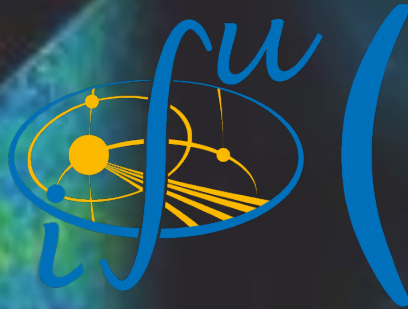


Institute for the Physics of the Universe



Institut
Physique de
l'Univers

Aix*Marseille Université

*Strengthen and structure our synergies
to better teach, do research, and transfer*






<https://www.univ-amu.fr/en/iphu>

Eric KAJFASZ – eric.kajfasz@univ-amu.fr



RESEARCH LABORATORIES (in alphabetic order)

- **CPPM** – UMR 7346 : Centre de Physique des Particules de Marseille 
- **CPT** – UMR 7332 : Centre de Physique Théorique 
- **LAM** – UMR 7326 : Laboratoire d'Astrophysique de Marseille 

COMPONENTS

- **Faculty of Sciences**
 - **Physics Department**
 - » Master Degree programme in Fundamental Physics (FunPhys)
- **OSU Pythéas** : OHP (Haute Provence Observatory)

DOCTORAL SCHOOL

- **ED 352** – Physics and Sciences of Matter

CNRS

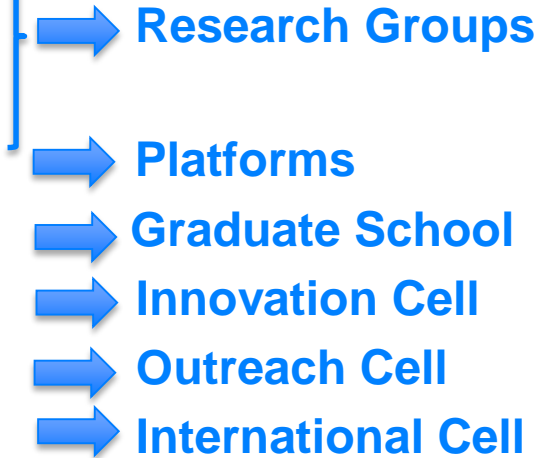
- **3 Institutes** – IN2P3, INP, INSU

DRIVING FORCES

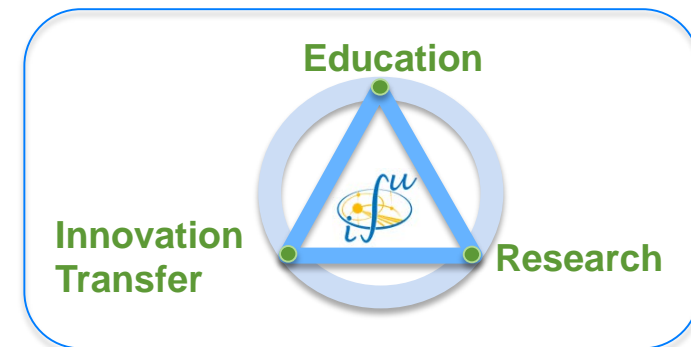
- **210 staff (110 HDR)**: 100 scientists, 110 engineers, techs and admins
35 postdocs, 65 PhD and 70 Master students *on average*

Collaborative environment positioned at the best international level

- **Leverage** in excellence and synergies of its 3 constituent laboratories based on the success of the OCEVU Labex (2012-2019) ["cluster of excellence"]
- **Encourage** and **support** ambitious joint actions and projects to:
 - Lift scientific and technological barriers
 - Push the limits in understanding the Physics of the Universe
- **Foster**
 - Training by and for Research
 - Innovation, Creativity, *Coopetition*
 - Transfer to society
 - Open to the world
- **Promote and enforce**
 - Crossed fertilization between its 3 pillars necessary to insure sustainability
 - HRS4R Compliant Practices

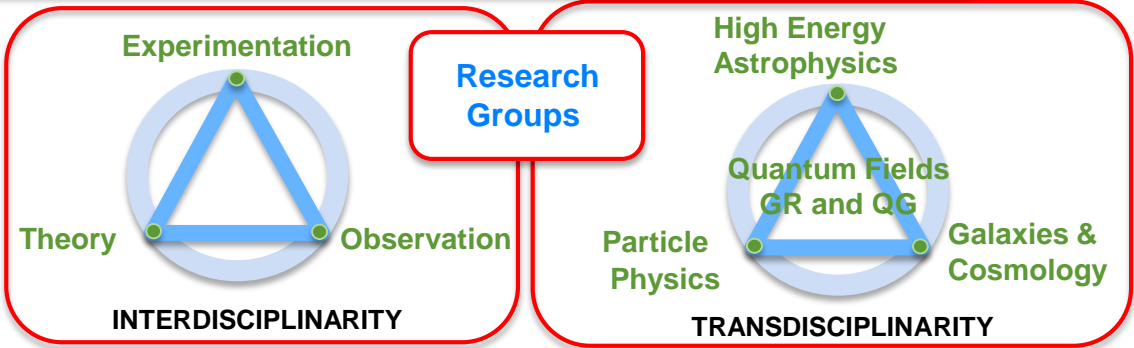
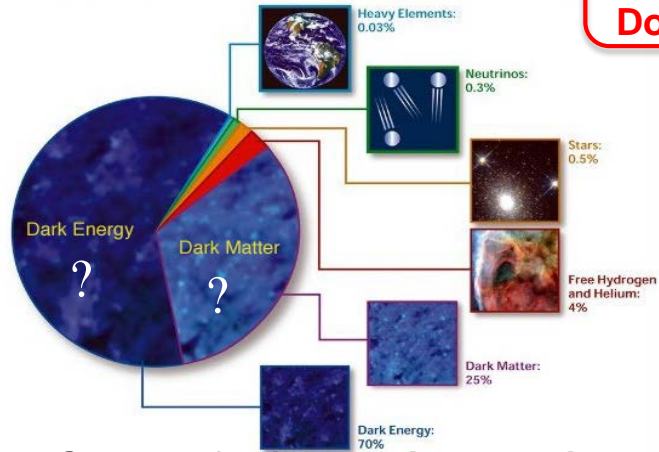


Ambitious project, created by AMU on 01/01/2020



Research

**What are the fundamental laws governing the Universe?
What is it made of? How did it form and how does it evolve?
Do we understand the Universe in its extreme states?**



- **Support for international projects** to ensure maximum scientific return
- **Support for original, innovative or risky ideas**
 - **Transverse projects:** dark matter and energy, neutrinos, **gravitational waves**, multi-messenger & multi-probe approaches...
 - **Big Scientific Data:** data management, processing and analysis issues
 - **Innovative or risky projects:** incubation of potential future large projects
- **Priority** to projects developing our synergies on international projects
- **International Hiring and Hosting Programs**
 - PhD students
 - High-level guests from science/technology/education
- **Development of state-of-the-art equipment and platforms:** LSPM and KM3NeT, GFT-Colibri; POLARIS and SPATIAL platforms; Instrumentation for the extreme; Dark Energy Center; Radon and Infrared sensors technological platforms; Haute Provence Observatory; IRiS and ePERON ... **Also used for training in the Institute Graduate School**

Euclid, DESI, LSST, ELT, LiteBIRD, MSE, PFS, WFIRST; KM3NeT, SVOM, CTA, Hess; LISA, MadMax, DarkSide; ATLAS, LHCb, BelleII; Quantum Fields and Quantum Gravity; ...

<https://www.univ-amu.fr/en/public/research-groups>

Cosmology: models and parameters; Galaxies: formation and evolution; Large Scale Structure: dark matter and dark energy; Reionization; Gravitation: general relativity and gravitational waves; Neutrinos; HE Astrophysics, Astroparticles, Energy Frontier, EWSB, BSM, Intensity Frontier (Flavour Physics, g-2)

Graduate School

Program of internationalized curriculum

4 “flavors”, including a new “instrument scientist”,
Direct connection to the Research Groups of the Institute

Innovative educational offer

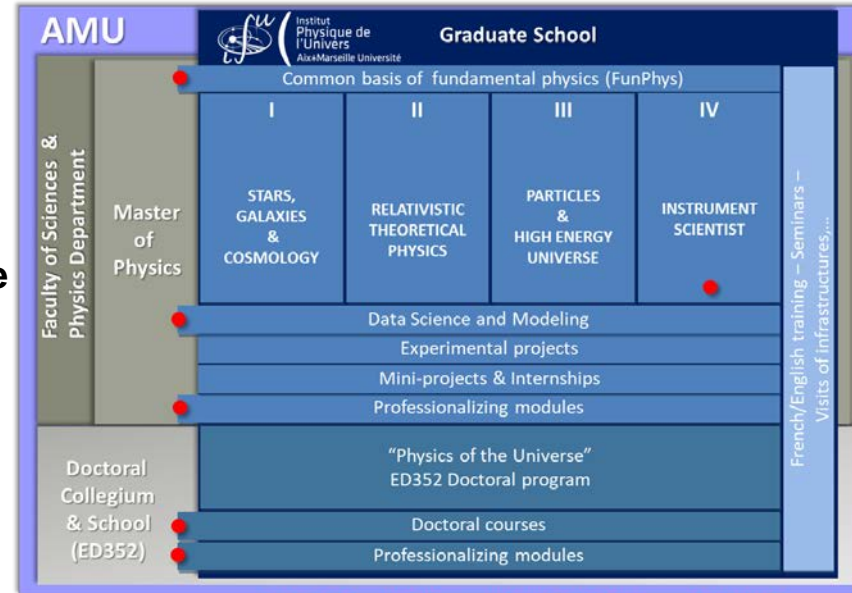
- Develop skills, autonomy and a sense of belonging
- Work in teams and learn by projects; access to research platforms
- Integrate into research teams, including abroad
- Participate in training and scientific dissemination actions

Link with related trainings - with strong involvement of the Grad School's students ● (partly) shared with other curricula in Faculty of Sciences and/or ED352

- Physics Summer Camps/Schools
- IRiS (*astonomy*) and ePERON (*cosmic rays*) training platforms
- Research and Discovery Internships in IPhU labs and abroad
- Communication/information/support gateways between Bachelor, Master and PhD students

Development of teaching and research links with other Universities

- Innovative pedagogy – e.g. some contacts with UCL (University College London)
- Contacts with **Barcelona AU**, **Bologna Univ.** and **Bucharest Univ. (CIVIS)**
- But also with: Penn State (USA), **UNAM** (Mexico), **UCAS**(IHEP, NAOC), USTC, **THU**, **PKU**, SDU, **SJTU**, SYSU (China)
[IRL ERIDENUS] [IRL FCPPL]
- Aim at structuring common adventures (e.g. ERASMUS MUNDUS,...) in **Education and Research**
- **Strengthen present collaborations,**
but open and eager to develop new ones, including within the CIVIS European University



World of knowledge

Amplify the dynamics of scientific dissemination and mediation

The Outreach Cell

- **Weave** multiple links between the places where science is produced and the various actors in society
- **Produce** multimedia resources and organize events and actions for these audiences
- **Foster** OHP, and IRiS and ePERON,... educational platforms as training infrastructure
- **Create** a space for exhibition and exchange with secondary school teachers and the general public

World of technology

Amplify links with industry and the regional economic actors

The Innovation Cell - in connection with CISAM, SATT, Competitiveness Clusters, etc. - will offer to innovative project leaders: individualized coaching, advice by groups of industrial and academic experts, adapted training, seed and pre-maturation funding, etc.

First concrete paths already being explored

- **LabCom and Partnerships with identified companies** to develop Design of spectrographs for large cosmological survey projects, Characterization of infrared sensors, Data acquisition and AI developments on FPGAs,...
- **Seminars, Internships and PhD grants linked to the « Instrument scientist » “flavor”**

Organization (1)

University Academic Council
(Conseil Académique) - AMU

Management Council
(Conseil de gestion) - A*MIDEX

Stakeholders Steering Committee
(Comité de pilotage des tutelles)

Scientific and Training Advisory Board

Conseil stratégique en formation et recherche / Scientific and training advisory board

Institute Council

IPhU Management

Fabienne Casoli, President of the Paris-PSL Observatory, Former Deputy Director of the Innovation, Applications and Science Division at CNES.

Françoise Combes, "Galaxies and Cosmology" Full Professor at Collège de France, Member of the French Academy of Sciences, Honorary Fellow of the Royal Astronomical Society - UK.

Eckard Elsen, Director for Research and Computing at CERN - Switzerland. Professor at Hamburg University - Germany.

Anne-Isabelle Etienne, Director of the Institute of research into the fundamental laws of the Universe (Irfu) at CEA, and with University Paris-Saclay.

Guido Martinelli, Professor of Theoretical Physics at La Sapienza University Roma - Italy. Member of the CERN Scientific Policy Committee - Switzerland and of the Accademia Nazionale dei Lincei - Italy.

Teresa Montaruli, Full Professor at University of Geneva - Switzerland. Chair of the European APPEC Consortium.

Joseph Silk, Professor of Physics at Sorbonne University. Homewood Professor of Physics and Astronomy at Johns Hopkins University - USA. Fellow of the Royal Society - UK.

Christian Stegmann, Director in charge of Astroparticle Physics at DESY - Germany. Deputy-Chair of the European APPEC Consortium.

Organization (2)

