



Virtual Science Camps



from My Favourite Experiments to
Particle Physics for Kids and beyond



Presented by Michael Gregory at IPPOG Meeting 19/05/21
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Virtual Science Camps at IPPOG

Who am I?

What is a Virtual Science Camp?

Why am I here?

What's next?

Who am I?

My Favourite Experiments

Cross-Canada 2017 - the birth of MFE

13 weeks
10000 km
9 museums
5 universities
>100 educators



Europe 2018



CERN ITW 2018



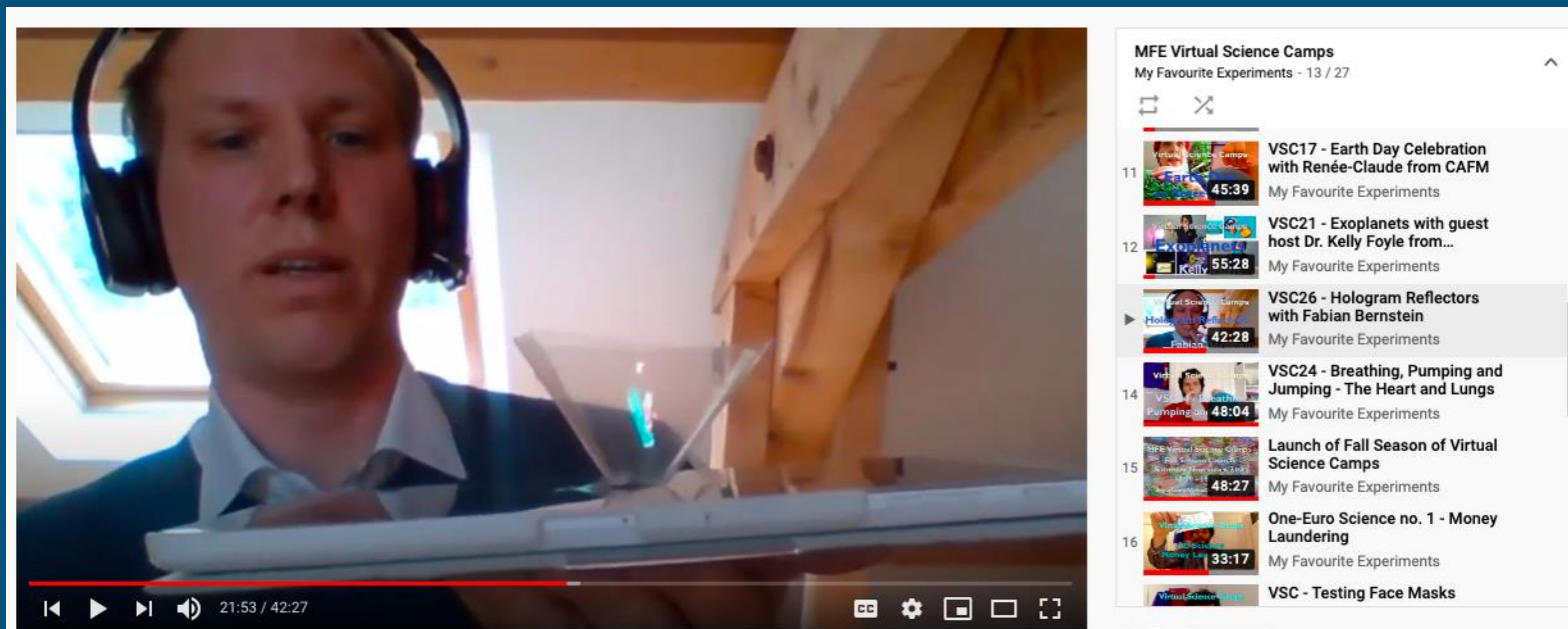
2019 - UNESCO, Ghana and YES!



What is a Virtual Science Camp?

Virtual Science Camps - Spring 2020

Using experience in low-cost experiments to increase access to hands-on science during the covid lockdowns.



The image shows a YouTube video player interface. The main video frame displays a man with light hair, wearing a dark suit, white shirt, and tie, along with large black headphones. He is looking slightly off-camera. In the foreground, a white laptop is open, and a small, glowing blue light is visible on its keyboard area. The background is a room with wooden beams and a window.

Below the video frame is a red progress bar and a timestamp of 21:53 / 42:27. To the right of the video frame is a list of recommended videos under the heading "MFE Virtual Science Camps". The list includes:

- VSC17 - Earth Day Celebration with Renée-Claude from CAFM (45:39)
- VSC21 - Exoplanets with guest host Dr. Kelly Foyle from... (55:28)
- VSC26 - Hologram Reflectors with Fabian Bernstein (42:28)
- VSC24 - Breathing, Pumping and Jumping - The Heart and Lungs (48:04)
- Launch of Fall Season of Virtual Science Camps (48:27)
- One-Euro Science no. 1 - Money Laundering (33:17)
- VSC - Testing Face Masks

Why am I here?

(How is this related to Particle Physics?)

Particle Physics for Kids

— Virtual Camps to bring experts from CERN, JINR and Perimeter into the homes of students and teachers in over 30 countries.



Particle Physics for Kids

My Favourite Experiments - 1 / 7

MPF Virtual Science Camps
Fun and Physics for Kids

Launch of Particle Physics for Kids - Sat. 09/01/21
My Favourite Experiments 48:32

2 VSC - Introduction to CERN with guest host Jeff Wiener
My Favourite Experiments 1:33:35

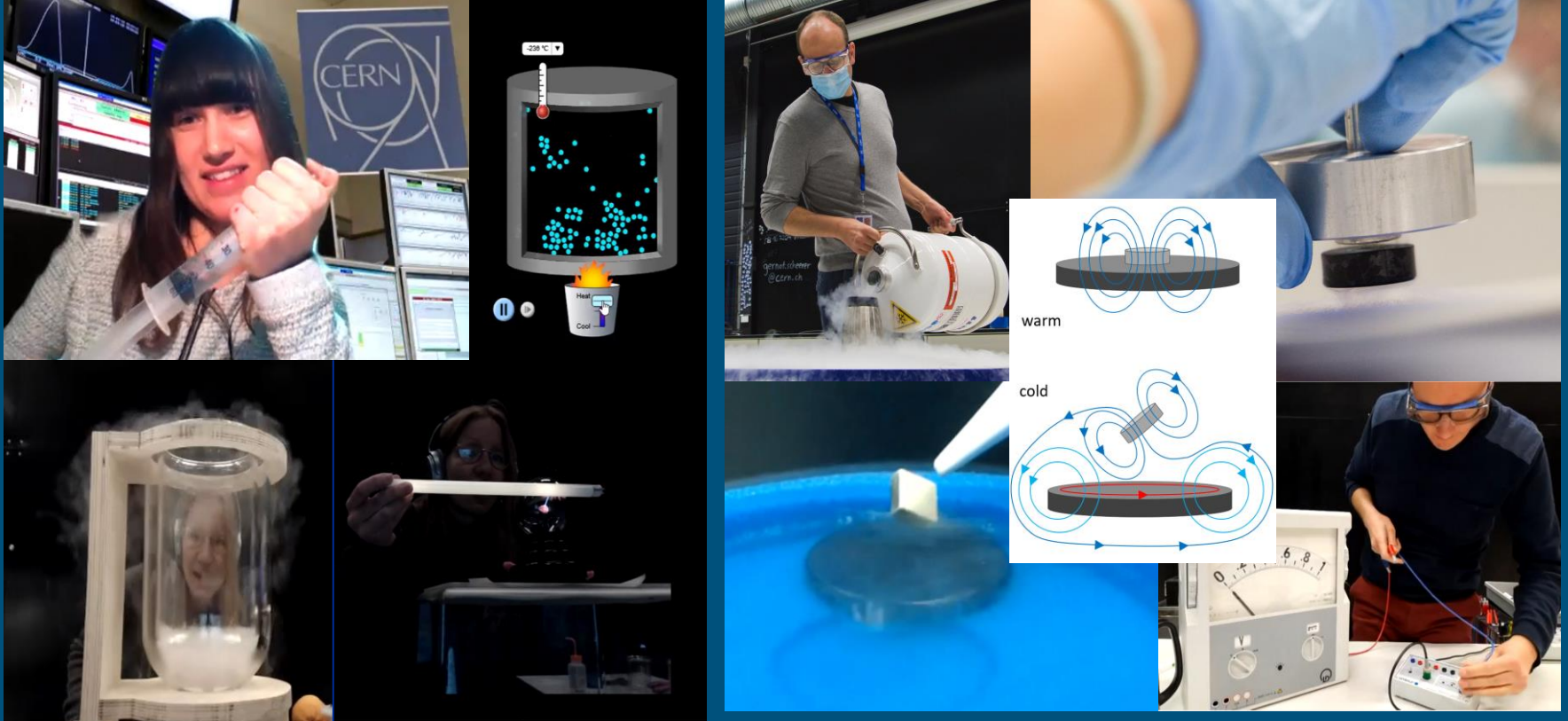
3 VSC - Phase Changes in the Kitchen - Sat. 16/01/21
My Favourite Experiments 51:08

4 VSC - Neutrino - Chasing the Ghost - with guest host Mark...
My Favourite Experiments 1:05:18

5 VSC - Modelling Magnification - Sat. 23/01/21
My Favourite Experiments 45:59

6 VSC - Virtual Visit of ATLAS Detector, CERN - Tues. 23/02
My Favourite Experiments 1:01:55

S'Cool Lab Science Shows



Jeff Wiener - CERN



Accelerators and decelerators from a penguin's point of view



Jeff Wiener

9 March 2021



CERN and the Higgs – What's next?



Jeff Wiener

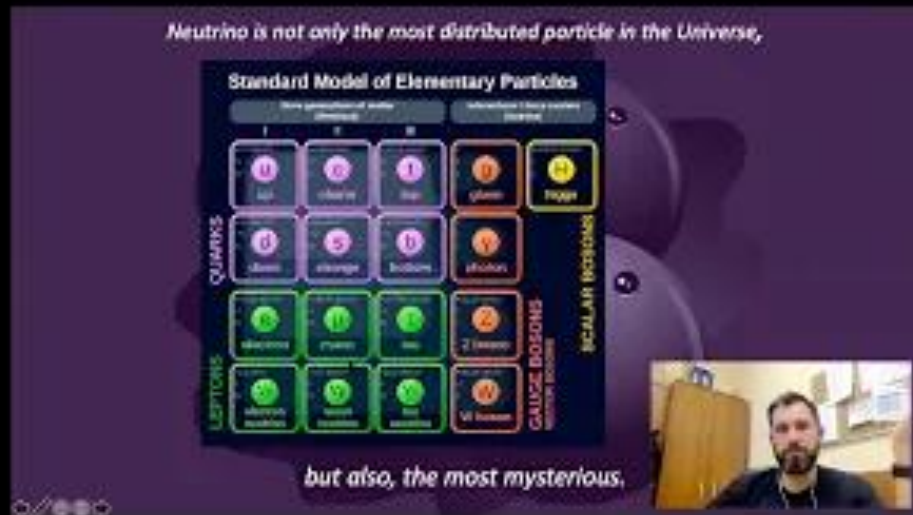
19 January 2021

JINR Guest Lectures



Mark Shirchenko
Neutrino -
Chasing the Ghost

Dmitry Dryablov -
The Big Bang Theory,
Evolution of the Universe



JINR Guest Lectures cont'd

Accelerators in radiation medicine



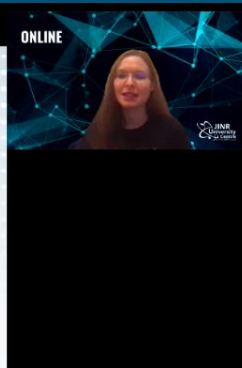
Phasotron, protons 170 MeV



Nuclotron, ^{12}C 500 MeV/amu



U-400M, up to 50 MeV/u Li, B, Ne ions



Maria Lalkovicova
What Happens to the
Brain in Space?

Area of Circle Method

```
import random
```

```
N = 10000000
```

```
Nc = 0
```

```
for i in range(N):
```

```
    x = random.random()
```

```
    y = random.random()
```

```
    if x*x + y*y < 1 :
```

```
        Nc = Nc + 1
```

```
pi = 4*Nc/N
```



Igor Pelevanyk
What is the Monte
Carlo Method?

Perimeter Institute - Host and Resources

Igniting the Orbitron Breakout Challenge



Project Briefing

The Orbitron Ignition

Science Background

The Orbitron is a particle accelerator in orbit around the Earth. It is very close to being operational. Due to its sheer size and its use of Earth's gravitational field, the Orbitron is poised to become the most powerful particle accelerator ever created. Unfortunately, the project director in charge of the operation, who is responsible for starting the accelerator, is stranded at the ICE CUBE Particle Detector in Antarctica with limited ability to connect. She has placed your team in charge of the final stages of initiating the Orbitron. Her notebook is all that's left for you to explore.



Objective

As a team of particle accelerator engineers, your task is to initiate the Orbitron.

For security reasons, six top-secret codes are required to start the accelerator. Each code is held by a research team at different particle detectors around the world. Only the director can access all of them, but since she isn't available, you must discover the codes and missing parameters that will initiate the Orbitron.

Some of the information needed to decipher these codes can be found in the Director's notebook. But to uncover all the missing pieces you will need to collaborate on an international scale as you investigate the research conducted at the different particle accelerators and learn more about the mysteries of particle physics.



Guest Teachers



Particle Physics for Kids

Making the Invisible Visible with Detectors

Activity IV: Detective work
– find the special
signatures on the screen

- Ionisation
- Induced new particles
- Scintillation



Marco Kirschner, Germany
Making the Invisible
Visible with Detectors

Paul Looyen, Australia
Structure of the
Atom and Proton

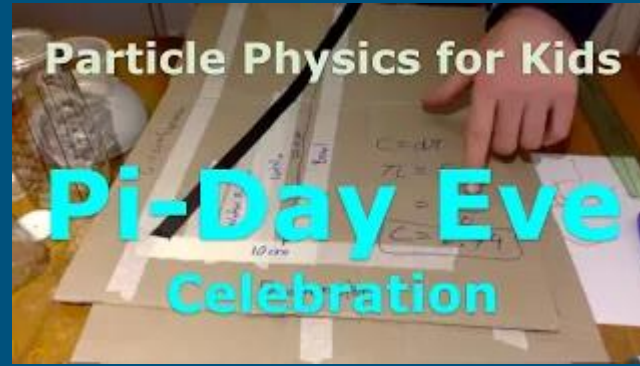
Guest Students

Alex Hancock
Modelling Magnification



José - Instant Ice
Phase Changes in the Kitchen

Experiments in the Home



PPK Grand Finale



But really why am I here?
(Or, how did I get here?)

CERN Virtual Visits

ATLAS

LEIR



Antimatter Factory

Superconducting Magnet Factory /
LHC Mockup Tunnel

CERN Data Centre

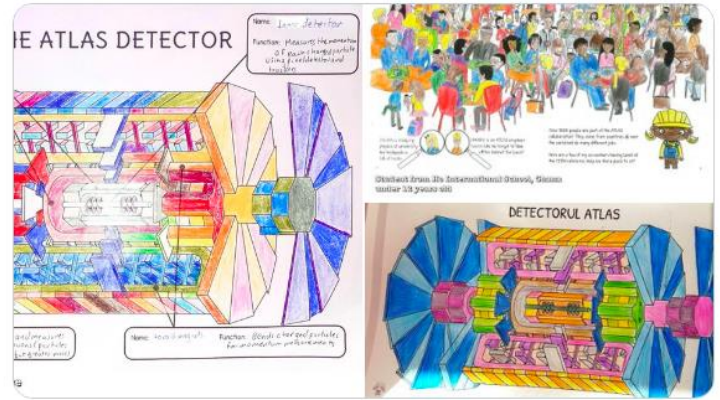
PPK Colouring Contest



ATLAS Experiment
@ATLASexperiment

What's your favorite page in the ATLAS Experiment
#coloringbook? And how would you color it in? 🎨

Some 60 kids & teens shared their favorites in a Particle
Physics coloring competition! Check out these winning
entries and get a coloring book of your own:
atlas.cern/colouring-books



What's Next?

YES! International

Sharing experiments between countries



Future Virtual Science Camps

Astrophysics for Kids Fall 2021

Particle Physics for Kids re-run Winter 2022 -

Looking for more Guest Hosts

Camps from the Road

... and as always, more homemade science!!!

Open Invitations

Homemade Science Video Festival - June 2021

Join me as guest host, share resources

Networking, diffusion & feedback (Scientix, etc.)

Crowdsourcing experiments

Diverse connections, invitations, etc.

Please connect with me

myfavouriteexperiments@gmail.com

To check out past virtual science camps:

[youtube.com/myfavouriteexperiments](https://www.youtube.com/myfavouriteexperiments)

<http://tinyurl.com/virtualsciencecamp>