



ScienzaPerTutti
scienzapertutti.infn.it

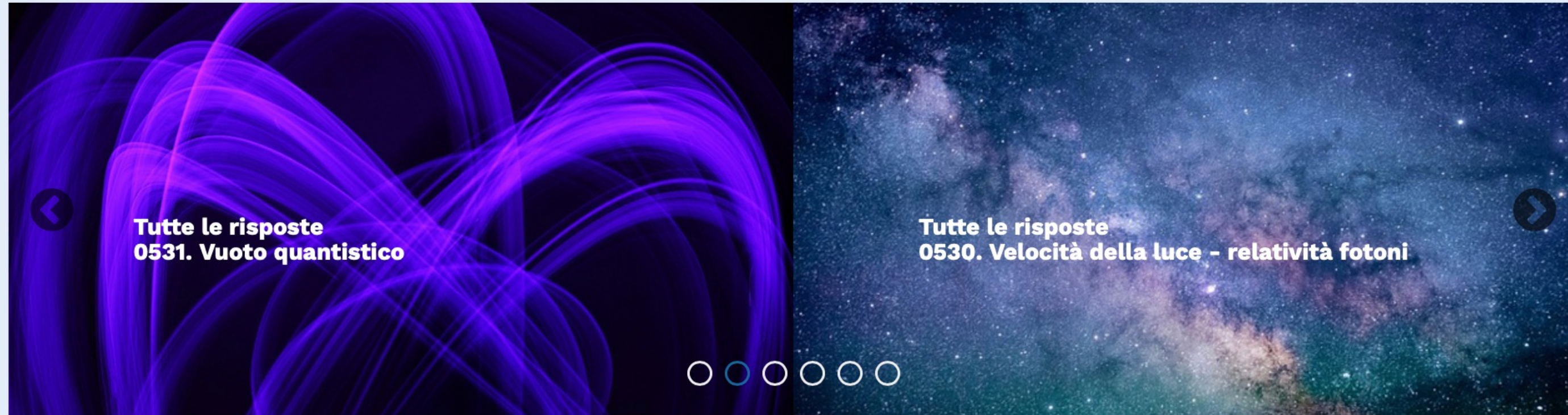
INFN ScienzaPerTutti: an overview of the annual contest for schools

Hamburg, August 21, 2023 – EPS-HEP Conference

Susanna Bertelli on behalf of ScienzaPerTutti web editorial board



In evidenza



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ScienzaPerTutti, literally **ScienceForAll**, is the web portal dedicated to Physics education and popularization of science curated by INFN - Italian National Institute for Nuclear Physics researchers.

Target audience:
High School students and teachers,
people passionate about science

Created in 2002, the website has changed through the years and nowadays it includes many areas. Contents are in Italian.

Main missions:
Inform about the research conducted by INFN
Raise awareness towards the latest issues in Physics (discoveries and applications)
Provide research materials
Support teaching/learning modern Physics

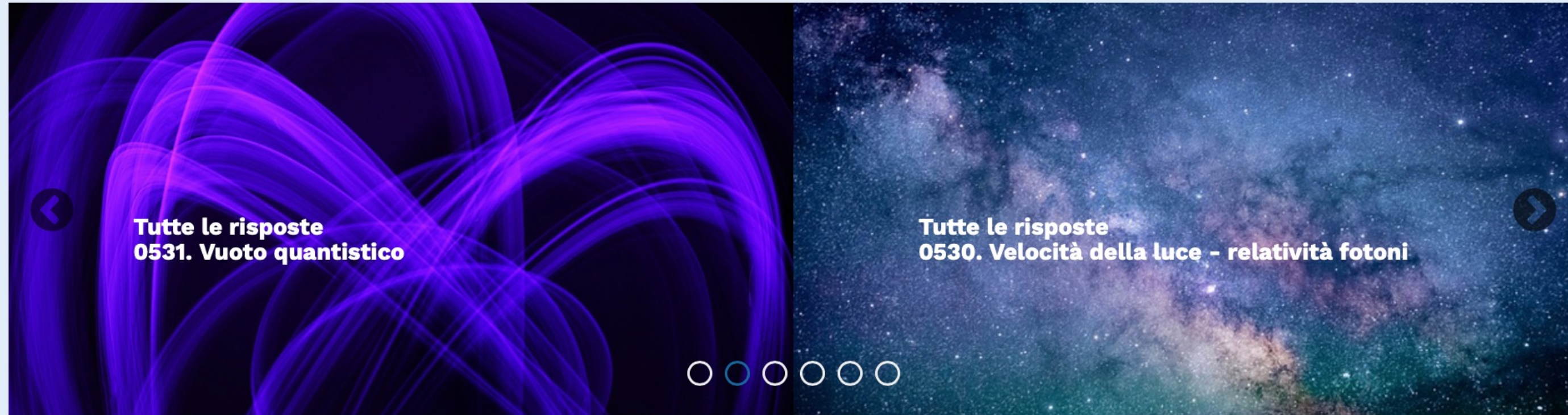
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INFN CC3M National project





In evidenza



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2020

Entries 822.123

Pages 1.344.861

2021

Entries 816.334

Pages 1.337.296

2022

Entries 677.130

Pages 1.090.000

[Go to the website](#)



Website map



Didactic paths – research materials about general and modern Physics

Columns – biographies, book reviews , podcast

Schools – monthly and annual contest

Ask an expert – interaction with audience

Posters and multimedia products

Website map



Didactic paths – research materials about general and modern Physics

Columns – biographies, book reviews , podcast

Schools – monthly and annual contest

Ask an expert – interaction with audience

Posters and multimedia products

Some of these multimedia contents have been shaped in other communication products



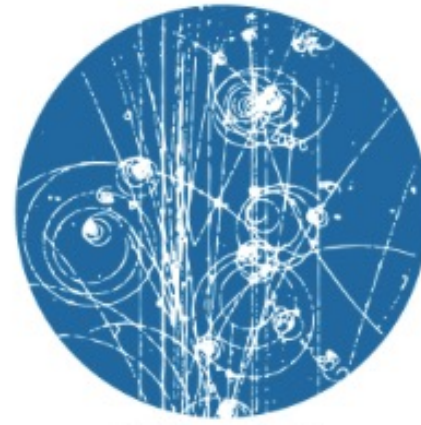
Didactic paths/ learning units

I percorsi divulgativi di SxT



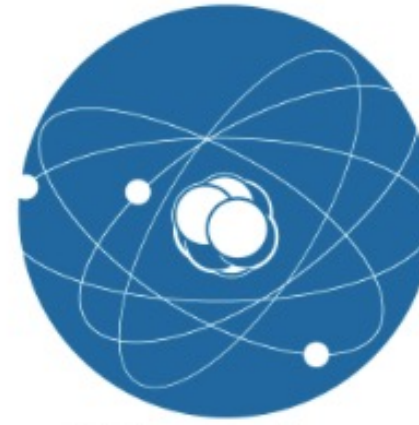
Astrofisica

Astrophysics



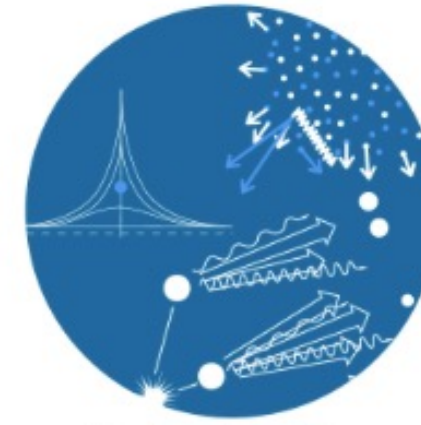
**Fisica delle
Particelle**

Particle Physics



Fisica Nucleare

Nuclear Physics



Fisica Teorica

Theoretical Physics



Storia della Fisica

History of Physics

45 educational resources



Didactic paths

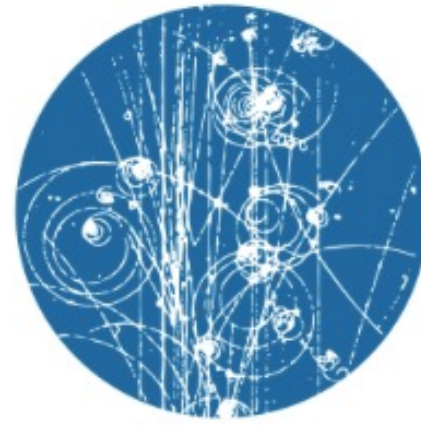


I percorsi divulgativi di SxT



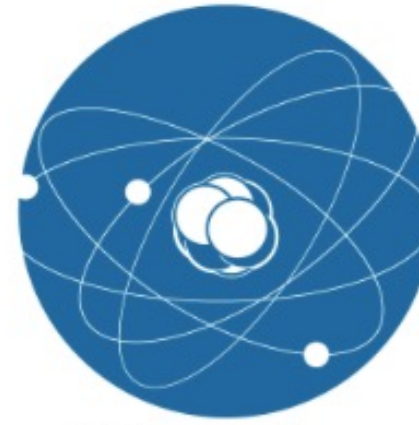
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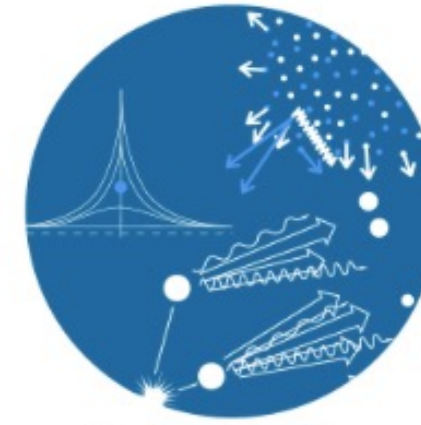
Fisica delle Particelle

Particle Physics



Fisica Nucleare

Nuclear Physics



Fisica Teorica

Theoretical Physics



Storia della Fisica

History of Physics

1. Il modello standard **The Standard Model**

modello standard

interazione elettromagnetica

interazione debole

interazione gravitazionale

interazioni fondamentali



Il percorso "IL MODELLO STANDARD" costituisce un vero e proprio vademecum per capire come sia fatta la materia, quali siano i mattoni fondamentali che la compongono e come questi costituenti interagiscano tra loro. Nel modello standard i fisici racchiudono la conoscenza che hanno elaborato studiando le particelle e le 4 forze fondamentali. Il modello standard non riesce tuttavia a spiegare tutto ciò che osserviamo e sono proprio gli interrogativi ancora aperti a guidare la ricerca nella fisica delle particelle, per comprendere fino in fondo l'Universo che ci circonda.

Table of contents

Il modello standard

- 1. Il modello standard
- 2. Interazioni tra le particelle
- 3. L'interazione elettromagnetica
- 4. L'interazione forte
- 5. L'interazione debole
- 6. L'interazione gravitazionale
- 7. Le forze fondamentali
- 8. I leptoni
- 9. I quark





Didactic paths

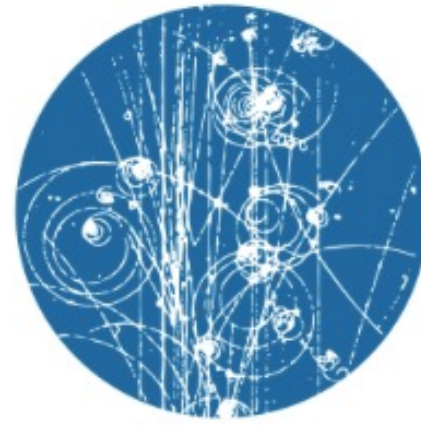


I percorsi divulgativi di SxT



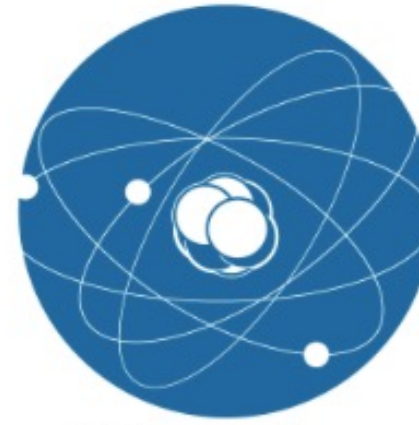
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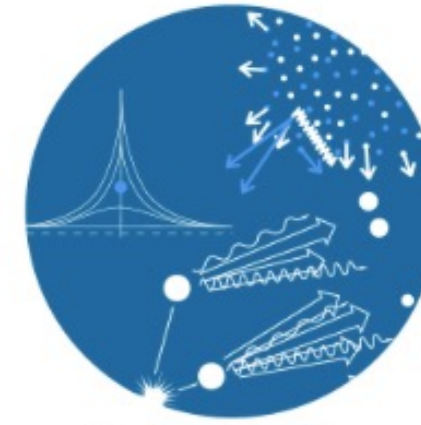
**Fisica delle
Particelle**

Particle Physics



Fisica Nucleare

Nuclear Physics



Fisica Teorica

Theoretical Physics



Storia della Fisica

History of Physics

Most-viewed [2021-2023]

1 A look to the light / Uno sguardo alla luce

2 Subatomic particles / La particelle subatomiche

3 Special Relativity / La Relatività Speciale

4 Quantum Mechanics / La meccanica quantistica

5 Discontinuities in Nature / La discontinuità della Natura





Columns

Biographies



Most popular biographies [2021-2023]



[1 Julius Robert Oppenheimer](#)

[2 Lise Meitner](#)

[3 Galilei Galileo](#)

[4 Hooke Robert](#)

[5 Marie Curie](#)



Biographies column

The column evolved in different outreach products



Biographies column

The column evolved in different outreach products

Calendar 2021, 12 months of discoveries

Lives of female and male scientists, protagonists of major achievements in Physics in the XX century.
Sent to 500 High Schools.



Biographies column

The column evolved in different outreach products



Calendar 2021, 12 months of discoveries

Lives of female and male scientists, protagonists of major achievements in Physics in the XX century. Sent to 500 High Schools.



Modern Physics through scientists and challenges

Science exhibition based on illustrations and biographies organized in an immersive art installation that trace the itinerary visit.

Ask an expert



Fai una domanda agli esperti della Scienza



Tutte le risposte dei nostri esperti



Most-viewed Answers of the expert [2021-2023]

- 1 What is the uncertainty principle?**
- 2 The size and weight of the Moon compared to Earth**
- 3 What is the twins paradox?**
- 4 Why is the sea salty?**
- 5 Why is the sky blue?**

More than 530 selected answers published on the website

From 1st January 2023 67 requests

Monthly contest

Post on ScienzaPerTutti Facebook page



Scienza Per Tutti INFN

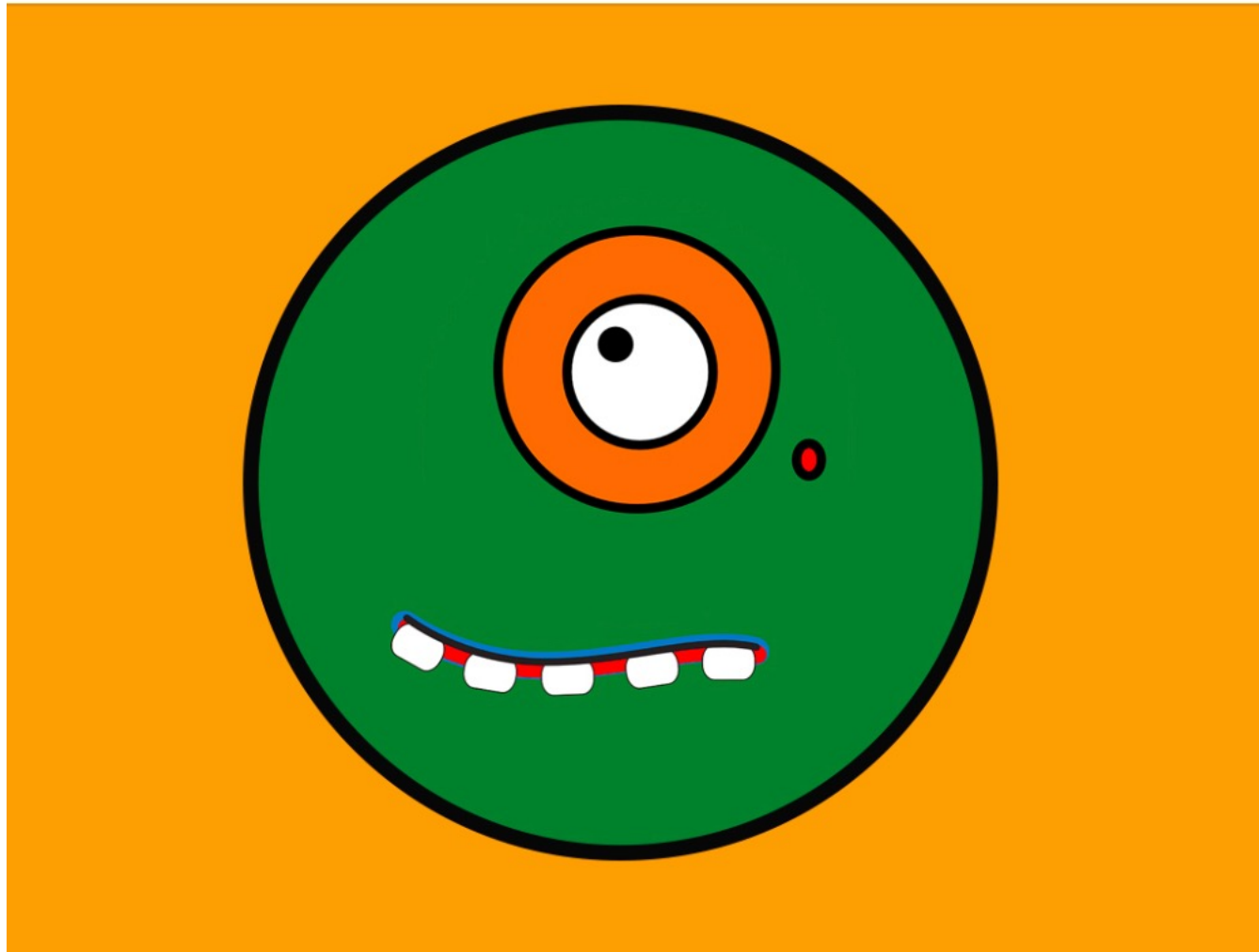
...

🔔 Ecco la domanda di novembre!

? Quale di queste particelle si può definire "strana"?

a. protone, b. pione, c. kaone, d. neutrone

🗨️ Motiva la risposta e scrivici in privato o a redazioneSxT@lists.infn.it



Which of these particles can be defined as *strange*?

1. proton
2. pion
3. kaon
4. neutron





Si può creare l'antimateria?

- a) No, l'antimateria è una invenzione degli scrittori di fantascienza
- b) Non c'è bisogno di creare antimateria, perchè l'Universo è formato al 50% di materia e al 50% di antimateria
- c) Si, l'antimateria è stata creata in laboratorio

11

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A selection of the monthly questions became a card quiz based science game that is played during science festivals and events.



Si può creare l'antimateria?

a) No, l'antimateria è una invenzione degli scrittori di fantascienza

b) Non c'è bisogno di creare antimateria, perchè l'Universo è formato al 50% di materia e al 50% di antimateria

c) Sì, l'antimateria è stata creata in laboratorio

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A selection of the monthly questions became a card quiz based science game that is played during science festivals and events. Last year the collection was organized in an app named BANG.



Annual contest for schools

IX - 2014
The broken symmetries

X - 2015
Light

XI - 2016
Time

XII - 2017
Infinity

XIII - 2018
Waves



XIV - 2019
Today I explain
3 minute video blog

XV - 2020
TWENTY TWENTY

XVI - 2021
Mistakes
The wrong physics

XVII - 2022
Eureka
Chronicle of a discovery

XVIII - 2023
It takes Physics
Physics in sports



edizione
XVISxT2021

ERRORI

la fisica sbagliata

nelle canzoni, nel cinema, nella letteratura e nell'arte



1 concorso
3 prove



Theme: Mistakes

Explain errors related to Physics issues in movies, songs, literature and arts

Rules of the contest

Students were asked to find one mistake related to Physics in one the mentioned areas and explain it

The contest combines three rounds:

1. Write a short text to introduce the selected subject and to explain the mistake
2. Create a meme to summarize the research
3. Realize a 2-minute video about the mistake and its implications

Participant categories

I category – Middle School students

II category – High School students – age 14-15

III category – High School students – age 16-19

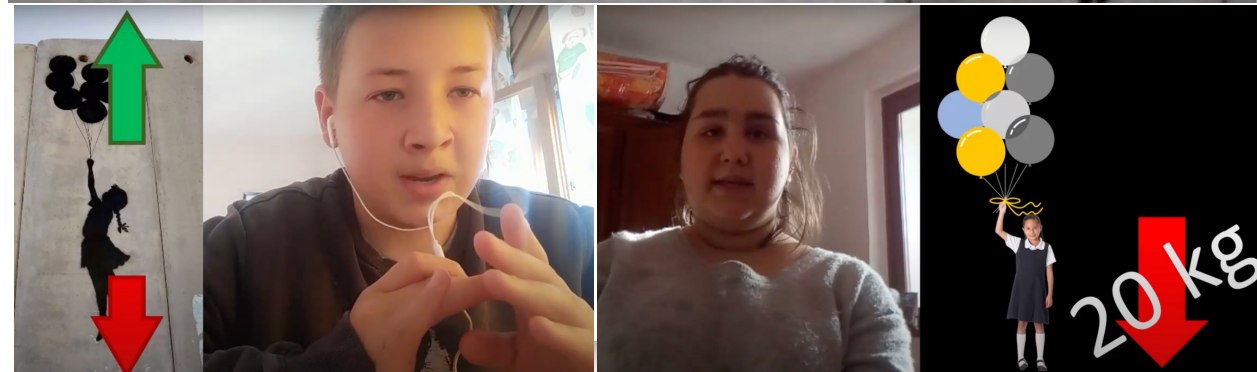
91 teams

356 participants

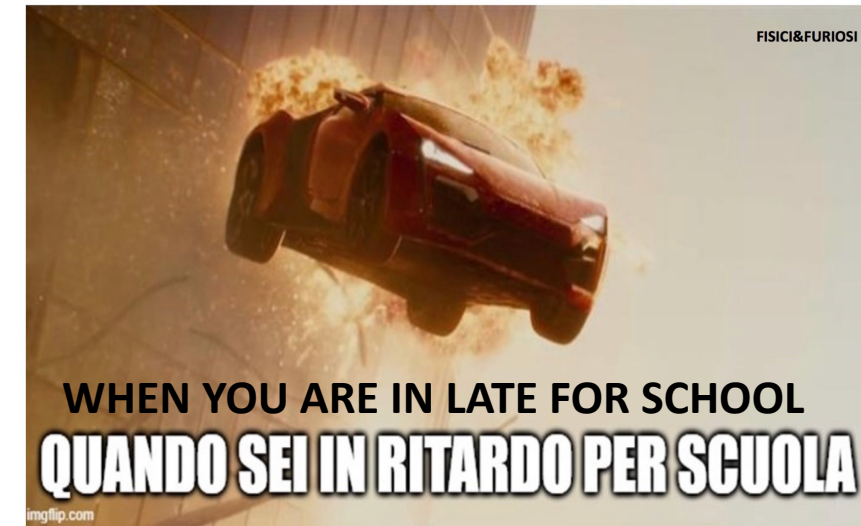
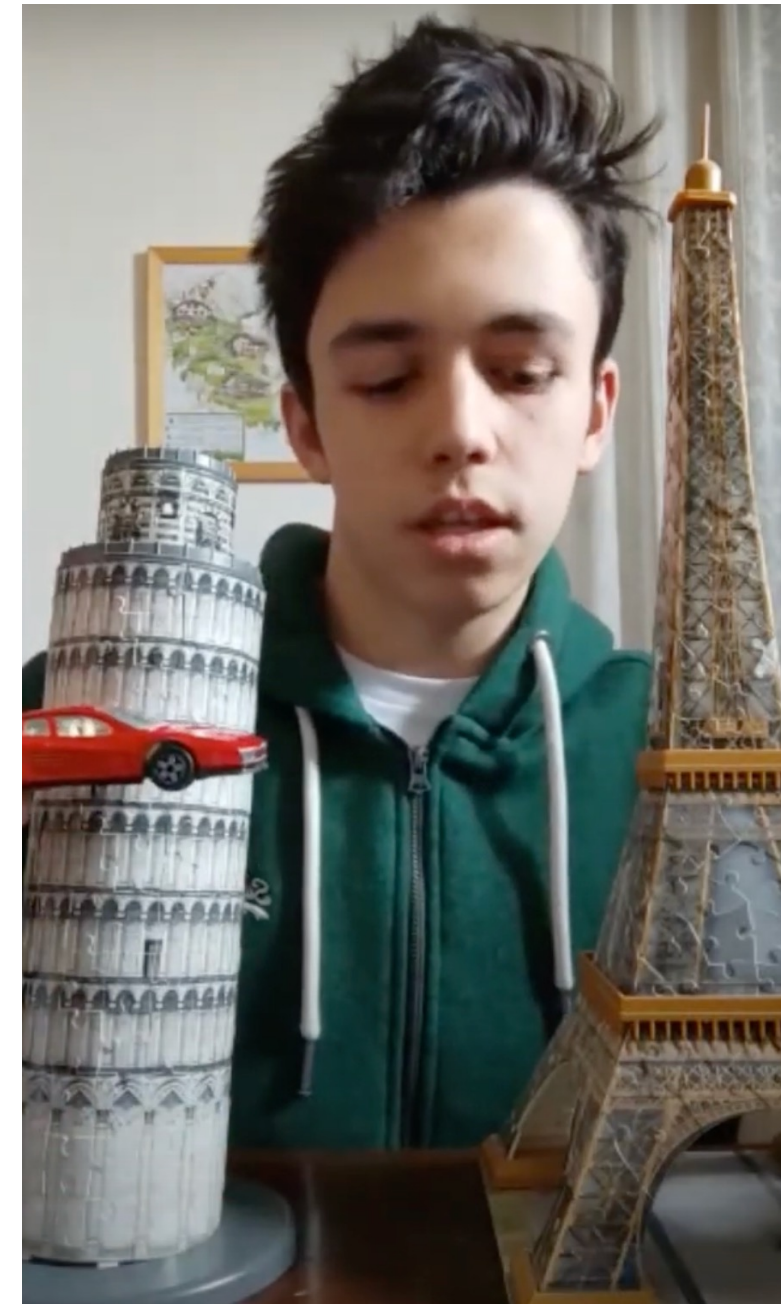
2021 edition - selected projects



Banksy and Archimedes' principle



Physics and furious



Eureka!

Cronaca di una scoperta



Theme: Science discoveries and facts

Rules of the contest

Students were asked to choose a discovery or a fact in the history of science. Playing the role of journalist they had to realize a short video to announce the discovery in that particular time.

Participant categories

I category – Middle School students

II category – High School students – age 14-15

III category – High School students – age 16-19

92 teams

300 participants

2022 edition - selected projects



The atomic bomb
Manhattan project



Torricelli and the barometer



The invention of microwave oven
How it works

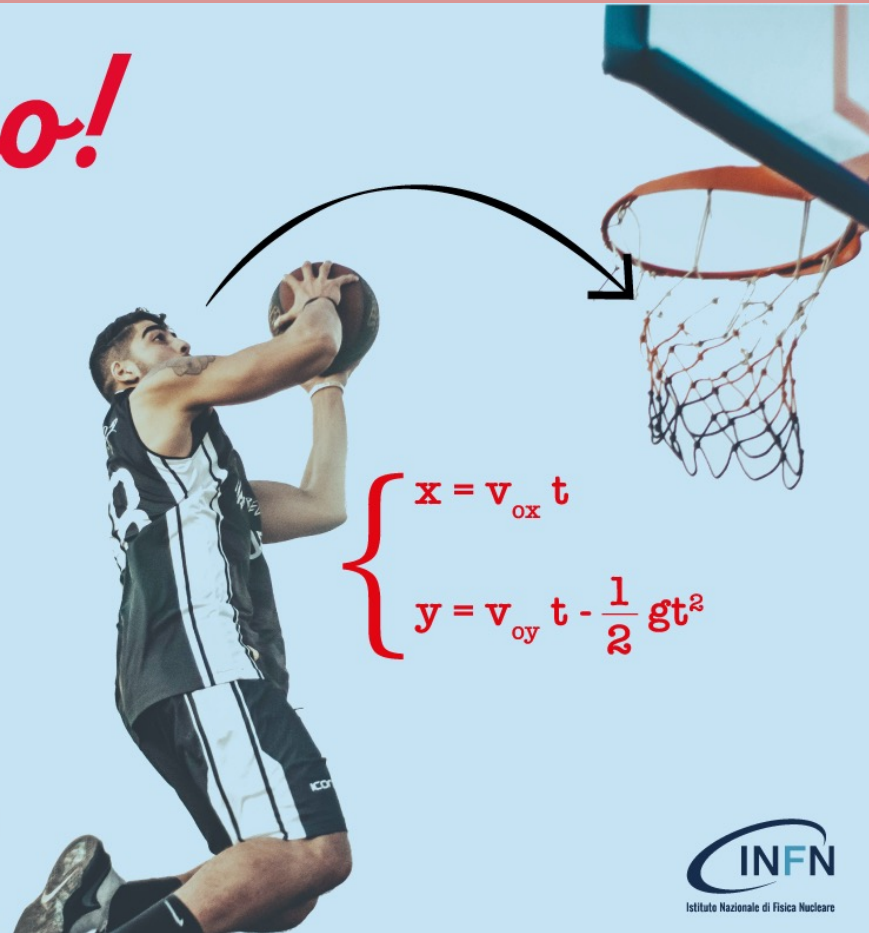
Full playlist https://www.youtube.com/@ScienzaPerTuttiINFN-SxT/playlists?view=50&shelf_id=4

Ci vuole il fisico!

La fisica dello sport



Concorso ScienzaPerTutti
per le scuole secondarie di I e II grado
XVIII Edizione Anno scolastico 2022-2023



Theme: The Physics of sport

Rules of the contest

Select a sport and explain the Physics behind it using a 5-minute video or audio, or in a short text.

For III category: imagine this sport played on the Moon or under the sea (change conditions) and invent a new sport.

In addition create a story for Instagram to promote the work.

Participant categories

I category – Middle School students

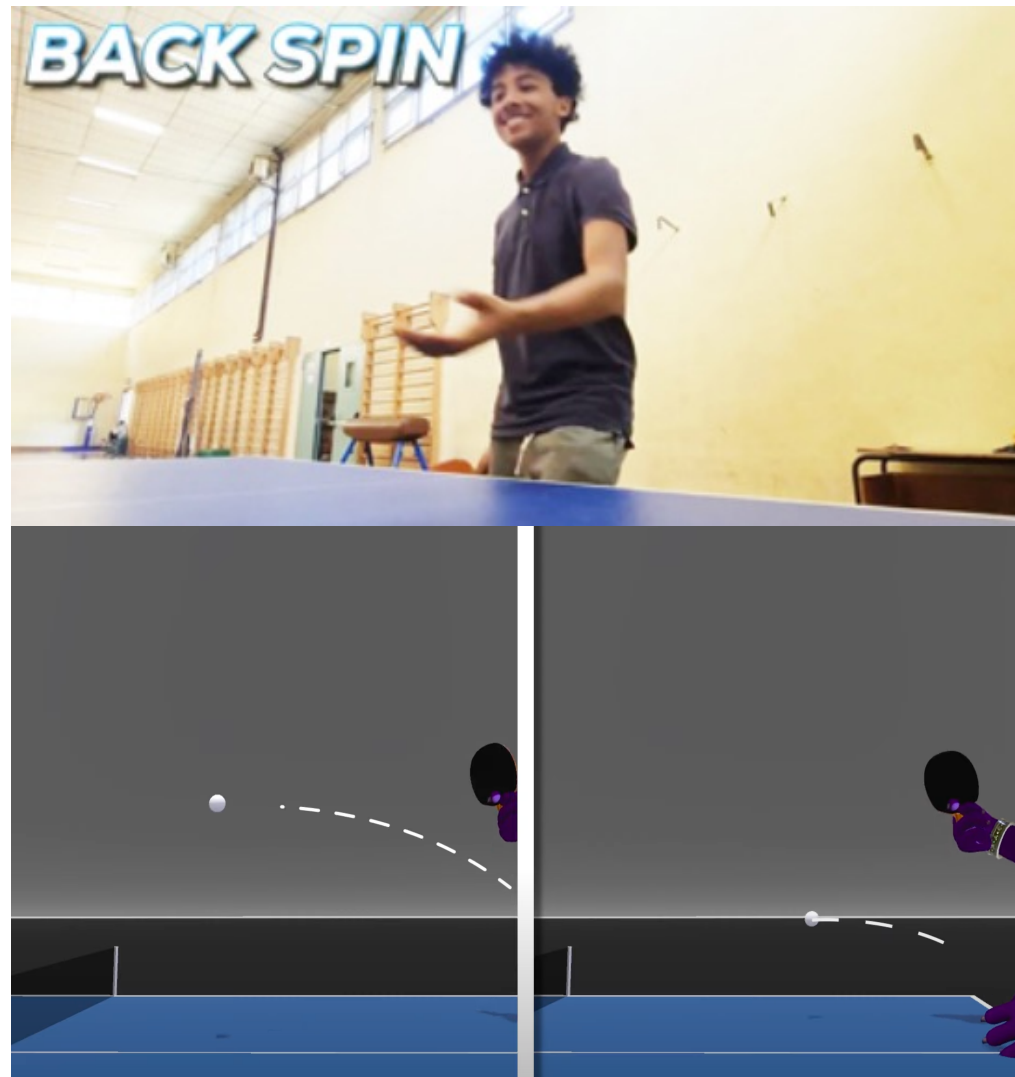
II category – High School students – age 14-15

III category – High School students – age 16-19

299 teams

1100 participants

2023 edition - selected projects



The Physics of table tennis and what happens if it is played on a Planet with twice the Earth's gravity

La quantità di moto la schiacciata

$\vec{p} = m\vec{v}$

La quantità di moto è una grandezza vettoriale utilizzata per descrivere il moto dei corpi e analizzare le loro interazioni.

L'impulso di una forza è una grandezza vettoriale che si ottiene dal prodotto della forza per il tempo in cui essa è applicata.

LEGGE DI CONSERVAZIONE DELLA QUANTITÀ DI MOTO

$F \cdot \Delta t = m_2 v_2 - m_1 v_1 \quad I = \Delta \vec{p}$

Il moto parabolico analisi

Noi studieremo: la 5 e la S (super)

Physics and volleyball



Ski jumping



Snowshoe hiking

SXT web editorial board



Laura Bandiera INFN FE



Anna Maragno UNIFE



Paolo Lenisa UNIFE/INFN FE



Marco Battaglieri INFN GE



Sabine Hemmer INFN PD



Danilo Domenici INFN LNF



Marco Cinausero INFN LNL



Stefano Marcellini INFN BO



Cecilia Collà Ruvolo INFN PRESID



Andrea Gozzelino INFN LNL



Francesca Cuicchio INFN PRESID



Chiara Oppedisano INFN TO



Susanna Bertelli INFN LNF

Conclusion



INFN ScienzaPerTutti is a web portal dedicated to the main Physics topics and in particular to the research conducted by INFN. The purpose is to inform High School students and teachers about discoveries, experiments and key concepts of modern Physics.

Feedback is positive, having an average of 2500 entries per day, nevertheless we would like to enlarge our reachability and several updates will be performed in the near future.

We are planning focus groups with our target audience in order to optimize some of the contents. As the interest in participating in public outreach initiatives is growing, we are working on exhibits and products related to the content of the website that will be showcased in these events.

The annual contest for schools is a meaningful activity that allows us to probe the interest of students towards science and have important feedback. We are currently designing a new format to improve the engagement of students.



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<https://bangsxt.infn.it/game>

