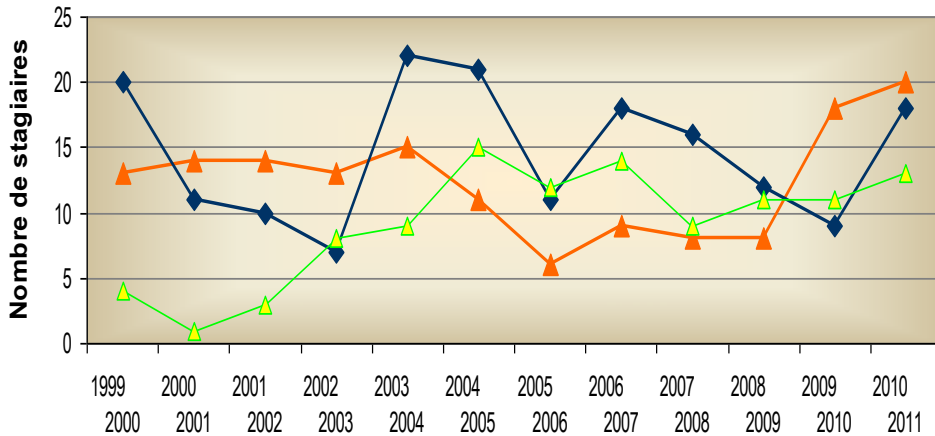
Foreign visitors (~60 pers./yr)



Education by research

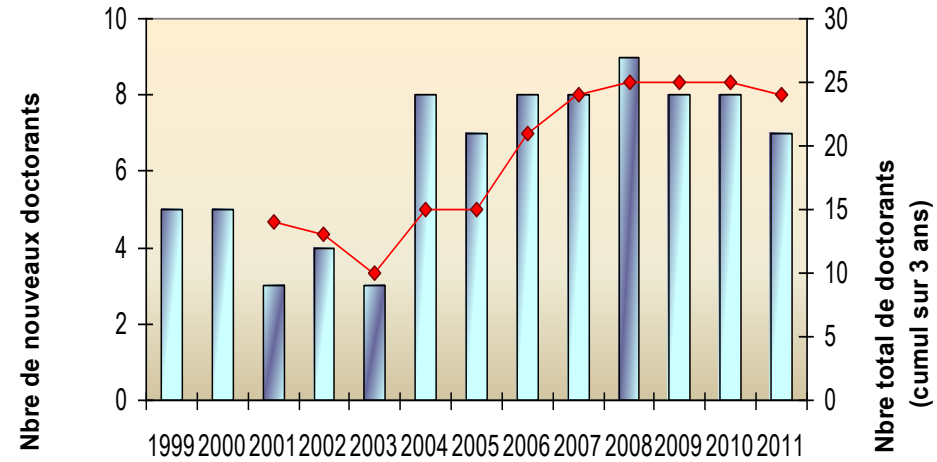
Internships

Average internship duration ~ 2months



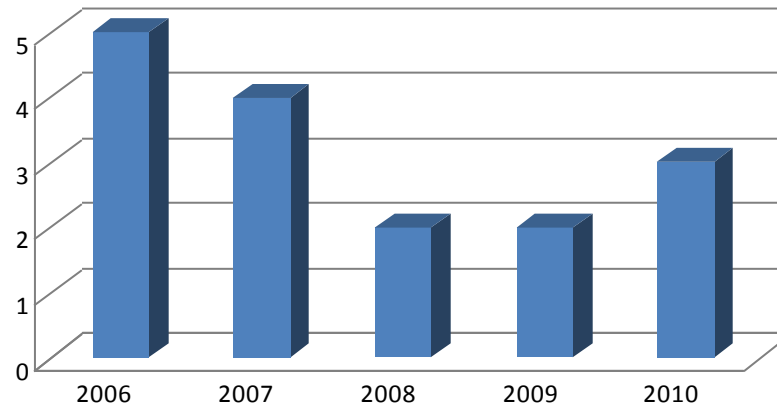
▲ Stages techniques ◆ Stages de physique ▲ Stage d'initiation

PhD students



Années
 ■ Nbre de nouveaux doctorants ◆ Cumul sur 3 ans

Postdocs & ATER



Education and Outreach

- Education: strong involvement (faculty, researchers, engineers) at Aix-Marseille University and engineering schools in the region, including managerial responsibilities (Licence, Master, and Doctoral School).
- Scientific communication and outreach

Publications, seminars,
 Conferences and schools...
 Brochures and Activity reports
 Articles and press releases,
 Conferences in high-schools, Master Classes (with CERN)
 Exhibitions, various events, Fête de la Science ...
 Development of didactic tools, ...



*Yearly Cycle of Conferences
 for the General Public
 Between 60 and 140 participants
 every month*



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