

# REINFORCE REsearch INfrastructures FOR Citizens in Europe

Cascina (PI)
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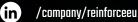
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#### **Classical particle physics**

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

#### Particles & waves in the XX century

- Massimiliano Razzano, Pisa University
- **Einstein special relativity**, E=mc<sup>2</sup>
- Quanta, particle-wave duality, E=hv, Heisenberg principle, particle and antiparticles
- **W** Cosmic ray physics
- Subnuclear forces, radioactivity, quantum field theory
- 🛞 Nuclear and particle reactions , why they produce energy
- **W** The forces and particles zoo

#### Waves: concept and detection

- Giancarlo Cella, Pisa University
- W The concept of wave in Hughens, amplitude, frequency, interference
- Electromagnetic theory and waves, aether
- **W** Their detection with the Michelson and Morley interferometer

#### **03** DEC 20**22**

#### The cosmology of the visible universe

Stavros Katsanevas, EGO

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

#### **Citizen Science: from theory to practice**

- Francesco Di Renzo, Pisa University
- W The REINFORCE project
- Search for glitches: tools and methods
- We Hands-on activity on Zooniverse



#### **General relativity**

Valerio Boschi, National Institute for Nuclear Phyics

- We 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



## Brainstorming and resolution of technical and theoretical problems

Gary Hemming, EGO

Brainstorming with REINFORCE technical manager



#### The sonification of gravitational waves

- Francesco Di Renzo, Pisa University
- We The sonification of gravitational waves
- Sonification tools and goals in REINFORCE



#### **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



### VISIT to EGO and the VIRGO interferometer Virgo Senior Citizen Scientist Prize 21/22

Gary Hemming, EGO & Emmanuel Chaniokatis, Ellinogermaniki Agogi

Wisit to the EGO site and the interferometer

**W** Final evaluation and awarding of the Virgo Senior Citizen Scientist Prize to the top senior citizen scientists of the class



