

INTERNATIONAL MASTERCLASSES HANDS ON PARTICLE PHYSICS

Particle Therapy MasterClass
Current Status and Plans
Yiota Foka (GSI)

IPPOG IMC SC 6 May 2020



Updates on PTMC and ALICE Framework

CHEP Proceedings publication, Presentation, in Australia

https://indico.cern.ch/event/773049/contributions/3591094/attachments/1938736/3214727/MasterClass_CHEP2019_wide_v3.pdf

The ALICE MCs in the new Framework used for IMC 2020.

The J/Psi still to be documented properly

Working on the web-based developments and on data formats

Piotr Nowakowski, Lukasz Graczykowski

New developments for ALICE MasterClasses and the new Particle Therapy MasterClass

Lukasz Graczykowski^{1}, Piotr Nowakowski^{2,**} and Panagiota Foka^{3,***}*
on behalf of the IPPOG Collaboration

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³GSI Helmholtzzentrum für Schwerionenforschung GmbH, Planckstrasse 1, 64291 Darmstadt, Germany

Abstract. International MasterClasses (IMC), an outreach activity of the International Particle Physics Outreach Group (IPPOG), has been bringing cutting-edge particle physics research to schoolchildren for over 15 years now. All four LHC experiments participate in the event, including ALICE, the experiment optimised for the study of heavy-ion collisions. Heavy-ion physics is actively contributing to IMC with new developments including experimental measurements but also applications for society, such as treatment of cancer with ions. In particular, ALICE provides three MC measurements related to the main observ-

Updates on PTMC

PTMC schedule 2020

Date/Time	Institutes	Indico page	Moderator(s) Staff	Helpdesk
Mon 02Mar For LatinoAmerica/US	ICN-UNAM	PTMC1 https://indico.cern.ch/event/870667/	Yiota Foka	Niklas Wahl, Amila Advic, Mirsad Tunja
	Tilata			
	State University of Rio de Janeiro			
Fri 27Mar	CERN(eng)	PTMC2 https://indico.cern.ch/event/870668/	Niklas Wahl, Christian Graeff	Niklas Wahl, Amra Ibrahimovic, Mirsad Tunja
	CERN (fr)			
	Oncology, TUZLA			
	AUTH, Thessaloniki Athens			
Mon 30Mar	LMU Munich	PTMC3 https://indico.cern.ch/event/837856/	Hans-Peter Wieser Christian Graeff	Niklas Wahl, Amra Ibrahimovic, MirsadTunja
	TU Dortmund/WPE			
	UNSA Sarajevo			
	Rayong KVIS Demokritos Athens			
Tue 31Mar	GSI Darmstadt	PTMC4 https://indico.cern.ch/event/870566/	Niklas Wahl, Yiota Foka	Hans-Peter Wieser, Amila Advic, Mirsad Tunja
	DKFZ & Life Science			
	Kaunas University of Technology			
	University Vilnius Strasbourg-IPHC			
Mon 06Apr	University of Podgorica	PTMC5 https://indico.cern.ch/event/870624/	Peter Malzaher, Christian Graeff	Amila Advic Amra Ibrahimovic, Evgeny Adronov
	St Petersburg State University			
	WUT Warsaw Poland			
	University of Belgrade			
	IP2I Lyon Benha University Egypt			

About 25 institutes

Part of them via

- 15 personal contact
- 10 IMC maillists

The difficulty is that there is no “collaboration”
And it is a “new” field, community

Further institutes declared interest
But meantime we had to cancel

Only the 2 March session took place
in Mexico City and Puebla
And was super-success

Updates on PTMC

Sessions before and after the Sarajevo workshop were planned (1-3 April 2020) and re-planned (16-18 April 2020) and we have to see how it goes with travel restrictions in Sarajevo, Tuzla, Montenegro

PTMC, IPPOG, IMC stands in associated public event

New doodle was prepared, few days before CERN shut down, not sent yet.
If no other institutes join we'll offer video conferencing with experts in GSI/DKFZ (as it is early in the school year, teachers do not yet have the control of the class
And in the given covid19 situation maybe other priorities)

Planning personal support from trained team for newcomers:
i.e. trained students going to Tuzla, Montenegro,
or from Thessaloniki to other places in Greece including Chios island etc
Amar kagic, Aris Mamaras.

Particularly for newcomers in IMC, one-to-one skype meetings for start-up support were appreciated
General MC concept, logistics on inviting schools, training, video-testing, questions etc

PTMC Local Sessions

PTMC Masterclass in **Saint-Petersburg State University**
by the Laboratory of Ultra-High Energy Physics

"High Energy Physics Medical Applications:
From Hadron Collider to Hadron and Flash Therapy"

The agenda and slides are in the INDICO:

<https://indico.cern.ch/event/871396/>

Participants:

schoolchildren from regional schools of Leningradskaya

Organised by: the Educational Center "Intellect"

<http://center-intellect.ru/>

St Petersburg 16-december 2019



Group of Grigory Feofilov, Evgeny Andronov

PTMC Local Sessions

11:00-11:40, Lecture. From Hadron Collider to Hadron Therapy

Speaker: Dr **Grigori Feofilov**

Tea-break

12:00-12:40. Lecture. Introduction to Nuclear Medicine

Speaker: Dr **Vladimir Zherebchevskii**

12:40-13:00 Discussion

13:00-14:00 Luch

14:00- 16_00 Hadron therapy master class, Computing Center

Research work.

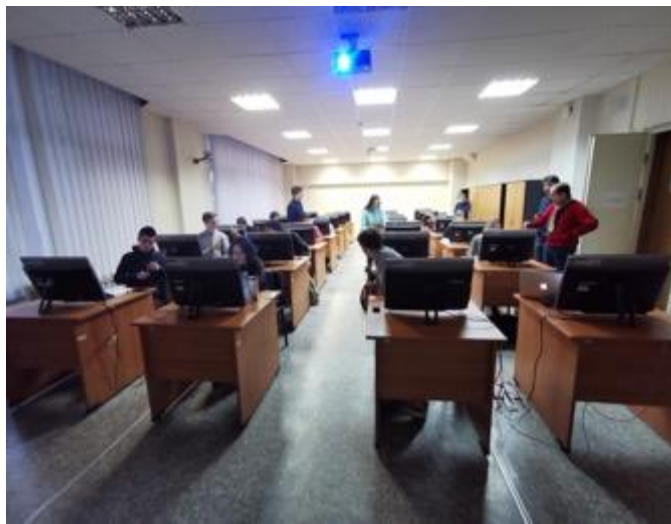
Speaker: Dr **Evgeny Andronov**

16:00-16:30 Concluding discussions

Provided list of questions
and comments

Collected feedback:
amazed by the lectures and hands-on

St Petersburg 16 december 2019



PTMC Local Sessions

Tuzla, 7 march 2019



Provided list of questions and comments



Hedim Osmanović, Associate Professor
Edis Djedovic
University of Tuzla

THE First PTMC in IMC



First International Masterclasses #physicsIMC on Hadron Therapy today! @UNAM_MX and @FISMATBUAP have invited 200 high school students to learn about the medical application of particle beams. Great new program under the umbrella of @lppogOrg



Mexico City

Antonio Ortiz Velasquez

PTMC session in UNAM, Mexico City
web page

http://epistemia.nucleares.unam.mx/web?name=fisica_y_sociedad_2020

Indico timetable

<https://indico.nucleares.unam.mx/event/1363/timetable/#20200302>

More than 100 students

Puebla

Irais Bautista Guzman

PTMC session at BUAP-Puebla.

webpage with information for the event,

<https://www.fcfm.buap.mx/ParticulasElementales/seminarios/PT/index.html>

Last minute readjustments due to strike
Still about 50 students (20 female)

Rio De Janeiro and Bogota had to cancel

PTMC in Puebla 2nd March 2020

<https://youtu.be/pqx1Gj28GBE>



Un día de física | para la sociedad

Un día de física y su impacto en la sociedad

2 March 2020
ICN-UNAM, IF-UNAM
Mexico/General timezone

- Overview
- Timetable
- Contribution List
- Author List
- Speaker List
- Registration
 - Registration Form
- Participant List
- Photos

Participant List

PTMC in MXC 2nd March 2020

Number of participants: 104

name	institution	position	city	country/region
AGUILAR ARÉVALO, Alexis	ICN, UNAM		Mexico	Mexico
ALENCASTE DESACHY, David Antonio	CCH Sur	Estudiante (BECA 100%)	Mexico	Mexico
ANIMAS AVILA, Yessica Alejandra	Colegio Anglo Mexicano Coyoacán	Estudiante (BECA 100%)	Mexico	Mexico
ARREDONDO HERNÁNDEZ, Jesús Enrique	Escuela Nacional	Estudiante	Mexico	Mexico

Closed registration
reaching max capacity
of auditorium
2x25 groups for hands-on

PTMC in MXC 2nd March 2020



A B C D

La Universidad Nacional Autónoma de México, a través de los institutos de Ciencias Nucleares (ICN) y de Física (IF) invita a los estudiantes del sistema de educación media superior de la UNAM y de escuelas incorporadas, a participar en el evento:

Un día de física para la sociedad 02032020

9 A 19H

www.fisica.unam.mx
www.nucleares.unam.mx

El evento está dirigido a estudiantes del nivel medio superior, interesados en aprender sobre los fundamentos de la física de partículas elementales y de las radiaciones ionizantes, así como los principios básicos de la radioterapia. Las actividades del IPPOG les permitirán tener un acercamiento con técnicas modernas de radioterapia utilizando rayos X de alta energía y haces de protones o iones de carbono.

Los participantes podrán asistir a conferencias magistrales, visitas guiadas a laboratorios, sesiones prácticas en aulas de cómputo con discusión de resultados e intercambio de ideas mediante videoconferencia con participantes de otras universidades en el extranjero.

Las conferencias se realizarán en los auditorios Alejandro Jasser (IF) y Marcos Moshinsky (ICN). Cupo limitado a 40 estudiantes.

Los interesados deberán enviar:

- Comprobante de inscripción que los acredite como alumno regular en el bachillerato de la UNAM o en escuelas incorporadas.
- Carta de motivos por los que desean participar en el evento.
- Carta de recomendación de un profesor de física de su plantel.

La fecha límite para recibir la solicitud es el 21 de febrero a las 18 h. Los documentos se deberán enviar por vía electrónica a:
Luis Alberto Medina (lmedina@fisica.unam.mx)
Antonio Ortiz (antonio.ortiz@nucleares.unam.mx)



E F G H



Article of THE First PTMC in the IMC schedule, 2 March 2020 in the UNAM Gaceta

<https://www.gaceta.unam.mx/clase-maestra-de-fisica-a-jovenes-de-bachillerato/>





PTMC in MXC 2nd March 2020



Masterclass' impact on choise of topics of studies

Viridiana Badillo

Biomedical Systems Engineering Student @ UNAM.

Alejandro Enrique Sánchez

Mechatronics Engineering Student @ UNAM.

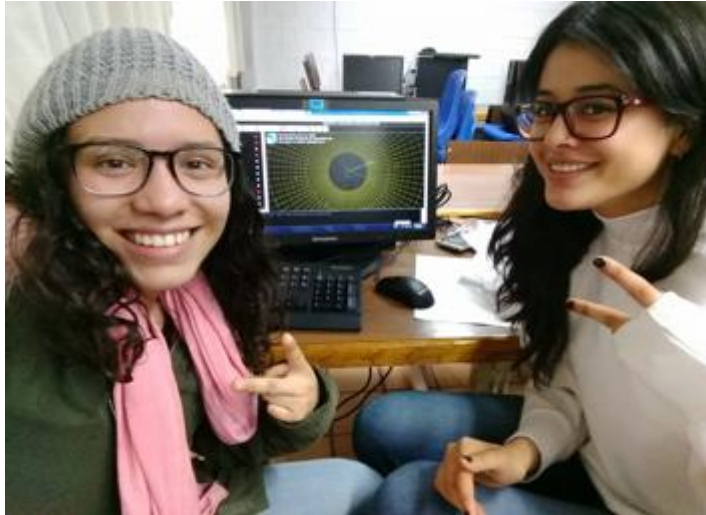
Impact of masterclass: experiences, witnesses

The experience taking this kind of masterclass sparked our interest in something we did not know that existed. We were high school students at UNAM.

Such great event invited us to STEM careers.
Each and every lecture meant a new question to be answered.
So many research and applications ideas were stunning.



To be given a certificate felt also great !



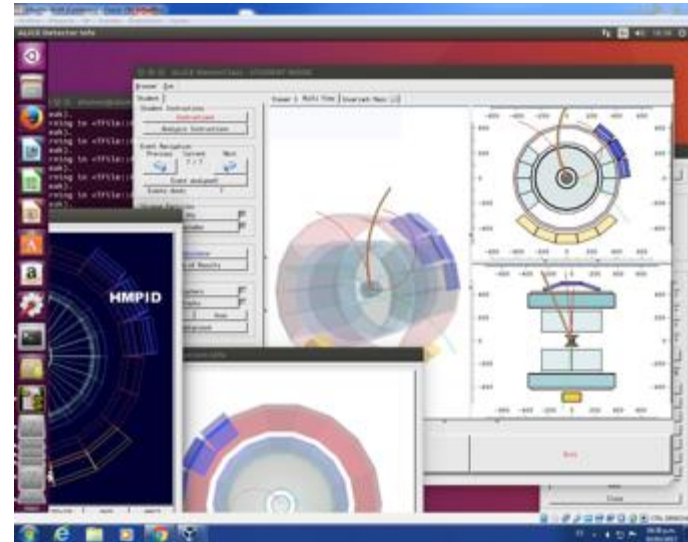
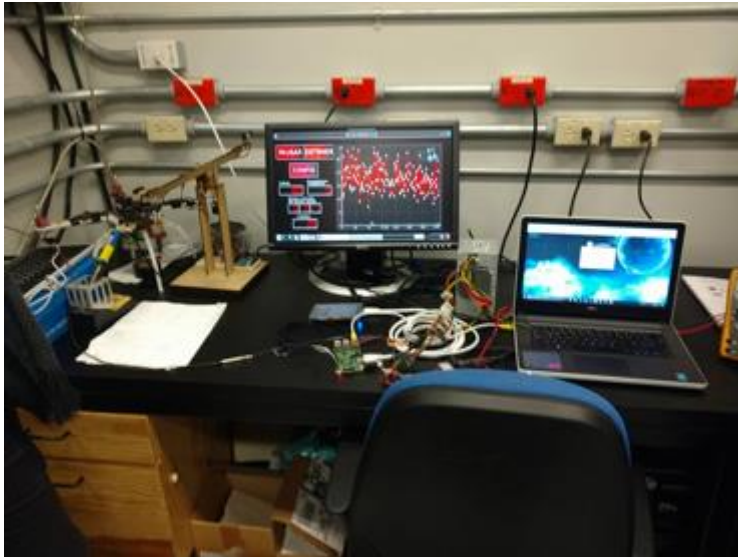
Impact of masterclass: experiences, witnesses

During the whole event we were surrounded by an environment full of energy that triggered our curiosity. Getting to know so many researchers passionate about their field is a strong new feeling. At the end we shared the results with other institutes that took the same masterclass in other countries and discussed with scientists at CERN. It was a whole new experience, like a window to the world.



Impact of masterclass: experiences, witnesses

Also very interesting and motivating the visits to the Detectors Lab of the host institute guided by the experts of the field.



Attendees of these
masterclasses were attracted by
Science, Technology, Engineering
and Math careers.

It was definitely our case



It is inspiring to young students.

This could mean more professionals in STEM
topics

Noteworthy fact:
now we collaborate here with our MC tutor
Antonio Ortiz Velasquez



**Tutors
of a masterclass:
our experience**

Tutors of masterclass: our experience



Introductory presentation for hands-on and writeup in **Spanish**
Step-by-step guidance through the workflow

Tutors of masterclass: our experience



Material in Spanish in google drive

https://drive.google.com/open?id=1u7okYFTIIFmiWLj_uLN0PDedyGk9DJtE

Tutors of masterclass: our experience



**After the PTMC event
Moderation centre
for Latinoamerica.**

PTMC Online Tutorials for Latinoamerica

After the 2 March PTMC in MXC plans on the spot for PTMC in Latinoamerica on 22 May 2020, BUT....

Contacts already via UNAM (R.A.M) :

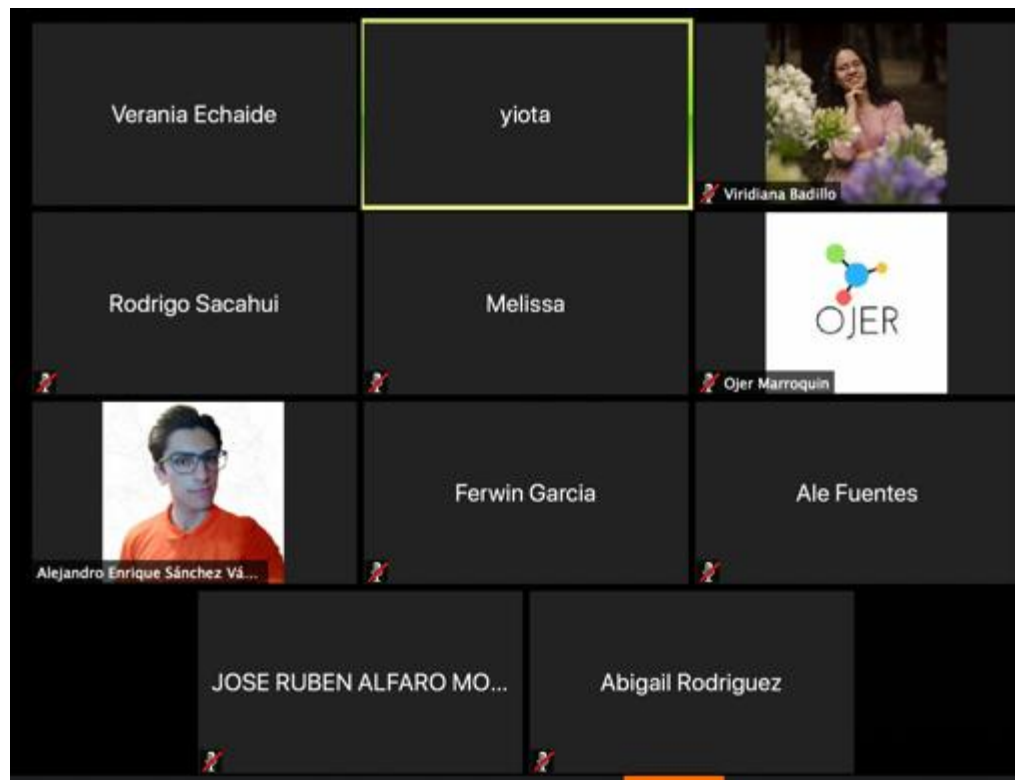
- Guatemala: José Rodrigo Sacahui Reyes
- Honduras: Melissa Cruz
(with possibilities for local funds)

To come:

- Venezuela
- Costa Rica
- El Salvador
- Chile...

Online tutorials on zoom by UNAM tutors:

- Itzel Viridiana González Badillo
- Alejandro Enrique Sánchez Vázquez

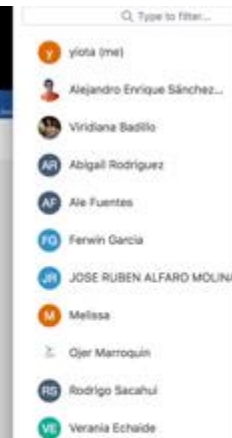
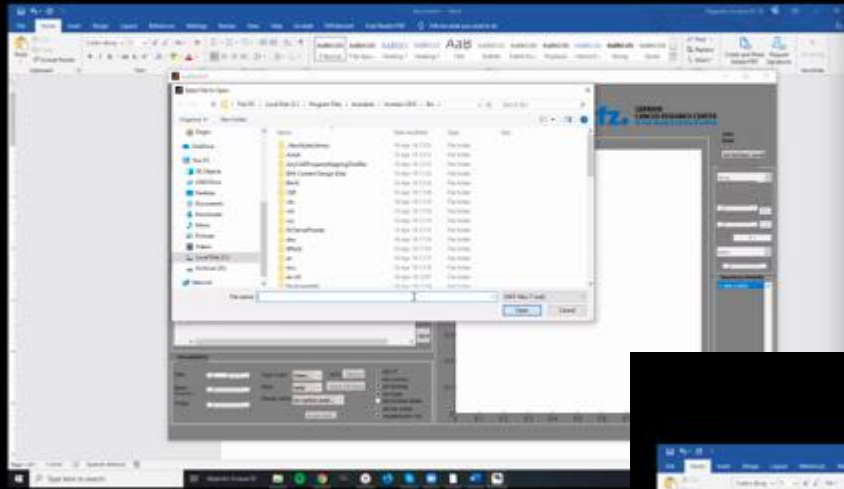


PTMC Online Tutorials

Test recording:

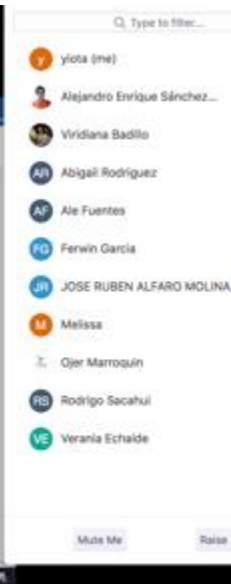
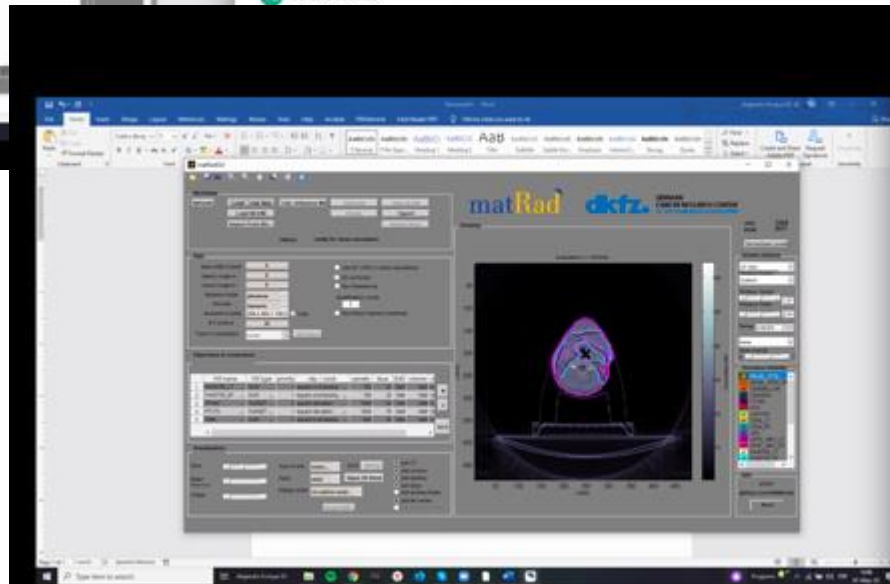
- Spanish
- English

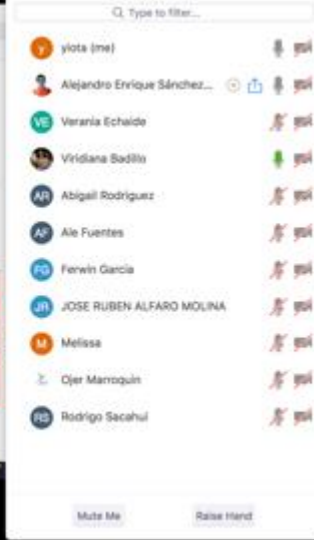
List of improvements for next one



Tested even via a mobile phone:

act from the mobile phone of Viri
on the screen of Alejandro





PTMC Plans

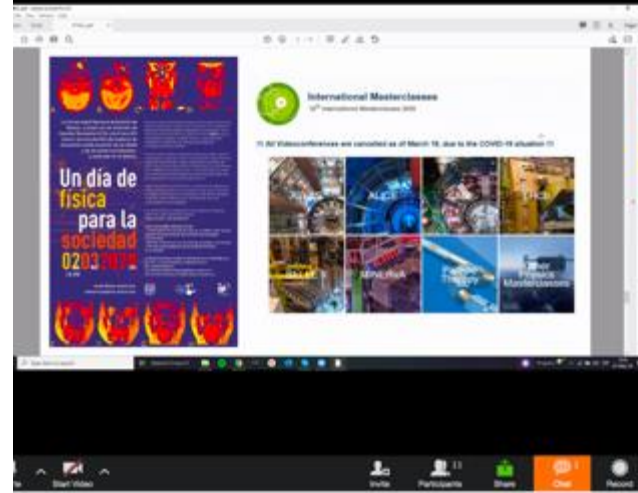
To also target:

- under-privileged areas in Mexico/other cities
- female students

Important: material in Spanish

https://drive.google.com/drive/folders/1u7okYFTIIFmiWLj_uLN0PDedyGk9DJtE

Important: personal support for new-comers
Some availability of funding would help



PTMC Plans

Regarding expanding: age groups, week-long schools (reaching uni/masters...)

Regarding expanding: teachers

Actually, matRad is a research tool, in its original version used for teaching at uni.
So, the workflow will be more involved and of course the introductory lectures

Several institutes are interested on that (as well as for special sessions for teachers)
The developers are also on board.

Social Media

Social Media: volunteers for twitter, facebook, instagram sent to Uta
(as promised... with some delay.....)

MEXICO

Itzel Viridiana González Badillo <viridiana.g.badillo@correo.nucleares.unam.mx>

Alejandro Enrique Sánchez Vázquez <alejandro.sanchez@correo.nucleares.unam.mx>

Twitter: @AlejandroE_SV Link to profile: https://twitter.com/AlejandroE_SV

Instagram: @a.enrique_sv Link to profile: https://www.instagram.com/a.enrique_sv/

Facebook: <https://www.facebook.com/AlejandroEnriqueSV/>

Twitter: @ViridianaBadilo

GREECE

Aris Mamaras <amamaras@physics.auth.gr>

POLAND

Lukasz Kamil Graczykowski <lukasz.kamil.graczykowski@cern.ch>

and some more from UNSA/Sarajevo

Updates of PTMC web pages

Updates by developers to support operating systems, new executables

ToDo

Animations of real particle therapy centres as “visit to experiment”

Contact already with PR of CNAO and MedAustron

Interest to join the PTMC: visit at CNAO and personal arrangements

Material in German: Uta, DKFZ contacts

Material in Spanish,

- Itzel Viridiana González Badillo
- Alejandro Enrique Sánchez Vázquez

IMC web pages

Home

Information for
High School Students

Information for
Teachers and Educators

Information for
Institutes and Physicists

Schedule

Intl. Day of Women
and Girls in Science

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Physics

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Hands on Particle Physics Masterclasses SCHEDULE 2020

International Masterclasses 2020 will be held from 26.02. - 08.04.2020, with satellite events later in April. At the end of each day a video linkup between the institutes and with moderators at CERN, at Fermilab, KEK, or GSI is established.

- LHC Masterclasses with **CERN** video conference ([pdf](#))
- LHC and MINERvA Masterclasses with **Fermilab** video conference ([link](#))
- Belle II Masterclasses with **KEK** video conference ([pdf](#))
- Particle Therapy Masterclasses with **GSI** video conference ([link](#))

- Masterclasses without videoconference ([link](#))
- Masterclasses for Teachers ([link](#))

Schedule for CERN videoconferences

26.02. - 28.02.2020

		Wed, Feb 26	Thu, Feb 27	Fri, Feb 28	
topic		VC 1: ATLAS Z	VC 1: ALICE	VC 1: ATLAS Z	
moderators		Ana	Anders	Ana	
moderators		Christos	Ina	Matt	
		Rome Sapienza 	Thessaloniki 	Braga 	
		Bologna 	Trieste 	Innsbruck 	

Acknowledgements PTMC

matRad Developers

Wahl, Niklas
Bangert, Mark
Hans-Peter Wieser

DKFZ Heidelberg

LoC: Wahl, Niklas
Katrin Platzer, Malte Ellerbrock
Noa Homolka Amit Ben Antony Bennan

GSI

LoC: Yiota Foka
GSI Biophysics:
Christian Graeff, Radek Pleskac
GSI ALICE, EMMI :
Ralf Aeverbeck, Malzacher, Peter
GSI IT :
Thorsten Kollegger, Behnert, Katharina
Osdoba, Sascha

General Coordination : Yiota Foka

CERN (staff and users)

CERN: tutors
Loc Org: Nikolaos Charitonidis
Alexander Gerbershagen
Evangelia Dimovasili
Elena Benedetto

CERN/ARIES: Maurizio Vretenar, Valerie Brunner
CERN/ENLIGHT: Manjit Dosanjh Petya Georgieva
CERN/KT: Manuela Cirilli Anais Rassat Rita Ferreira
Giovanni Porcellana
CERN: Visits Service Erwan Harrouch Francois Butin
CERN: Training Centre: Eric Bonnefoy M-L LECOQ

Uni Sarajevo: web pages

Amila Avdic
Amra Ibrahimovic
Mirsad Tunja

Sponsors : Edmond Offermann