

## UMR 5814 - CNRS / USMB

**Faculty:** UFR Sciences and Mountain

**PhD school:** Grenoble Physics Doctoral School (EDPHY)

### FIELD OF TRANSVERSAL SKILLS

- Fundamental Science, Earth sciences and Environment

### KEY WORDS

- Particle ■ Astroparticle ■ Physics ■ Microelectronics ■ Electronics ■ Computer network ■ Real time computing ■ Big data ■ Mechanics ■ CAO/IAO

### SECTORS

- Fundamental Physics and instrumentation
- Scientific calculation and modelisation

LAPP (Laboratory of Anancy-le-Vieux for Particle Physics) is a high energy physics laboratory located in Anancy le Vieux, which is 50kms from Geneva. The lab was founded in 1976 and is one of the 19 laboratories of IN2P3 (National institute of nuclear and particle physics), which is in charge of coordinating research activities in the fields of nuclear physics, particle and astroparticle physics. LAPP is also a member of the University de Savoie. Close to 150 people are working at LAPP: researchers, professors, support staff, students and visiting scientists. The lab researchers are working in the field of elementary particle physics and their interactions, as well as in the field of astroparticle physics.

### RESEARCH THEMES

The different ongoing projects are the following :

- **Particle physics on colliders LHC au CERN**
  - ATLAS : study of the Higgs boson properties and direct search for new physics (new particles)
  - LHCb: precision measurements of particles containing beauty or charmed quarks and search for indirect evidence of new physics in their decays
- **R&D for future accelerators**
  - Beam magnets stabilization
  - Development of beam position sensors
  - Design and development of equipment for experiments coming
- **Astroparticle physics**
  - VIRGO : direct detection of gravitational waves produced in extragalactic cataclysmic events.
  - HESS and CTA : study of high energy photons emitted by cosmic sources.
  - AMS (on the International Space Station): precise measurements of the flux and of the nature of high energy cosmic rays
- **Neutrino physics and oscillations**
  - STEREO: Research on sterile neutrinos in an experiment based at the ILL nuclear reactor in Grenoble
  - SuperNEMO: Future neutrino experiments: Research on neutrino-less double beta decays
  - WA105/DUNE: measurement of CP violation in the neutrino sector

### SPECIFIC EQUIPEMENT AND EXPERTISE

- CAD in mechanics and electronics
- Vibration analysis apparatus
- Three-dimensional measuring machine
- Equipment for design and tests of electronics systems
- Computing mesocenter tier2 : grid and analysis facility, scientific computing

### NETWORKS / PARTNERSHIPS

#### Academic cooperations

- CERN
- Several international universities throughout the world: all the LAPP experiments are large international collaborations
- Membre du Labex ENIGMASS

#### Institutional cooperation

Departmental council of Haute-Savoie ■ Conseil Régional ■ Grand Anancy

#### Industrial cooperation

- Particle and astroparticle physics require huge experiments at the top of modern technology. Therefore, LAPP works with many industrial partners in the fields of mechanical construction and electronics

### INTERNATIONAL RELATIONS

- Host PhD students and post-doctoral students through the ENIGMASS Labex project and ASTERICS program
- Host foreign researchers working in the field of LHC physics. This programme is funded by the departmental council of Haute-Savoie (CG74)

### KEY DATA\*

**43** researchers and professors  
**70** administrative and technical staff  
**15** PhD students and **15** post-doctoral students  
**7** emeritus

\* Academic year 2017-2018