

## UMR 5108 - 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

- Theoretical physics ■ Particles and fields
- Phenomenology in high energy physics
- Astroparticles/cosmology ■ Integrable systems

### SECTORS

- Fundamental physics ■ Theoretical physics
- Mathematical physics ■ Particles physics ■ Astroparticles and cosmology

LAPTh physicists study the structure of matter from a very small to a very large scale in the Universe. They develop mathematical tools applied to various fields of physics - some of them being more phenomenologically oriented - and work in relation with experimentalists to explain various results from high energy particles accelerator collisions (closely with the LHC accelerator at CERN) or astrophysical observations.

### PHD STUDENTS SKILLS

- Modelling of physical phenomena
- Symbolic and numerical computation methods

### RESEARCH THEMES

Research at LAPTh is organized along three main lines:

#### ■ Mathematical physics

- Symmetries
- Integrable systems and applications
- Strings and quantum field theory

#### ■ Theoretical particle physics

- Interactions between fundamental constituents
- The Standard Model and its extensions
- Phenomenology of particle and astroparticle physics

#### ■ Cosmology and astroparticles

- The large scale structure of the Universe: formation, evolution and contents
- Astrophysical phenomena such as cosmic rays, gamma ray bursts...

### NETWORKS / PARTNERSHIPS

#### Academic cooperations

- University of Boston (USA)
- University of Sydney (Australia)
- KEK (Tsukuba, Japan)
- JINR (Dubna, Russia)
- University of Turin and Pisa (Italy)
- Princeton (USA)

#### Institutional cooperations

- CERN (Geneva, Switzerland)
- CEA Saclay (France)
- DESY (Hamburg, Germany)

### INTERNATIONAL RELATIONS

- LIA and GDRI
- European networks
- Western Europe
- Eastern Europe (Bulgaria, Georgia, Serbia, Russia)
- USA
- Asia (South Korea, Japan, India, Vietnam)
- Middle-East (Lebanon)
- North Africa (Algeria, Morocco)

### KEY DATA\*

- 21 researchers and professors
- 5 administrative and technical staff
- 5 PhD students

\* Year 2017