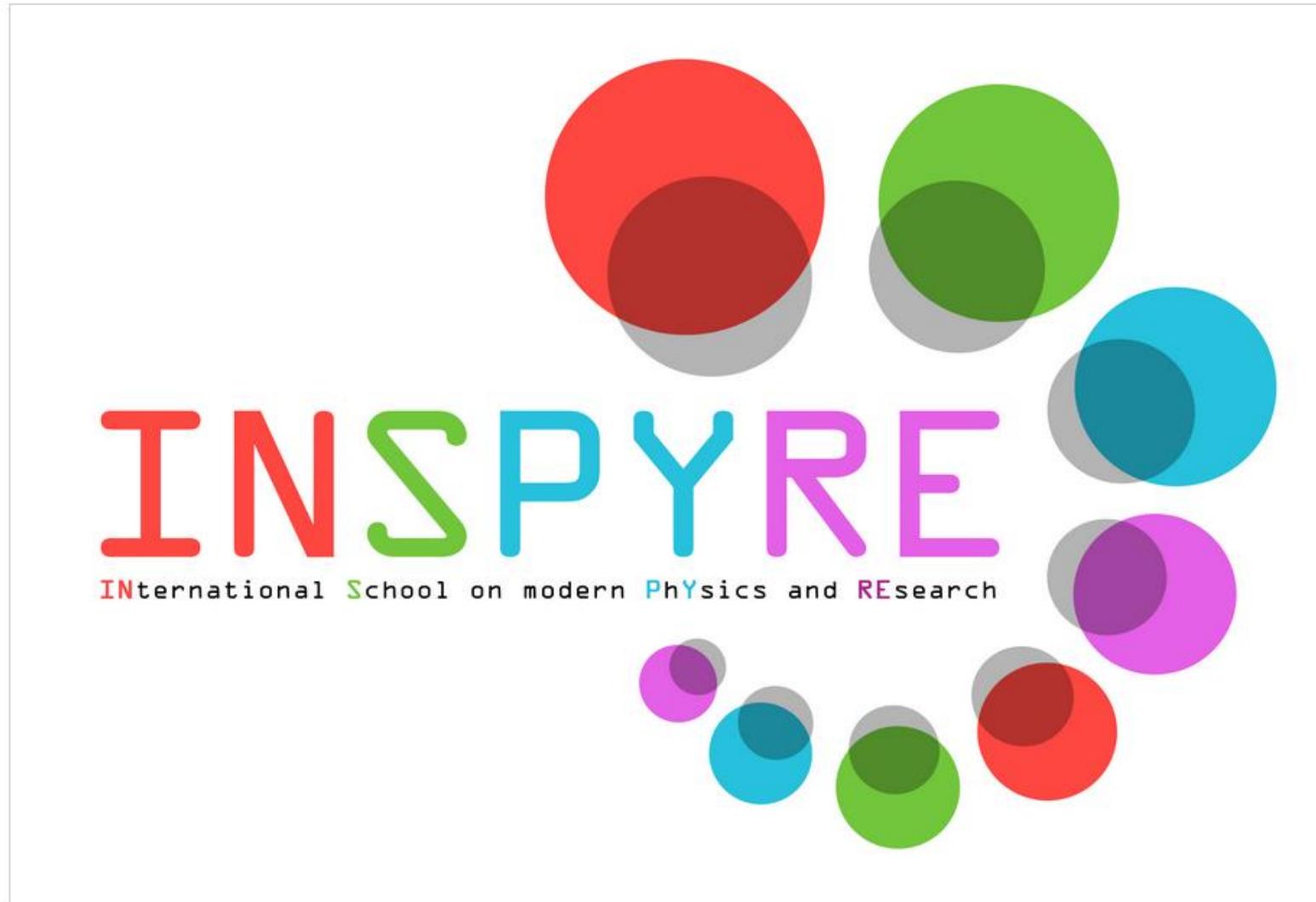


INSPYRE

International School on modern Physics and Research

INSPYRE 2021

Frascati, April 12th – 16th, 2021



The magic realm of Particle Accelerators

What is INSPYRE ?

- International School opened in **presence** (in 2019) to **about 100** students in last year(s) of high school/college coming from all **European -> world countries**.
- It is organized in **lectures on Modern Physics** and its applications in Society, with particular care to the "hot topics", **and in hands-on activities**
- The activity is free of charge; however, the participants should provide for travel, accommodation and dinner expenses (lunch is organized at the LNF canteen).

We started in 2010:

Physics in the 21st Century
7 - 10 Febbraio 2011

[Photo Album](#) [Analysis of Questionnaires](#)

I [Laboratori Nazionali di Frascati](#) dell'[INFN](#) organizzano lo **Stage International Masterclass 2011** per studenti scuola secondaria di secondo grado IV anno:

Periodo : LNF 7 - 10 Febbraio 2011
Frequenza : orario lavorativo (8:00 - 16:00)
Durata : 4 giorni
Totale Studenti : 20
Tutori : M. Bazzi, C. Curceanu, V. Fafone, M. Iannarelli, K. Piscicchia, A. Rizzo, A. Rocchi, A. Scordo, D. Sirghi

Istituti Partecipanti : Lic. Cl. J. Joyce, Ariccia (RM)
Lic. Sc. G. Vailati, Genzano di Roma (RM)
Lic. Sc. B. Touschek, Grottaferrata (RM)
Lic. Sc. A. Righi, Roma
Lic. Sc. Virgilio, Roma
Lic. Sc. Farnesina, Roma
Colegiul National Mihai Viteazul, Stanfu Gheorghe, Jud Covasna, Romania
Colegiul National Elena Ghiba Birta, Arad Romania
Liceul Teoretic Mihai Eminescu, Barlad Vaslui Romania

Studenti : Alessandro Averardi Marta Gavi Edoardo Marchese Claudio Moretti
Vanessa Badiali Francesca Grossi Chiara Mariani Alexandra Neagu
Bianca Amelia Balan Izabela Horvath Luca Mastrofini Nicolae Teodor Pavel
Sergio Di Silvio Martina Lapresa Andrea Merlo Francesco Salusti
Simone Galli Andrea Mancini Eleonora Messina Adriano Titta

Programma : **Monday 7 February - Aula Seminari**
09.00 - 10.15 Registration and Welcome (Italian)
10.15 - 11.00 Presentation of INFN Activities (Italian) C. Curceanu Aula B. Touschek
11.00 - 11.15 Break



INSPYRE 2019

International School on modern PhYsics and REsearch

“Challenges in Modern Physics and Quantum Technologies”



Laboratori Nazionali di Frascati
Auditorium B. Touschek

9th Edition, April 1st - 5th 2019

Directors

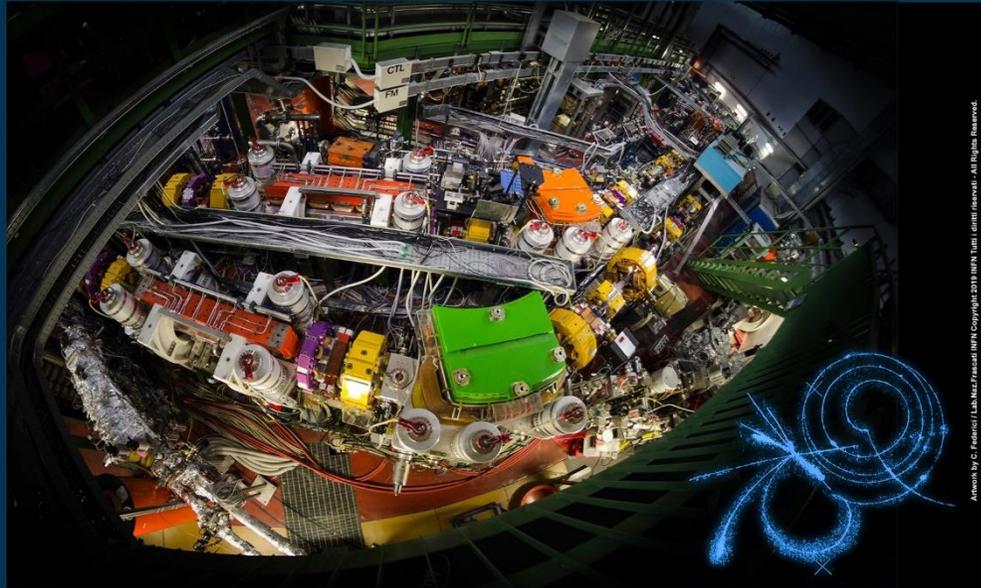
Catalina Curceanu, Rossana Centioni

<http://edu.lnf.infn.it/inspyre-2019/>

Organization

Camilla Paola Maglione, Debora Bifaretti

The INSPYRE 2019 School is dedicated to the hottest topics of Modern Physics and to the powerful Quantum Technologies. About 100 students in last years of high school, coming from all around the world, will take part to lectures given by experts, hands-on experiments and will visit the main experiments and accelerating facilities of LNF-INFN. INSPYRE 2019 will host a two-days dedicated event organized in the framework of the European COST Action CA15220 Quantum Technologies in Space.



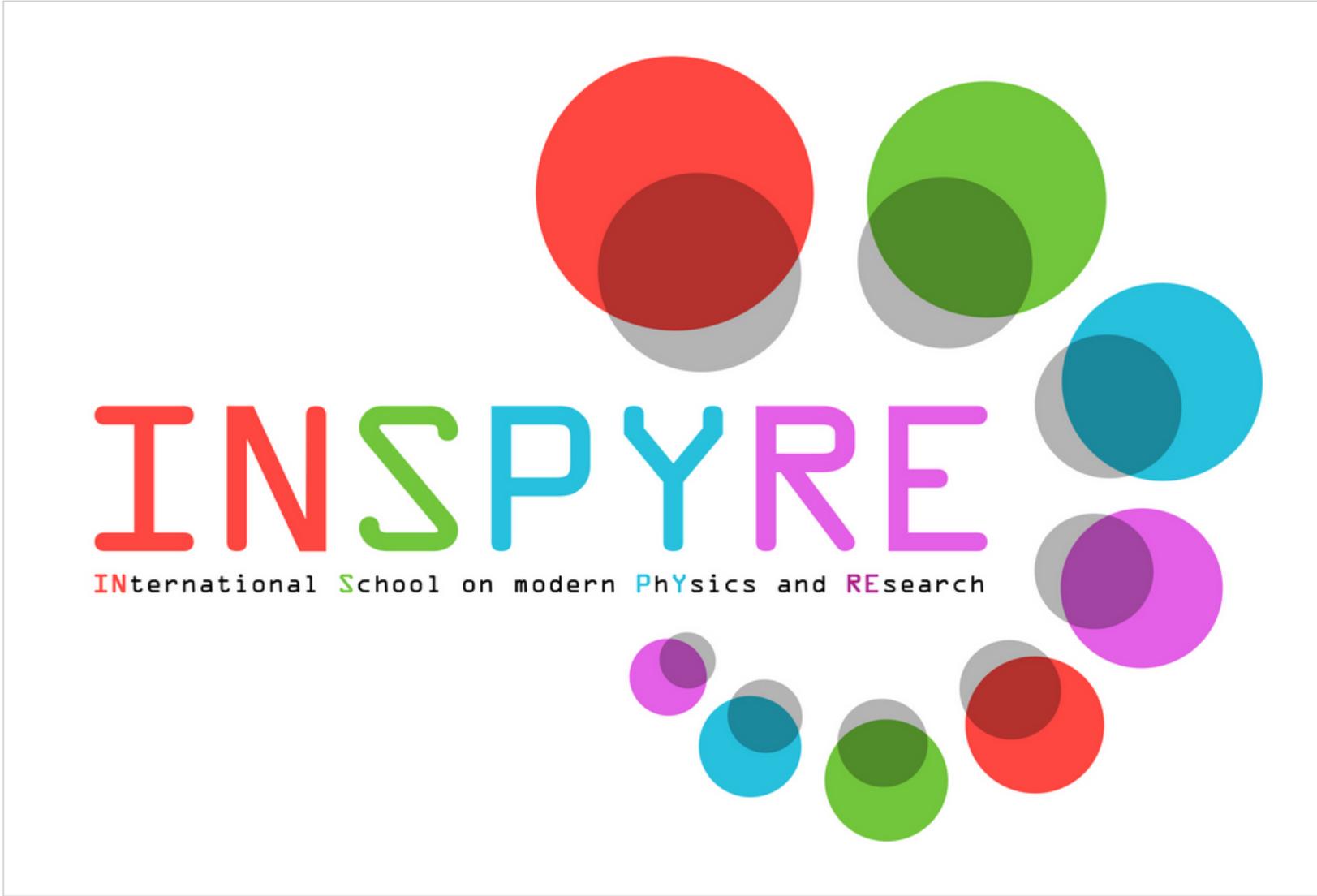
Approved by C. Pedersoli / LNF-INFN / Frascati INFN. Copyright 2019 INFN. Tutti i diritti riservati. All Rights Reserved.



SIDS-Ufficio Educazione e Divulgazione Scientifica
stages@lists.lnf.infn.it
EDU.LNF.INFN.IT



Frascati, March 30th – April 3rd, 2020



The Hitchhiker's Guide to the...Universe

The Hitchhiker's Guide to the...Universe

ONLINE EDITION

In 2020 the INSPYRE School celebrates 10 years since its very first edition. During these years we arrived from 20 participants to about 100, and many INSPYRED ones are now physicists, engineers, biologists, even lawyers and economists. We INSPYREd them, but they also INSPYREd us! This 2020 INSPYRE School is a very special event and we would like to celebrate it with you – our INSPYREd 2020 ones! The 2020 Edition of INSPYRE – International School on modern PhYsics and Research, “The Hitchhiker’s Guide to the...Universe”, is dedicated to the hottest topics and challenges in Modern Physics, from particles to cosmology. We’ll guide you in a fantastic journey from quarks to black holes, from gravity and quantum physics to quantum technologies, and much more!

This year the Scholl will be organized online, on a virtual platform, from the 30th of March to the 3rd of April and will contain a series of lectures.

The lectures are scheduled in the mornings from 10:30 to 13:30.

Presently we are finalizing our program which you will find in this page.

Connect to our YouTube channel to attend the lectures:

<https://www.youtube.com/user/INFNLNF>

We invite you to involve also your colleagues, teachers and students, to join the event.

“The Hitchhiker’s Guide to the... Universe”



INSPYRE

INTERNATIONAL SCHOOL ON MODERN PHYSICS AND RESEARCH

10th Edition, March 30th - April 3rd, 2020

Online edition

Directors

Catalina Curceanu, Rossana Centioni

Organization

Camilla Paola Maglione, Debora Bifaretti, Sara Arnone

In this difficult situation generated by COVID-19, we want to give you some positive message, a hope for the future: INSPYRE 2020 is here for you, to inspire and guide you into the beauty of science.

In 2020 INSPYRE – International School on modern Physics and Research – celebrates 10 years since its birth. The 2020 INSPYRE edition, “The Hitchhiker’s Guide to the... Universe”, is dedicated to the hottest topics and challenges in Modern Physics, from particles to cosmology. Through a series of online talks, we’ll guide our travellers in a fantastic journey from quarks to black holes, from gravity to quantum physics and technologies, up to the main experimental facilities of LNF and CERN. Get ready to be INSPYRED!



This is an open-minded fish.

Its universe is a 10km cube of water.

If we tell him about the stars what would he think?

We will talk about very strange concepts of modern physics so... Remember the fish.

Keep your mind open!

What is time? If no one asks me, I know, but as soon as I try to explain it I CAN WE do better than this? Not much. I CANT.

S. Augustine of Hippo (Confessiones)

Before After

Impossible to define time without using temporal concepts

what time is it... what is time? ... I don't even know what I'm talking about... I don't know who I am...

In physics: Time is what is measured by a clock

A clock measures time

what is a clock? what is time?

Also in physics: What is an event?

Something that measures the distance between events...

And there are other meanings of time

Time flows (No)

It's an illusion

time ≠ something that changes in time

My Philosophers: Time doesn't exist

Leibniz, Mc Taggart

the present 'exists', the past and the future don't

RELATIVITY No!

CLAP! CLAP!

SIMULTANEOUS FOR ME

But not for everybody

OBSERVER MOVING

For an observer moving with respect to me, one happens BEFORE the other AFTER.

CLAP CLAP

the present depends on the motion

"ME" and "observer" would disagree on what exists

only for high speed

Same degree of existence

PAST FUTURE

Relativity

Physicists: 'block universe'

space-time

Relativity: division

space time

Past-present-future have the same degree of existence

BUT (What does it mean to say that time exists?)

If I block all change and movement, time would still exist?

NEWTON: "Yes."

ARISTOTLE, LUCREZIO, LEIBNIZ: "No."

And both are wrong and right!

If nothing happens, time exists (in relativity) but it's not absolute!

Time is relational, I can only localize an event with respect to another.

to be... or not to be...

CAN WE TRAVEL IN TIME?

2005 1428

To the future, yes! To the past? Yes! Maybe. But only theoretically.

I arrived to tomorrow before you!

Hello.

It's possible thanks to relativistic time dilation.

Time in systems that move* (with respect to us) is slower than hours

Really fast

For example: Travelled very quickly ≈ speed of light

a little older much older

SMALL SPEED SMALL EFFECTS

I KNEW IT...

atom clock

Hafele - Keating (1971) experiment

He travelled 40,000 km to the future

look at atomic clock

Other mechanism? → Gravity

Time in systems with a larger gravitational (than ours) field, flows slower.

(like in the movie interstellar)

In the movie, 1h on the planet next to the black hole = 7 years on earth

Because of the difference between gravitational fields

But slow affects small

In our lives: Without relativity, gps wouldn't work!

Satellites lose 40 microsec per day

atomic clocks

Can we travel to the past?

Yes! Theoretically: General relativity predicts time travel to the past. BUT general relativity could be wrong!

Even if it's right, building a time machine would be impossible in practice.

OH...

Goedel (mathematical logician a great friend of Einstein): "General relativity predicts time travel"

This is a problem for the theory: Time travel paradoxes. Perhaps physics prevents it?

Goedel's universe: a universe that "rotates on itself"

If you shine a laser light beam in a direction, after some time the light beam come back!

If you follow this curve, you can go to any point in space-time

Cloud Timeline Curve (time travel)

theoretically!

Our universe doesn't rotate on itself. Goedel's trajectory cannot be used to travel in time.

Temporal paradoxes:

- Grandfather paradox
- Monia Lisa paradox

Grandfather paradox: I go to the past and kill my grandfather before he meets my grandmother. I can't be born. I can't kill my grandfather.

2 Solutions:

- Time travel is impossible
- only paradoxes are impossible

Monia Lisa paradox: I take a photo of Monia Lisa to Leonardo who paints the picture copying my photo. Who painted the picture? Leonardo took it from me, I took it from him!

No logical contradiction! Avoiding these paradoxes is much more difficult!

Solution:

RELATIVITY + QUANTUM MECHANICS

Already relativity has drastic consequences on our explanation of time...

... what happens if we introduce also quantum mechanics?

nuclear explosion

We're not sure that the universe evolves.

Wheeler - De Witt equation joins relativity and quantum mechanics:

$$\hat{H}|\Psi\rangle = 0$$

It means that the state of the universe is stationary. This is a "problem of time" in modern physics.

ALL OUR INTUITIONS OF TIME TURN OUT TO BE WRONG!

"The growth of our knowledge has led to a slow disintegration of our notion of time" - C. Rovelli

Are physicists all crazy? Have they lost touch with reality?

Yeah... everything is just an illusion...

⇒ No! The truth is that... it's necessary to abandon the limitations of our senses and our common sense to UNDERSTAND REALITY!

(as Plato)

Physicists are not crazy... it's physics that is very strange.

Remember the fish: tackle modern physics with open minds.

"I close my eyes to see" - Paul Gauguin

It's impossible to see the results from relativity and quantum mechanics

You have to use the eyes of the mind, helping yourself with mathematical formalism: the language of physics.

$$\langle \psi | \hat{H} | \psi \rangle = i\hbar \frac{\partial}{\partial t} \langle \psi | \psi \rangle$$

$$h\nu = \frac{1}{2} h\nu_{\text{ph}} = 8\pi G T \nu$$


From the lecture of:

- Lorenzo Maccone
- (Dip. Fisica, INFN Sez. Pavia, Università di Pavia)

Illustrated by Amok Haebler

[as] selfie

Inspyre.

di Anouk Haesler

studentessa del liceo Clelab, Francia

L'anno scorso, grazie alla classe europea del mio liceo Clelab (Collège Lycée Expérimental Laboratory), ho avuto la possibilità di partecipare al tirocinio Inspyre (International School on Modern Physics and Research) presso i Laboratori Nazionali di Frascati (Lnf) dell'Infn dall'1 al 5 aprile 2019. Eravamo 30 studenti provenienti da 14 paesi in tutto il mondo e 44 scuole diverse. Durante questa settimana abbiamo alloggiato in un hotel a Frascati e lo stage è stato un'introduzione al mondo della ricerca. In quei pochi giorni abbiamo imparato tanto e abbiamo incontrato molte persone. Innanzitutto, siamo stati accolti da Catalina Curceanu, una delle direttrici di Inspyre e ricercatrice presso i laboratori. Il primo giorno, abbiamo imparato su che cosa si basa il lavoro dei Lnf e abbiamo avuto l'opportunità di conoscere gli altri studenti grazie a un'attività di speed dating. Abbiamo partecipato alla nostra prima lezione sul modello standard di fisica delle particelle tenuta da Antonio Polosa della Sapienza Università di Roma. I giorni seguenti abbiamo assistito a quasi 40 ore di conferenze sulla fisica moderna fatte da molte ricercatrici e ricercatori. Alcuni argomenti erano tecnici e difficili da capire, ma ho imparato molto sulle basi della fisica moderna e della fisica in generale. Poiché sono interessata alla



a.

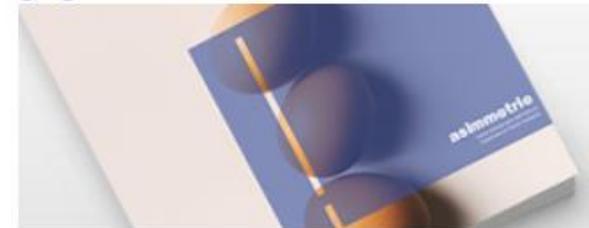
Anouk (a sinistra) e altre studentesse partecipano a un laboratorio di Inspyre 2019.



[as] asimmetrie28

origini

giugno 2020



Indice

- > Editoriale
- > In principio
- > Un'intuizione spettacolare
- > Lo specchio rotto
- > L'asimmetria materia-antimateria
- > La ragnatela dell'universo

Search FQXi

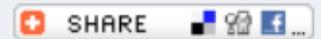
[show search help](#)

If you are aware of an interesting new academic paper (that has been published in a peer-reviewed journal or has appeared on the arXiv), a conference talk (at an official professional scientific meeting), an external blog post (by a professional scientist) or a news item (in the mainstream news media), which you think might make an interesting topic for an FQXi blog post, then please contact us at forums@fqxi.org with a link to the original source and a sentence about why you think that the work is worthy of discussion. Please note that we receive many such suggestions and while we endeavour to respond to them, we may not be able to reply to all suggestions.

CATEGORY: [Blog](#) [\[back\]](#)

TOPIC: [INSPYRE 2020 -- Please join our free online course in modern physics](#)

[\[refresh\]](#)



[Login](#) or [create account](#) to post reply or comment.

Blogger Catalina Curceanu wrote on Mar. 23, 2020 @ 15:55 GMT

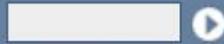
I would like to inform you that next week, starting 30th March, we shall have-- online due to Coronavirus--the international school "INSPYRE," organized with support from FQXi.

INSPYRE 2020 is opened to all schools from all around the world. Many schools are now closing, but all students, parents, teachers--and anyone excited about science--is welcome to join.

For 10 years the International School on Modern Physics and Research, INSPYRE, has been one of the major and most prestigious events of the Educational program of INFN Frascati National Laboratory (LNF). The School is aimed at High School students, who have come from all over the world to explore the most relevant issues of Modern Physics.

Since its first edition in 2011, the program has involved 5 days at LNF, featuring lessons and experimental sessions performed in team with INFN researchers.

Due to the current emergency situation, LNF has rescheduled the 2020 edition of INSPYRE--"The Hichhikers's Guide to the Universe"--as an online course, live-streaming the School lessons directly on the INFN-LNF YouTube channel, in order to reach all the students who are passionate about science and technology at their home.



[show search help](#)

If you are aware of an interesting new academic paper (that has been published in a peer-reviewed journal or has appeared on the arXiv), a conference talk (at an official professional scientific meeting), an external blog post (by a professional scientist) or a news item (in the mainstream news media), which you think might make an interesting topic for an FQXi blog post, then please contact us at forums@fqxi.org with a link to the original source and a sentence about why you think that the work is worthy of discussion. Please note that we receive many such suggestions and while we endeavour to respond to them, we may not be able to reply to all suggestions.

Please also note that we do not accept unsolicited posts and we cannot review, or open new threads for, unsolicited articles or papers. Requests to review or post such materials will not be answered. If you have your own novel

CATEGORY: [Blog](#) [[back](#)]

TOPIC: [Welcome to INSPYRE 2020 - Hitchhikers in the Universe!](#) by Catalina Curceanu [[refresh](#)]



[Login](#) or [create account](#) to post reply or comment.

FQXi Administrator Zeeya Merali wrote on May. 22, 2020 @ 15:28 GMT

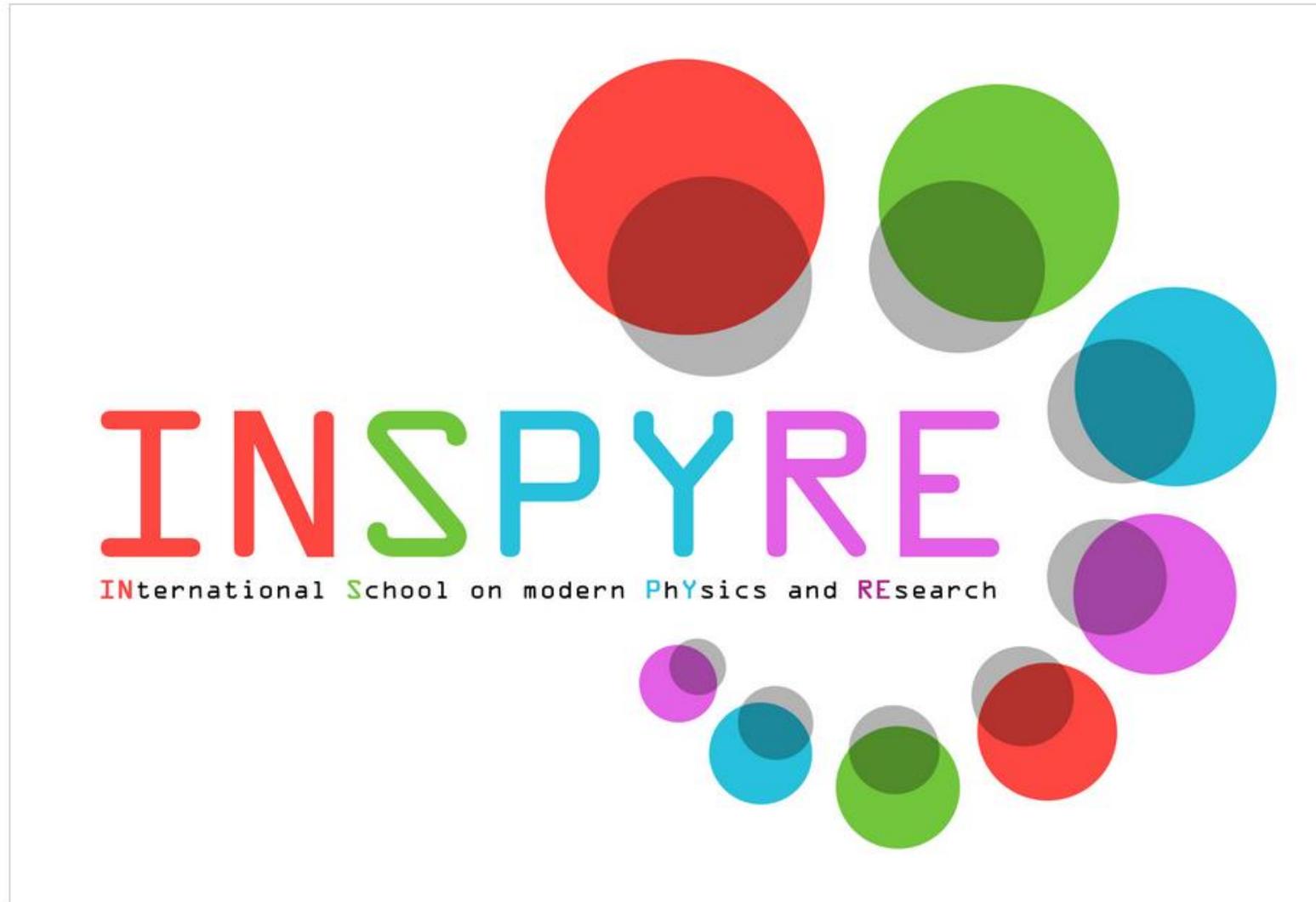
INSPYRE, International School on modern PhYsics and REsearch, organized by INFN Frascati National Laboratory is addressed to High School students and dedicated to the latest issues of modern physics and cutting edge technologies.

Keywords: [#Introduction](#) [#Schools](#) [#Universe](#) [#quantum](#) [#cosmology](#)

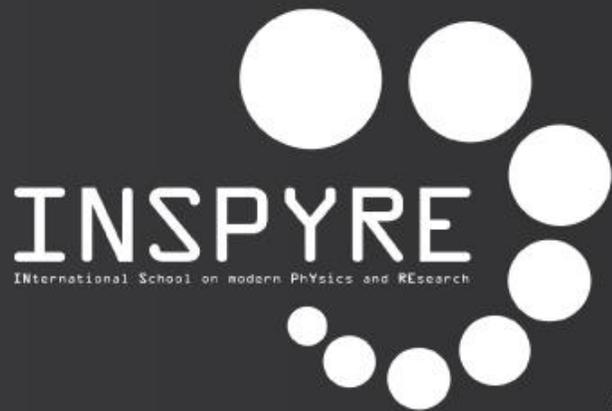


INSPYRE 2021

Frascati, April 12th – 16th, 2021



The magic realm of Particle Accelerators



ONLINE EDITION 2021

The magic realm of Particle Accelerators

April 12th - 16th, 2021

3:00 pm - 6:00 pm (Rome CET)

organized by:



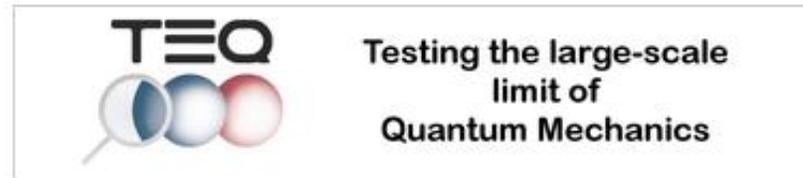
with the participation
and support of:



ONLINE EDITION

This year the Scholl will be organized online, on a virtual platform, from the 12th to the 16th of April and will contain a series of lectures. The lectures are scheduled in the afternoons from 3:00 pm to 6:00 pm (Rome CET). Presently we are finalizing our program which you will find in this page.

INSPYRE 2021 is organized with the participation and support of:



TeQuantum



Foundational Questions



STRONG 2020

National project of INFN Third Mission Committee





96 registered participants:

55 High-schools:

Albania, Bangladesh, Egitto, Francia, Germania, Italia, Pakistan,
Romania, Slovacchi, Spagna, USA

Italy

<http://edu.Inf.infn.it/inspyre-2021/>

PROGRAM

Work in progress

Monday 12 April – Chairwoman Catalina Curceanu

02:50 pm – 03:00 pm

INSPYRE 2021: Welcome and introduction (INSPYRE Director: C. Curceanu)

03:00 pm – 04:20 pm

From Cathode Ray Tubes to the LHC: an Accelerator Driven Journey from Electron to Higgs Boson (S. Bertolucci – Univ. di Bologna)

04:40 pm – 06:00 pm

Introduction to particle accelerators: from sub-nuclear microscopes to instruments for medicine (D. Alesini – INFN-LNF)

Tuesday 13 April – Chairwoman Paola Gianotti

03:00 pm – 04:20 pm

Physics and Cultural Heritage. CHNet – The INFN network devoted to cultural heritage (M. Romani, L. Pronti – INFN-LNF)

04:40 pm – 06:00 pm

The case of the missing antimatter (Michael Doser – CERN)

Wednesday 14 April

03:00 pm – 05:00 pm

Virtual Tour

Thursday 15 April – Chairwoman Silvia Pisano

03:00 pm – 04:20 pm

The Quantum Universe: from Science to Technology and back (Catalina Curceanu – INFN-LNF, Hendrik Ulbricht – University of Southampton)

04:40 pm – 06:00 pm

Space accelerators! (M. Casolino – INFN-Roma 2)

Friday 16 April – Chairwoman Susanna Bertelli

02:45 pm – 04:30 pm

ALICE : the heavy ion experiment at the LHC (D. Hatzifotiadou – CERN)

04:40 pm – 06:00 pm

Accelerating the future (M. Ferrario – INFN-LNF)



INSPIRE 2021

10 video • 2.127 visualizzazioni • Ultimo aggiornamento in data 26 apr 2021



INFN LNF -
Laboratori
Nazionali di
Frascati

ISCRITTO



1



INFN LNF - Laboratori Nazionali di Frascati

2



Introduction to particle accelerators - D. Alesini

INFN LNF - Laboratori Nazionali di Frascati

3



Physics and Cultural Heritage - M. Romani, L. Pronti

INFN LNF - Laboratori Nazionali di Frascati

4



The case of the missing antimatter - M. Doser

INFN LNF - Laboratori Nazionali di Frascati

5



INSPIRE - DAFNE Virtual Tour - C. Curceanu

INFN LNF - Laboratori Nazionali di Frascati

6



INSPIRE - B. Touschek Visitor Centre Virtual Tour - D. Domenici

INFN LNF - Laboratori Nazionali di Frascati

7



The Quantum Universe: from science to technology and back - C. Curceanu, Hendrik Ulbricht

INFN LNF - Laboratori Nazionali di Frascati

8



Space accelerators! - M Casolino

INFN LNF - Laboratori Nazionali di Frascati

9



ALICE: a journey of discovery into the core of matter - D. Hatzifotiadou

INFN LNF - Laboratori Nazionali di Frascati

10

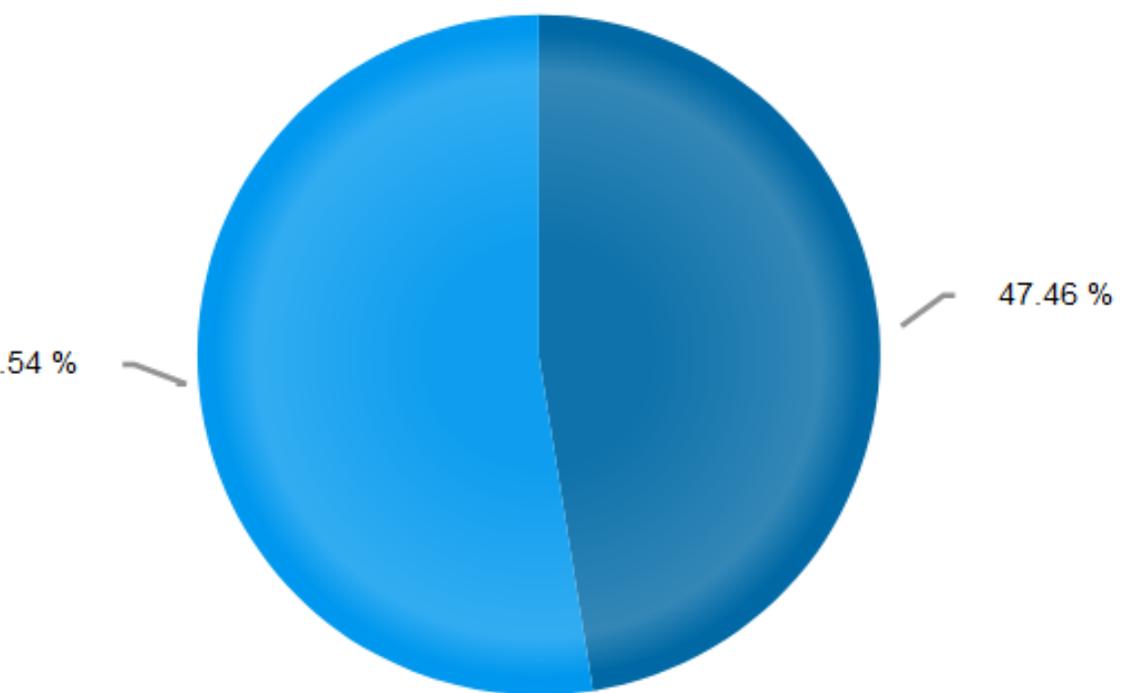


Accelerating the future - M. Ferrario

INFN LNF - Laboratori Nazionali di Frascati

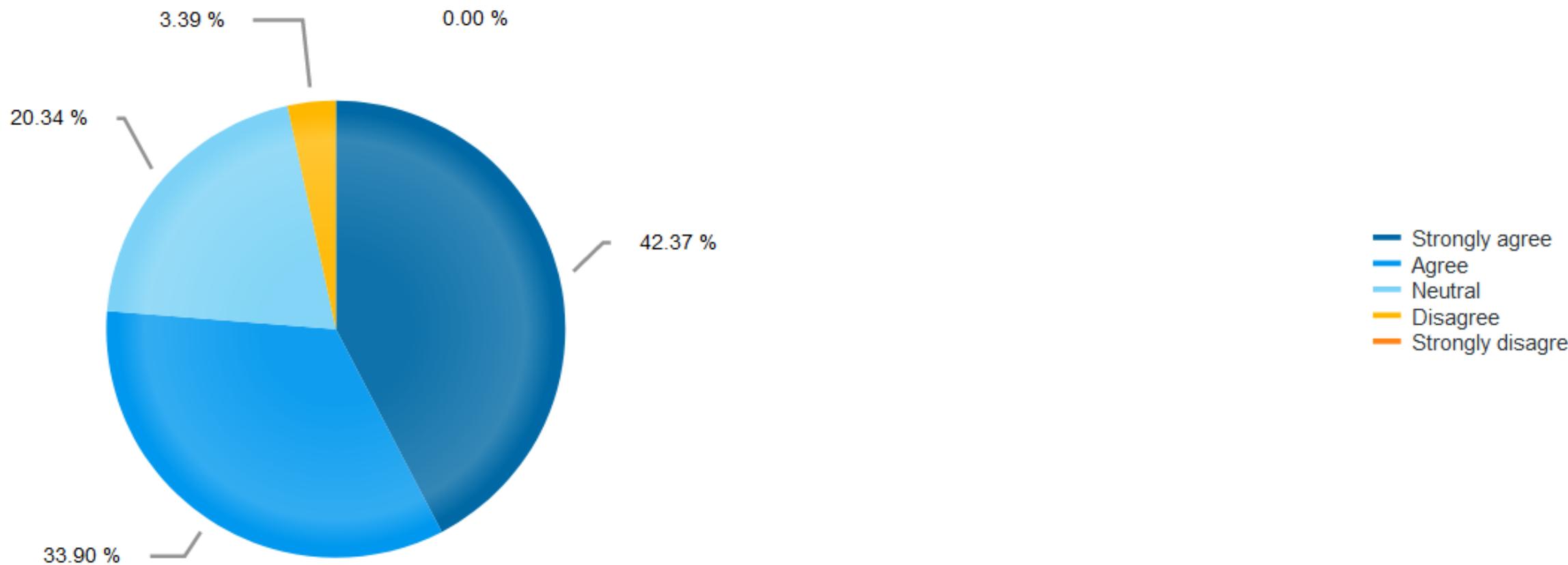
Gender

0.00 %

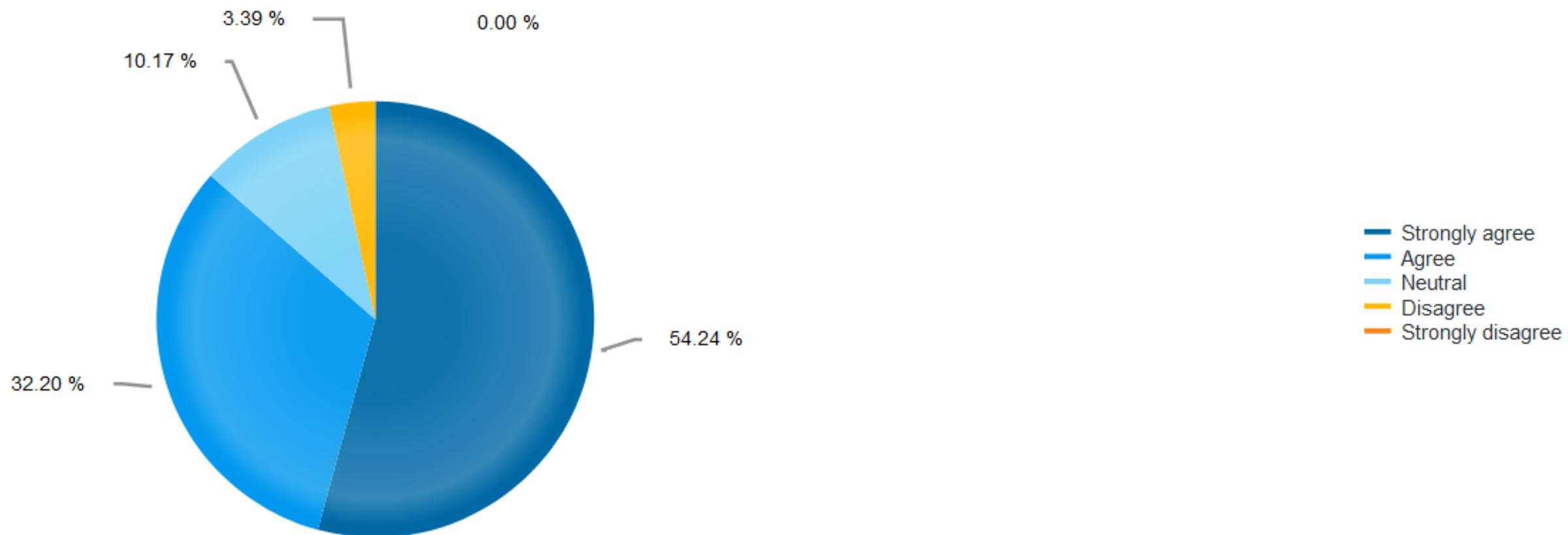


- Female
- Male
- Prefer not to say

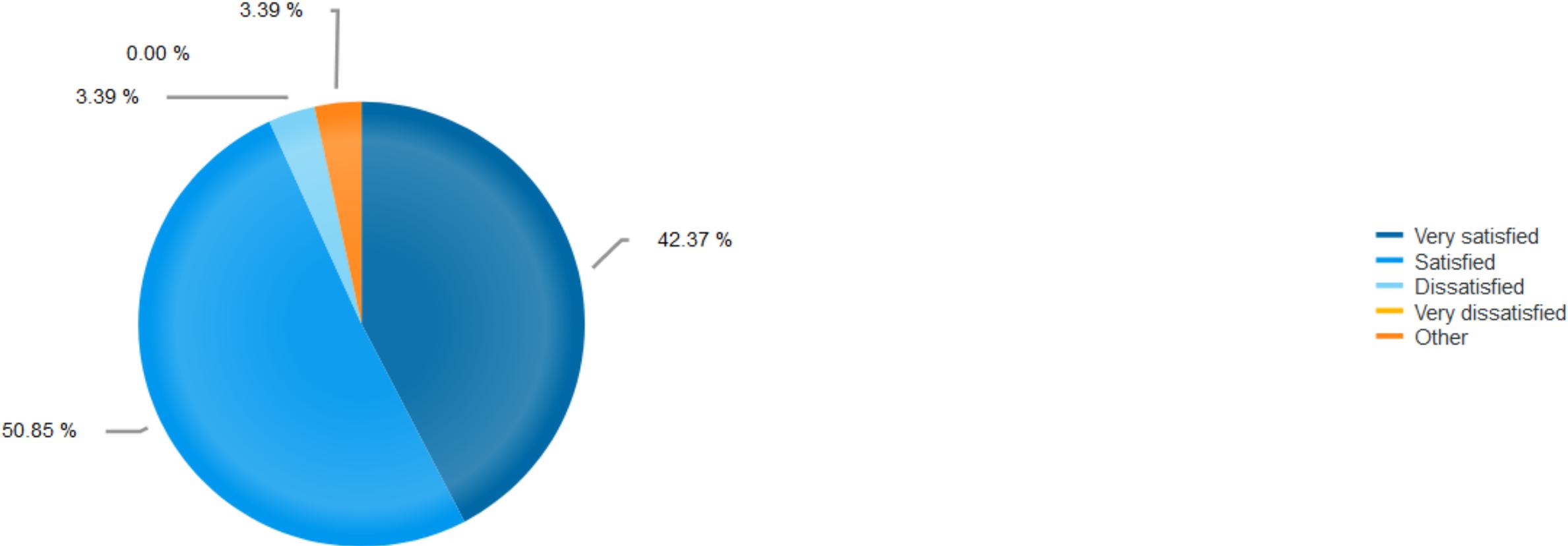
Attending the INSPYRE school will encourage me to pursue a scientific career.



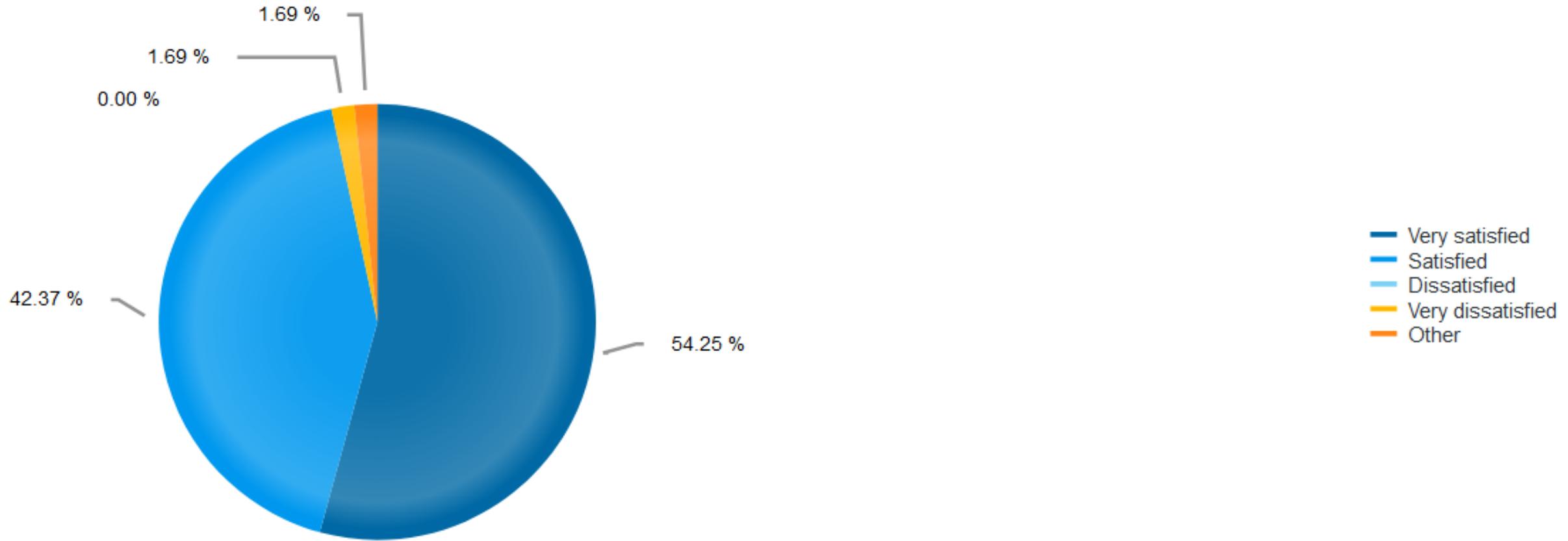
INSPYRE School is useful for deepening the physics studied at school.



How satisfied are you with the online edition of the INSPYRE School?



How satisfied are you with the content of the lectures?



Nel 2021 e' stato pubblicato in Asimmetrie: l'articolo:
<https://www.asimmetrie.it/in-primo-piano/2382-al-via-l-xi-edizione-di-inspyre-la-scuola-internazionale-di-fisica-moderna>

🕒 12 APRILE 2021

Al via l'XI edizione di INSPYRE, la scuola internazionale di fisica moderna



“The Magic Realm of Particle Accelerators” è il titolo dell'XI edizione di INSPYRE (INternational School on modernPhYsics and REsearch), la scuola internazionale organizzata dai Laboratori Nazionali di Frascati dell'INFN e dedicata a studentesse e studenti dell'ultimo anno delle scuole secondarie di II grado di tutto il mondo.

Questa settimana, dal 12 al 16 aprile, 96 studenti (di cui 22 stranieri), provenienti da 55 Istituti scolastici di tutta Italia e di diversi Paesi del mondo, si confronteranno con il mondo della ricerca in fisica delle particelle e in particolare con gli acceleratori. Ricercatori e ricercatrici delle sezioni INFN di Bologna, Roma Tor Vergata e dei Laboratori Nazionali di Frascati, insieme a ricercatori del CERN e della University of

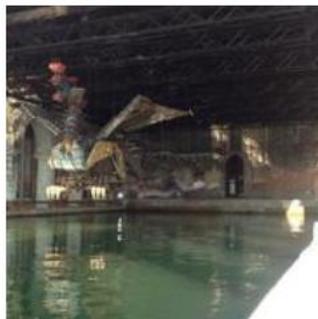
Southampton, accompagneranno le studentesse e gli studenti in cinque giorni di approfondimento sulla fisica agli acceleratori.

Le lezioni online, accessibili agli iscritti e, una volta conclusa la scuola, disponibili al pubblico su YouTube, spazieranno dalle origini degli esperimenti sull'atomo alla scoperta dell'Higgs e agli esperimenti del CERN, dagli acceleratori negli ospedali a quelli nello spazio, fino alle ultime frontiere nel mondo della ricerca in fisica delle particelle con uno sguardo ai risvolti sulla società. Grazie ai tour virtuali, gli studenti potranno visitare DAFNE, il complesso di acceleratori per le collisioni elettrone-positrone dei Laboratori Nazionali di Frascati, e ALICE, uno degli esperimenti del Large Hadron Collider (LHC) del CERN, e durante la visita virtuale al Bruno Touschek Visitor Centre dei Laboratori Nazionali di Frascati scopriranno la storia degli acceleratori in un racconto che intreccia le grandi domande della fisica contemporanea con gli strumenti che ci aiutano a trovare le risposte.

Iniziata nel 2011 con 20 ragazzi prevalentemente italiani, INSPYRE vede oggi la partecipazione di studentesse e studenti provenienti da Albania, Bangladesh, Egitto, Francia, Germania, Italia, Pakistan, Romania, Slovacchia, Spagna e Stati Uniti. Anche se quest'anno, a causa della pandemia di Covid-19, la scuola si svolgerà interamente online sarà un momento di confronto tra studenti di diversi paesi e di scoperta del mondo della ricerca e della fisica moderna. [Cecilia Collà Ruvolo]

INSPYRE 2021 team:

Sara Reda, Sara Arnone, Debora Bifaretti, Elisa Santinelli, Elena Patrignanelli, [Susanna Bertelli](#)



INSPYRE 2022 – in presenza!

- 4 – 8 aprile 2022 (tbc) – in contemporanea con la settimana della fisica quantistica!
- Con supporto: TEQ (FET EU); Templeton Foundation (QUBO project); FQXi (ICON project)
- Tornare a fare esperimenti!
- In presenza – 50 (tbc – or more) ragazzi (50% dall'estero, 50% dall'Italia)
- Programma -> lezioni frontale e (2019 enriched) hands on experiments in sicurezza

2019 experiments:

Thursday 4 April– Auditorium B. Touschek

09:20 – 13:30

Dedicated to experiments:

- Quantum Mechanics experiments (S. Bertelli, E. Turri, M. Iannarelli, INFN-LNF)
- Bionanotechnologies (A. Cataldo, O. Calamai, S. Bellucci, INFN-LNF; A. Lustrissimi, Progetto Torno Subito Reg. Lazio)
- ArduSipm electronic (V. Bocci, F. Iacoangeli, INFN-Roma 1)
- Diagnostics and preservation of Cultural Heritage (M. Cestelli Guidi, M. Romani, INFN-LNF)
- Medicine & Physics (G. Gadda, INFN-Ferrara)
- Channeling Technologies (S. Dabagov, D. Hampai, INFN-LNF)
- Cosmic Ray (P. Ciambrone, G. Felici, C. Gatti, G. Papalino INFN-LNF)
- Solar energy and photovoltaic systems (P. Bernardoni, INFN-Ferrara)
- Discovering Enviromental Radioactivity (M. Alberi, E. Chiarelli, INFN-Ferrara)
- Simulation of events at LHC: from generation to reconstruction (G. Corcella, M. Testa)
- Gravitational lenses (P. Bergamini, Univ. di Ferrara)

INSPYRE 2022

- 12-a edizione!
- Sezioni partecipanti: Catania, Ferrara, Firenze, Lab. Naz. di Frascati, Lab. Naz. di Legnaro, Pisa, Roma I, Roma II, Torino, Trieste

Attività prevista

- 1) preparazione dell'evento INSPYRE 2022; include preparazione del sito, invito e conferma speakers e tutor esperimenti hands-on; invito alle scuole, pubblicizzazione dell'evento su vari siti/giornali; preparazione poster; intervista lancio etc
- 2) preparazione degli esperimenti hands-on - 12-14 esperimenti di fisica moderna e applicazioni per la società (da fare in diretta se l'evento sarà con partecipanti ospitati ai LNF con misure anti-Covid attualizzate oppure online se l'edizione sarà da remoto)
- 3) preparazione degli strumenti di trasmissione online - se INSPYRE 2022 verrà organizzata (come INSPYRE 2021) online
- 3) svolgimento della scuola INSPYRE 2022 all'inizio aprile, con interviste agli studenti e tutor; trasmissioni in diretta online su social (Facebook, Twitter, youtube etc)
- 4) assessment post evento: questionario e analisi risposte
- 5) presentazione dell'evento e degli achievements alla SIF2022 e in altre 1/2 conferenze o workshop internazionali dedicate a dissemination/education
- 6) preparazione INSPYRE 2023: scelta periodo, invito scuole, preparazione sito evento etc.
- 7) dissemination events per INSPYRE - presentazione evento in seminari alle scuole; presentazione in scuole all'estero; lobbying presso ministeri etc...
- 8) investigare la possibilità di includere evento in un prog Europeo dedicato alla society/dissemination e di estendere l'iniziativa presso altri laboratory in Italia e/o all'estero

Milestone

Descrizione	Data completamento
Sito web dell'evento – scuola INSPYRE 2022 pronto	15-02-2022
Call per l'evento INSPYRE 2023 mandato a scuole e pubblicizzato	20-12-2022
Analisi questionario post-evento e stesura di un report per INSPYRE 2022	30-09-2022

Mod. EC/EN 8

(a cura del responsabile nazionale)

RICHIESTE 2022

1) Missioni per un totale di 4 kEuro:

Missioni per tutors esperimenti da altre sezioni/laboratori INFN per venire ai LNF per la preparazione e svolgimento esperimenti (in presenza oppure online): circa 10 missioni per un totale di 3 kEuro

Missioni per promuovere l'evento presso scuole, ministeri, altri enti: 1 kEuro

2) Consumo, totale 4 kEuro per:

- Materiale vario tipo materiale di cancelleria, quaderni, penne e cartelline per i partecipanti a INSPYRE2021: 1 kEuro

- Cavi, cavetti, lampadine in sostituzione ai materiali consumati per esperimenti hands-on esistenti: 2 kEuro

- 10 kit per esperimenti meccanica quantistica con Arduino (misura costante Planck) 100 euro a kit : 1kEuro

3) Trasporti: affitto pulmino per trasporto partecipanti a INSPYRE 2022: 1.5 kEuro (costo si basa su quanto pagato gli anni scorsi)

4) Inventariabile: 25.5 kEuro:

23 kEuro per kit per lo studio completo dei raggi X Phywe (vedi allegato opzione 11) per esperimenti hands-on

- offerta allegata LNF_ISP_C3M_all_1.pdf

- supporto a inventario tubo Perrin e kit 2.2 kEuro vedi allegato - offerta allegata LNF_ISP_C3M_all_2.pdf

Dettagli kit raggi X:

- 1) il kit verrebbe utilizzato in tante altre iniziative (IDF, IDF modulo esperimenti, Summer School, OpenLabs, Notte europea dei Ricercatori)
- 2) non è facilmente trasportabile, si tratta di uno strumento molto fragile, una volta trovata una collocazione non andrebbe spostato, quindi sì nel caso verrebbe inserito nel database degli exhibit ma sconsiglierei la condivisione
- 3) si tratta di un kit didattico già assemblato (c'è un tubo radiogeno all'interno) quindi non è possibile recuperare componenti



Quantum Design

EUROPE

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#	P/N	DESCRIZIONE	PREZZO UNIT. €	Q.TA'
		<ul style="list-style-type: none">○ USB 2.0 interface● XR 4.0 CT object Z-rotation unit, 09057-41●<ul style="list-style-type: none">○ Angle resolution below 1 degree○ Motorized, USB 2.0 interface○ Stepper motor with 4200 steps/360°● measure XR 4.0 tomography software package, 14421-61● XR 4.0 CT accessories, 09057-42		
<p style="text-align: center;"><u>Related experiments</u></p>				
11	09117-88	XRE 4.0 X-ray expert set for schools	18.800,00	1



Function and Applications

Complete set for carrying out 8 experiments according to the curriculum on X-ray physics and imaging with X-rays: characteristic X-rays of copper, braking radiation, Bragg equation, qualitative and quantitative absorption, counter tube characteristics, radiographic examination of objects and monochromatization of X-rays.

School X-ray machine has received a type approval from the Federal Office for Radiation Protection (BfS) according to the X-ray Ordinance (version 4 October 2011) with the No. BfS02/12.

Expandable with upgrade sets for further specific applications and subject areas on request.