

‘A Scuola di astroparticelle’  
*‘At School of astroparticles’*

Carla Aramo and Martina De Laurentis,

*on behalf of INFN OCRA*

# “A Scuola di astroparticeLe”

‘A Scuola di astroparticeLe’  
*‘At School of astroparticLe’*

Started in the 2016 as an outreach  
program of



(National Institute of Nuclear Physics - Napoli Unit)

*In 2018* became part of the national outreach project of INFN,  
OCRA - Outreach Cosmic Ray Activities

– *project with the aim of collecting into a common framework  
the numerous outreach activities in cosmic-ray field carried out at the local level.*

*‘At School of astroparticLe’*

Collaboration extended *during the 2022 5<sup>th</sup> edition*





# “A Scuola di astroparticleLe”

Starting from 2018/2019 edition

the activities are proposed by the schools as part of the  
Italian Educational Program PCTO



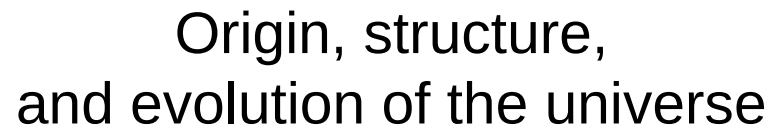
*(Percorsi per le Competenze Trasversali e per l'Orientamento)*

Education Ministry Program for the higher school students for their orientation in the  
professional and social citizen life

ASL activities offer the possibility to the students to ‘touch’  
the researchers experience and work  
by participating at working groups, study groups and seminars

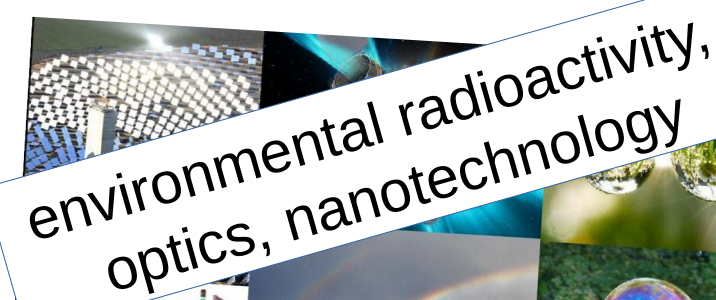
ASL Universities, Research Institutions and High Schools in our Territory compete synergistically for  
a single call, aimed at disseminating the occupational potential of the professional figure of the  
Physicist.

## *Covered Topics:*



Origin, structure,  
and evolution of the universe

nuclear physics and  
technical aspects related  
to the development of particle  
detectors



environmental radioactivity,  
optics, nanotechnology



gender in  
science



# “A Scuola di astroparticleLe”

The program offers projects related to the main experiments in cosmic ray, astroparticles physics and gravitational waves

- Each school chooses the project to work
- At least one tutor that follows the students during the project, *(depending on the number of its students that participate)*
- *The project is articulated along the scholastic year*
- *The project activities can include both theoretical and experimental activities that can be done in some laboratories that the participant research institutes allow to use or in the school, with portable instruments from the research institutes laboratories*
- *At the end each school prepare a seminar with an oral presentation and posters to present in final event*
- *A jury of experts at the end assign a prize to the best project, with the attention to gratify all the other participants:*



# “A Scuola di astroparticle”

*the final event must be more a festival than an examination where the students of different school can meet*

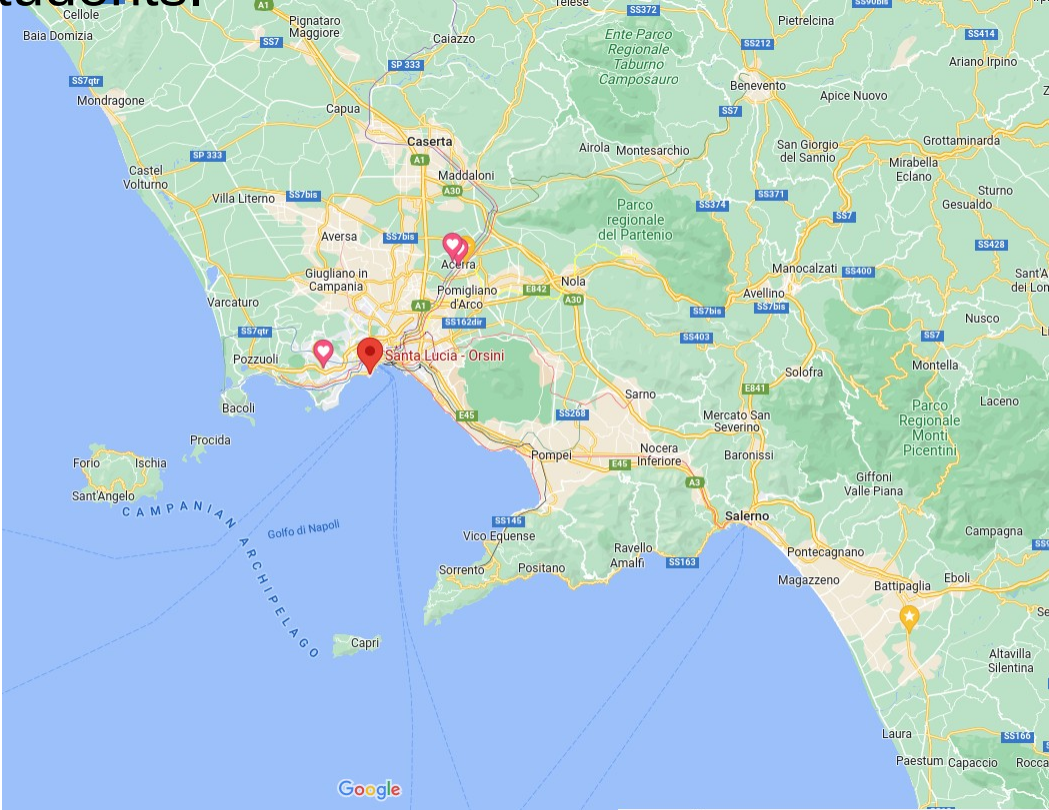






L'Istituto Nazionale di Fisica Nucleare in collaborazione con il Dipartimento di Fisica "E. Pancini" dell'Università Federico II di Napoli, l'INAF - Osservatorio Astronomico di Capodimonte e gli Istituti CNR, INO, SPIN e ISASI organizzano

This fifth edition (2021-2022) involved 14 schools in the Campania region with more than 300 students.




## A scuola di astroparticelle

"In viaggio verso... la Fisica Moderna"

V Edizione 2021-2022

### Scuole partecipanti

- Liceo Scientifico Statale "GALILEO GALILEI" - Mondragone
- Liceo Statale "ELEONORA PIMENTEL FONSECA" - Napoli
- Liceo Scientifico "TORRICELLI" - Somma Vesuviana
- Liceo "MAZZINI" - Napoli
- Liceo "SANNAZZARO" - Napoli
- Liceo Scientifico Statale "P.S. MANCINI" - Avellino
- IIS "DON LORENZO MILANI" - Gragnano
- Liceo "A.M. DE' LIGUORI" - Acerra
- Liceo Pluricomprendivo "RENATO CARTESIO" - Giugliano in Campania
- Liceo "SENECA" - Bacoli
- Liceo "E.PASCAL" - Pompei
- Istituto Superiore "ADRIANO TILGHER" - Ercolano
- Liceo Scientifico "ALFRED NOBEL" - Torre del Greco
- Liceo Scientifico Statale "LEON BATTISTA ALBERTI" - Napoli

**12 maggio 2022 - ore 9.00**

Arrivo ed accoglienza scuole presso il Complesso Universitario di Monte Sant'Angelo (Napoli) - Aula Carlo Ciliberto

**Ore 9.30 - 13.30**  
Introduce e modera Carla Aramo INFN Napoli  
Presentazione dei lavori da parte degli studenti delle scuole partecipanti

**CERIMONIA DI PREMIAZIONE**  
ore 15.00 - 17.00

**Saluti Istituzionali:**

Prof. Luca Lista	Direttore Sezione INFN Napoli
Prof. Gianroberto Milele	Direttore del Dipartimento di Fisica "Ettore Pancini" Università Federico II Napoli
Dr.ssa Marcella Marconi	Direttrice INAF-Osservatorio Astronomico di Capodimonte
Dr. Ivo Rendina	Direttore CNR-ISASI
Dr. Fabio Miletto Granzio	Direttore CNR- SPIN
Dr. Gianluca Gagliardi	Responsabile CNR-INO Sede Secondaria di Pozzuoli
Dr. Antigone Marino	Consigliere SIF Società Italiana di Fisica




**Intervento del dott. Giancarlo Ariano,**  
Dottorato di ricerca in Matematica, Fisica e applicazioni per l'Ingegneria presso il Dipartimento di Matematica e Fisica dell'Università degli Studi della Campania "Luigi Vanvitelli"  
"Il ruolo della fisica nei contesti formali e informali: un percorso tra ricerca, didattica e divulgazione scientifica"

Premiazione della scuola vincitrice della V edizione e premio speciale  
A cura della Commissione di valutazione dei lavori:  
Dr. Pasquale Maddaloni - CNR-INO  
Dr. Agatino Rifatto - INAF Osservatorio Astronomico di Capodimonte  
Dr.ssa Valentina Scotti - INFN Napoli e Dipartimento di Fisica "E. Pancini"

Agenda completa al link <https://agenda.infn.it/event/31164/>

**Con la collaborazione dei e delle Tutor:**

Carla Aramo	Alessandra Rocco
Roberta Colalillo	Amata Mercurio
Giuseppe La Verde	Clementina Sasso
Antigone Marino	Luciano Terranevra
Simona de Luca	Mauro Gargano
Simona Mosca	Silvia Galano
Maurizio Paolillo	Italo Testa
Gabriella Pugliese	Maria Rosaria Masullo
Martina De Laurentis	Paolo Mastroserio
Mario Barra	

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# ASL 2022GW project

The Virgo Napoli Group join the activities in the last years.

Due to COVID pandemic situation the last year was not possible have in laboratory activities

The activities has been carried out at school during five meeting

Students from 3<sup>rd</sup> class of  
a **Scientific Liceo**

For this reason was meanly an theoretical activities in which the thirty **students**, after a preliminary overview on the Gravitational Waves and on the GW detectors, were **divided in *five study groups*** plus ***one coordinating group***:

- 1) What are GW
- 2) Type of GW sources
- 3) Observed GW catalog
- 4) GW detection: interferometers
- 5) Fundamental Noise sources in GW interferometrical detector
- 6) Group devoted to the coordintation between all the groups and to the final presentation preparation

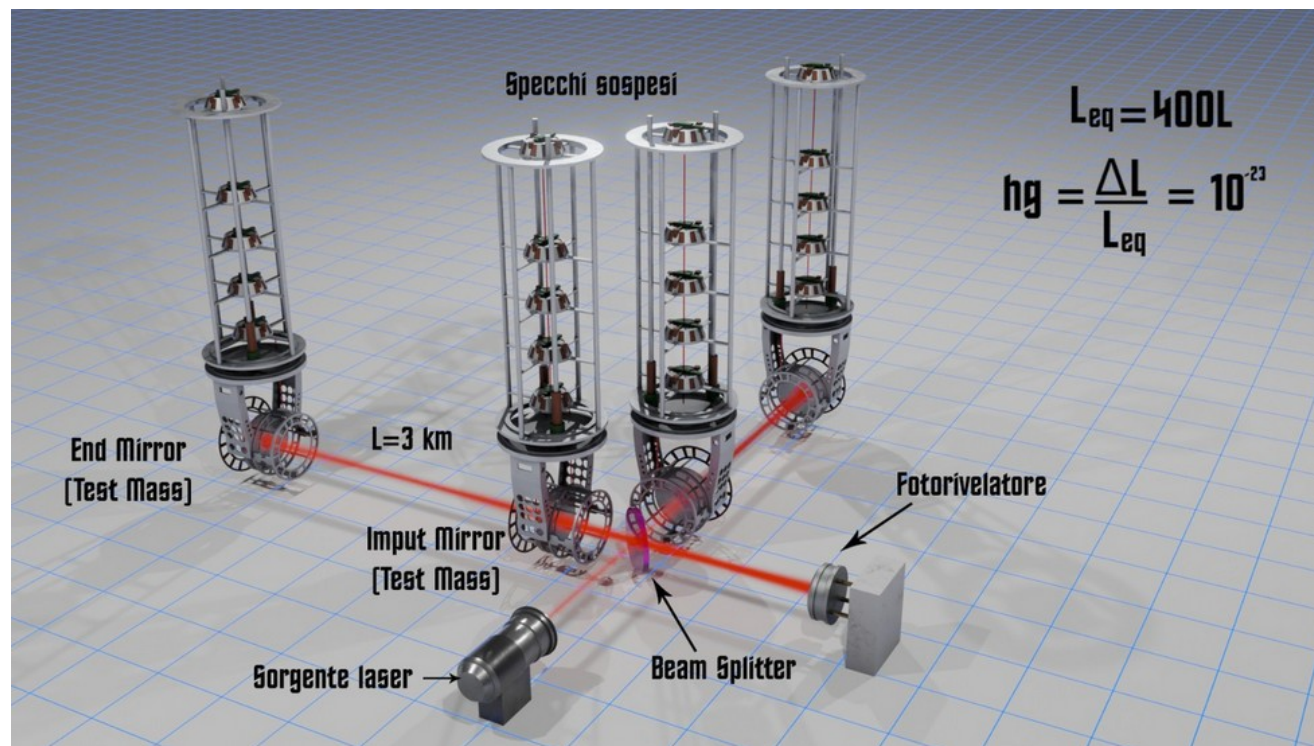
→ Each group had a coordinator elected by the other members.

REPRODUCE A  
Small scientific collaboration!!!

Among the **scientific discussions** to satisfy their curiosity and that they were able to link to the basic physics studied during the years (example the angular momentum), the students had even the possibility to express their **artistic creativity and ability**

Example:

A 3D sketch of an GW detector ITF completely developed with Blender CAD starting by the pictures and the sketch





# ASL 2022GW project

L'astronomia gravitazionale ci ha dato l'occasione di unire le classi terze dello scientifico del nostro istituto, il liceo Alfonso Maria De Liguori, per ampliare lo studio della fisica e in particolare della gravitazione arricchendo la nostra conoscenza entrando in contatto con lo studio delle onde gravitazionali.

At the end the students, as well for the other schools, expressed their satisfaction to had the opportunity to:

- work with students of other classes (they were selected by their professors In different classes)
- To know more about the physics
- To discovery a not a lot known branch of the physics and thus of universe

ASL *collects* Universities, Research Institutions and High Schools in a Collaboration to

→ **enlighten** on the **physics research activities on our territory**

→ **attract students** and show the occupational potential of the professional figure of the Physicist, and the **beauty, the charm and fun** in this profession

→ offer the **possibility** to the **students to test and improve their knoweldge**, competences and abilities and to **learn to work in collaboration**

MOreOver

- **fully satisfies the requests of the Italian Educational Project PCTO**
- **Students** were **enthusiastic** about this experience. They **used the newly acquired knowledge for their study course and final exams** and the work done was highly appreciated
- The project is a **valid tool for school and personal growth of young students**
- In the **next years, we will continue** to propose "A scuola di Astroparticelle" as PCTO and to expand the available research paths.



Thanks a lot!!!!