

Outreach Activities @ EGO



V. Boschi

Istituto Nazionale di Fisica Nucleare (INFN)

on behalf of the EGO/Virgo Outreach group



Outline



- Site Visits
- On site Events
- Art and Science
- European Projects

Site visits

Overview

Name of Best Practice	Site Visits
Context	Activity
Target Group	Students (High School, University), General public
Activity Setting	On site
Geographical Coverage	International (EU, USA, Asia)
Duration	2-3 hours
Starting Date – Ending Date	2005 -
Number of people involved so far	>10000: 1200 (2015), 2000 (2016), 4000 (2017), 4800 (2018), 7200 (2019)
Organizing Institution	EGO
Link	http://public.virgo-gw.eu/visit/ https://indico.ego-gw.it/event/1/

Site visits

Description



- Starting from 2005, EGO started to open its doors to the schools, universities and general public.
- The visit consists in a 45 minute seminar about GWs and Virgo and a tour of the facility (Control Room, Experimental Buildings, Vacuum Pipes)
- After the first GW detection, the number of visitors doubled and they are continuously increasing.
- **Problems**
 - Automatic booking is needed. Now we are using INDICO
 - Very difficult to find guides
 - Digital feedback system is needed. Now we are using paper forms.
 - A dedicated person is needed. Now we rely on the invaluable help of C. Fabozzi and C. Bradaschia

Site visits

Impact

- Number of visitors are steadily increasing:

Almost doubled in 2017 and 2019 !!

- Students get introduced to GW physics beyond the school curriculum.

- Students experience the environment of a big international research infrastructure.

- Teachers get motivated in modern science and in many cases bring their classes the following years.

Visitors



On Site Events

Inclusive Astronomy




Stelle per tutti
Giornata Nazionale
della divulgazione inclusiva dell'Astronomia
promossa dall'Unione Astrofili Italiani
Sabato 8 giugno 2019
EUROPEAN GRAVITATIONAL OBSERVATORY
Via Amaldi, S. Stefano a Macerata - Cascina (PI)

Programma:

- Ore 17:00** Inizio attività didattiche per la divulgazione inclusiva con gli astrofili di ACA ed i fisici di Virgo. Saranno presenti inoltre varie associazioni che si occupano di disabilità intellettive, di autismo, disabilità visive ed uditive.
- Ore 17:45** Presentazione del progetto DI-UAI Stelle per Tutti a cura di Domenico Antonacci (ACA) e Silvia Fiumalbi (ACA)
- Ore 18:00** Virgo e le Onde Gravitazionali
Seminaro a cura della Dr.ssa Livia Conti (INFN Padova). Introducono il Prof. Carlo Bradaschia (INFN Pisa) ed il Dr. Valerio Boschi (INFN Pisa).
- Ore 18:40** Visite guidate all'interferometro Virgo
- Ore 20:00** Apericena, Gelato De' Coltelli (A pagamento)
- Ore 20:30** Presentazione Associazioni
- Ore 21:00** Spettacolo di danza dal titolo "Cascina oltre la luce..."
A cura della scuola di danza MUDRA Danza. Coreografie di Martina Barsotti e Elena Westbowsky.
- Ore 21:30 - 23:30** Osservazioni Astronomiche
La Luna, Giove e molto di più con i telescopi e gli astrofili di ACA.

Per Prenotazioni:

<https://indico.ego-gw.it/event/27/>



- On June 8th 2019 we organized an event for national day of inclusive astronomy.
- Several groups of disabled people (mainly deaf and autistic) visited the site.



@EGO PHOTO

On Site Events

European Researchers' Night

La notte europea dei ricercatori 2019
European Gravitational Observatory

VIRGO EGO

27 Settembre 2019

BRIGHT 2019
LA NOTTE DEI RICERCATORI IN TOSCANA

public.virgo-gw.eu/bright2019 www.virgo-gw.eu

11:00 **Un caffè insieme a Wanda Diaz-Merced, la donna che, superando ogni barrier, ha reso musica l'economia**
Incontra l'astrofisico Wanda Diaz-Merced, il prof. Marco Pipolino, il direttore di EGO prof. Stavros Katsanevas
A cura di P. Antolini e I. Marini.
Riservato agli studenti del Liceo Dini
Luogo: Auditorium Dini

15:30 **Tour di Virgo**
A cosa serve Virgo? Come funziona? Vieni a visitare Virgo, il grande orecchio che ascolta il suono dell'universo!
Con la partecipazione di V. Boschi, C. Bradaschia, V. Dattilo, I. Fiori
Luogo: European Gravitational Observatory, MAIN BUILDING (Auditorium)

16:00 **Gelato**
Cosa possono avere in comune l'interferometro Virgo e il gelato? L'azoto liquido! Scoprite il perché con una degustazione alla gelateria criogenica. Potrai provare anche l'esclusivo gusto 'Virgo' creato dalla gelateria De' Coltelli.
Con la partecipazione di A. Pasqualelli e la Gelateria De' Coltelli
Luogo: European Gravitational Observatory, CORTILE

16:00 **Stampa 3D**
Cosa ci fa a Virgo una stampante 3D?
Con la partecipazione di A. Buggiani
Luogo: European Gravitational Observatory, CENTRAL BUILDING (Meeting room)

16:00 **Informatica senza computer**
Si può capire l'informatica senza usare i computer? Spettacolo interattivo per ragazzi da 7 a 14 anni.
ATTENZIONE: può nuocere gravemente agli esperti della materia.
Con la partecipazione di R. Cavalieri, B. Montanari, F. Nocera
Luogo: European Gravitational Observatory, CENTRAL BUILDING (Seminar room)

16:00 **Osservazioni astronomiche**
Associazione astrofili di Cascina
Luogo: European Gravitational Observatory, CORTILE

18:00 **Seminario "Light is life"**
Vieni a scoprire come la luce influenza la vita.
Con la partecipazione di M. D'Andrea
Luogo: European Gravitational Observatory, MAIN BUILDING (Auditorium)

19:00 **Aperitivo con Wanda Diaz-Merced, la donna che, superando ogni barrier, ha reso musica l'economia**
Prendi un aperitivo con l'astrofisico Wanda Diaz-Merced ed il direttore di EGO prof. Stavros Katsanevas!
Luogo: European Gravitational Observatory, MAIN BUILDING (Auditorium)

19:30 **Aperitivo**
Presentazione del libro di V. Mirra, "Viaggio ai confini dell'universo"

21:30 **Musica and Dance**
Musica e danza si incontrano con l'ensemble barocco Il Rossignolo e Margherita Cappelletto
Con la partecipazione di M. Cappelletto, Il Rossignolo, Il Rossignolo
Luogo: European Gravitational Observatory, MAIN BUILDING (Auditorium)

22:30 **Associazioni astronomiche**
Associazione astrofili di Cascina
Luogo: European Gravitational Observatory, CORTILE

Alcuni eventi hanno un numero limitato di posti disponibili. La prenotazione è obbligatoria

www.facebook.com/EGOVirgoCollaboration www.twitter.com/ego_virgo

Logos: INFN, A.S.T., ASSOCIAZIONE CASCIENSE ASTRONOMI, DE' COLTELLI

- Every year a day full of seminars, visits, astronomical observations is organized at EGO.
- The blind astrophysicist Wanda Diaz-Merced that developed several techniques to sonify astronomical images participated.
- Several ideas to involve her in our REINFORCE citizen science program came up (fellowships for blind researchers).



Art and Science

'On Air' Exhibition: Overview

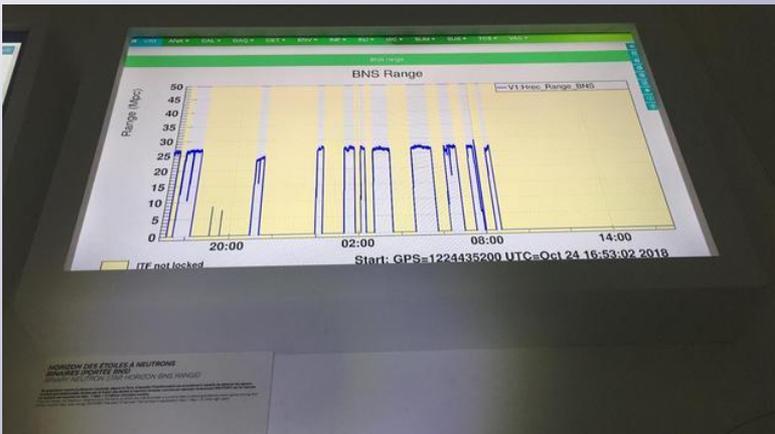
Name of Best Practice	Multi-messenger room inside Thomas Saraceno's 'On Air' exhibition
Context	Events
Target Group	Students, General public
Activity Setting	Paris
Geographical Coverage	International
Duration	3 months
Starting Date – Ending Date	October 17th, 2018 - January 6th, 2019
Number of people involved so far	Several 1000s
Organizing Institution	EGO
Links	https://www.palaisdetokyo.com/fr/evenement/air https://wiki.virgo-gw.eu/Main/SaracenoOnAirExhibition

Art and Science

'On Air' Exhibition: Description



- A sort of multimessenger control room where all the data coming from the various experiments (VIRGO, [KM3Net](#), Auger, Antares, AMS) would be available to the visitors has been developed.
- The initial idea was to reproduce accurately Virgo Control Room
- In the exhibition a set of 10 Raspberry Pis were visualizing the Virgo data and live streams of the beam
- The rest of the exhibition was dedicated to the art works of Saraceno



Art and Science

'On Air' Exhibition: Impact

- 'On Air' was **one of the most successful exhibition** ever organized at Palais de Tokyo in Paris.
- The press (['Le Monde'](#) and ['New York Times'](#)) wrote articles about the room.
- The multi-messenger room is a cheap and easy setup that can be used in many events and exhibitions around the world.
- Students and the general public can see the strong relationships between visual and performing arts and science.
- Students and the general public can experience the feelings and stimuli that science can transmit to an artist.
- Students and the general public can therefore appreciate the importance of science for the humanities.

Art and Science

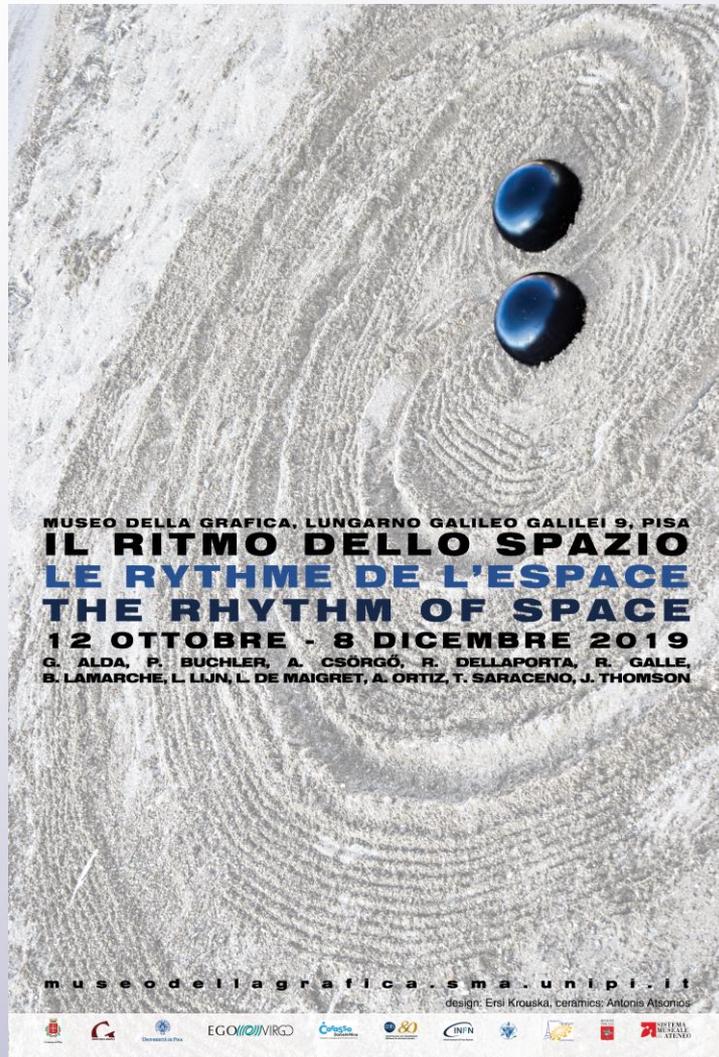
'Il Ritmo dello Spazio' Exhibition: Overview

Name of Best Practice	Il Ritmo dello Spazio
Context	Events
Target Group	Students, General public
Activity Setting	Museo della Grafica, Pisa
Geographical Coverage	International
Duration	2 months
Starting Date – Ending Date	October 12th, 2019 - December 8th, 2019
Number of people involved so far	Several 100s
Organizing Institution	EGO, INFN, University of Pisa
Links	https://sites.ego-gw.eu/ilritmodellospazio/

Art and Science

'Il Ritmo dello Spazio' Exhibition: Description

- The exhibition merge contemporary art and gravitational wave physics in a fascinating journey for experts and general public of all ages.
- Visits with high school students will be organized every Friday (bookings almost already sold-out).
- A room showing live control room data and the fringes of a small interferometer has been setup close to a Saraceno work.



Art and Science

Concerts

Name of Best Practice	Researchers' Night Concerts Surfing Einstein
Context	Events
Target Group	Students, General public
Activity Setting	On site
Geographical Coverage	Local
Duration	2 hours
Starting Date – Ending Date	2017 -
Number of people involved so far	Several 100s
Organizing Institution	EGO
Links	https://indico.ego-gw.it/event/33/SurfingEinstein-Brochure.pdf http://www.ilrossignolo.com

Art and Science

Dance and Concerts



- Collaboration with M. Cappelletto, M. Campos Olivé for 'Surfing Einstein' project.
- Baroque music concerts have been organized during last three European Researchers' Nights with the ensemble 'Il Rossignolo'
- This year a performance merged dance and music during Researcher's night.
- The general idea is to highlight the deep connections with science of the symmetries and mathematical contents of baroque music and dance.



European Projects

Frontiers

- The FRONTIERS project brings together expertise from the fields of Particle Physics, Gravitational Wave Astronomy, Astrophysics, Cosmology and Astroparticle Physics, Science Education and Teacher Training in order to facilitate the introduction of frontier Physics in K12 education.
- To achieve this goal, the FRONTIERS consortium proposes a set of 17 (for now) innovative educational scenarios which follow a proposed pedagogical framework: the FRONTIERS demonstrators.



European Projects

Frontiers

- A series of training events for high school teachers is being organized around Europe (already in Greece and Ireland).
- Remote connections with Virgo control room were much appreciated by participants.
- An event for Italian teachers will be organized on November 8th at EGO.

FRONTIER
Bringing Nobel Prize Physics in the Classroom

Visionary Workshop for Science teachers

Learn how to integrate Modern Physics in the school curriculum.
During the workshop you will be introduced to cutting edge educational activities e.g. black holes in my school, gravitational waves in the classroom, search for the Z and Higgs Boson, using the FRONTIER approach.

DCU Marconi Building, Glasnevin campus, DCU. Room N 201, 2nd floor
10am-1pm, Wednesday 16th October

<http://www.frontiers-project.eu>
info@frontiers-project.eu

Frontiers Project (@frontierseu)





European Projects

Reinforce

- The **REINFORCE project (Research Infrastructures FOR Citizens in Europe)** aims to minimize the knowledge gap between Large Research Infrastructures and Society through Citizen Science.
- Activities involve GW noise hunting, environmental studies for KM3 neutrino detector, LHC data analysis, interdisciplinary studies with Geoscience and Archaeology
- Strong collaboration with LIGO (Gravity Spy will used as a model) and with Oxford University (Zooniverse)
- Project has been accepted by European Community (budget: 2 M€, 250k€ for EGO) and will be launched on December 9th
- W. Diaz-Merced will be involved for image sonification.

