The Events of FYKOS 2024/25

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Abstract

This year, as well as many others, FYKOS organized a great number of exciting events for high school students. From long-term competitions to large physics contests, the FYKOS team had quite a lot of work to undertake. Let us take a look at the most significant of these events.

FYKOS

FYKOS[1] is a correspondence competition with physical topics. The competition primarily targets high school students and has four categories according to the four common high school years. Students of lower grades can also compete; however, they are included in the first-grade category.

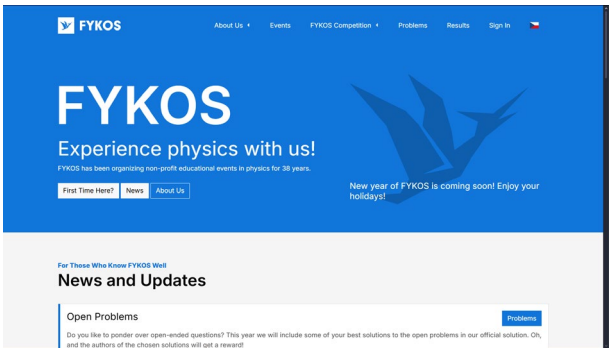

Figure 1: FYKOS' website

FYKOS comprises six series, each of which consists of eight unique physics problems. These problems are diversified both by their nature and their field. In each series, there are five theoretical problems of increasing difficulty according to the problem number. Then there is an open problem, an experimental problem, and a serial problem. Open problems encourage students to investigate and research the topic in question. To successfully solve an experimental problem, students need to perform an experiment and then process their data. The last problem of each series is always the so-called "serial problem", these problems are thematically connected with the other serial problems of the series and each comes with an educational text. This year, the serial was dedicated to quantum chemistry.

[1] https://fykos.org

The first series was published already in June, not long after the previous year of FYKOS concluded. The diligent students who managed to submit their solution before the start of a school year had a chance to get invited to the autumn FYKOS camp which was mainly, though, for the solvers of the previous year. The autumn FYKOS camp took place in Lázně Libverda at the end of September. Traditionally, the week was packed with scientific programs, such as lectures or experiments, as well as camp activities.

Figure 2: Autumn FYKOS camp 2025

After the autumn camp came the other five series of FYKOS, the last of which ended in May, just after the spring FYKOS camp. The spring FYKOS camp is, just like its autumn counterpart, a camp for the best solvers of the competition, in this case only the points from the first half of the competition are included. This year it came to pass in Bílý Potok at the end of April and the beginning of May. With the last deadline, FYKOS ended and the winners were finally announced. The winner of the first-grade category is Max Menčík, of the second grade is Kosma Šatánek, of the third grade is Damián Šatánek, and finally of the fourth grade is Jakub Kubica. Congratulations to the winners and good luck with their future studies.

Náboj Physics

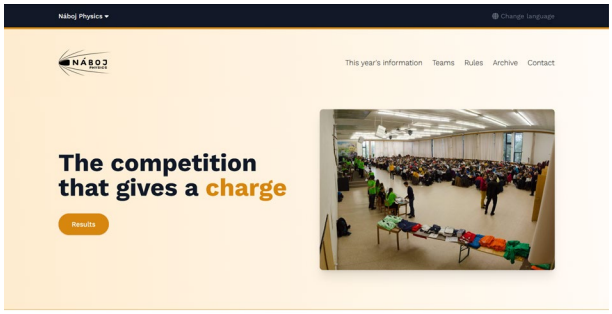

Figure 3: Náboj Physics website

Náboj Physics[2] is an international competition organized by Trojsten which is a Slovak educational organization. FYKOS is responsible for organizing the Czech branch of the competition that takes place in Prague and Ostrava. The competition is intended for four- to five-member teams of high school students. So as to be more fair, Náboj Physics has two categories – senior and junior. In the junior category, the students of the last two years of high school cannot participate.

The course of the competition goes as follows: The teams receive a set of eight problems, subsequently, when a successful solution of a problem is presented, the team obtains a new one. The total number of prepared problems is 40 and their difficulty increases with every problem. The team that has solved the most problems during the two-hour period wins. The results are evaluated locally; even though the contest takes place simultaneously in numerous

[2] https://physics.naboj.org/

countries all over Europe. The results from other countries serve as a means of comparison and also spark a little bit of additional rivalry.

This school year, Náboj Physics took place in Prague and Ostrava on November 15, 2024. A total of 86 teams from all across Czechia participated in the contest. The winner of the Junior category was the team from Wichterlovo gymnázium consisting of Mikuláš Hořenek, Matyáš Měch, Václav Holuša, Ondřej Kočur, and Filip Gašparín. The first prize in the Senior category was won by the team also from Wichterlovo gymnázium consisting of Marco Kormanik, Petr Němec, Michal Matoušek, Richard Beneš, and Vít Kaděra. Congratulations to the winners!

Fyziklani

Similar to Náboj Physics, Fyziklani[3] is an international team competition organized by FYKOS. The teams can consist of up to five high school students from a maximum of 2 schools. According to the level of education among the students in the team, they are put into one of the three categories.

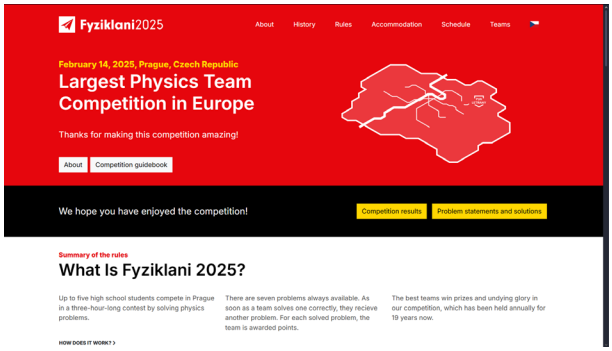

Figure 4: Fyziklani website

The rules of this contest resemble a bit those of Náboj Physics in the manner that the teams also get a set of problems, in this case seven, and when they solve one problem a new one is immediately given to them. However, the grading of the problem in this competition depends not only on the correctness of the answer but also on the number of attempts it takes the team to get to the right solution. The first place earns the team with the most points. It is also allowed to use any literature as a source during the competition.

This year teams from all over the world gathered in February for (almost) a week in Prague to compete in the 19th year of Fyziklani. Foreigners and locals alike awaited a rich accompanying program that began on Wednesday, February 12, where the competitors gathered on the tour of Stefanik Observatory. Thursday started with lab tours of the Faculty of Mathematics and Physics complex, after which came a lecture on the Physics Approach to AI Safety and Adversarial Robustness. The day ended with a panel discussion with several scientists, where they shared their personal experiences.

Then came Friday, February 14, and the contest itself. Nearly 1,200 participants in 246 teams from 14 countries assembled at PVA Expo Prague. The event, which everyone was waiting for, started at 10:30 and lasted three hours, after which the results were evaluated and the winners were announced. In the “A” category won the team NANITZA KOPILE from

[3] https://fyziklani.org

Romania consisting of Ionut Gabriel Stan, Tudor Dan Popescu, Rares Felix Tudose, Bogdan Mihai Ciocârlan, and Andrei Vila. In the category "B" scored the most points the team Flux Deluxe from Serbia with the following members: Andrej Drobnjaković, Jovan Kulezić, Rastko Ilić, Vladimir Đurica, and Dušan Lazić. And in the "C" category took first place the team Aproximátori from Slovakia consisting of Dávid Lučivňák, Martin Pistovčák, Martin Cingel, Michal Haverlík, and Marián Kovaľ. Best of luck to all the competitors next year.

After the competition, some participants moved to analysis of the problems where the correct solution to all the problems was shown. In the evening, a party took place in one of Prague's clubs. On Saturday, participants had a chance to attend a series of physics-related lectures and then go to the Science show. The end of the whole event was on Sunday, when the last program was underfoot and it was a City Rally. The contestants formed small groups in which they solved various tasks related to Prague that sent them through the streets of the city. Thereafter there remained nothing more than to send all the participants home full of exciting memories and start preparations for the next year.

Physics Brawl Online

Physics Brawl Online[4] is an online international physics contest for high school teams of up to five students. Similar to Fyziklani, Physics Brawl Online has 3 competitive categories – A, B, and C – where teams are divided according to the average level of (high school) education. However, there is also the Open category that is non-competitive, where anyone can experience the thrill of the competition.

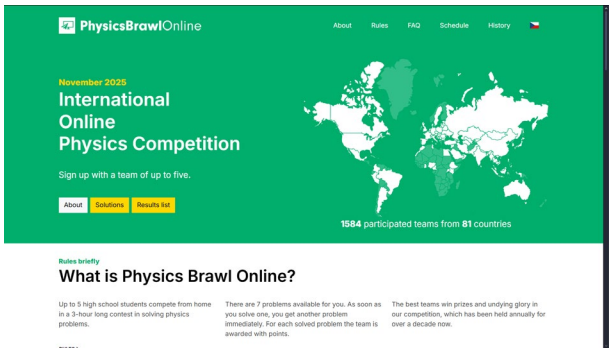

Figure 5: Physics Brawl Online website

The rules of the competition are almost identical to those of Fyziklani. The teams get a set of problems at the beginning and with each solved one, they get another one. The amount of points received depends on the number of tries the team needs to get to the correct answer. However, there are also a few differences between the two competitions. The major distinction is that Physics Brawl Online takes place online, therefore various online sources of information are allowed, except for the use of generative artificial intelligence tools. Another distinction of this competition is the Hurry-up series of problems, where competitors can gain bonus points for solving one of the mini-series with topic-related problems. However, this option is open after an hour into the competition and only for half an hour. The last significant change is the existence of an option for skipping problems. Half through the contest, teams can choose to skip up to ten problems, which, however, costs them one point.

[4] https://physicsbrawl.org

This school year on November 20 happened the fourteenth year of Physics Brawl Online with 6324 participants assembled in 1574 registered teams from 81 countries all over the world. The Hurry-up mini-series of this year had three topics – Mechanics, Hydrodynamics, and Solar sail. In the end, the competition had three winners. In the "A" category took the first place team from Romania with the name NANITZA KOPILE consisting of Ionut Gabriel Stan, Rares Felix Tudose, Tudor Dan Popescu, Andrei Vila, Bogdan Mihai Ciocârlan (the same team that won Fyziklani). The "B" category was won by the team from India called PhysicsE which consisted of only one member Evyavan Choudhary. And in the "C" category triumphed the team nyaa ichi ni san nyaa arigato from Singapore comprised of Ming Yuan Loh, Caleb Lim Shi Jie, Kieran Ho Jianming, Hong Shyan Yee, and Jia Shuo Asher Khoo. Congratulations to the winners and good luck to all next year.

Conclusions

The year 2024/25 was indeed packed with many events of FYKOS. Throughout the year, FYKOS brought education and inspiration to thousands of high school students interested in physics. And as soon as all of the events ended, the preparations for the next year commenced. The whole team is excited for the year 2025/26 which will hopefully include even more physics than the last one.

Acknowledgments

We would like to thank all the students, teachers, and volunteers who participated in and supported FYKOS events throughout the year. Special thanks go to our organizing team, problem authors, reviewers, and partner institutions, including the Faculty of Mathematics and Physics at Charles University. Without their dedication, none of this would be possible. We are also grateful for the continued support from our sponsors and collaborators, who help us bring physics closer to young minds around the world.