REINFORCE
REsearch INfrastructures FOR Citizens in Europe

EGO EUROPEAN GRAVITATIONAL OBSERVATORY

Symposium Stavros Katsanevas

Outreach and Citizen Science projects – REINFORCE

June 1st, 2023 – Université Paris Cité, France

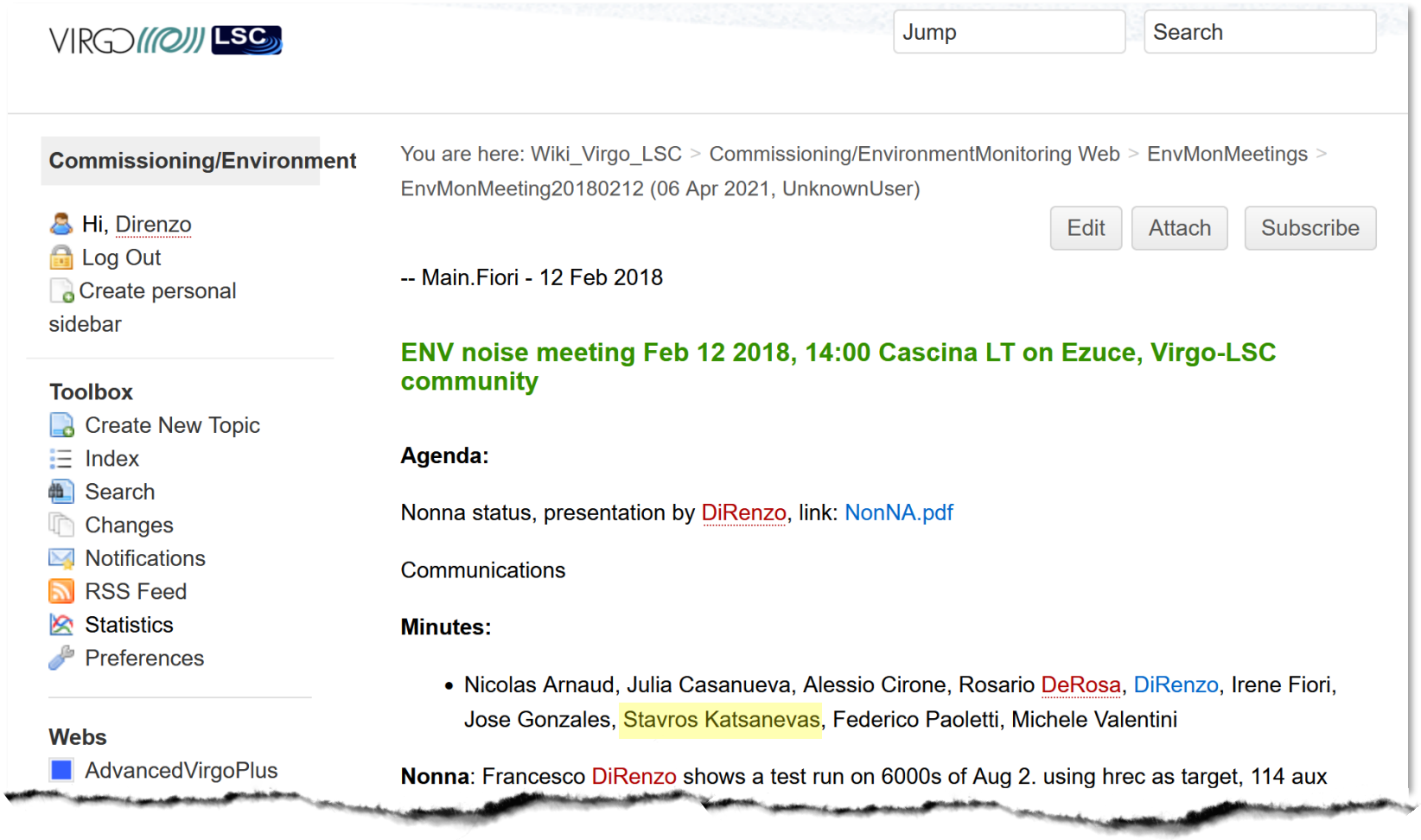
Francesco Di Renzo – IP2I, Lyon

Prelude: Noise Hunting and the Advanced Virgo+ Commissioning

Virgo Environmental noise meeting

February 12, 2018

- Presentation on a software for the investigation of non-stationary noise
- Limited by the computational cost
- **Stavros:** "Take a look at the RINSE project, for analyzing TB of data" [T. Palpanas]



VIRGO LSC

Jump Search

Commissioning/Environment

Hi, Direnzo
Log Out
Create personal sidebar

Toolbox
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Changes
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Preferences

Webs
AdvancedVirgoPlus

You are here: Wiki_Virgo_LSC > Commissioning/EnvironmentMonitoring Web > EnvMonMeetings > EnvMonMeeting20180212 (06 Apr 2021, UnknownUser)

Edit Attach Subscribe

-- Main.Fiori - 12 Feb 2018

ENV noise meeting Feb 12 2018, 14:00 Cascina LT on Ezuce, Virgo-LSC community

Agenda:

Nonna status, presentation by DiRenzo, link: NonNA.pdf

Communications

Minutes:

- Nicolas Arnaud, Julia Casanueva, Alessio Cirone, Rosario DeRosa, DiRenzo, Irene Fiori, Jose Gonzales, Stavros Katsanevas, Federico Paoletti, Michele Valentini

Nonna: Francesco DiRenzo shows a test run on 6000s of Aug 2. using hrec as target, 114 aux

The REINFORCE Project

REsearch INfrastructures FOR Citizens in Europe

Research & Innovation Project, supported by the European Union's Horizon 2020 SWAFS "Science with and for Society" work program.

The mission: *Minimizing the knowledge gap between Large Research Infrastructures and Society through Citizen Science*

1. Change in awareness and understanding of basic research and its impact on society
2. Development of new knowledge and innovations by citizen
3. Availability of evaluation data concerning the societal, democratic and economic costs and benefits of citizen science
4. Indicators to measure the impact of citizen science activities

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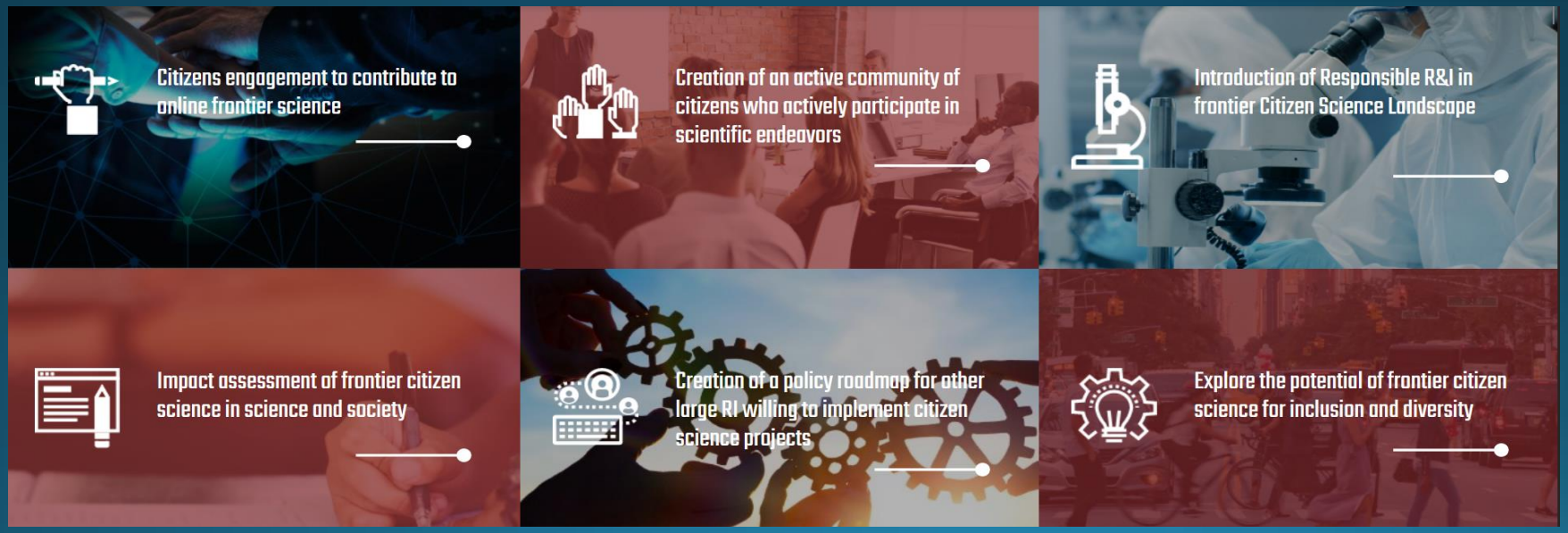
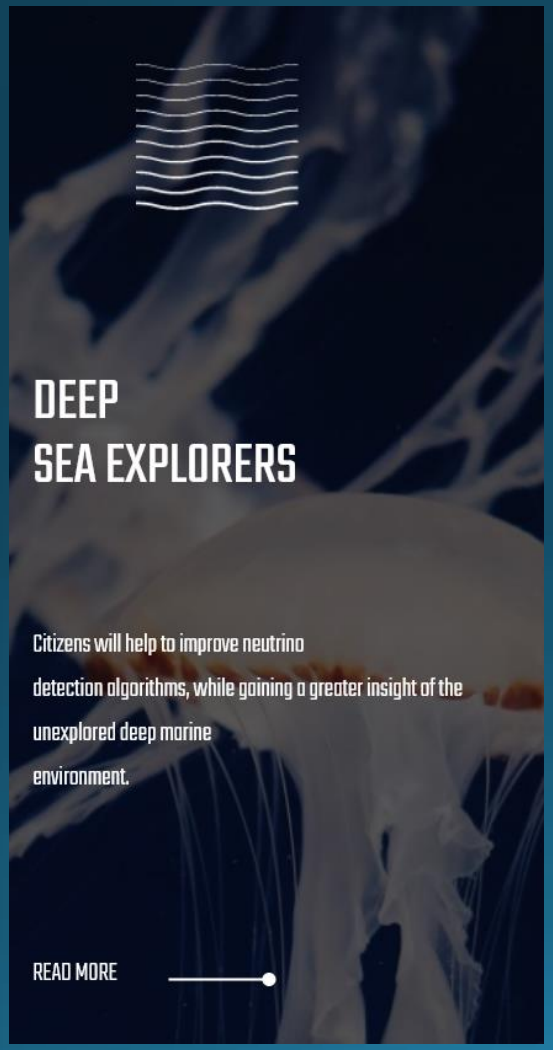
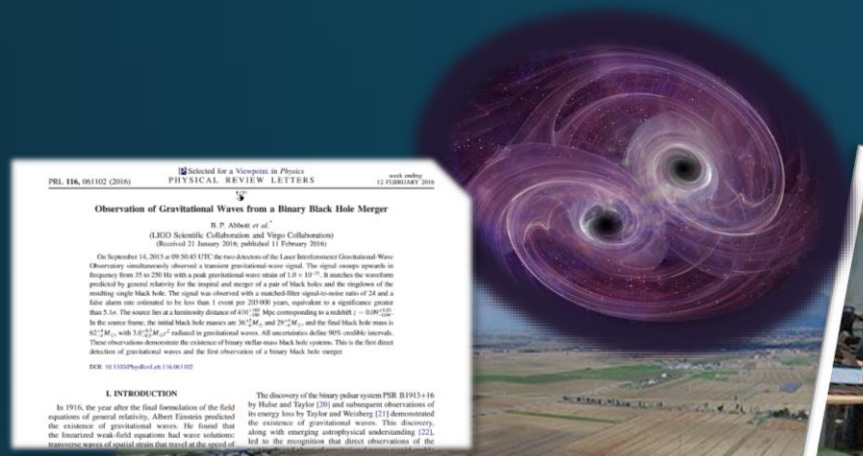


The REINFORCE Project

REsearch INfrastructures FOR Citizens in Europe



The GWitchHunters Project


Selected for a Viewpoint in *Physics*

PRL 116, 061102 (2016) PHYSICAL REVIEW LETTERS week ending 12 FEBRUARY 2016

Observation of Gravitational Waves from a Binary Black Hole Merger

B. P. Abbott *et al.**

(LIGO Scientific Collaboration and Virgo Collaboration)

(Received 21 January 2016; published 11 February 2016)

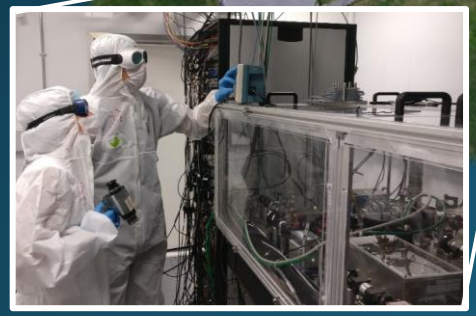
On September 14, 2015 at 09:50:45 UTC the two detectors of the Laser Interferometer Gravitational-Wave Observatory simultaneously observed a transient gravitational-wave signal. The signal sweeps upwards in frequency from 35 to 250 Hz with a peak gravitational-wave strain of 1.0×10^{-21}. It matches the waveform predicted by general relativity for the inspiral and merger of a pair of black holes and the ringdown of the resulting single black hole. The signal was observed with a matched-filter signal-to-noise ratio of 24 and a false alarm rate estimated to be less than 1 event per 203 000 years, equivalent to a significance greater than 5.1σ. The source lies at a luminosity distance of 410^{+160}_{-180} Mpc corresponding to a redshift $z = 0.09^{+0.03}_{-0.04}$. In the source frame, the initial black hole masses are $36^{+5}_{-4} M_\odot$ and $29^{+4}_{-4} M_\odot$, and the final black hole mass is $62^{+4}_{-4} M_\odot$, with $3.0^{+0.5}_{-0.5} M_\odot c^2$ radiated in gravitational waves. All uncertainties define 90% credible intervals. These observations demonstrate the existence of binary stellar-mass black hole systems. This is the first direct detection of gravitational waves and the first observation of a binary black hole merger.

DOI: 10.1103/PhysRevLett.116.061102

I. INTRODUCTION

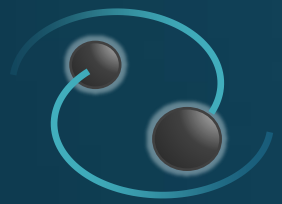
In 1916, the year after the final formulation of the field equations of general relativity, Albert Einstein predicted the existence of gravitational waves. He found that the linearized weak-field equations had wave solutions: transverse waves of spatial strain that travel at the speed of

The discovery of the binary pulsar system PSR B1913+16 by Hulse and Taylor [20] and subsequent observations of its energy loss by Taylor and Weisberg [21] demonstrated the existence of gravitational waves. This discovery, along with emerging astrophysical understanding [22], led to the recognition that direct observations of the



The GWitchHunters Project

a citizen science demonstrator for the improvement of current GW detectors

1.  vs. 

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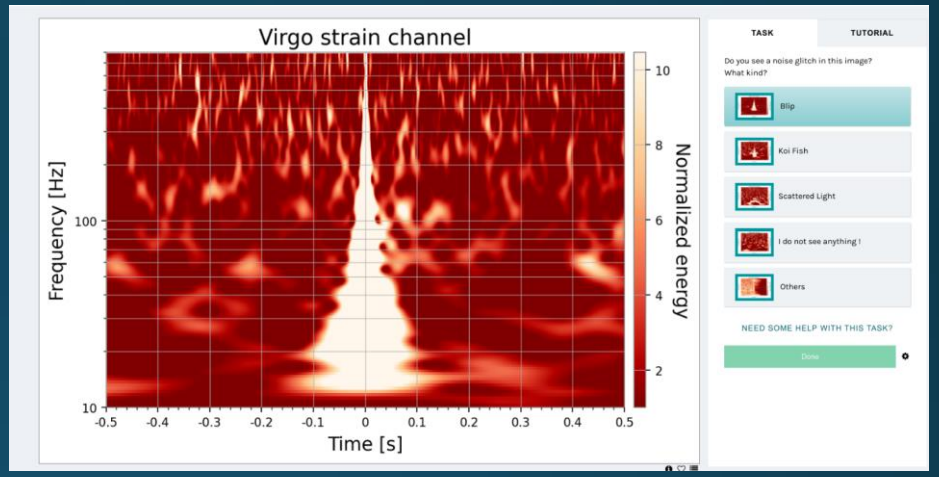
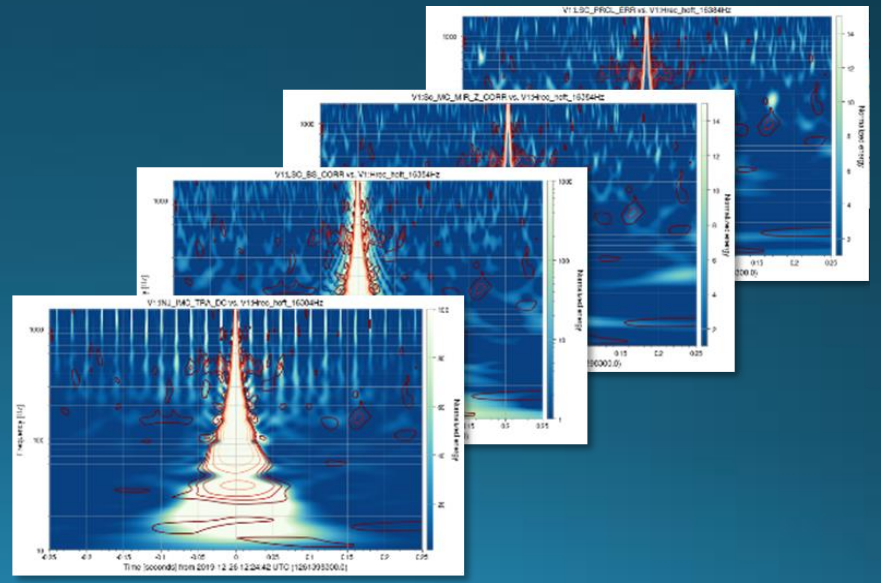
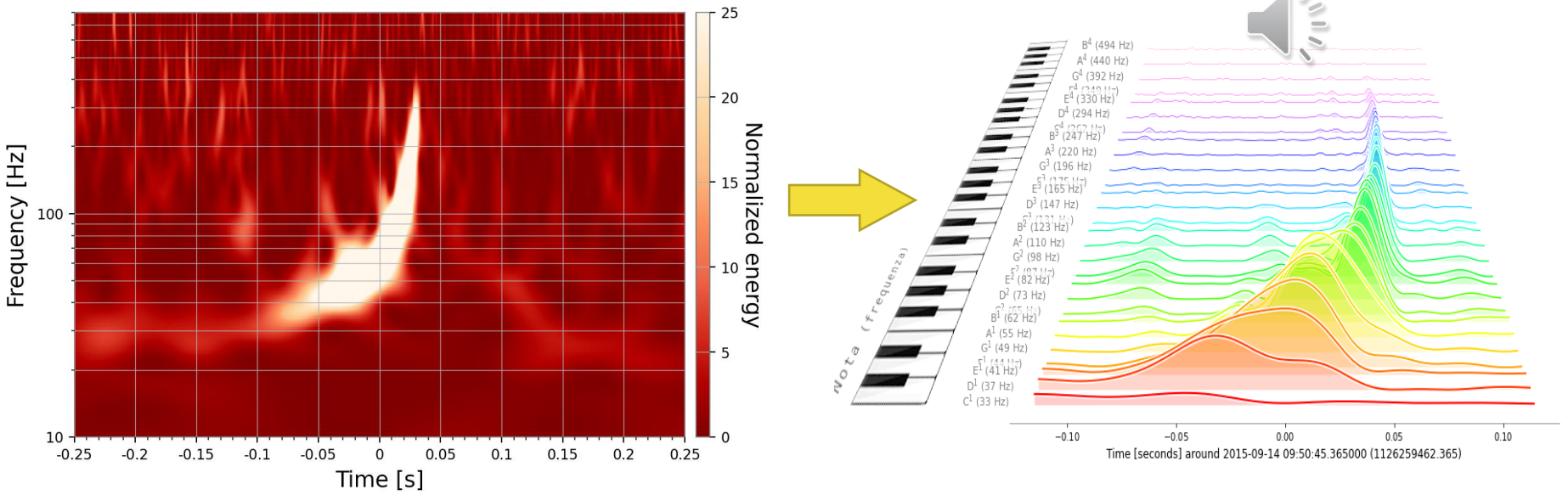




Sonification Projects

Make scientific data enjoyable by anyone, transposing it to suitable formats.

First gravitational Wave detection - GW150914 – LIGO Hanford

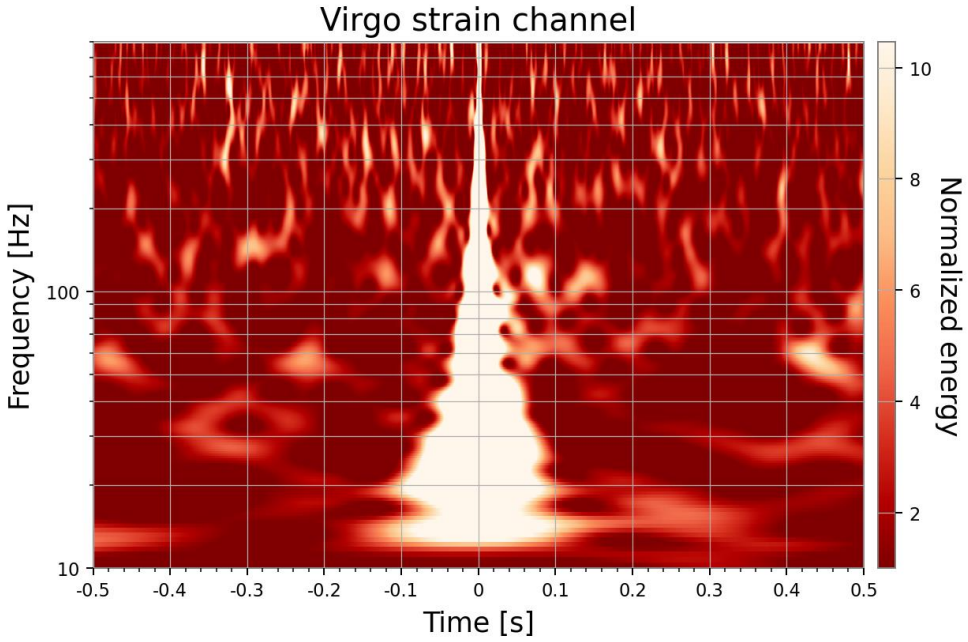


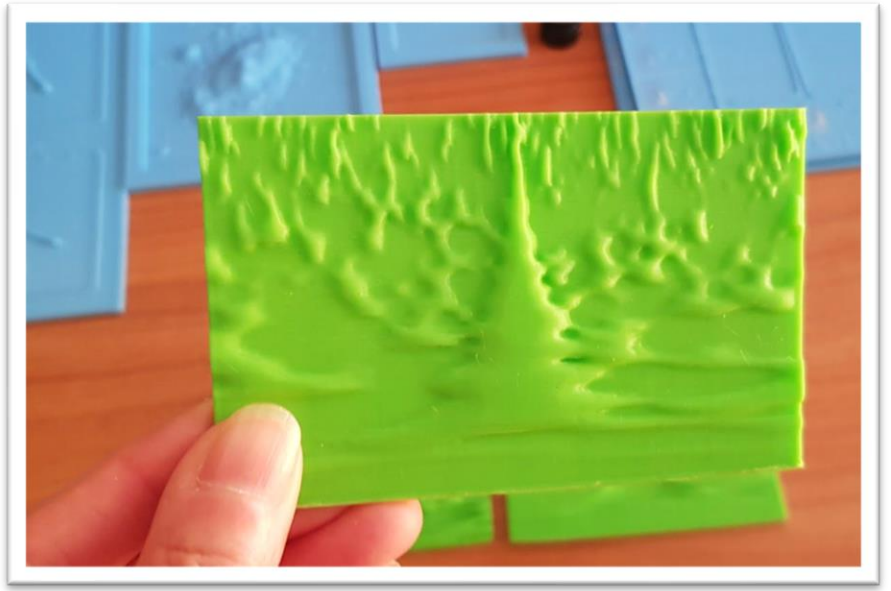
Presentation by Wanda Diaz Merced

Accessibility Projects

Make scientific data enjoyable by anyone, transposing it to suitable formats.

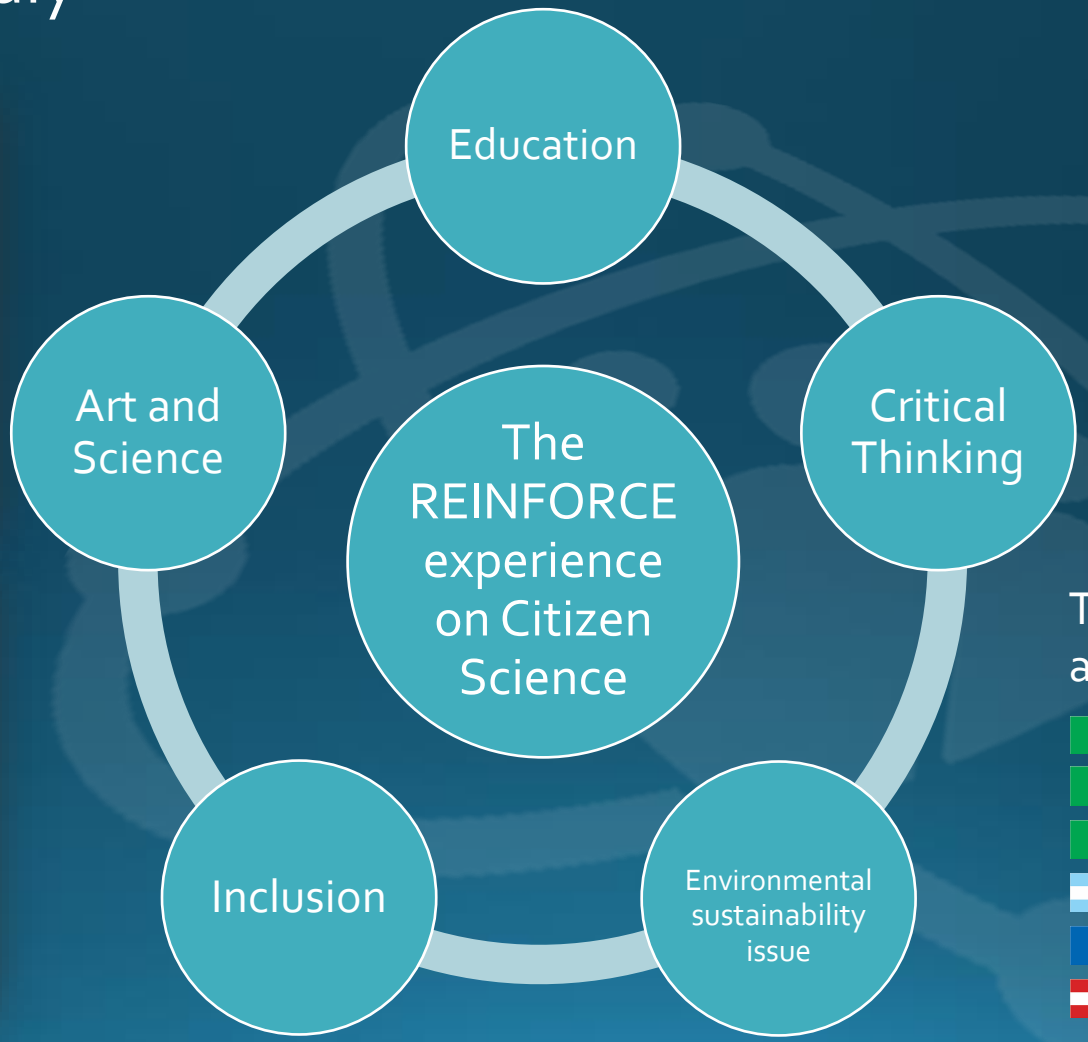
Representations of transient excess noise in gravitational-wave data





REINFORCE takeaway message at the International Conference of HEP

July 2022 - Bologna, Italy



After the Pandemic, we will have to rethink the relationship between research and education

Kip Thorne, Roger Blandford

Thanks to all the partners and the people involved!

Physics Class for “Senior Citizen Scientists”

“B. Impastato” Library, Cascina (PI), Italy

06 APR 2022

La sonificazione delle onde gravitazionali

Francesco Di Renzo, Università di Pisa

I partecipanti discuteranno con il ricercatore Francesco Di Renzo della tecnica di sonificazione delle onde gravitazionali e della realizzazione nell’ambito del progetto REINFORCE di un apposito software per l’accesso multisensoriale ai dati astronomici.

11 MAG 2022

Arte e scienza

Stavros Katsanevas, EGO

Verranno illustrate e discusse con i partecipanti le attività di Art&Science realizzate da EGO nell’ambito del progetto REINFORCE e delle collaborazioni avviate con artisti internazionali come Tomás Saraceno. I partecipanti saranno invitati a cogliere il nesso tra idee scientifiche e arte e l’influenza reciproca tra la sfera artistica e quella scientifica.

09 MAR 2022

Brainstorming e risoluzione di problemi teorici e tecnici

Gary Hemming, EGO & Emmanuel Chaniokatis, Ellinogermaniki Agogi

I partecipanti discuteranno con gli scienziati di EGO e del progetto REINFORCE delle tematiche affrontate nell’ambito del Corso, con particolare riferimento alle problematiche di natura tecnica e teorica emerse nel contesto dei progetti di citizen science avviati in REINFORCE

Beyond its intellectual, technological and practical impact in our lives, research in fundamental science can play a leading role in connecting people because it is universal and unifying.

It is universal because it is based on objective facts and not on opinions.

It is unifying because the quest for knowledge and the passion for learning are shared values and aspirations of all humanity.

Scientific knowledge has no passport, no gender, no race and no political party.

Stavros

The human and scientific personality of Stavros Katsanevas, the recently passed away director of EGO, was so rich and multifaceted, and the connections he had around the world so vast, that it would probably be impossible to draw a truly complete and exhaustive (as he liked to be) portrait of him.

Therefore we want to remember him and keep alive the light with which he illuminated many of our lives, through the messages and images that friends and colleagues felt the need to share after his untimely death.