

The OSOS PROJECT and IPPOG

Boyka Aneva
Bulgarian Academy of Sciences

25th IPPOG meeting, 9-13 May, Sofia

Outline

- Prelude – The Music of Physics in Sofia
- The OSOS Project
- CERN Masterclasses in Bulgaria
- Young Physicists' Tournament & Workshop
- Students Projects
- Teachers Training



*Music
of Physics*
Sofia, Bulgaria
**10-12 May
2018**

Music of Physics Fest

- A three-day event
- at the Sofia Science Festival – for high school students
- at the City Mark Art Centre – for general public
- at the National Music Academy – for students and musicians

Program

- **The Physics of the LHC:** Seeking the Composition of Our Universe (Steven Goldfarb)
- **The Music of the LHC:** Physics and Composition (Roger Zare with the Silhouettes Chamber Ensemble)
- **The Theremin:** Physics and Instrumentation (Dorit Chrysler)
- **The Cosmic Piano:** Music of the Cosmos (Guillermo Tejeda Munoz and Arturo Fernandez Tellez with Pianist Karolina Koynova)
- **A Musical Experiment** (Everyone)

OSOS - Open Schools for Open Societies Project

HORIZON 2020 European Program for Research and Innovation

Objectives:

- Schools – accelerators of innovation
- Schools – innovative ecosystems - shared sites of science learning for which leaders, teachers, students and the local community share responsibility, and from which they all benefit
- Schools-increase community science culture & responsible citizenship

Partners: Spain, Portugal, Netherlands, Finland, France, Ireland, Israel, Greece, Germany, EPS, Bulgaria

OSOS – Inspiring to

FEEL

IMAGINE

CREATE

SHARE



**Open
Schools for
Open
Societies**

The Open Schools for Open Societies project (OSOS) provides innovative ways to explore the world, to inspire, to engage, to connect.

The OSOS Project

An Open School - a School that is open to other Schools,
to the Local Community, to Local and Global Problems

Essential Ingredients of the Open Schooling Methodology

INQUIRY BASED LEARNING

SCIENCE BASED LEARNING

PROJECT BASED EDUCATION

International CERN Masterclass

- Science Based Learning
- Lectures by active scientists on basic concepts and methods in particle physics
- Students perform measurements on real data (CERN open data) from LHC experiments
- Students analyse the results
- Students report and discuss the results in a videoconference like in a real research collaboration

CERN Masterclasses in BULGARIA

- The first CERN CMS Masterclass In Bulgaria – 23.03.2018
at the Faculty of Physics, University of Sofia
69 students from the whole country,
selected out of more than 100 candidates
16 teachers, 12 scientists, 3 IT

Organised by INRNE – BAS and Faculty of Physics, Uni Sofia in
collaboration with CERN, IPPOG and with the support of OSOS

CERN Masterclasses in BULGARIA

2019 – 2023 Every year CMS MC in four cities of BG

150 – 160 participants

Sofia - at the Faculty of Physics, recent at the Tech Park

Varna – at the National observatory N Copernicus

Plovdiv – co organizer the University of Plovdiv

Kozlodyu, Smolyan, Svistov, Pernik,

Russe, Pleven, Dimitrovgrad

Vratsa 2023 – ALICE masterclass

Particle Therapy Masterclass

- Organised by the Faculty of Physics, Uni Sofia in cooperation with IPPOG
- Software - DKFZ Heidelberg
- Direct relation of fundamental research and applied research
very important and useful impact for the society
- Organised in BG every year since 2021
26.03.2021; 11.02.2022; 10.02.2023
- about 40 participating students in each MC





Young Physicists' Tournament & Workshop

- Organised in Sofia 11.-13.04.2018 as an event implementing Inquiry Based Learning and the OSOS Open Schooling approach
- Participants from Greece, Serbia, Slovakia, Bulgaria:
students, team leaders, teachers
- YPT – **unique competition** – as fights between teams of 3-5 students
- team roles in fights: **Reporter, Opponent, Reviewer**
- mimics real life research

INQUIRY BASED LEARNING activity

- 17 research problems by International Committee (end of summer)
- students work in teams on the problems for months in advance
design experiments, do inquiries, imagine possible solutions, analyze, draw conclusions
- In the fights: **Reporter** presents the work done and the results
- **Opponent** makes a critical analysis of the report, **Reviewer** summarises positive and negative issues of both presentations
- **Jury** of Experts assesses the results and selects the **Winners**

Aims of YPT&W

- Soft skills – analytical and critical thinking, creativity, English language
- Platform for discussion with the teachers on Inquiry Based learning and Science Based Learning
- Increase the interest of students and teachers in YPT
- Regional Tournament

YPT&W becomes a Tradition

as a Regional Tournament

april 2019 YPT&W - teams Bulgaria, Greece, North Macedonia

19.-23.04.2023 YPT&W - 7 teams Bulgaria, Greece, Romania, Slovakia,
Turkey



05:06 of 05:00



14. Looping Pendulum

Thank You!



ИНСТИТУТ
ЗА ЯДРО
ИЗСЛЕДВАНИЯ



FEEL

CREATE

Teachers Forum Innovative Practices

- Training Seminars:
- implementing IBL to solving open research problems in natural science education at school
- work with CERN open data measured in the experiments on LHC
- studying earthquakes following the program of the European Erasmus + project SNAC – School Networks Alert Citizens

71 teachers, 9 scientists

Some best practices/ projects developed by different schools

*School 5th Hristo Botev Kuystendil
Project - Suitable and quality food for Astronauts*

Gymnasium "N.Vaptsarov" Shumen Project - Hunting for Asteroids

*High School for Natural Science and Mathematics Vratsa
Project Let me EnterStem you - based on their work for the CERN project
competition "Beamline for Schools"*

<https://www.youtube.com/watch?v=bF6QGXaAj68>

*With this Project the school and the teacher Pavlova have won second place
in the National Contest SuperStem 2019*

OSOS project in Bulgaria

- 10 very active schools – hubs – inspiring and attracting many other schools for the OSOS open schooling approach
- National Open Schooling Day – 5 October 2019 – 18 projects
3 primary and 15 high schools
- The main OSOS inspired activities continue after the OSOS project becoming

TRADIION

THANK YOU