

Gravitational Waves

Session CX

July 2nd – 27th, 2018

Organizers:

Bruce Allen (Albert Einstein Institute, Hannover), Marie-Anne Bizouard (Laboratoire de l'Accélérateur Linéaire, Orsay), Nelson Christensen (Observatoire de la Côte d'Azur, Nice) and Pierre-François Cohadon (Laboratoire Kastler Brossel, Paris)

Overview:

The school will cover the emerging field of gravitational and multi-messenger astronomy, following the discoveries of GW150914 and GW170817. Within a few years, with the expected sensitivity improvements for the Advanced LIGO and Advanced Virgo detectors, we can expect many other detections, which will open up a new window on astrophysical objects such as binary systems of black holes or neutron stars, or even totally unexpected objects. This extensive research area requires the input from theoretical physics, experimental physics and information systems: from modeling and simulation of gravitational systems to design and operation of laser interferometers of kilometric size, through quantum optics, data analysis... The objective of this summer school is to provide a large number of students and post-docs with a solid corpus in most aspects of the field, to help and strengthen the collaboration between the different communities.

Website: www.lkb.ens.fr/GravitationalWaves2018

Lectures:

T. Moore, Pomona College
E. Gourgoulhon, Observatoire de Paris
P. Saulson, Syracuse University
D. McClelland, Australian National University
A. Weinstein, California Institute of Technology
I. Mandel, University of Birmingham
C. Will, University of Florida
M. Hewitson, Albert Einstein Institute Hannover
N. Cornish, Montana State University
V. Mandic, University of Minnesota
S. Nissanke, Radboud University
A. Sesana, University of Birmingham
H. Pfeiffer, University of Toronto
S. Bernuzzi, Università di Parma
J. Veitch, University of Glasgow
C. Belczynski, Warsaw University
J. Romano, University of Texas Rio Grande Valley
M. A. Papa, Albert Einstein Institute Hannover
M.-A. Bizouard, Université Paris-Sud

General Relativity and Gravitational Waves
Black Hole Physics
GW detection: early history and fundamentals
Advanced quantum techniques for GW detection
GW data analysis: techniques and results
Astrophysical Sources of Gravitational Waves
Testing General Relativity
The LISA mission
Stochastic GW Background
Cosmological Sources of GW
Electromagnetic Follow-Up: Techniques and results
LISA Science
Numerical Relativity: Introduction and Binary Black Holes
Numerical Relativity: Binary Neutron Stars
Binary Systems: Parameter Estimation
GW and Binary Systems: Formation and Astrophysics
Pulsar Timing
Continuous wave GW searches
GW burst searches

Registration: The online application can be found at <https://houches.univ-grenoble-alpes.fr/>. Applications must reach the School before March 1st, 2018, in order to be considered by the selection committee. The full cost per participant, including housing, meals and the book of lecture notes is given on the website. We should be able to provide financial aid to a limited number of students. Further information can be found on the website. One can also contact the School at:

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Location: Les Houches is a village located in Chamonix valley, in the French Alps. Established in 1951, the Physics School is situated at 1150 m above sea level in natural surroundings, with breathtaking views on the Mont-Blanc mountain range, conducive to reflection and discussion.