



# REINFORCE

REsearch INfrastructures FOR Citizens in Europe


Course Programme:


## “ Physics for Senior Citizen Scientists ”


2021/2022


📍 **Cascina (PI)**  
**Biblioteca comunale**  
**Viale Comaschi n° 67**

● ● ● ● ● ● 16:00-17:00

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06  
OCT  
2021

## Classical particle physics

Giancarlo Cella, Pisa University

- 🔗 The concept of space and time, in Galileo, Descartes and Newton
- 🔗 The concept of particle trajectory, mass, speed, acceleration
- 🔗 Laws of Newton, the movement of the planets

08  
OCT  
2021

## Particles & waves in the XX century

Massimiliano Razzano, Pisa University

- 🔗 Einstein special relativity,  $E=mc^2$
- 🔗 Quanta, particle-wave duality,  $E=h\nu$ , Heisenberg principle, particle and antiparticles
- 🔗 Cosmic ray physics
- 🔗 Subnuclear forces, radioactivity, quantum field theory
- 🔗 Nuclear and particle reactions, why they produce energy
- 🔗 The forces and particles zoo

10  
NOV  
2021

## Waves: concept and detection

Giancarlo Cella, Pisa University

- 🔗 The concept of wave in Hugenius, amplitude, frequency, interference
- 🔗 Electromagnetic theory and waves, aether
- 🔗 Their detection with the Michelson and Morley interferometer

03  
DEC  
2022

## The cosmology of the visible universe

Stavros Katsanevas, EGO

- 🔗 Formation and evolution of white dwarf stars, black holes and neutron stars
- 🔗 Formation and evolution of galaxies, their redshift
- 🔗 Formation and evolution of particles, primordial cosmology

09  
MAR  
2022

## Citizen Science: from theory to practice

Francesco Di Renzo, Pisa University

- 🔗 The REINFORCE project
- 🔗 Search for glitches: tools and methods
- 🔗 Hands-on activity on Zooniverse

06  
APR  
2021

## General relativity

Valerio Boschi, National Institute for Nuclear Physics

- 🔗 New concept of spacetime, GW equations, effects, ways of detection, LIGO and Virgo, sources of noise
- 🔗 Sources of Noise, analyses of waves, glitches, FFT etc
- 🔗 What have we discovered up to now

29  
APR  
2022

## Brainstorming and resolution of technical and theoretical problems

Gary Hemming, EGO

- 🔗 Brainstorming with REINFORCE technical manager

06  
MAY  
2022

## The sonification of gravitational waves

Francesco Di Renzo, Pisa University

- 🔗 The sonification of gravitational waves
- 🔗 Sonification tools and goals in REINFORCE

11  
MAY  
2022

## Art & Science

Stavros Katsanevas, EGO

- 🔗 Art & Science in REINFORCE
- 🔗 Concept, techniques and representation of the nature of space and time
- 🔗 The role of humans as observers and actors

18  
MAY  
2022

## VISIT to EGO and the VIRGO interferometer

### Virgo Senior Citizen Scientist Prize 21/22

Gary Hemming, EGO & Emmanuel Chaniokatis, Ellinogermaniki Agogi

- 🔗 Visit to the EGO site and the interferometer
- 🔗 Final evaluation and awarding of the Virgo Senior Citizen Scientist Prize to the top senior citizen scientists of the class



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