

IPh Info

44th

Copenhagen Denmark **7-15 July 2013**



WELCOME TO IPhO 2013

Dear students, leaders, observers and visitors,

It is a great pleasure to welcome all of you to the 44th IPhO in Denmark. We are looking forward to some exciting and challenging days.

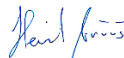
This leaflet fits into the name badge, which should be carried visibly during your stay. Further information will be given on whiteboards placed next to the IPhO stands at Danhostel Copenhagen City, where the students will be staying, and at Hotel Scandic Eremitage and Hotel Schæffergården, where the leaders, observers and visitors will be staying.

You will all receive a backpack. Among other things it contains a ball with a rain poncho, which unfortunately sometimes can be very useful in Denmark. Please note that each student backpack contains the official pocket calculator which is to be used during the examinations. No other electronic aid will be allowed.

On behalf of the organizing committee,

Edited by
Miriam Ortwed & Turi Schäffer
for
IPhO 2013 Copenhagen, Denmark


Senior Lecturer
Niels Hartling


Professor
Henrik Bruus


Director
Christian T. Jacobsen

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ACCOMODATION

STUDENTS & GUIDES

Danhostel Copenhagen City
H.C. Andersens Boulevard 50
1553 København V
Phone: +45 33 11 85 85
E-mail: copenhagencity@danhostel.dk

LEADERS, OBSERVERS & VISITORS

Hotel Scandic Eremitage
Klampenborgvej 230
2800 Lyngby København
Phone: +45 45 88 77 00
E-mail: eremitage@scandichotels.com

Hotel Schæffergården
Jægersborg Allé 166
DK 2820 Gentofte
Phone: +45 39 77 28 00
E-mail: info@schaeffergaarden.dk

COMPETITION RULES

At IPhO 2013 we enforce a strict zero-tolerance policy on cheating as stated in regulations to §7 of the IPhO Statues:

“If it is found that leaders, observers or students from a country have been in collusion to cheat in one of the International Olympiad examinations, the students concerned should be disqualified from that Olympiad. In addition, the leaders, observers and students involved should not be allowed to return to any future Olympiad. Appropriate decisions are taken by the International Board.”

Participating students must hand in their cell phones, laptop computers and other electronic communication devices to the IPhO Guides for safekeeping from Monday morning on 8 July to Thursday afternoon 11 July.

Upon arrival each student will receive the IPhO 2013 backpack containing the official pocket calculator (Hewlett Packard 10s+) to be used in the competition. This calculator is the only calculator allowed in the competition, and if lost no replacement will be provided. Each student is responsible for bringing along the calculator for both the theoretical and experimental examination.

You may bring your own writing tools, but IPhO will provide pencils, sharpeners and erasers.

After the experimental examination the students can keep the pocket calculator.

At the end of the examinations, the students must place all papers in the provided envelope. No papers must be taken out of the examination room.

PROGRAMME // STUDENTS

| | MORNING | AFTERNOON | EVENING |
|--------------------------|---|---|----------------------------------|
| SUNDAY 7 JULY | Arrival, registration & pictures | Arrival, registration & pictures | Arrival, registration & pictures |
| MONDAY 8 JULY | Opening Ceremony Busses leave at 8.00 | Dyrehaven | Bakken |
| TUESDAY 9 JULY | Theoretical Examination Busses leave at 8.00 | Niels Bohr Institute Tour | Biocenter |
| WEDNESDAY 10 JULY | Free time | Tivoli Science Talents 14.00 | Tivoli |
| THURSDAY 11 JULY | Experimental Examination Busses leave at 8.00 | Technical University of Denmark Tour | Midterm party |
| FRIDAY 12 JULY | Experimentarium Busses leave at 9.00 | Copenhagen City Hall Reception 14.00 | Tivoli Friday Rock |
| SATURDAY 13 JULY | Lejre, Viking Ship Museum & Roskilde Busses leave at 9.00 | Lejre, Viking Ship Museum & Roskilde | Kongens Have |
| SUNDAY 14 JULY | Canal Tour 11.30 | Closing Ceremony | Farewell Party |
| MONDAY 15 JULY | Departure | Departure | Departure |

EXCURSIONS // STUDENTS

DYREHAVEN

Dyrehaven is a large green park 10 km north of Copenhagen. It is known for its many deer that walk around freely and for the large red wooden gates that make up the entrances to the park. Inside the park you find a beautiful castle called the Eremitage Hunting Lodge, which was built in 1734 for Christian V who was king at the time. The king used the grounds as hunting area and the lodge for royal banquets.

BAKKEN

Dyrehaven also houses Bakken, an amusement park dating back to 1583. It is the oldest existing amusement park in the world. Bakken has 33 rides and many restaurants. One of the restaurants is called Lille Peter (Little Peter) and you will have dinner at this restaurant on 8 July. At Bakken there is no entrance fee so it is a popular place for Danes to take a walk and eat at the restaurants.

NIELS BOHR INSTITUTE

Niels Bohr Institute (NBI) is the oldest part of the physics department of University of Copenhagen. The Institute was inaugurated by Niels Bohr in 1921 and it was an international centre for physics in the post-war era. Physicists like Erwin Schrödinger and Werner Heisenberg visited Niels Bohr at the Insti-

tute at what was called the Copenhagen School. This school played a central part in the development of quantum mechanics. NBI has arranged the theoretical test.

TIVOLI

Tivoli is an amusement park in the centre of Copenhagen situated right beside the main station. It is the second oldest existing amusement park in the world and was opened in 1843. Tivoli is the biggest tourist attraction in Denmark. If you walk through the park you will notice that it is characterized by beautiful flower beds and romantic pathways.

TECHNICAL UNIVERSITY OF DENMARK

Technical University of Denmark (DTU) is the largest engineering school in Denmark situated in Lyngby north of Copenhagen. The campus is constructed as a coordinate system with four quadrants and there are numerous student dormitories on the grounds. The ceremonies, experimental examination and parties will take place at DTU.

EXPERIMENTARIUM

Experimentarium is a science center in Hellerup – just outside Copenhagen. Inside you are allowed to touch and experiment with all the installations and the center focuses on the body, energy, physics, water and Danish technology. Currently there is an exhibition on dinosaurs on the ground floor and on the

first floor you can try out your surfing skills on a large artificial surfing wave.

COPENHAGEN CITY HALL

Copenhagen City Hall is situated on the town hall square. It was built from 1892-1905 and it is one of the tallest buildings in Copenhagen with its 100 meters. The sound of the clock tower bells is transmitted on the Danish state radio channel at 12 noon every day and on New Year's Eve at midnight. Every year at the Copenhagen Culture Night the general public is invited inside to eat the famous City Hall Pancakes, and you are also invited to taste them.

LEJRE

Lejre – Land of Legends is situated in Roskilde. It is an outdoor museum with houses and equipment from the Stone Age, the Iron Age and the Viking Era. You can find people dressed up as Viking kings or farmers from the Iron Age and you can see them work in the workshops as they did many thousand years ago. The museum also has animals from the different eras and you can see how they prepared their food.

THE VIKING SHIP MUSEUM

The Viking Ship Museum in Roskilde has the largest exhibition of ships from the Antiquity and Middle Age in Denmark. There is both an indoor exhibition with old Viking ships that was found in the waters of Roskilde Fjord and an outdoor shipbuilding yard, where you can watch copies of old ships being built.

ROSKILDE

Roskilde is one of the oldest cities in Denmark. It is a well-known city and a big tourist attraction because of its cultural gems like the Viking Ship Museum and the Roskilde Cathedral. Many Danish kings and queens have been buried in the Cathedral and it was included in the UNESCO World Heritage List in 1995. The first week of July Roskilde hosts the famous rock festival: Roskilde Festival, which is the biggest festival in the north with more than 100.000 guests.

KONGENS HAVE

Kongens Have (The King's Garden) is a beautiful green area in the centre of Copenhagen. It surrounds Rosenborg Castle and both the garden and the castle was built in 1606 by Christian IV. Today the castle is a museum for the sequence of kings and their crown jewels. The King's Garden is the most popular park in Copenhagen and when the weather is good the park is filled with Copenhageners of all ages who picnic, play games or sunbathe.

CANALS

Sailing on the Canals of Copenhagen is a great way to see the city. Along the quay you can see some of the nicest buildings in Copenhagen: the Opera House, the Playhouse and Nyhavn (New Harbour) with its characteristic coloured houses along the shore.

PROGRAMME // LEADERS & OBSERVERS

| | MORNING | AFTERNOON | EVENING |
|--------------------------|---|--|----------------------------------|
| SUNDAY 7 JULY | Arrival, registration & pictures | Arrival, registration & pictures | Arrival, registration & pictures |
| MONDAY 8 JULY | Opening Ceremony Busses leave at 8.30 | International Board meeting Theory discussion | Translation & printing |
| TUESDAY 9 JULY | Tour at the Niels Bohr Institute Busses leave at 11.00 | Rigshospitalet (lunch) & Canal Tour | Reception at Carlsberg |
| WEDNESDAY 10 JULY | Marking of Theoretical Problems Busses leave at 12.00 | Experimental discussion | Translation & printing |
| THURSDAY 11 JULY | Louisiana Busses leave at 10.00 | Aarstiderne (lunch) & Kronborg | Midterm party |
| FRIDAY 12 JULY | Marking of Experimental Problems Busses leave at 13.00 | Copenhagen City Hall Reception 14.00 | Hotel |
| SATURDAY 13 JULY | Hotel/DTU Prepare Moderation Busses leave from 8.30 | International Board meeting & Moderation | Moderation |
| SUNDAY 14 JULY | International Board meeting Busses leave at 9.00 | Closing Ceremony | Farewell Party |
| MONDAY 15 JULY | Departure | Departure | Departure |

EXCURSIONS // LEADERS, OBSERVERS & VISITORS

NIELS BOHR INSTITUTE

Niels Bohr Institute (NBI) is the oldest part of the physics department of the University of Copenhagen. The Institute was inaugurated by Niels Bohr in 1921 and it was an international centre for physics in the post-war era. Physicists like Erwin Schrödinger and Werner Heisenberg visited Niels Bohr at the Institute at what was called the Copenhagen School. This school played a central part in the development of quantum mechanics. NBI has arranged the theoretical examination.

THE BOTANICAL GARDEN

The Botanical Garden is situated in the heart of Copenhagen. It contains Denmark's largest collection of living plants and it has the only gene bank for wild-plants. The most important task of the garden is to maintain a large and varied plant collection for research and education in Denmark.

CANALS

Sailing on the Canals of Copenhagen is a great way to see the city. Along the quay you can see some of the nicest buildings in Copenhagen: the Opera House, the Playhouse and Nyhavn (New Harbour) with its characteristic coloured houses along the shore.

CARLSBERG

The first Carlsberg beer was brewed in 1847 in Copenhagen by J. C. Jacobsen. The quality of the beer was important for J. C. Jacobsen, so he founded the Carlsberg Laboratory in 1875 with the hopes of getting to know the chemistry of the beer. In 1883 the laboratory succeeded in cultivating the beer yeast and the Carlsberg brewery could thereby avoid the damaging beer sickness. As of today the Carlsberg yeast is used throughout the world for Pilsner brewing. Carlsberg is one of the four leading breweries in the world. The Carlsberg Foundation is one of the IPhO 2013 sponsors.

LOUISIANA

Louisiana is the leading museum of modern art in Denmark and it is situated in Humlebæk north of Copenhagen. The location is extraordinary with a view over the water to Sweden. From here you can spot the island Hven, where Tycho Brahe had his world famous astronomical observatory in the last two decades of the 16th century. There is a large permanent exhibition with a variety of artists and temporary exhibitions. Right now you can see the exhibitions Yoko Ono Half-A-Wind Show and Louisiana Contemporary – Tara Donovan.

KRONBORG

Kronborg is a large castle and fortress in Helsingør (Elsinore) north of Copenhagen. It dates back to 1420, but was rebuilt in its present form in the middle of the 17th century by Christian IV, who was one of the most significant kings in the history of Denmark. In 2000 Kronborg was included in the UNESCO World Heritage List. Thanks to Shakespeare, Kronborg is also known as Hamlet's castle.

COPENHAGEN CITY HALL

Copenhagen City Hall is situated on the town hall square. It was built from 1892-1905 and it is one of the tallest buildings in Copenhagen with its 100 meters. The sound of the clock tower bells is transmitted on the Danish state radio channel at 12 am every day and on New Year's Eve at 12 pm. Every year at the Copenhagen Culture Night the general public is invited inside to eat the famous City Hall Pancakes, and you are also invited to taste them.

SWIMMING IN THE HARBOUR

The student hostel is situated next to the harbour bath in Islands Brygge. Students may use these facilities together with their guides if they are permitted to go swimming. Swimming is only allowed during the opening hours shown below. It is prohibited to jump in the water from other places than in the designated area of the harbour bath.

Opening hours of Harbour Bath Islands Brygge
Monday – Friday 07:00 - 19:00
Saturday, Sunday 11:00 - 19:00

BEVERAGES DURING THE WEEK

There will be served water with the meals during the week. All additional orders – both drinks and food – are paid for individually.

CHECK-IN AND CHECK-OUT

The hotels and hostel may request a copy of both passport and credit card during check-in. Supplementary expenses must be settled with the hotel before leaving.

IPhO INFORMATION DESKS

There will be IPhO desks at the hotels and at the hostel. The opening hours can be found on boards by the desks. The daily program can be found on these boards as well. It is important that all participants keep themselves informed about departure times every day (this schedule will be the most recently updated schedule).

TRANSPORTATION

All students must stay close to their guides at all times. The guides know the daily program and will make sure that all students are at the right place at the right time.

Leaders, observers and visitors must be aware that the busses leave when they are full. It is the leaders, observers and visitors own responsibility that they arrive at the announced times (as announced at the IPhO Information Desks).

DANISH PHRASES // TRY IT WITH YOUR GUIDES

| | |
|-----------------------|-------------------------|
| Hallo | Hej |
| How are you? | Hvordan går det? |
| Thank you | Tak |
| You are welcome | Selv tak |
| Excuse me | Undskyld mig |
| My name is ... | Jeg hedder... |
| What is your name? | Hvad hedder du? |
| Yes | Ja |
| No | Nej |
| Goodbye | Farvel |
| Good morning | Godmorgen |
| Good night | Godnat |
| Sleep well | Sov godt |
| Good luck! | Held og lykke! |
| I can't speak Danish | Jeg kan ikke tale dansk |
| Do you speak English? | Taler du engelsk? |
| Where is the toilet? | Hvor er toilettet? |
| What time is it? | Hvad er klokken? |
| One | En |
| Two | To |
| Three | Tre |
| Four | Fire |
| Five | Fem |
| Six | Seks |
| Seven | Syv |
| Eight | Otte |
| Nine | Ni |
| Ten | Ti |

SEATING PLAN OF OTICON

Countries are seated in two sections in alphabetical order according to the ISO codes shown on the following pages.

| | | | | | |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 |
|---|---|---|---|---|---|

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|----|----|----|----|----|----|
| AM | AT | AU | AZ | BA | BD |
|----|----|----|----|----|----|

| | | | | | |
|----|----|----|----|----|----|
| BE | BG | BO | BR | BY | CA |
|----|----|----|----|----|----|

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|----|----|----|----|----|----|
| CH | CN | CO | CU | CY | CZ |
|----|----|----|----|----|----|

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|----|----|----|----|----|----|
| DE | DK | EC | EE | ES | FI |
|----|----|----|----|----|----|

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|----|----|----|----|----|----|
| FR | GB | GE | GR | HK | HR |
|----|----|----|----|----|----|

| | | | | | |
|----|----|----|----|----|----|
| HU | ID | IL | IN | IR | IS |
|----|----|----|----|----|----|

| | | | | | |
|----|----|----|----|----|----|
| IT | JP | KG | KR | KW | KZ |
|----|----|----|----|----|----|

| | | | | | |
|------|------|------|------|------|------|
| (OB) | (OB) | (OB) | (OB) | (OB) | (OB) |
|------|------|------|------|------|------|

| | | | |
|---|----|---|------|
| 0 | Sp | 0 | (IT) |
|---|----|---|------|

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|----|----|----|----|----|----|
| LI | LK | LT | LV | MD | ME |
|----|----|----|----|----|----|

| | | | | | |
|----|----|----|----|----|----|
| MK | MN | MO | MX | MY | NG |
|----|----|----|----|----|----|

| | | | | | |
|----|----|----|----|----|----|
| NL | NO | NP | PE | PK | PL |
|----|----|----|----|----|----|

| | | | | | |
|----|----|----|----|----|----|
| PR | PT | RO | RS | RU | SA |
|----|----|----|----|----|----|

| | | | | | |
|----|----|----|----|----|----|
| SE | SG | SI | SK | SR | SV |
|----|----|----|----|----|----|

| | | | | | |
|----|----|----|----|----|----|
| SY | TH | TJ | TM | TR | TW |
|----|----|----|----|----|----|

| | | | | | |
|----|----|----|----|----|--|
| UA | US | UZ | VN | ZA | |
|----|----|----|----|----|--|

| | | | | | |
|------|------|------|------|------|------|
| (OB) | (OB) | (OB) | (OB) | (OB) | (OB) |
|------|------|------|------|------|------|

| COUNTRY | CODE | | | | OTHERS | CODE |
|--------------------------|------|---------------------|----|--------------------------|--------|------|
| Armenia | AM | Israel | IL | Slovenia | SI | Sp |
| Australia | AU | Italy | IT | South Africa | ZA | 0 |
| Austria | AT | Japan | JP | Spain | ES | (IT) |
| Azerbaijan | AZ | Kazakhstan | KZ | Sri Lanka | LK | (OB) |
| Bangladesh | BD | Kuwait | KW | Suriname | SR | |
| Belarus | BY | Kyrgyzstan | KG | Sweden | SE | |
| Belgium | BE | Latvia | LV | Switzerland | CH | |
| Bolivia | BO | Liechtenstein | LI | Syrian Arab Republic | SY | |
| Bosnia and Herzegovina | BA | Lithuania | LT | Taiwan | TW | |
| Brazil | BR | Macao | MO | Tajikistan | TJ | |
| Bulgaria | BG | F.Y.R. Macedonia | MK | Thailand | TH | |
| Canada | CA | Malaysia | MY | Turkey | TR | |
| P.R. China | CN | Mexico | MX | Turkmenistan | TM | |
| Colombia | CO | Mongolia | MN | Ukraine | UA | |
| Croatia | HR | Montenegro | ME | United Kingdom | GB | |
| Cuba | CU | Nepal | NP | United States of America | US | |
| Cyprus | CY | Netherlands | NL | Uzbekistan | UZ | |
| Czech Republic | CZ | Nigeria | NG | Vietnam | VN | |
| Denmark | DK | Norway | NO | | | |
| Ecuador | EC | Pakistan | PK | | | |
| El Salvador | SV | Peru | PE | | | |
| Estonia | EE | Poland | PL | | | |
| Finland | FI | Portugal | PT | | | |
| France | FR | Puerto Rico | PR | | | |
| Georgia | GE | Republic of Korea | KR | | | |
| Germany | DE | Republic of Moldova | MD | | | |
| Greece | GR | Romania | RO | | | |
| Hong Kong | HK | Russian Federation | RU | | | |
| Hungary | HU | Saudi Arabia | SA | | | |
| Iceland | IS | Serbia | RS | | | |
| India | IN | Singapore | SG | | | |
| Indonesia | ID | Slovakia | SK | | | |
| Islamic Republic of Iran | IR | | | | | |

EMERGENCY NUMBERS

112

Ambulance

114

Police

1813

Emergency Phone – Medical Guidance

+45 38 69 38 69

Doctors 6pm - 8am

+45 45 25 55 84

IPhO office

HOTEL RECEPTIONS 24h

(if you get sick or have any questions)

+45 33 11 85 85

Danhostel Copenhagen City

+45 45 88 77 00

Hotel Scandic Eremitage

+45 39 77 28 00

Hotel Schæffergården