



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

Friday, 12 June 2026

Welcome to the 10th European Physics Olympiad!

Välkommen or welcome to **Gothenburg, Sweden** for the **10th European Physics Olympiad 2026!** We hope that your journey was pleasant and eventful. The EuPhO is a competition open to not only European countries, but also beyond. Each country is eligible to send one team consisting of up to 5 students and 2 leaders. Observers or visitors are also welcome to EuPhOs. Sweden, the host country, is eligible to participate with a second team. Similarly to IPhO, the competition is designed for high school students. EuPhO 2026 is organised by the Swedish Physical Society and hosted by Gothenburg Physics Centre (GPC) at Chalmers University of Technology and the University of Gothenburg. We express our heartfelt gratitude to our sponsor, the Marcus and Amalia Wallenberg Foundation, for funding the event. As the EuPhO progresses with the

experimental and theoretical exams, you will also get an opportunity to tour some lovely sites nearby, as part of your excursions. There will be an exciting boat trip to Brännö and Marstrand for the students and leaders respectively. After the exams, students will be able to relax at the Liseberg Amusement Park and the leaders will be at the Vitlycke Rock Carvings.

Oh, and don't forget to bring out your midsummer attire for the Farewell Party to match the theme! We truly hope you enjoy EuPhO 2026 and everything that Sweden has to offer!

Sven Says...

Hi! My name is **Sven**, and I'm going to be your guide for EuPhO 2026. I live way up in the Arctic so I'm so excited to be in Gothenburg and eat a lot of mackerel! I've travelled all around the world with the Swedish team, so I'm very glad to finally be able to welcome my international friends to my country! I hope you have a lot of fun and make a lot of friends. And of course, good luck, or as you say in Swedish, lycka till!



Words from the President of EuPhO

The fact that you have made it to EuPhO is proof that you have been studying physics for some time. That spares me the obligatory speech about how "physics is fun" — you already know it. And in the unlikely event that you don't yet, EuPhO is here to convince you: physics is full of puzzles, and solving them is genuinely delightful. Once you become a physicist, you will not need sudokus or crosswords — your daily professional work is more entertaining than either. There is also a quieter bonus: the mind of a physicist stays young. Newton famously described himself as "a boy playing on the seashore... while the great ocean of truth lay all undiscovered before [him]." Three and a half centuries later, the ocean is still there, and so is the play.

But let me address the elephant in the room: artificial intelligence. AI is already reshaping the job market, and much of what looks like a stable career today may not look stable in ten years. Most universities keep a poker face about this, as if it doesn't concern them. It does, and it concerns you even more.

You will not outsmart an AI with raw knowledge. AI systems have parsed essentially every useful bit of information humanity has accumulated — and, truth be told, every useless bit too. This is exactly where your first opportunity lies: learn to be sharp enough to judge what is useful and what is not. You will be the captain; AI will be your boat. Your second opportunity is to be creative enough to occasionally produce a trick humanity does not yet know. Does that sound hopeless, given how many geniuses have come before you? Not at all. New, emerging disciplines demand new tricks, and history's geniuses simply did not have access to those problems.



Whichever way you look at it, the only future-proof career runs through creativity — as AI will eventually drive the robot-plumbers too. A strong physics education, of the kind that EuPhO both demands and develops, is one of the best ways to cultivate that creativity. The problems you will meet here are not designed to test how much you know; they are designed to test how creatively you can think with what you know. That is exactly the muscle you will need for the rest of your life, regardless of which path you eventually take.

So enjoy the puzzles we have prepared for you, and make many new friends.

Welcome to EuPhO.

A handwritten signature in black ink, appearing to read 'J. Kalda', written in a cursive style.

Prof. Jaan Kalda

Been There, Solved That

Meet **Adam Warnerbring**, who participated in the very first EuPhO in 2017 and is now a team leader of our hosts, the Swedish team.

Q

As a participant in EuPhO 2017, did you think back then that you would one day be leading Team Sweden for EuPhO?

Not at all, I never even thought about that possibility back then. At the time, I was fully focused on the experience as a participant. So it feels quite special to return, and I'm very grateful for the opportunity to be a team leader this year.

Q

As a team leader of the host country, what message would you like to give to all our participants?

I hope all of you will have a great experience at EuPhO 2026 and enjoy your time in Sweden. It is definitely a unique event, both academically and socially, so it is worth making the most of it. And of course, I wish everyone the very best of luck in the competition!

Q

What are your expectations from your students as a team lead?

I expect them to prepare carefully and give their absolute best during the competition. I also really hope they take the opportunity to enjoy the event outside of the competition, and to meet many new people and make friends with the other participants.

Q

In your opinion, what are some elementary mistakes that students can work on, so that they can work better on removing those to score better?

One of the easiest mistakes I very often see is forgetting to include units in answers and plots, which is quite avoidable. Another common issue is hesitating to write down a solution attempt, even when you have a good idea. It is often worth presenting your ideas, even if you are not completely sure of the final result.



Photo credit: Adam Warnerbring

Q

What are some of the things you're most excited about for EuPhO 2026?

This is a really hard question. The program looks great, so I am excited for everything. But if I had to choose, I would say I am especially excited to see the problems, and also the midsummer themed party. Being from Sweden, that is a tradition I am very happy to share with everyone.

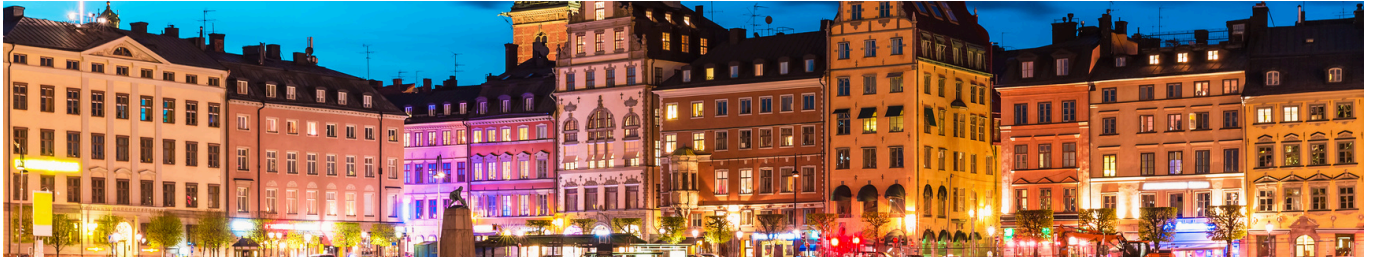


Adam(left) at EuPhO with his team.

Photo credit: Max Kesselberg

*Adam is currently a PhD student at the University of Siegen (Germany) since 2023 and a member of the ATLAS Collaboration at CERN. His research focuses on top-quark physics and flavour tagging, particularly on measuring the CKM matrix element $|V_{cb}|$, a fundamental parameter of the Standard Model. **Interviewed by Asira Lele.***

Slow Down, You're in SWEDEN



The Kingdom of Sweden is nestled in the heart of the Scandinavian Peninsula in Northern Europe. It is bordered by Finland and Norway, and connected to Denmark in the southwest by the Öresund Bridge. The official language of Sweden is Swedish, along with five minority languages: Finnish, Meänkieli, Romani Chib, Sami, and Yiddish. However, almost everyone also speaks English. Sweden is well known internationally for its modernity, equality, and groundbreaking innovation.

The capital and largest city of Sweden is Stockholm, more famously known as the home of the annual Nobel Prize ceremonies. The second-largest city is Gothenburg, which is renowned for its port, industries, and technology. The country is home to some of the world's finest universities and has also produced globally successful companies such as IKEA, Volvo, and Spotify. Beyond its innovations, Sweden is equally celebrated for its emphasis on work-life balance, sustainable living, and a simplistic life.

Sweden is home to several important cultural and historical sites recognized as UNESCO World Heritage Sites. These include the Hanseatic town of Visby, the Royal Drottningholm Palace, Grimeton Radio Station, and the ancient rock carvings in Tanum, which the leaders will be visiting as an excursion. Sweden is also famous for its contribution to the pop music scene, especially through the legendary group ABBA, and more recently, Zara Larsson. Swedish music producers like Max Martin and Shellback are also recognized for their strong influence on the global music industry.

We hope that you get to experience the many facets of Sweden during your stay and make lifelong memories!

Essential Swedish



Fun Facts about Sweden



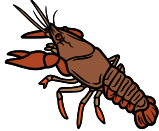
Sweden was the first country to introduce **banknotes** in Europe, in 1661.



The **three-point seatbelt** was invented in Gothenburg. The patent was given away for free.



On Christmas Eve, at exactly 3 pm, Swedes watch a compilation of **Donald Duck**.



Swedes hold **crayfish parties** in August where they wear silly hats and eat crayfish together.



Gothenburg has the world's only mounted taxidermy **blue whale** at the Natural History Museum.



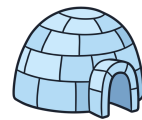
Einstein held his Nobel Prize lecture at **Liseberg** Amusement Park in Gothenburg.



Cinnamon Bun Day is celebrated on October 4th in Sweden, with around 7 million eaten in a day.



Swedish chemist, **Svante Arrhenius** predicted human-caused climate change in 1896.



There's an **ice hotel** in Jukkasjärvi, Sweden rebuilt with ice and snow every winter.

Famous Swedish Physicists



Lise Meitner

(Austrian/Swedish)
Nuclear fission pioneer



Gustaf Dalén

Invented automated lighthouse technology



Anders Celsius

Created the Celsius temperature scale



Manne Siegbahn

Advanced X-ray spectroscopy



Hannes Alfvén

Made contributions to plasma physics



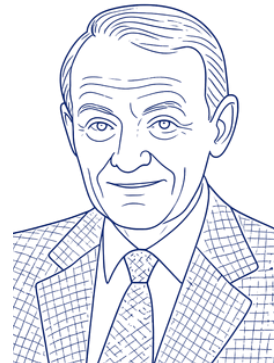
Anders Ångström

Laid the foundations for modern spectroscopy



Anne L'Huillier

(French/Swedish)
Notable for her work in attosecond physics



Kai Siegbahn

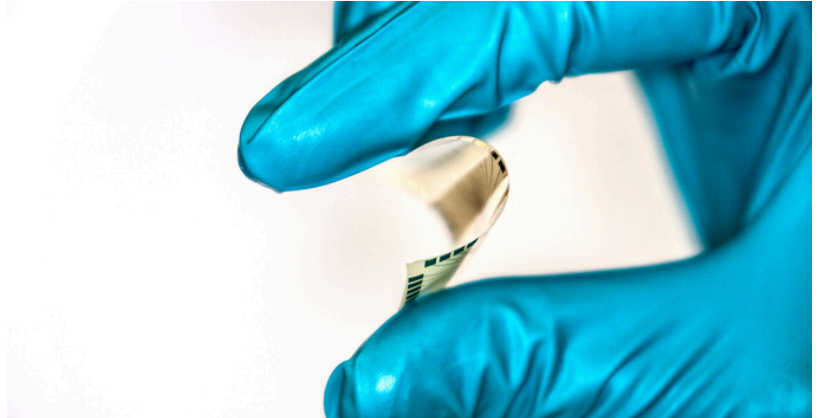
Developed high-resolution electron spectroscopy

From Lab to Application

Gothenburg at the centre of graphene innovation

Written by Lisa Gahnertz

Sixteen years ago, Andre Geim and Konstantin Novoselov of the University of Manchester won the Nobel Prize in Physics for their pioneering experiments isolating the ultra-light and ultra-thin material graphene. During a ten-year period starting in 2013, the Graphene Flagship, the EU's largest ever research programme, was coordinated from Chalmers University of Technology in Gothenburg.



Inbrain Neuroelectronics, a Graphene Flagship spin-off company, is creating a novel class of flexible, high-resolution, high-precision graphene-based implantable neurotechnology to help treat neural disorders like Epilepsy and Parkinson's disease. Photo Credit: Inbrain Neuroelectronics, part of the Graphene Flagship.

Graphene was the first known 2D material and stunned the world with its "exceptional properties originating in the strange world of quantum physics," according to the Nobel Foundation's press release. Many potential applications were identified for this

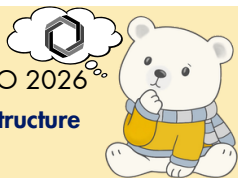


The Graphene Flagship's partnership with Italian automotive manufacturer Dallara Automobili SpA has led to the development of a sports car featuring a graphene-enhanced, fire-resistant interior.

Photo Credit: Graphene Flagship

Sven Says...

Did you know, the EuPhO 2026 logo is inspired by the **structure of graphene?**



electrically conductive, heat-resistant and light-transmitting material.

Physics professor Jari Kinaret's research team had been exploring the material since 2006, and when he learned of the European Commission's call for a ten-year research programme, it prompted him to submit an application. The Graphene Flagship was initiated to ensure that Europe would maintain its leading position in

graphene research and innovation, and its coordination and administration fell to Chalmers with Jari Kinaret at the helm.

The autumn of 2013 saw the launch of the massive ten-year Science, Technology and Innovation research programme on graphene and other related two-dimensional materials. Joint funding from the European Commission and EU Member States totalled a staggering €1,000 million. More than a decade later, it is clear that the large-scale initiative has succeeded in its endeavours. According to a report by the research institute WifOR, the Graphene Flagship will have created a total contribution to GDP of €3,800 million and 38,400 new jobs in the 27 EU countries between 2014 and 2030.

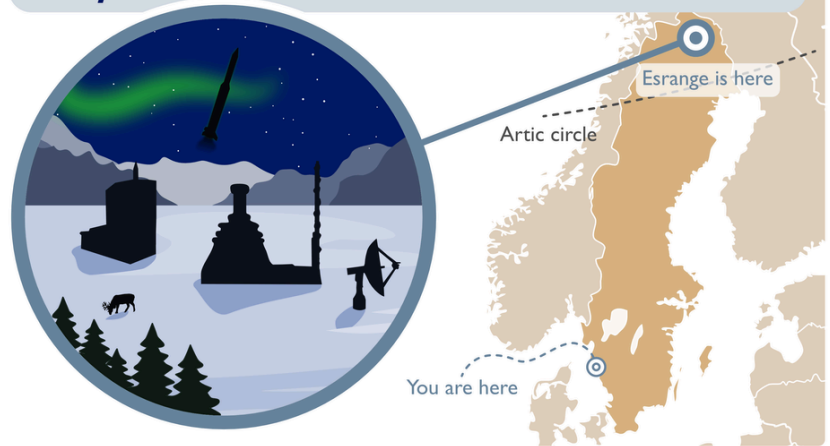
Graphene's extraordinary properties are now being used to

deliver the next generation of technologies in a wide range of fields, such as sensors for self-driving cars, advanced batteries, new water purification methods and sophisticated instruments for use in neuroscience. As for the project, it has proved highly successful in developing graphene-based technology in Europe, resulting in 17 new companies, around 100 new products, nearly 500 patent applications and thousands of scientific papers.

Today, the Graphene Flagship initiative is made up of 13 research and innovation projects and one coordination and support project, which is placed at Chalmers. The Graphene Flagship initiative will continue to advance Europe's strategic autonomy in technologies that rely on graphene and other 2D materials.

Sweden's spaceport above the arctic circle

Physics research in Sweden: ESRANGE

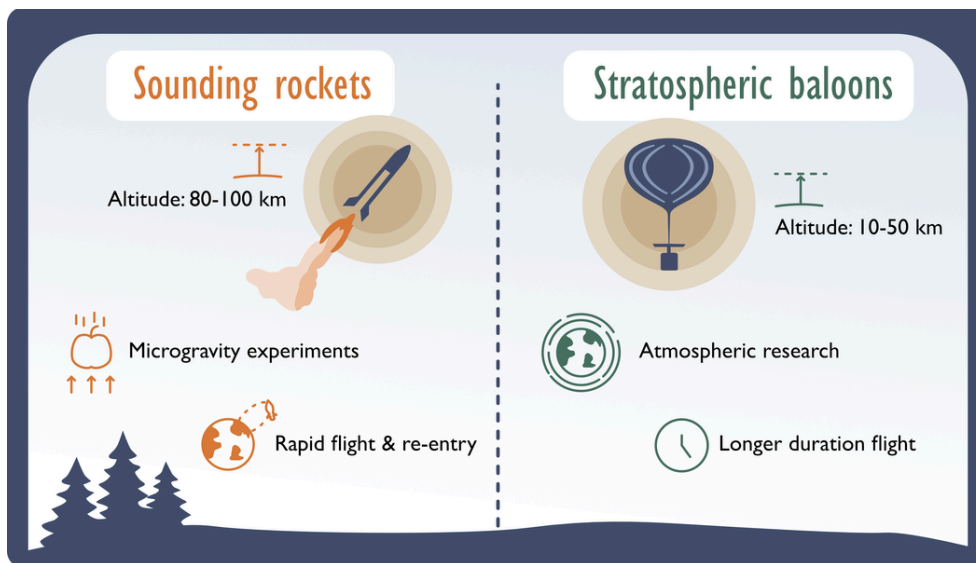


Written & Illustrated by Moa Kristiansson

If you travel far north, past forests, mines and midnight-sun skies, you eventually reach a place where rockets rise into the atmosphere and giant balloons drift toward the edge of space. This is ESRANGE Space Center, Sweden's own spaceport, located about 45 kilometers east of Kiruna. It's one of only a few facilities in the world where scientists can launch research

rockets, release stratospheric balloons, and communicate with satellites orbiting Earth.

ESRANGE has been active for more than fifty years. Since the first launch in 1966, over 600 sounding rockets and 680 stratospheric balloons have lifted off from the base. Sounding rockets shoot straight up, spend a few minutes in microgravity, and then fall back to Earth. Those short



moments without weight are perfect for studying how materials, fluids, and biological systems behave when gravity no longer dominates. Balloons, on the other hand, float up to 30–45 kilometers and carry instruments that measure things like ozone, temperature, and cosmic radiation.

One of the most exciting parts of ESRANGE is that

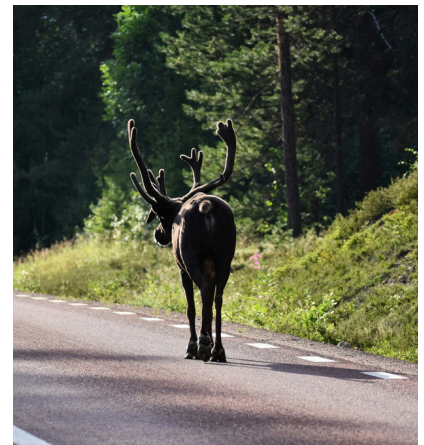
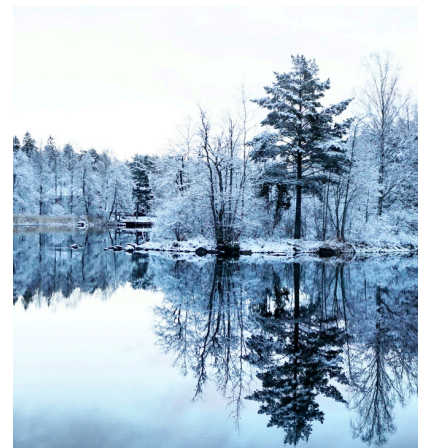
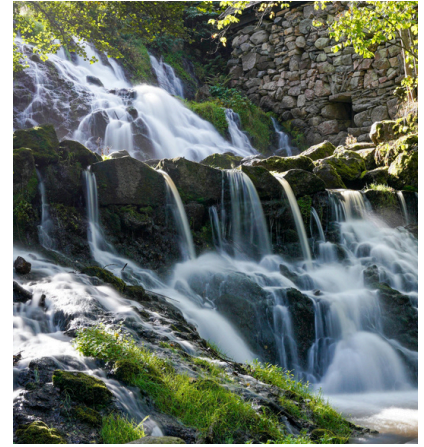
students can actually take part in real space missions. Through the REXUS/BEXUS programme, university teams design experiments that fly on sounding rockets or stratospheric balloons. The projects are wildly varied. Some teams study how fluids behave when gravity suddenly disappears, using high-speed cameras to track droplets and waves during the rocket's microgravity phase. Others test new materials, sensors or electronics to see how they handle extreme cold, low pressure and rapid acceleration. Balloon teams often focus on atmospheric physics, measuring ozone, aerosols, cosmic radiation or winds at altitudes where commercial aircraft never reach. There are even biology experiments that explore how microbes or cells respond to near-space conditions. What all these projects have in common is that they turn student ideas into hardware that actually launches from ESRANGE and collects real scientific data.

If you are curious about the student program, you can check it out at www.rexusbexus.net.

Nature in Sweden

Looking at the map, one can immediately notice how long Sweden is; travelling from the west to the east coast by car takes around 5 hours, but from the northernmost to the southernmost point takes over 24 hours! This makes Sweden the largest country in the Nordics. Due to its geography, the country experiences significant climate differences. Northern Sweden lies between the Arctic and subarctic zones, with harsh, snowy winters (perfect for Sven!). This region experiences midnight sun during the summer, where the sun does not set between May and July. In the winter, there is complete darkness in January, but the sky is colored with the Northern Lights. However, we are in the south of Sweden, where, thanks to the Gulf Stream, we enjoy a temperate climate with more rain than snow and warm sunny summers. Sweden is well known for its pristine natural landscapes. 97% of Swedish land is uninhabited, and most of it is

covered with extensive forests, which offer breathtaking hiking routes. These forests are home to a wide variety of wildlife, including moose, deer, foxes, bears, etc. Sweden is also famous for having one of the world's largest archipelagos, with thousands of islands along its coastline. The Gothenburg archipelago, in particular, is a stunning coastal region where rocky islands, calm waters, and sailors come together to create an unforgettable experience. Two of these islands are included in your excursions: Brännö for the students and Marstrand for the leaders. Be prepared for some swimming and loads of fun! An important aspect of Swedish nature is the concept of **Allemansrätten**, or the Right of Public Access. This law allows people to roam freely in nature, pick berries and mushrooms, and camp almost anywhere, as long as they respect the environment and private property. This helps people take responsibility for nature and become more considerate of wildlife. We hope you do that too in Gothenburg.



Today's Schedule

Time	Students & Leaders	Venue
All day	International Arrivals	Airport/Central Station/Harbour
16:00 -	Registration and Check-in	Liseberg Grand Curiosa Hotel
18:00 - 19:00	Opening Ceremony	RunAn, Chalmers
19:30 - 22:00	Welcome Dinner	Chalmers Student Union Restaurant

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