



Contribution ID: 1151

Type: Poster

“PER (Particle Escape Room) me si va ne la fisica recente”

Friday, 8 July 2022 20:27 (3 minutes)

In recent years, outreach activities have acquired great importance among the three university missions for the involvement of the non-expert community.

In this context, the “Physics4Teenagers” outreach group of the University of Pavia Physics Department, in northern Italy, designed the “PER me si va ne la fisica recente” experience.

In physics promotion, our major target is usually high school students with a particular focus on the choice of their future studies. As a matter of fact, for more than ten years, we have been organizing the “TenDaysPhysics4Teenagers” summer school for an audience of about thirty teenagers from different cities. About 30% of those former attendees are now enrolled as students at our Department, confirming the effectiveness of our method.

With this in mind, we decided to exploit a new format: the educational escape room. Based on the success of recreational escape rooms, this format has acquired great visibility in the last decades, combining entertainment with learning goals. Besides, it allows for the development of soft skills such as collaboration and critical thinking through hands-on activities.

This experience was designed for the “Festival della Scienza” in Genova at the end of October 2021. The keyword of the edition was “maps”, thus we created a journey through the history of particle physics from the atomic theory of Democritus to the discovery of the Higgs boson, which completes the Standard Model. Furthermore, we pushed the boundaries of our map towards the questions that remain unsolved in this theory, such as the problem of dark matter, neutrino masses and oscillations, and unification of forces. The choice of the topic was driven by the fact that nuclear and particle physics has been recently introduced in the ministerial guidelines for high school teaching, and we strongly believe that such an activity could lead to interesting insights.

Moreover, since in 2021 the 700th anniversary of Dante’s death was celebrated, we shaped this journey like the one carried out in the “Divina Commedia”. Democritus, performed by us, plays the role of Virgilio, guiding the audience through the most important steps of particle physics history in the first room. Then, unable to answer the questions left unsolved by the Standard Model, he gives way to a modern and scientific version of Beatrice, the curiosity, that in a second room tries to shed light on open problems.

All the puzzles proposed were crafted by hand, exploiting, when possible, recycled and inexpensive materials. Among these, the following are worth mentioning: the reproduction of Rutherford’s experiment, the analysis of cosmic rays particles behavior in a magnetic field and the theoretical hypothesis of the neutrino existence. In the first one the users were asked to shoot little rubber bullets to a gold coloured tissue paper, tracking the same experimental results obtained by Rutherford and deducing the planetary model of the atom.

In the second one, the participants could play with a control panel changing parameters, such as mass and charge, to interactively simulate the trajectories of particles in a magnetic field. This allowed the explanation of muon, pion and positron discovery.

Finally, the users were guided through the theoretical prediction of the neutrinos by applying some simple conservation laws (charge, baryonic and leptonic number), just as in a typical escape room puzzle.

During the festival, we hosted around one thousand participants, both high school classes and groups of non-students of different ages.

The experience was then installed in the “Liceo Respighi” high school in Piacenza for one week in March 2022, reaching around 400 students. In next months, it will be proposed at the “Liceo Copernico” of Pavia and in the frame of the European Researchers Night program.

At the end of the escape room, we asked the participants for feedback and suggestions through a satisfaction questionnaire. The good results in both occasions confirm the suitability of the format and the effectiveness

of the friendly and informal attitude.

With this contribution we will discuss details of the activities and results, mentioning future installations and possible improvements.

In-person participation

Yes

Primary authors: ARMANETTI, Arianna (Università di Pavia); AIMÈ, Chiara; MONTAGNA, Paolo Maria (Istituto Nazionale di Fisica Nucleare); AURELIO, Daniele (IIS "Favarelli" Stradella (PV)); GIANATTI, Davide (Università di Pavia); SANTOSTASI, Davide (Liceo "B,Cairolì" Vigevano (PV)); BUDASSI, Ettore; ZATTI, Luca (Università di Pavia); PIROLA, Michele (Istituto Nazionale di Fisica Nucleare); RESTELLI, Simone (Università di Pavia); VENTURINI, Simone

Presenter: VENTURINI, Simone

Session Classification: Poster Session

Track Classification: Education and Outreach