ISAPP 2014: Multi-wavelength and multi-messenger investigation of the visible and dark Universe

Monday, July 21, 2014 - Wednesday, July 30, 2014

Villa Carlotta, Belgirate

Scientific Program

A - PARTICLE PHYSICS LECTURES [number of hours: 12]

A1 - Introduction to particle physics: Standard Model and beyond (J. Valle) [7.5]

A2 - Principles of particle cosmology (P. Serpico) [4.5]

B - ASTROPHYSICS LECTURES [12]

B1 - Dark matter structures (R. Sheth) [4.5]

B2 - Non-thermal processes (A. Neronov) [4.5]

B3 - Transport of cosmic-rays in the Galaxy and in the heliosphere (D. Maurin) [3]

C - PRINCIPLES OF SIGNALS DETECTION AND DETECTORS [10.5]

C1 - Radio telescopes (E. de Blok) [3]

C2 - Satellite detectors: gamma rays and cosmic rays (L. Baldini) [4.5]

C3 - Gamma-ray detectors on the ground (A. De Angelis) [1.5]

C4 - Neutrino telescopes (C. de los Heros) [1.5]

D - MULTI-WAVELENGTH AND MULTI-MESSENGER DARK MATTER SEARCHES [10.5]

D1 - Electromagnetic signals: from radio to gamma rays (M. Regis) [6]

D2 - Charged signals: electrons/positrons, anti-baryons (D. Maurin) [3]

D3 - Neutrinos as dark matter signals (C. de los Heros) [1.5]

The school is devoted to the multi-messenger and multi-wavelength approach to the indirect search

for dark matter in the Universe.

The first week covers introductory courses on particle physics, particle cosmology and astrophysical processes relevant for dark matter studies. The second week deals with more advanced courses on the full range of multi-wavelength and multi-messenger signals of dark matter, and covers both theoretical/phenomenological and experimental/observational aspects. The program is complemented by a seminar on the current status of gravitational waves physics.

The schedule is organized in slots of 1.5 hours lectures (intended as 75 min of teaching, followed by 15 min of interaction with the students). Discussion sessions, placed at the end of most of the lecture days, are further devoted to stimulate dialogue between students and teachers.