DragoNews

6th European Physics Olympiad | Ljubljana, Slovenia | 20–24 May 2022

22nd May 2022, Sunday

Weather forecast Ljubljana 25 °C

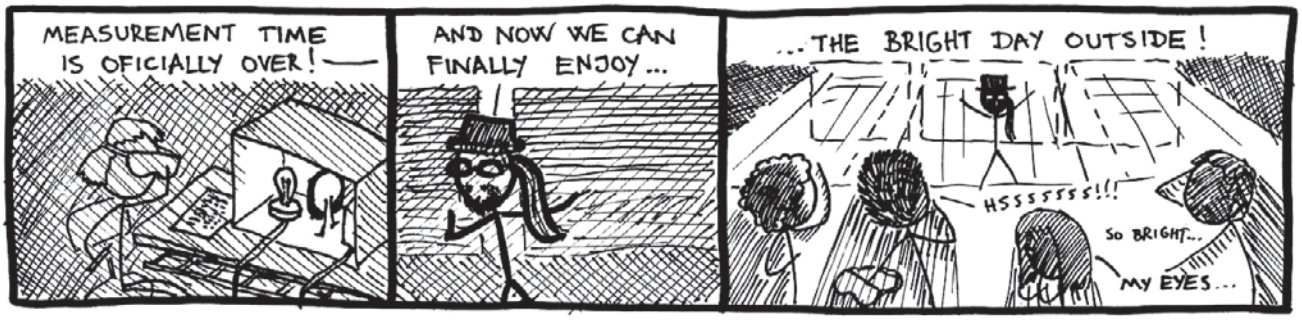
Illuminating the dark

The quest of the experimental exam

On Saturday morning, the experimental exam of EuPhO 2022 took place. The students started their examination at 9:00 am and the room was darkened for conducting the experiments. The experiment question was about the physics of illumination. There were three tasks, namely: colour and temperature, luminous efficacy, and radiative heating. The exam lasted for 5 hours, and a very observable phenomenon besides the sweating students and anxious faces, was that the room's temperature started at 24 degrees at 9 am and went up to 26.5 degrees by 2 pm!

Emil Scharin from Team Sweden said, "The experiment exam was hard, but do-able." Team Macedonia had a different opinion. Emilija Nikolovska and Jan Stojanovski said, "Time was insufficient for us." Matej Gelev said, "This year's experiment was more oriented towards measurements and the process of doing things." Odita from Latvia said, "This is my first time at the Olympiad. The problems here were challenging, but amazing. I don't think we will ever get an experience of such a different variety like this elsewhere, the way an Olympiad gives you." Now, the rest remains to be seen. The students take the theoretical exam on the morning of 22nd May. We wish the students all the very best!

Students taking the experimental exam



The Opening Ceremony

The opening ceremony took place at the Faculty of Physics and Mathematics on the evening of 20th May. It started by some soulful music, and very soon, the aura of physics merged with the rhythms. The Society of Mathematics, Physicists, and Astrophysicists welcomed all 182 participants from the 37 delegations that arrived at Ljubljana. Prof. Jaan Kalda, President of the EuPhO, spoke about how a combination of luck and hard work is an important factor as a measure of success at any Olympiad. Other eminent speakers were Prof. Dr. Simon Širca, Chairman of EuPhO 2022, Prof. Dr. Boštjan Golob, Rector of University Nova Gorica, and Prof. Dr. Jurij Bajc. The opening ceremony was followed by dinner.

The Opening Ceremony

Slovenian Physicists

Jožef Stefan is the most famous Slovenian physicist of the past. His name stands for the name of the largest Slovenian scientific institute, IJS, located in Jadranska Street, on the opposite side of the Faculty of Mathematics and Physics and is connected with the Peterlin Pavilion, where the opening ceremony of the 6th EuPhO was held. His name is also used for the Stefan-Boltzmann law, the Stefan-Boltzmann constant equation, the Stefan adhesion, the Stefan problem, the Stefan equation, the Stefan formula, the Stefan flow, the Stefan number, the Stefan tube, and the Maxwell-Stefan diffusion.

Jožef Stefan

Born in 1835 in a village called Sv. Peter in the Austrian Empire, he was the son of an illiterate man and a servant girl. Jožef showed his talent in just elementary school and was grateful to his parents who supported him during his studies. In 1858, he chose mathematical physics at the University of Vienna. During his studies, he also wrote and published several poems in Slovene.

The most famous Stefan's equation is Stefan's Law equation, which states that the radiant flux density equation, also called irradiance as you learned from the experimental problem of a black body emitting electromagnetic radiation is proportional to the fourth power of the absolute temperature. The constant of proportionality is, of course, the Stefan-Boltzmann constant.

Stefan's most famous student was Ludwig Boltzmann. All members of the Slovenian EuPhO team participated in national competitions for the bronze, silver, and gold Stefan prizes during their elementary and high school years, winning several of them.

University of Nova Gorica

The University of Nova Gorica is situated in the western part of Slovenia, in central Europe. And what better way to describe it in the words of the European University Association Institutional Evaluation team, "*We have found a small, young, active, and enthusiastic university of happy and satisfied students.*"

of Science, School of Humanities, School for Viticulture and Enology, Graduate School, and School of Arts.

EuPhO students may be interested in their School of Science, with study programs in Physics, Astrophysics, and Environmental Sciences. The school's first or bachelor level offers general

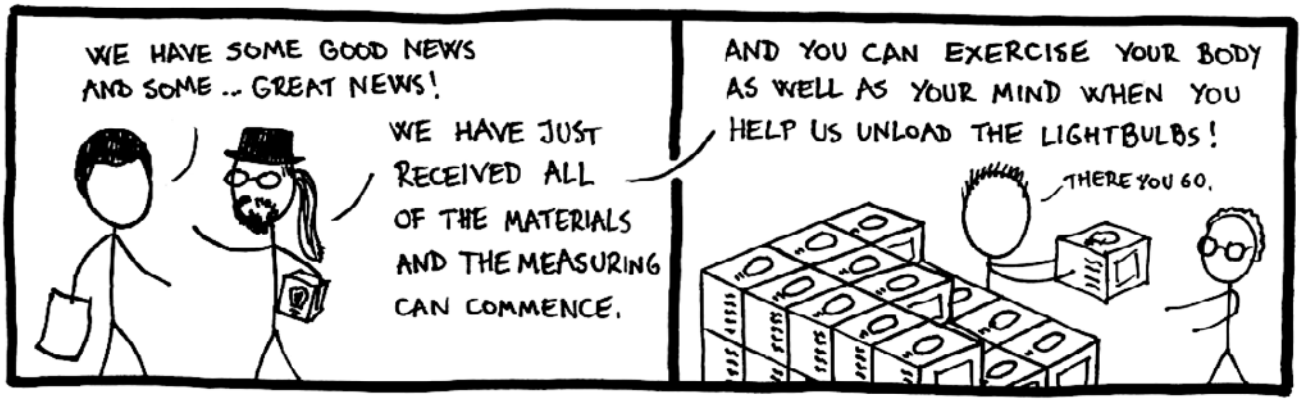
Prof. Dr. Boštjan Golob, Rector of the university, who attended the EuPhO opening ceremony mentioned that the University of Nova Gorica will offer two scholarships each, for the best performing female and male student. The university consists of 6 faculties and one academy; The School of Environmental Sciences, School of Engineering and Management, School

foundations of physics and astronomy, and continues with special courses oriented towards Astrophysics (Astronomical Observations, Stellar Astrophysics, Galaxies and Cosmology, and Astroparticle Physics). Some advanced physics topics such as Mathematical Physics and Quantum Mechanics are included in the curriculum as well. At the second or master's level, the emphasis is on the research work for the Master thesis, where one can fully take advantage of the university's robotized telescope positioned in the Atacama Desert in Chile.

After the Master thesis, a way to a PhD is open through the third or doctoral level program in Physics, or any of the other eight PhD programs. At this stage, the well-equipped university laboratories for Environmental and Life Sciences, Organic Matter Physics, Materials Research, Quantum Optics, Astrophysics and Cosmology, Atmospheric Research, and several others offer posibilities for cutting edge PhD research.

University of Nova Gorica welcomes you as their future students. Further information can be obtained at https://www.ung.si/en/.

Light 'em up!



The legend of Lake Bled

In the heart of Slovenia's most beautiful lakes, Lake Bled, lies a small and charming island, with a church at the top. Perched on a rock overlooking the lake is the iconic medieval Bled Castle. Known as the 'Wishing Bell', you could ring it while making a wish, which then supposedly comes true. There are many tales in Slovenian folklore that go hand-in-hand with about the origin of Lake Bled and Bled Island. Lake Bled with its mesmerizing surroundings is one of the most visited and recognizable tourist destinations in Slovenia. It offers a spectacular view of the mountains and the crystal blue water of the lake.

The tectonic structure of the lake has not only shaped the lake itself, but has also contributed to the emergence of many thermal springs on the east side of the lake, where the temperature does not drop below 20°C. A tectonic hole made by the Bohinj glacier through the years, once existed at the location of the lake. Its path was obstructed by a huge rock which was scraped until the remnant was the present island. The ice melted and the basin filled with water, thus Lake Bled emerged, which is in some places up to 30 metres deep and quite popular amongst divers. Around 19 species of fish live in the lake, including carp, sheatfish, and lake trout. Ducks, swans as well as diverse plants also thrive on its surface.

Human traces from prehistory have been found on the island. Before the church was built, there was a temple devoted to Živa, the Slavic goddess of love and fertility. Another legend is about the story of young shepherds, who shepherded their sheep on a meadow. Mountain fairies danced in the meadow at night. The sheep often wandered off to a chapel that was in the midst of the meadow. To protect the fairies from the grazing sheep, Nature decided to create a lake around the chapel to protect it. That is how Lake Bled and the island with the church got created.

You can try the traditional Slovenian dessert called blejska kremna rezina, also known as blejska kremšnita or the Bled cream cake, which is considered an original feature of town Bled.

Škocjanske jame

Škocjan Caves are of exceptional significance in Slovenia, and are on UNESCO's list of natural and cultural World Heritage Sites. International scientific circles have acknowledged the importance of the caves as one of the natural treasures of planet earth. The first written sources on Škocjan Caves originate in 2nd century B.C. by Posidonius of Apamea, and they are marked on the oldest published maps of Europe.

Ranking among the most important caves in the world, Škocjan Caves represents the most important underground phenomena on the Karst plateau and in Slovenia. The explored length of the caves is 6200 m. The caves have formed in 300 metre thick layer of Cretaceous and Paleocene limestone. The exceptional volume of the underground canyon is what distinguishes Škocjan Caves from other caves and places it among the most famous underground features in the world. An underground channel is approximately 3.5 km long, and expands into huge underground chambers.

A Wonder Woman in Astrophysics

Assist. Prof. Dr. Tanja Petrushevska, Centre for Astrophysics and Cosmology, at University of Nova Gorica shares her experience...

"I started working at the Centre for Astrophysics and Cosmology in 2018. I am working with the astrophysics group led by Prof. Andreja Gomboc. Our group studies transient phenomena in the sky, which means short-lived, explosive cosmic events like supernovae or stars being devoured by a supermassive black hole. For example, I am now leading one study where, together with other international researchers, we are studying a disruption of a star in proximity of a supermassive black hole. For this, we are using several telescopes from the ground and space to observe this interesting event that flared in 2016 and it is still observable. Another thing that we are really excited about in our group is, the Vera Rubin Observatory, currently under construction in Chile, which will start operating in 2023. This will be the largest telescopic survey ever made, not only will it use a large telescope (8.4 meters), but it will also have the largest digital camera ever constructed with a large field view. Therefore, we expect that we will see a revolution in the field of astrophysics of transient phenomena.

I am delighted to be working at the Center for Astrophysics and Cosmology from the University of Nova Gorica, which so far has proved to have a dynamic and truly inclusive research atmosphere, where almost half of the researchers are international. From the perspective of a big underrepresentation of women in science, it is gratifying to work in a group led by a female professor. I was previously at the Department of Physics of Stockholm University, where the large majority (around 80%) of the professors are male, despite the fact that the country has some of the best gender equality policies. Furthermore, our group is active in the popularisation of astronomy, in many forms, including organising events for the public like lectures and observations, popularising our research work through press releases and newspaper articles, interviews for newspapers, TV, radio and podcasts in Slovenia and abroad. I think this part of our job as researchers is also very important, because we want to inspire young people to get interested in the wonders of the universe, those persons who will pave the way to even more astonishing and ground-breaking discoveries. Additionally, we are showing the public that women are also researchers and youngsters can have role models which can be both female and male."

Assist. Prof. Dr. Tanja Petrushevska

Slovenian Food Culture

Slovenia has a lot of traditional foods. A beloved dessert is the Prekmurska Gibanica; a traditional dessert from the Prekmurje region of Slovenia, which means over the 'mura' or river, and Gibanica meaning folding.

Ingredients:

For the shortcrust dough:

200 g	wheat flour
100 g	butter
A pinch of	salt
1 dl	cold water

For the poppy seed filling:

200 g	ground poppy seeds
50 g	sugar
1 tablespoon	rum

For the cottage cheese filling:

1,5 kg	cottage cheese
120 g	sugar
2	eggs
1	vanilla sugar

For the walnut filling:

250 g	ground walnuts
70 g	sugar
1 tablespoon	rum

For the apple filling:

1,5 kg	apples
100 g	sugar
50 g	breadcrumbs
1 teaspoon	cinnamon

For the sour cream topping:

4 dl	sour cream
2	eggs
9 layers of	strudel dough

DIRECTIONS:

1. There are two types of dough needed for this recipe; the shortcrust dough for the bottom and the strudel dough for in between each filling. To make the shortcrust dough stir together flour, salt, diced butter, and water. Knead it into a dough until it's smooth. Then let it rest for half an hour in a cool place.
2. To make things easier you can buy premade strudel dough. Nine layers of dough are needed. For the poppy seed filling, mix ground poppy seeds with sugar and rum. For the cottage cheese filling, mix cottage cheese with sugar, eggs and vanilla sugar. For the walnut filling, mix ground walnuts with sugar and rum. For the apple filling, peel the apples and then grate them. Wring out the grated apples to get rid of the liquid. Add sugar, breadcrumbs, and cinnamon to the grated apples.
3. After the shortcrust dough has rested, roll it out to fit a 40 x 35 cm baking pan. The dough should be about 0.5 cm thick. Grease the baking pan before you put the rolled-out dough in.
4. Mix the sour cream with eggs for the sour cream topping. Sprinkle and spread some of the topping on the top of the dough (it should be spread thinly). Spread half of the poppy seed filling on top. Cover it with a layer of strudel dough. Spread half of the cottage cheese filling on top. Cover it with a layer of strudel dough. Sprinkle and spread some of the sour cream topping on. Spread half of the walnut filling on top. Cover it with a layer of strudel dough. Sprinkle and spread some of the sour cream topping on. Spread half of the apple filling on top. Cover it with a layer of strudel dough. Sprinkle and spread some of the sour cream topping on. Now repeat the layering process with the other half of the fillings. After the last layer of the apple filling, cover it with two layers of strudel dough. Spread the sour cream topping on top. This time it should be spread thicker.
5. Bake it in an oven preheated to 180 – 200°C for about one hour.

The Ljubljana Castle

The Ljubljana Castle is an important city landmark and is located on the hill above the center of Ljubljana. According to archaeological surveys, the area around the Castle has had continuously human activity since 1200 BC. Although the Castle construction is said to have begun in the 11th century, the construction went on till the 16th century. It was initially a medieval fortress but is now a major cultural venue of the city of Ljubljana. For a time from 1813 till 1945, it also served as a provincial prison.

The castle once had a drawbridge and with its high walls was presumed to be impregnable. Just after the entrance to the castle is a courtyard where there is a sculpture of the Dragon, which is the symbol of Ljubljana. The castle and the dragon have the honor to be depicted on Ljubljana city's Coat of Arms.

One can go to castle either by a car or walk through forest trails or just take the funicular rail. The rail track length is only about 120 meters and the difference in the height of the lower and the upper stations is about 70 meters. The castle has many points of interest namely, The Archers' tower, The wall of defence, the prison with the woody stemmed vine, The tower of Erasmus, The Chapel of St. George, The Panaromic tower, The Hribar Hall with its armoury, the pentagonal tower, and the courtyard with a coffee shop. The courtyard also serves as a meeting point and connects to all points of the Castle.

Team Brazil and Team Norway having fun at Ljubljana Old Town

Things to carry for your excursion at Bled and Škocjan caves today:

1. Water bottle
2. Camera
3. Cap
4. Walking shoes
5. Windcheater and / or jacket

EuPhO schedule

Students' program

May 22 (Sunday)

◊ 07.45	Breakfast, M hotel
08.10	Bus departure, M hotel ◊ PEF
09.00	Theoretical competition, PEF
14.00	Lunch, PEF
15.00	Excursion Škocjan caves, PEF ◊ Škocjan
20.30	Dinner, M hotel
21.30 ◊	Meeting leaders, M hotel

May 23 (Monday)

◊ 07.45	Breakfast, M hotel
08.00	Preparation for Moderation, M hotel
09.00–13.30	Moderation / Free time, M hotel / City
13.00–15.00	Lunch, M hotel
14.30–18.00	Moderation / Free time, M hotel / City
19.00	Mayor of Ljubljana reception, Kino Šiška
20.30	Concert - Koala Voice, Kino Šiška

May 24 (Tuesday)

◊ 08.45	Breakfast, M hotel
09.20	Bus departure, M hotel ◊ CD
10.00	Closing ceremony, CD
12.00	Farewell reception, CD
13.30	Bus departure, CD ◊ M hotel
14.00 ◊	Departures, M hotel

Leaders' and observers' program

May 22 (Sunday)

05.00–07.50	Theoretical problem translation, M hotel
08.00	Breakfast, M hotel
10.00	Excursion to Bled, M hotel d Bled
13.30	Lunch (lunch-box), Bled
18.00	Bus departure, Bled ◊ Ljubljana
19.00	Leader's and Observer's dinner, Ljubljana
21.30 ◊	Meeting students, M hotel

May 23 (Monday)

◊ 07.45	Breakfast, M hotel
08.00	Preparation for Moderation, M hotel
09.00–13.30	Moderation / Free time, M hotel / City
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12.00	Farewell reception, CD
13.30	Bus departure, CD ◊ M hotel
14.00 ◊	Departures, M hotel

Cogwheel: People behind the Olympiad

I am Eva Kučiš, a student guide at EuPhO 2022. I come from a small town from the province of Štajerska. Right now, I am pursuing a master's degree at Faculty of Education, at University of Ljubljana. After I finish my degree, I will get the title 'Professor of Mathematics and Physics'. In my free time I like to travel around the world, explore fascinating new places, discover other cultures, and meet new people. I decided to volunteer at the EuPhO because this is a good opportunity to encounter new people from different countries, learn about their culture, and acquire new knowledge about teaching techniques in other parts of the world. I will ensure

that my group feels well throughout the competition, arrives on places on time, and I will try to keep their morale high, and show them Ljubljana. I will be taking care of a team that comes from another continent, therefore I will do my best to really give them a taste of the Slovenian spirit, as it will be a unique experience for them. I expect the Olympiad to be an unforgettable experience for me, which will remain in my memory forever. I look forward to meeting and being surrounded by people that share the same admiration for physics as I do. I hope that I have unforgettable adventures with my team and that this EuPhO occupies a special corner in their hearts and takes them back to this little corner of the world - my Slovenia.

Editor-in-Chief: Asira Lele
Layout: Pavle Jovanovski

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