

# LNF Mini-Workshop Series



October 23rd, 2014 – Aula Bruno Touschek

## Fundamental and Quantum Physics with Lasers

### Abstract:

After 54 years since their invention, lasers are nowadays used in a wide variety of applications, including, exactly 50 years ago, precision laser tracking of satellites and the Moon.

This workshop is dedicated to fundamental research that benefits from laser application: from quantum communication to new accelerator techniques, from space geodesy and lunar physics to gravitational physics (including detection of gravitational waves, precise measurements of  $G$ , the Newton constant, of  $G\dot{G}/G$ , of the PPN beta and more). This workshop is conceived also in preparation of the "International Year of Light and Light-based Technologies (IYL 2015)



Welcome 10'	Speaker:	Umberto Dosselli (PD)
09:30 - 10:10		
Celebrating 50 years of Satellite and Lunar Laser Ranging 40'	Speaker:	Simone Dell'Agnello (LNF) for G. Bianco (ASI)
10:10 - 10:50		
Quantum Communications in space using satellites 40'	Speaker:	G. Vallone (INFN Padova)
10:50 - 11:30		
Integrated Quantum Optics for Space 40'	Speaker:	Prof. Paolo Mataloni (Sapienza Università di Roma)
11:30 - 11:50		
Coffee Break Poster Session (all day): Emanuele Ciocci, SCF_Lab: TEST OF GENERAL RELATIVITY USING LUNAR LASER RANGING DATA AND THE PLANETARY EPHEMERIS PROGRAM.		
11:50 - 12:30		
Laser excitation of positronium to ryberg levels in high magnetic fields to produce a cold beam of antihydrogen in the AEGIS experiment 40'	Speaker:	Ruggero Caravita (INFN Genova)
12:30 - 13:20		
Precision measurement of the fundamental gravitational constant $G$ with laser-cooled atomic fountains 50'	Speaker:	Guglielmo Maria Tino (FI)
13:20 - 14:30		
Lunch		
14:30 - 15:10		
Observing the two-photon Breit-Wheeler process for the first time 40'	Speaker:	O. Pike (Imperial College)
15:10 - 15:50		
A photon-photon scattering machine based on twin photo-injectors and Compton sources 40'	Speaker:	Luca Serafini (MI)
15:50 - 16:10		
Coffee Break Poster Session:		
16:10 - 16:50		
The VIRGO laser light for probing the metric of the space-time 40'	Speaker:	Fulvio Ricci (ROMA1)
16:50 - 17:30		
Applied and fundamental physics with ringlasers 40'	Speaker:	Angela Dora Vittoria Di Virgilio (PI)

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