

## "Materials for gravitational wave detectors"

### 1. Organisateurs (avec affiliation, usuellement 2 ou 3 personnes) :

Gianpietro Cagnoli (g-MAG, Institut Lumière Matière, Univ Lyon 1)

Valérie Martinez (g-MAG, Institut Lumière Matière, Univ Lyon 1)

### 2. Parrainage ou lien avec des sociétés savantes, des GDR ou autres structures :

GDR Ondes gravitationnelles

GDR MecaQ

### 3. Résumé de la thématique du mini-colloque :

The Gravitational Waves (GW) astronomy is a rapidly emerging field worldwide after the first observations of fusions of black holes and the award of the 2017 Nobel Prize in Physics. This observation was made possible thanks to very sensitive interferometers and an improvement in terms of volume of universe probed. The number of detected events is directly connected to the optical and mechanical performance of materials used in the interferometers. As a matter of facts, research on materials is of capital importance in this field.

Thermal noise, absorption and scattered light of optics are well-known limiting factors to the sensitivity of GW detectors therefore studies on mechanical, optical and thermal properties are carried out.

This mini-colloquium will be the occasion to make the status of the current investigations and to debate on the future materials for new generation detectors. We are living a transitional period: in the following years the scientific community will work on the upgrade of the existing detectors and on the development of new ones at the same time. This development considers operation of detectors at low temperature, hence the need to develop new optics and suspensions. A significant transition from amorphous to crystalline materials is also expected working at cryogenic temperature, therefore new problems are attending the scientists.

This mini-colloquium aims to gather theoretical and experimental researchers working on all the components of GW detectors: high power laser and ancillary optics, mirror coatings, substrate, suspensions, nonlinear materials for squeezed light.



*Virgo detector (Cascina, Italy)*