

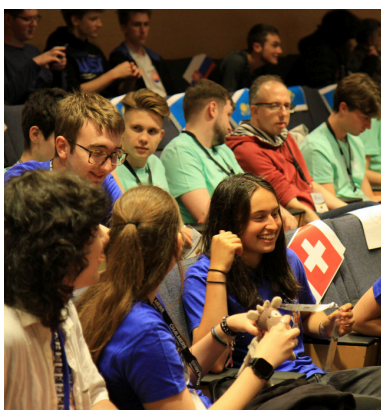


10th European Physics Olympiad
Gothenburg, Sweden
12 - 16 June 2026

Sunday, 14 June 2026

Opening Ceremony

The 10th edition of EuPhO commenced with an opening ceremony at the RunAn Auditorium, Chalmers University. The opening ceremony featured welcome speeches by Julia Järlebark, Chair of the Organizing Committee; Jaan Kalda, President of EuPhO; and Susanne Aalto, Deputy President of Chalmers University. The audience was overjoyed when the Gosskören performed delightful and interactive musical interludes. Each team was welcomed with a brief introduction highlighting a notable connection between their country and Sweden. The ceremony concluded with a dinner, where participants had the opportunity to relax and mingle.





Conversations at EuPhO

Luise Koehler, Grader

We chatted with Luise after the opening ceremony



Q: What do you like about physics?

Luise: *I am very curious about how things work. When I was younger, I asked myself, How does this work? Like, how does a refrigerator work, for example, and I just wanted to learn more to understand how everything works. When I am working on my bachelor's thesis about particle physics, I want to learn more and more about how the world works on a smaller scale, and I want to go deeper and deeper to understand how it all comes together. That is what is most interesting to me.*

We chatted with Amelia coming back from the welcome dinner

Amelia Elezi



Q: What do you like about physics?

Amelia: *I like physics because it comes naturally to me and it makes me happy whenever I solve a problem or answer a question correctly. And I love it because it reveals the hidden rules behind the universe.*



Ruby Susan Raju, Guide

Ruby is the guide for team Croatia



Q: Is this your first Olympiad?

Ruby: *Yes, this is my first Olympiad. I am super excited for this opportunity*

Q: What are your expectations?

Ruby: *Honestly, since it's my first time, I don't know what to expect. I have heard from other people that it is going to be an amazing experience for everybody. I just want to experience that and be a part of it and be as supportive as I can. I also live in Gothenburg so I want to be able to give the team the best experience of the city.*

Early Society in Sweden

Written by Daniel Arvidsson



Photo credit: Ola Myrin / Malmö museum

Around 14,000 BC, at the end of the last Ice Age, the ice that had covered Scandinavia began to retreat, making the region gradually habitable. The first humans migrated into Scandinavia during this time. These people were hunter-gatherers who followed the edge of the melting ice, searching for new hunting grounds. The traces they left behind, such as stone tools, ornaments, and petroglyphs, provide valuable insights into their way of life.

Petroglyphs are shallow engravings made by repeatedly striking the rock with stone or metal tools. This process creates shallow grooves that can be difficult to see at first glance, especially if they are not highlighted with paint, as they often are today. There is no clear evidence that petroglyphs were originally painted when they were created. Instead, the repeated striking would temporarily discolor the rock, making the motif stand out. Over time, this contrast would fade, causing the petroglyphs to blend in with the surrounding surface.

The earliest petroglyphs in Scandinavia are estimated to date from around 7000 BC. These are often referred to as "hunter-gatherer" or "wild" petroglyphs and typically depict scenes from daily life, such as hunting and animals. In contrast, there are also "agricultural petroglyphs," which illustrate farming life. The earliest examples of these date back to approximately 1800–1100 BC, during the Early Bronze Age.

The largest concentration of these petroglyphs can be found in Tanum, which has been designated a UNESCO World Heritage Site. The area contains over

600 rock carving sites depicting boats, weapons, humans, and animals.

It is believed that these petroglyphs may have had ritual, symbolic, or communicative purposes, possibly connected to religious beliefs, social identity, or storytelling. Their exact meaning will likely never be known. However, what we can say with some certainty is that they must have been important to the people who created them. Carving them took a great deal of time and effort, and the images would only stand out clearly for a limited time, suggesting that the act of creating them truly mattered, even if the result did not last.



Photo credit: Vitlycke museum

This stands as a testament to the indisputable fact that the need for self-expression, to create one's own story, and to make sense of the world has always been an essential part of the human experience. It is a legacy that connects us to people who lived thousands of years ago, just as it will connect us to those in the future.



Photo credit: Julia Järlebark

Developing the Experiment

Q Hi Dr. Smaragda-Maria Argyri, could you first tell us how acoustic levitation works?

Acoustic levitation is a phenomenon that occurs when ultrasonic waves (i.e., acoustic waves with a frequency > 20 kHz, so above the hearing range of humans) that are travelling in opposite directions interfere in a way that creates a standing wave. This means that there are areas of high and low pressure that appear to be immovable in space. In those low-pressure regions, we can place a small object, and it will stay trapped in place due to the high pressure around it.

Q What makes acoustic levitation interesting from a researcher's point of view?

Acoustic levitation allows the implementation of contact-free studies. This is particularly interesting because in studies the presence of containers might create artifacts or unwanted effects. In the case of liquids, for example, acoustic levitation enables the study of dynamic phenomena, such as evaporation, crystallization, and phase transitions, without the interference of solid surfaces. It also allows the implementation of fundamental studies in the fields of physics, materials science, fluid dynamics, and so on.

During my PhD, I used acoustic levitation as a tool to study surface and interfacial effects on soft matter (i.e., liquids, gels, etc.). There were 5 challenges I focused on: i) improving and evaluating the performance of acoustic levitators, ii) studying the surface tension of liquids, iii) studying a two-droplet system, iv) developing a contact-free magnetic resonance technique, and v) studying a liquid-to-gel phase transition, which was induced by CO_2 flowing gas on the levitating droplet.

Q What part of this phenomenon is still not fully understood by scientists?

There are many things we are still learning. For example, although we can easily levitate and control the shape of liquid droplets, it is not easy to stop them from rotating along the z-axis. This is believed to occur due to secondary acoustic radiation forces (known as acoustic streaming) which act around the droplet. However, the interplay between acoustic radiation pressure, acoustic streaming, and object geometry creates complex dynamics that are difficult to model precisely.

The experimental exam of EuPhO 2026 yesterday focused on the physics of acoustic levitation, a topic that is naturally both fascinating and full of surprises - and this year's setup certainly put students' problem-solving skills to the test.

To learn more about the science behind the experiment, we reached out to Dr. Smaragda-Maria Argyri, who completed a PhD in acoustic levitation at Chalmers, and asked her a few questions.

Q What is the coolest or most unexpected experiment you have done with acoustic levitation?

The coolest moment was when I levitated a liquid droplet for the first time. I was fascinated by it. The most unexpected experimental observation was when we levitated a droplet of water and a droplet of hexadecane together in the same node. Now, these two liquids are immiscible, which means that they do not mix with each other. And what we saw was that a solid crystal was starting to form on the surface of one of the two droplets. What we later realized was that hexadecane was the one forming a crystal due to the alignment of the molecules at the air/liquid interface and the cooling effect caused by the evaporation of water.

Q Why do you think this topic was chosen for an Olympiad experiment?

I believe acoustic levitation is a fascinating technique that looks simple on the surface but hides many challenges. It feels like magic, which is captivating, at least for me, and it is a good tool to test the in-depth fundamental understanding of the students.

Q Do you have any advice for girls who enjoy physics but aren't sure if they "fit the mold"?

I believe that each one can make their own mold. There is no need to fit into a pre-existing one. And that is the beauty of physics and science in general. Exploring routes no one has seen before, surpassing boundaries, and creating a new path. Enjoying it is what makes the hardships worth it and pushes us forward. So, I have one piece of advice: avancez (i.e., advance, go forward) :)

Q You are also taking part in the grading of the EuPhO 2026 experimental exam. What do you hope to see from the students?

I hope to see creative and analytical solutions. The experimental problems are definitely challenging and not straightforward, so what I hope is that the students will manage to break down each problem into smaller pieces that can hopefully lead them to the right solution. We should keep in mind that sometimes there are more than 1 solutions, so I would be amazed if a student found a solution I hadn't thought about.

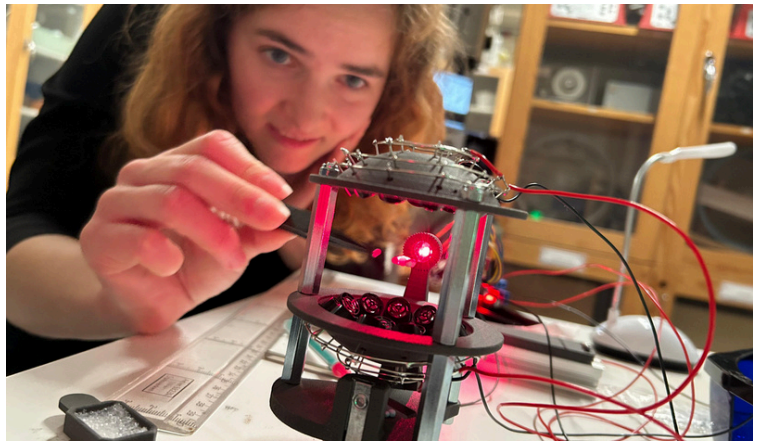


Photo credit: Maurice Zeuner

The Legendary Liseberg

Written by Ann-Marie Pendrill



Photos credit: Liseberg AB

As you exit the tram at Korsvägen, you can see the large drop tower called AtmosFear behind the large Ferris Wheel. If you choose the stairs on the way to the entrance, you will pass Albert Einstein's star. He visited Liseberg on 11 July 1923, where he gave his Nobel lecture, although he spoke about relativity rather than the photoelectric effect which is what he won the prize for.

The insight that free fall feels like weightlessness is said to have been Einstein's happiest thought. What a pity there was no free fall tower at the time! Since acceleration feels like a gravitational field in the opposite direction, there are many opportunities at Liseberg to experience your shifting weight (or 'apparent weight' depending on your definition of weight), in roller coasters, swings, carousels and drop towers.

To make the most of your visit, make sure you download the Liseberg app before the visit. When you have entered the park, you can enter virtual queues for the main rides. You will need it for the roller coasters! Each phone can queue for one ride at a time, but everyone can queue for the whole team. With a bit of planning, you can get your time slots lined up. However, you cannot choose your time slots, only accept the one you get. (If one time slot does not work out, skip it and try for some other ride instead.)

To help you discover the physics in some of the 42 rides, you will get a worksheet with 20 questions to be answered as a team on a response sheet, which also includes instructions for handing in the responses. The top teams will be announced during the farewell dinner.

What ride are you most excited about?

Helix

The longest and fastest rollercoaster at Liseberg.

Year of opening: 2014

Ride time: 2 min 10 s

Top speed: 100 kph

Difference in altitude: 52 metres

Track length: 1381 metres

G-force: 4.3 G

Inversions (upside down): 7 times



Valkyria

The longest and tallest Dive Coaster in Europe.

Year of opening: 2018

Top speed: 105 kph

Elevation change: 50 metres

Track length: 700 metres

Inversions (upside down): 3 times



Balder

The wooden roller coaster. Often called one of the best roller coasters in Europe.

Year of opening: 2003

Ride time 2 min 8 s



Lisebergbanan

The Liseberg classic ride among the trees and hills of the amusement park.

Year of opening: 1987

Ride time: 2 min 50 s

Top speed: 80 kph

Elevation change: 65 metres

Track length: 1340 metres

G-force: 3 G

Top speed: 90 kph

Height: 36 metres

Track length: 1070 metres

Vote for your favourite on the EuPhO 2026 Instagram!

Photos credit: Liseberg AB

Lise Meitner and the missing Nobel prize

Born: 7 November 1878 in Vienna, Austria

Education: Studied physics at the University of Vienna, earned her doctorate in 1906, continued advanced work in Berlin with Max Planck and Otto Hahn.

Key scientific achievements: Co-discovered protactinium, made major contributions to radioactivity and nuclear physics, and with Otto Frisch provided the theoretical explanation of nuclear fission. Discovered a radiation-less transition effect where an atom adjusts to a more stable state by emitting an electron rather than a

photon, called the Auger effect. First female professor of physics in Germany.

Life in Sweden: Escaped Nazi Germany in 1938, worked at the Nobel Institute for Physics in Stockholm and later at KTH, spent restorative summers in Kungälv where she continued her research.

Nobel Prize omission: The 1944 Chemistry Prize went solely to Otto Hahn; Meitner's crucial theoretical insight was overlooked due to gender bias, her forced exile, and the committee's narrow focus on experimental data.



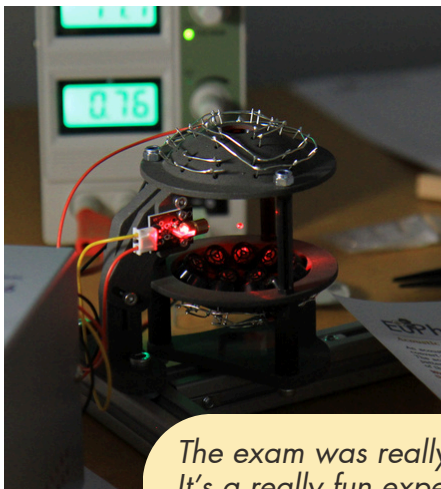
From the Experimental Exam



I hoped for a little better from my side.
Team Slovakia



I was able to get some good good data points. Sometimes it was a bit difficult.
Team Denmark

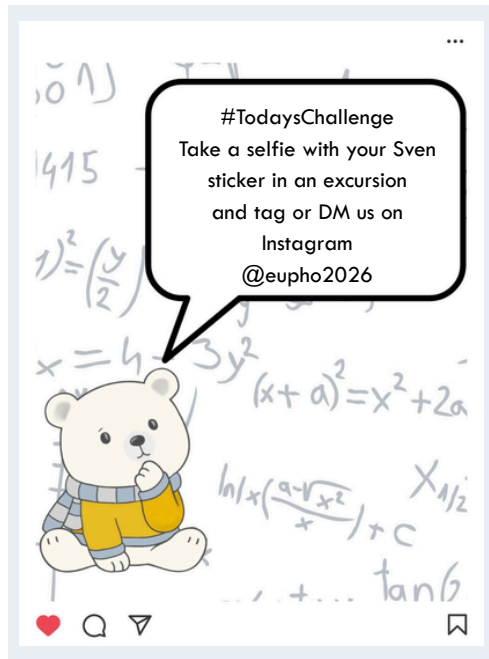


The exam was really good. It's a really fun experiment!
Team Iceland



Today's Schedule

Time	Students	Venue
7:00 - 8:00	Breakfast	LGC Hotel
8:00	Transport to Exam Hall	Bus/Tram/Walk
9:00 - 14:00	Theoretical Exam	SB Multisal, Chalmers
14:00	Transport to Liseberg	Tram
14:30 - 20:30	Physics at Liseberg incl. Lunch & Dinner	Liseberg Park
21:00 - 22:00	Presentation of solutions	Gustaf Dalén Auditorium, Chalmers
Time	Leaders	Venue
5:00 - 8:00	Translation & Breakfast	Auditoriet, LGC Hotel
8:00 - 9:30	Breakfast/Free time	LGC Hotel
9:45	Bus to Tanumshede	LGC Hotel
12:00 - 14:00	Guided tour & Lunch	Vitlycke Rock Carvings
14:15	Bus to Kungälv	Vitlycke Museum
15:30 - 17:00	Ice cream/Free time	Kungälv/Bohus Castle
17:00	Bus to LGC Hotel	Bohus Castle
19:00 - 20:30	Dinner	Hamnkrogen, Liseberg Park
21:00 - 22:00	Presentation of solutions	Gustaf Dalén Auditorium, Chalmers



Layout & Editing: Maitreyi Muralidhar
Sven Design & Social Media: Miriam Pristera
Photographer: Marin Gečaj
Journalist: Moa Kristiansson
www.eupho26.se | [@eupho2026](https://www.instagram.com/eupho2026)

