



IPPOG

Johan Rathsmann

IPPOG

MasterClasses

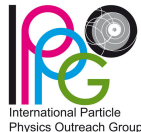
Resources

Summary and outlook

Spaatind etc

# IPPOG

Johan Rathsmann, Lund University



Partikeldagarna, Stockholm, 2012-11-26–27

- 1 IPPOG - International Particle Physics Outreach Group
- 2 International Masterclasses 2013
- 3 New IPPOG global learning resource collection
- 4 Summary and outlook
- 5 Spaatind January 2014 + other announcements



IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spaandind etc

# IPPOG - International Particle Physics Outreach Group



International Particle  
Physics Outreach Group



IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spaatind etc

New homepage - <http://ippog.web.cern.ch/>



International Particle Physics Outreach Group

[HOME](#) | [ABOUT](#) | [MEMBERS](#) | [RESOURCES](#) | [MASTERCLASSES](#)

## The International Particle Physics Outreach Group (IPPOG)

IPPOG is a network of scientists, informal science educators and explainers working across the globe in informal science education and outreach for particle physics. Our membership currently includes representatives from each member state of CERN, four major experiments at CERN's Large Hadron Collider (LHC) and prominent labs and institutions in the USA and Europe.

### PhD TV: The Higgs Boson Explained

A clever animation explaining what the Higgs Boson is and how the LHC will find it (if it exists).

Film / Video, Book



## Latest Resources



### Tutorial for CMS...

Originally presented to the CMS Collaboration to understand the concept, purpose and execution of...

0 comments



### ATLAS Virtual...

Poster presented at CHEP 2012, describing the ATLAS Virtual Visit Project.

0 comments



### ATLAS Virtual...

Description of ATLAS Virtual Visits

0 comments

[HOME](#)

[ABOUT](#)

[MEMBERS](#)

[RESOURCES](#)

[MASTERCLASSES](#)

Activities  
Programs & Events  
Media  
Professional Development  
& Coaching  
Exhibits  
Souvenir / Novelty Item

[ippog.web.cern.ch/resources/2012/phd-tv-higgs-boson-explained](http://ippog.web.cern.ch/resources/2012/phd-tv-higgs-boson-explained)



IPPOG

Johan Rathsman

IPPOG

MasterClasses

Resources

Summary and outlook

Spaatind etc

# IPPOG - International Particle Physics Outreach Group

Network of particle physicists, researchers, informal science educators and science explainers engaged in world-wide outreach and informal science education for particle physics

## IPPOG's Aim

raise awareness, understanding and standards of global outreach efforts in particle physics and general science

- Providing discussion forums and regular information exchange for science institutions and labs engaged in global outreach and informal science education
- Proposing and implementing strategies to share lessons learned and best practices for outreach in particle physics and general sciences
- Promoting current outreach efforts of network members
- **update: will stay LHC-centric to begin**



IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spaandind etc

## Network Members

IPPOG is composed of

- one member nominated by the particle physics community of each CERN Member State (normally the responsible person for outreach activities in the state concerned)
- **update: new Swedish representative - interested?**
- one member each from DESY and CERN, appointed by the managements of those laboratories
- additional representatives from particle physics experiments, astroparticle physics and non-Member States of CERN (so far USA)
- **update: KEK and Israel invited to join**

IPPOG was formed in 1997 under the joint auspices of the European Committee for Future Accelerators (ECFA) and the High Energy Particle Physics Board of the European Physical Society (EPS-HEPP Board).



IPPOG

Johan Rathsman

IPPOG

MasterClasses

Resources

Summary and outlook

Spaatind etc

# International Masterclasses 2013

## General objectives

- opportunity for students (16-19) to discover particle physics
- get insight into topics and methods of basic research
- perform measurements on real LHC data (distributed on DVD)
  - $W$ ,  $Z$  and  $J/\psi$  from ATLAS/CMS and  $\Lambda$ ,  $K^0$  from ALICE
- participate in an international video conference for discussion and combination of results



IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spaartind etc

# International Masterclasses 2013

## General objectives

- opportunity for students (16-19) to discover particle physics
- get insight into topics and methods of basic research
- perform measurements on real LHC data (distributed on DVD)
  - $W$ ,  $Z$  and  $J/\psi$  from ATLAS/CMS and  $\Lambda$ ,  $K^0$  from ALICE
- participate in an international video conference for discussion and combination of results

## This academic year

- February 25 to March 22, 2013, coordinated by TU-Dresden
- Each day up to 10 out of about 120 institutes from 32 countries will participate
- <http://physicsmasterclasses.org/>
- Lund (5/3), Stockholm (7/3), Uppsala (11/3)



IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spaandind etc

http:

//atlas.physicsmasterclasses.org/en/index.htm



[HOMEPAGE](#)

[W-PATH](#)

[Z-PATH](#)

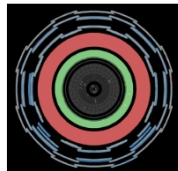
## LHC@InternationalMasterclasses

Join us on a journey to the smallest pieces of matter! Learn what is happening 100 meters below the ground at the European Organization for Nuclear Research (CERN). In the Large Hadron Collider, with a circumference of 27 kilometres, the experiments ALICE, ATLAS, CMS, and LHCb are running. The following short video gives an impression of the start of a fascinating journey looking for the origin of mass, Dark Matter, and new phenomena such as Supersymmetry or Extra Dimensions.



Particle Physics is exciting research! You can take your part in that research on the following pages. The analysis of data samples that have been recorded in 2010 with the ATLAS detector is waiting for you. Under the points in the main (upper) menu, you can choose between two different measurements with original data from the ATLAS experiment. They are called W-path and Z-path. The processing

## Links



## Facebook



## LHC Livescreen







IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spaandind etc

# W-path – search for the Higgs boson using real data



[HOMEPAGE](#)

[W-PATH](#)

[Z-PATH](#)

## Search for the Higgs

### Task 2

*Among other things, the LHC was built to find evidence of the Higgs field in our universe by discovering the Higgs particle for which physicists have been searching for a while. Theoretical predictions tell us that heavy particles, e.g. top quarks, produced in collisions within the LHC might produce such Higgs particles. But this has not yet been observed. However, you can look for them! A few simulated Higgs events were hidden in real data.  
Find the Higgs events!*

You also need to know criteria, which will enable you to identify a possible Higgs candidate. A Higgs candidate event must:

- contain EXACTLY TWO OPPOSITE electric charged leptons, which
- are isolated on the one side and
- each of them must have a transverse momentum of at least 20 GeV. Furthermore
- a missing transverse momentum of at least 40 GeV is required.

Only if an event fulfils all these criteria a Higgs particle might have been

## Content

AIMS/TASKS

IDENTIFYING PARTICLES

IDENTIFYING EVENTS

MEASUREMENT

STRUCTURE OF THE PROTON

[Search for the Higgs](#)

ANALYSIS



IPPOG

Johan Rathsman

IPPOG

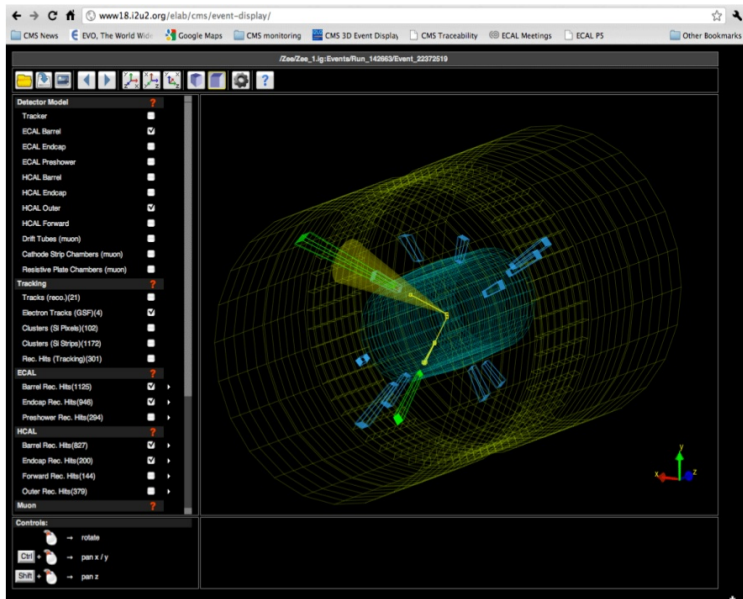
MasterClasses

Resources

Summary and outlook

Spaatind etc

# Event displays



Similarly MINERVA based on ATLANTIS (ATLAS)



IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spatind etc

<http://physicsmasterclasses.org/>



International Particle  
Physics Outreach Group

Home

Participate!

Schedule

My Country

Physics

Local Organisation

In the Media

Archive

Imprint

Contact Us

facebook

Name:  
International  
Particle Physics  
Masterclasses



## International Masterclasses

9<sup>th</sup> International Masterclasses 2013

Each year about 8000 high school students in [32 countries](#) come to one of about 120 nearby universities or research centres for one day in order to unravel the mysteries of particle physics. Lectures from active scientists give insight in topics and methods of basic research at the fundaments of matter and forces, enabling the students to perform measurements on real data from particle physics experiments themselves. At the end of each day, like in an international research collaboration, the participants join in a video conference for discussion and combination of their results.

**International Masterclasses 2013** will be held from **25.2. - 22.3.2013**.

**U.S. Masterclasses** will be organized from **9.3. - 23.3.2013**.

International Masterclasses 2012 have been held from 27.2. - 24.3.2012, see [here](#) for media coverage). A parallel program in [US](#) from 10.3. - 24.3.2012 has included about 30 more institutes.

### Discover the world of Quarks and Leptons with real data



- get out of school for one day and come to a nearby university or research centre
- get insight into topics and methods of basic research at the fundaments of matter and forces



IPPOG

Johan Rathsman

IPPOG

MasterClasses

Resources

Summary and outlook

Spaatind etc

# New IPPOG global learning resource collection

First-ever global database for materials related to particle physics outreach and informal education

- recommended tools and materials: videos, brochures, posters, talks, ideas for hands-on activities, . . . shared by members and partners of the IPPOG network.
- available for anyone engaged in particle physics outreach initiatives
- share your ideas/materials by becoming a registered user and upload your material
- suggestions and feedback appreciated
- **update: New dedicated website released**



IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spaatind etc

<http://ippog.web.cern.ch/resources>

[HOME](#) | [ABOUT](#) | [MEMBERS](#) | [RESOURCES](#) | [MASTERCLASSES](#)

[HOME](#) > [RESOURCES](#)

## Resources

Activities  
Cart Demonstration  
Display  
Classroom Activity  
Facilitated Activity  
Presentation  
Game  
Programs & Events  
Media  
Professional  
Development &  
Coaching  
Exhibits  
Permanent  
Exhibitions  
Portable Exhibitions  
Exhibits  
Souvenir / Novelty Item

FAQs

**Welcome !**

**What is this?**

**Who is this for?**

Want to share items,  
leave comments and  
rate stuff too? [Learn  
more](#) about joining  
the collection's user  
group.

### Learning Topics



- ▶ Physics
- ▶ Technology
- ▶ International Collaboration
- ▶ Broader Impacts

[LATEST](#)

[FEATURED](#)



[Article / Journal](#)

**ATLAS Virtual Visits: Bringing the World into the ATLAS Control Room**

Description of ATLAS Virtual Visits

### Search by

**Learning Topic**

- Any -

**Audience**

- Any -

**Item Type**

- Any -

**Availability**

- Any -

**Duration**

- Any -

**Language**

- Any -

**Key Words**

### Resources in your language

[English](#) [French](#) [German](#)  
[Italian](#) [Portuguese](#) [Spanish](#)

[more](#)

### Filter by audience

6 to 9 years  
9 to 12 years  
12 to 15 years



IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spaatind etc

Many possibilities to search for specific resources

<http://ippog.web.cern.ch/resources>

**Activities**

- Cart Demonstration
- Display
- Classroom Activity
- Facilitated Activity
- Presentation
- Game

**Programs & Events**

**Media**

**Professional Development & Coaching**

**Exhibits**

- Permanent
- Exhibitions
- Portable Exhibitions
- Exhibits

**Souvenir / Novelty Item**

**FAQs**


**Welcome !**

**What is this?**

**Who is this for?**

Want to share Items, leave comments and rate stuff too? [Learn more](#) about joining the collection's user group.

## Learning Topics



▼ Physics

- Conservation Laws
- Cosmic Microwave Background
- Cosmology
- Dark Energy
- Dark Matter
- Extra / Multi Dimensions
- Forces
- Higgs Boson
- W' Z' Bosons
- Mass
- Matter / Antimatter
- Micro Black Holes
- Neutrinos
- New Physics
- Particles
- Quark Gluon Plasma
- Standard Model
- SUSY
- Symmetry

► Technology

► International Collaboration

► Broader Impacts

**LATEST** **FEATURED**

**Search by**

**Learning Topic**

- Any -

**Audience**

- Any -

**Item Type**

- Any -

**Availability**

- Any -

**Duration**

- Any -

**Language**

- Any -

**Key Words**

**Resources in your language**

[English](#) [French](#) [German](#)  
[Italian](#) [Portuguese](#) [Spanish](#)

[more](#)

**Filter by audience**



IPPOG

Johan Rathsman

IPPOG

MasterClasses

Resources

Summary and outlook

Spaatind etc

# update: Discovery Packages not happening

Still some background material

<http://press.web.cern.ch/backgrounders>

## Backgrounders

### On the Higgs boson

#### [Higgs update 4 July](#)

CERN observes new fundamental particle – what comes next?

#### [Higgs boson - Higgs limit FAQ for EPS-HEP 2011](#)

Extracts from a paper by the CERN Scientific Policy Committee on the scientific significance of the possible exclusion regions of the Higgs

#### [Important terms in Higgs research](#)

Use our glossary of important terms from particle physics and statistics to inform your articles on the Higgs boson

#### [The Higgs boson: Evolution or revolution?](#)

Discovering the Higgs particle at the LHC would be a triumph, but showing that it doesn't exist could be just as exciting

#### [The Higgs boson](#)

The Standard Model cannot explain why particles have mass. The Higgs may be the answer, and CERN physicists are looking for it

### Other topics in physics

#### [Compositeness](#)

The unprecedented energy of proton collisions at the LHC could be what scientists need to find a new world of subatomic particles

#### [Dark matter](#)

Dark matter makes up more than 80% of all the matter in the universe, but it can only be detected by its gravitational effects

#### [Extra dimensions](#)

### Resources

[Images](#)

[Videos](#)

[Facts and figures](#)

[Biographies](#)

[Events](#)

[Backgrounders](#)

[Brochures](#)

### Publications

[CERN Courier](#)

[CERN Bulletin](#)

[Annual Report](#)

### LHC experiments

[ALICE](#)

[ATLAS](#)

[CMS](#)

[LHCb](#)

[LHCf](#)

[MoEDAL](#)

[TOTEM](#)



IPPOG

Johan Rathsman

IPPOG

MasterClasses

Resources

Summary and outlook

Spatind etc

# Summary and outlook

## International Particle Physics Outreach Group

- Masterclasses, Feb 25 – March 22, 2012
- Lund (5/3), Stockholm (7/3), Uppsala (11/3)
- New database for sharing material and ideas
- ~~Discovery Packages being prepared~~





IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spaatind etc

# Spaatind January 2014 + other announcements

## Nordic Particle Physics meeting

- invited lectures on recent progress in particle physics
- contributed talks by younger participants

## When, where

- every second year (last time in Skeikampen)
- in between New years eve and Epiphany (trettonhelgen)
- Sweden organizes next time (Tord Ekelöf and JR co-chairs)

## Extras

- loooooong lunch break when the sun is up ( $\sim 10-15$ )
- excellent skiing

## How to contribute

- make sure to reserve date and sign up
- need one representative from each University in organizing committee



**IPPOG**

**Johan Rathsmann**

IPPOG

MasterClasses

Resources

Summary and outlook

**Spaaitind etc**

# Cross-country





IPPOG

Johan Rathsman

IPPOG

MasterClasses

Resources

Summary and outlook

Spaatind etc

# Alpine





IPPOG

Johan Rathsmann

IPPOG

MasterClasses

Resources

Summary and outlook

Spaatind etc

# Nordic Physics Days

THIRD JOINT MEETING OF THE NORDIC PHYSICAL SOCIETIES

•Nordiska Fysikdagarna •Põhjaamaade Füüsikapäevad •Nordisk Fysikermøte •Pohjoismaiset Fysiikan Päivät •Nordisk Fysik Dage

LUND UNIVERSITY | 12-14 JUNE 2013

## Physics and Society



### LOCAL COMMITTEE

Joakim Cederkäll  
Melyvn Davies  
Knut Deppert  
Arno Hiess  
Anders Irbäck  
Stefan Kröll  
Mats Lindroos  
Else Lytken  
Johan Mauritsson  
Gunnar Ohlén  
Ann-Marie Pendrill  
Torbjörn Sjöstrand  
Sune Svanberg  
Jonas Tegenfeldt  
Sven Åberg

### NORDIC SOCIETIES

Ian Bearden (DK)  
Karl-Fredrik Berggren (SE)  
Per Osland (N)  
Kaido Reivelt (EST)  
Ritva Serimaa (FI)

### ADVISORY PANEL

Susan Aalto  
Carl Angell  
Per Balling  
Paula Eerola  
Olle Ericsson  
Chris Flynn  
Thomas Fordell  
Morten Forre  
Christian Forsén  
Hans Fynbo  
Lotten Glans  
Mette Marie-Louise Grage  
Andi Hektor  
Haavard Helstrup  
Vladimir Hiznjakov  
Morten Hjorth-Jensen  
Bodil Holst  
Rauno Julin  
Hans Kjeldsen  
Ismo Koponen  
Per Lilje  
Cedric Linder  
Anne-Sofie Mårtensson  
Sindra Petersson Årsköld  
Rebecca Seviour  
Axel Steuwer  
Björn Stokke  
Aile Tamm  
Kimmo Tuominen  
Ilpo Vattulainen

### CONFERENCE TOPICS

ASTRONOMY AND ASTROPHYSICS

BIOPHYSICS AND SOFT MATTER

PARTICLE PHYSICS

SOLID STATE AND NANO PHYSICS

LARGE SCALE FACILITIES

ATOMIC AND MOLECULAR PHYSICS

NUCLEAR PHYSICS

PHYSICS EDUCATION

WOMEN IN PHYSICS

PHYSICS AND SOCIETY





**IPPOG**

**Johan Rathsmann**

IPPOG

MasterClasses

Resources

Summary and outlook

**Spatind etc**

# Thank you

Thank you to Barbro and Mark for organizing the meeting!

See you next year in Lund?