

Aftermath

Heavy Ion Therapy MasterClass School

17-21 May 2021

YIOTA FOKA (GSI)

FOR THE ORGANISERS



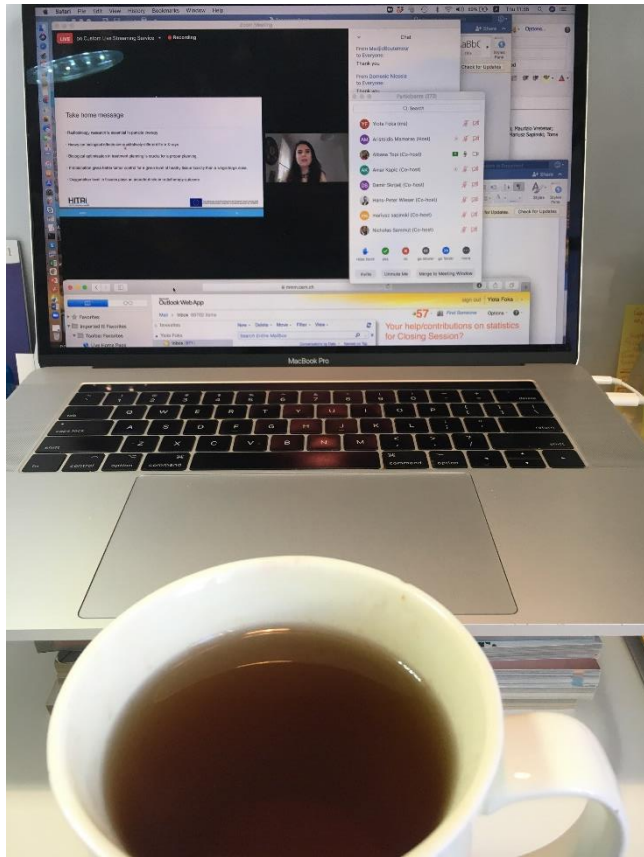
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101008548



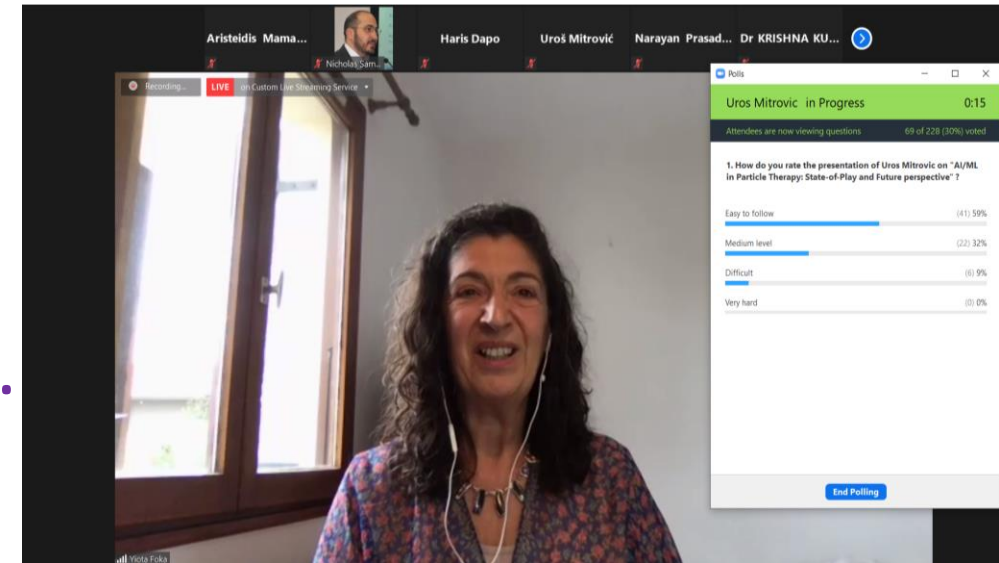
On the stage !

Statistics

- N. of litres of coffee
- N. of Kg of chocolate
- N. of emails answered
- N. of hours of sleep deficit...



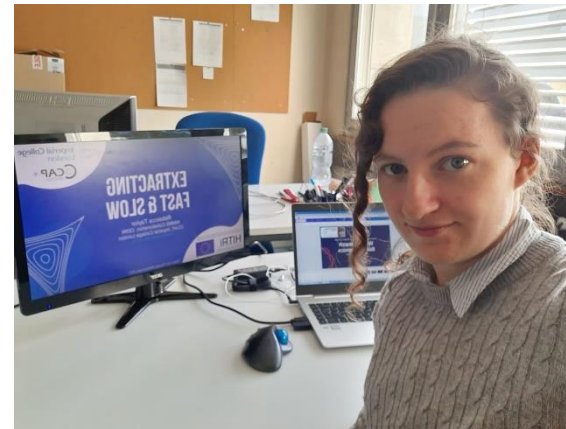
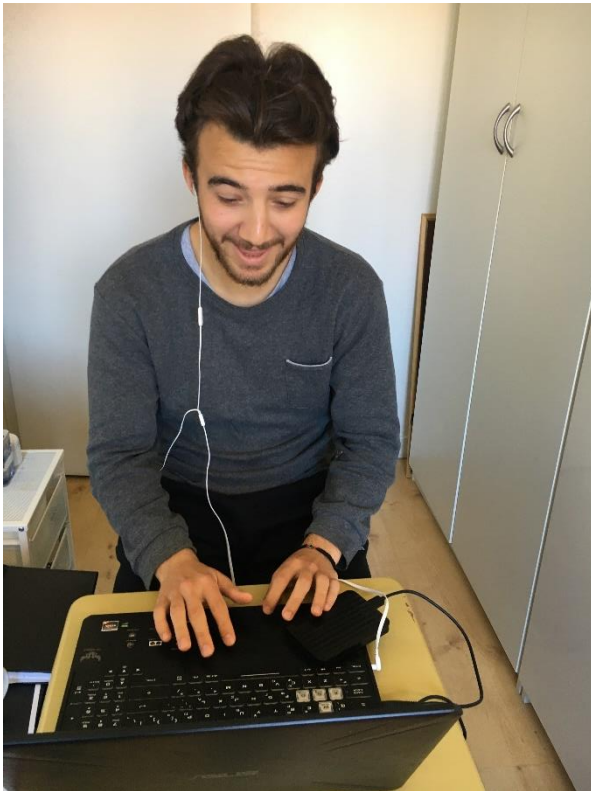
Heavy Ion Therapy Research Integration



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Behind the scenes !



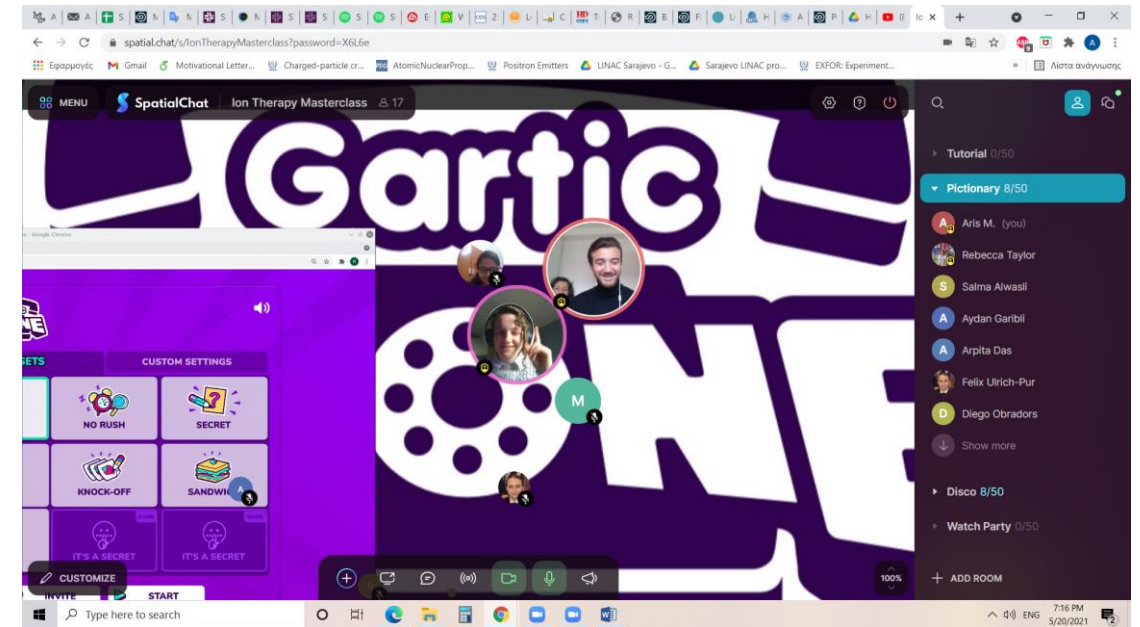
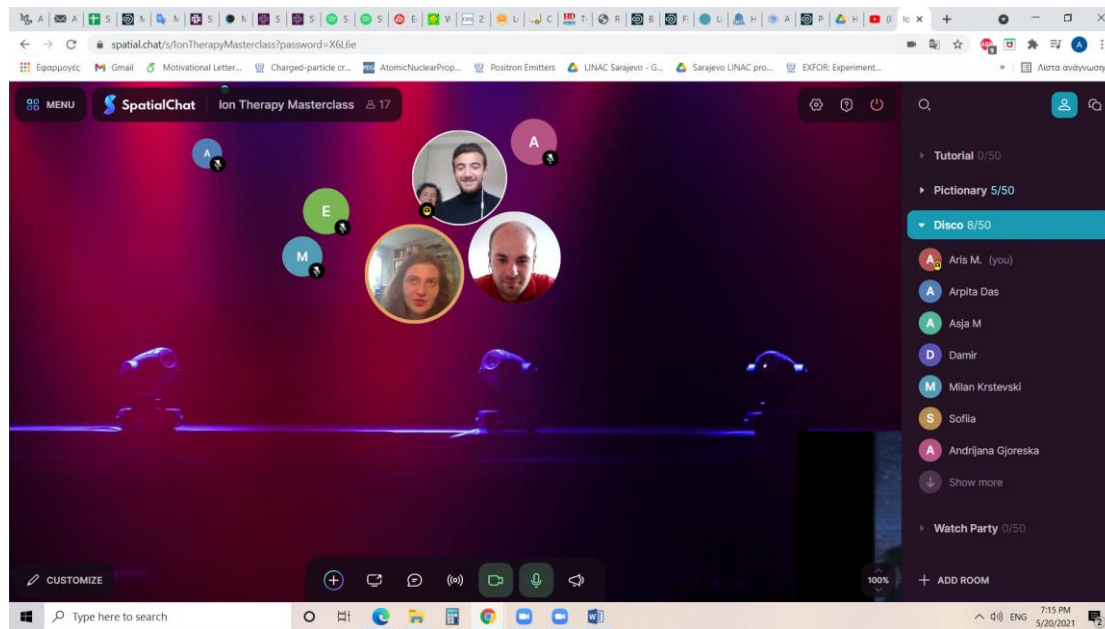
Big Thanks!



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The disco and fun !



Heavy Ion Therapy Masterclass

17th May - 21st May 2021
Evening Socials
From 18:00



MON **Introductory Drinks**
Meeting the other attendees with drinks!
Speaker: Manjit discussing the ENLIGHT network
Dress Code: Smart Casual

TUE **Language Cafe**
Learn other languages & cultures!
Speaker: Mimosa - ion treatment for beginners
Dress Code: Traditional

WED **Student Q&A**
Ask advice & chat to current students
Speaker: CERN Knowledge Transfer
Dress Code: Pyjama Party

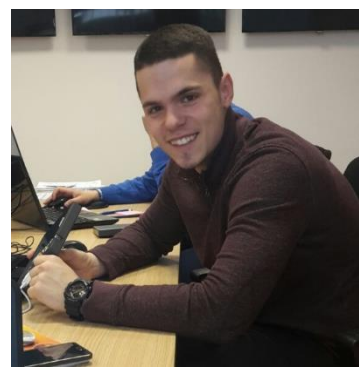
THU **Tours, Games & Disco**
Share music tastes & play games & quizzes
Dress Code: Impress Us.

FRI **Career Fair**
Discussion with experts on career paths
Speakers: CERN, GSI, CNAO, DKFZ & Cosylab
Dress Code: Formal Attire

Social Events Networking

Link: <https://spatial.chat/s/IonTherapyMasterclass>

The Hosting team @ Social Events:



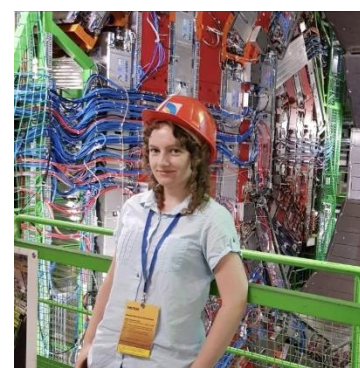
Amar Kapić
PhD student
EPFL/CERN



Aristeidis Mamaras
MSc student
AUTH/CERN



Damir Škrijelj
MSc student
UNSA/DKFZ



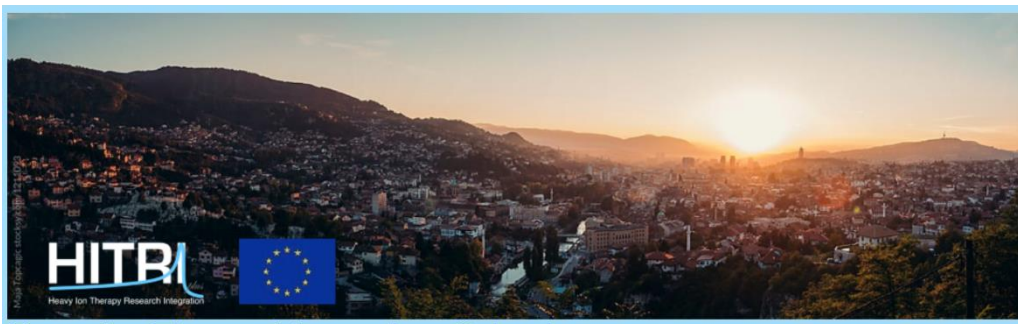
Rebecca Taylor
PhD student
ICL/CERN

Every evening 18:00-19:00 CET

8 speakers on various topics



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Heavy Ion Therapy Masterclass School

Connections and Statistics

<https://indico.cern.ch/e/HeavyIonTherapyMasterClass>

- Home
- Organizers and Sponsors
- Objectives and Scientific Programme
- Poster School
- Poster Social Events
- Agenda
- Timetable
- Registration Fees and Instructions
- Registration Form
- Participant List
- Presentations Instructions
- MatRad Instructions
- Zoom Instructions
- Photos Gallery
- Connection Instructions**
- Contact

webcasting with support of CERN IT: **Thanks !**

Statistics:

Average at same time : 250-300

Unique users on zoom by day

- 17.5: webcast + 163 zoom
- 18.5: 601
- 19.5: 469
- 20.5: 450
- 21.5 NNN

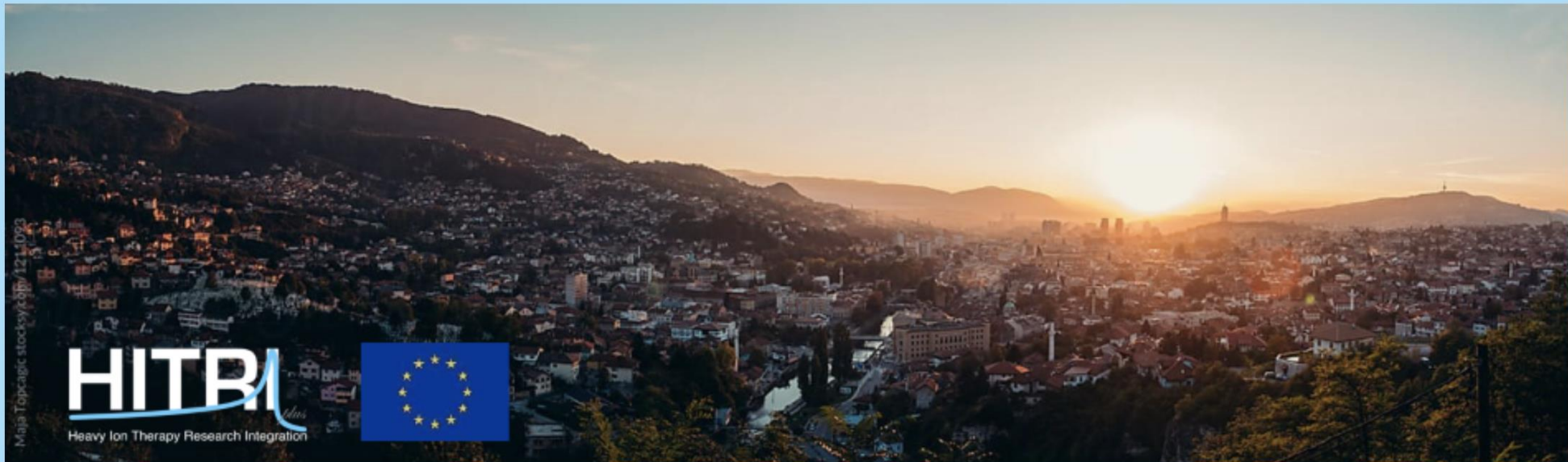
A Unique user: Egypt Benha Uni with 80-100 students

Statistics

- N. of Evaluation Forms: 316+
- N. of Delivered Results: 125
- N. of Certificate Requests: 95



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Heavy Ion Therapy Masterclass School

17-22 May 2021
Sarajevo-Online
Europe/Sarajevo timezone

Number of participants: 965

- 36 lecturers
- 222 young researchers
- 234 PhD students
- 197 Master students
- 276 Undergraduate students

<https://indico.cern.ch/e/HeavylonTherapyMasterClass>

Home
Organizers and Sponsors
Objectives and Scientific Programme
Poster School

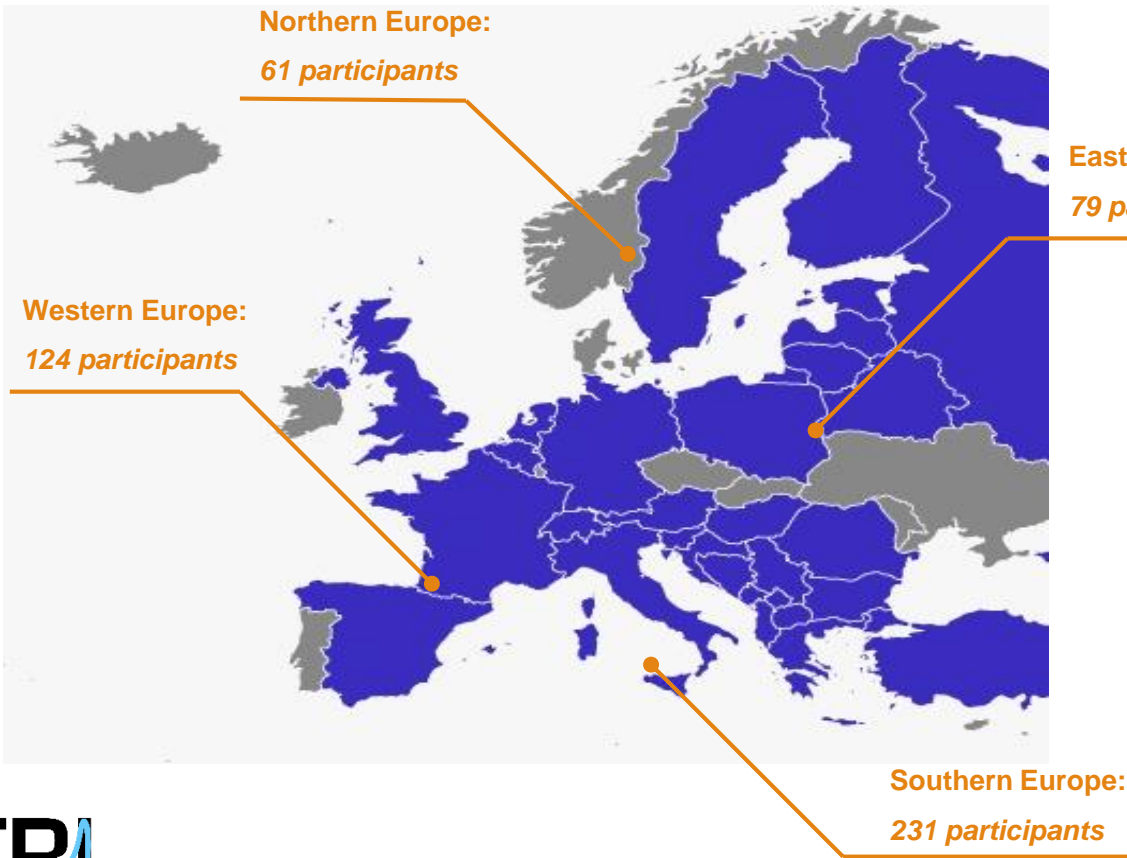


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Heavy Ion Therapy Masterclass School

Expanding in Europe and beyond

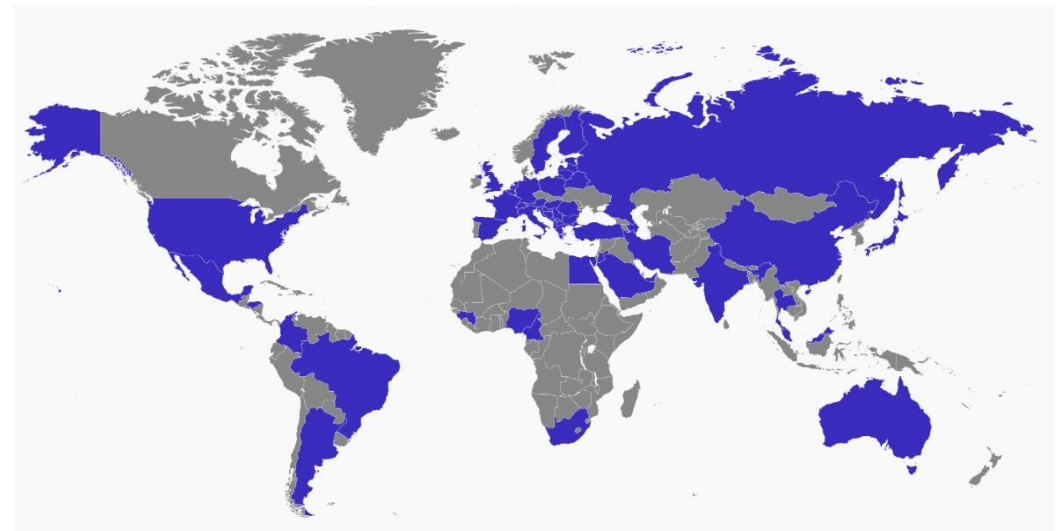


European countries:

➤ 495 participants

Non-European countries:

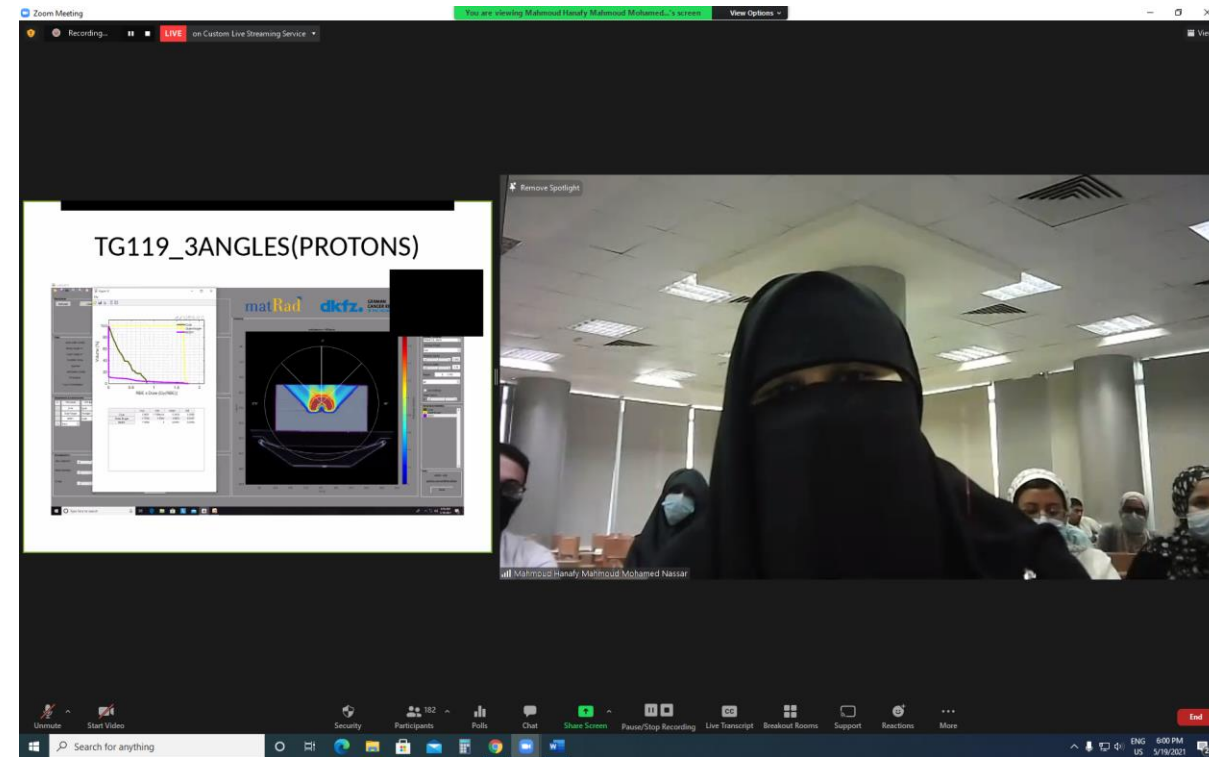
➤ 470 participants



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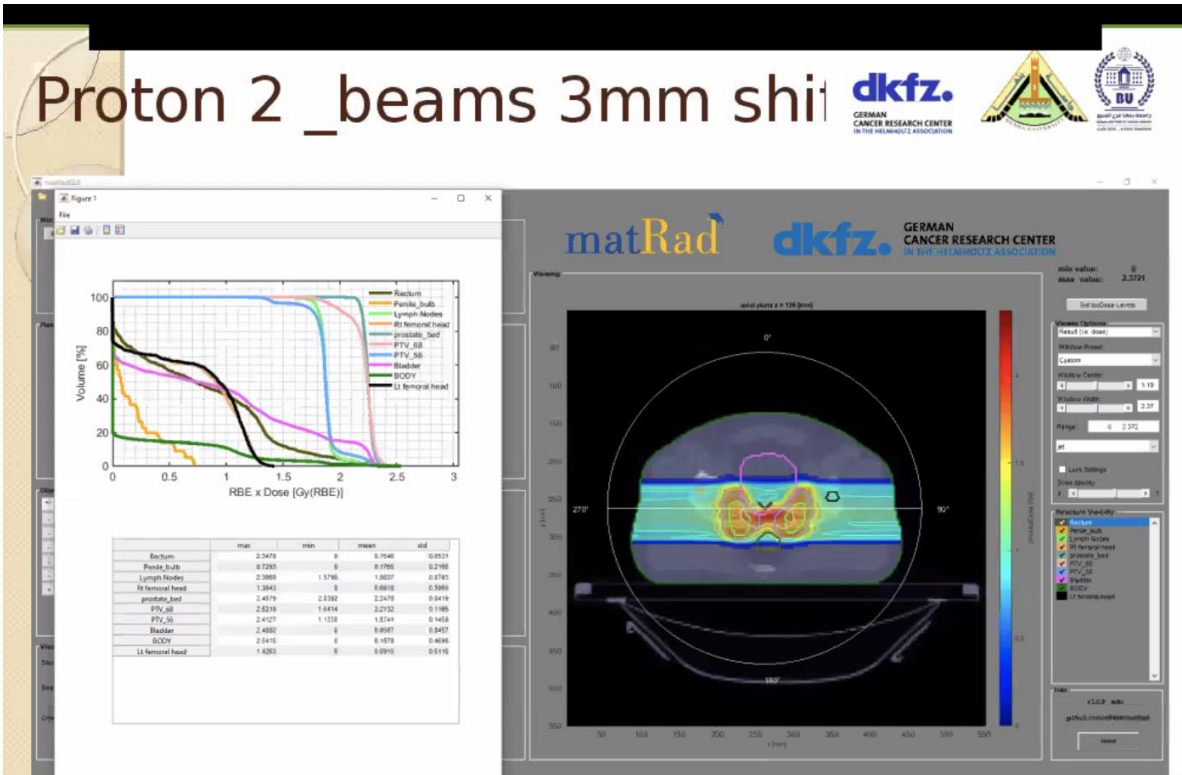


Diversity and sharing know-how





Diversity and sharing know-how



Damir Skrijelj

Fehima

Participants (163)

Search

- YF Yiota Foka (Co-host, me)
- AM Aristeidis Mamaras (Host)
- MH Mahmoud Hanafy Mah... (Co-host)
- DS Damir Skrijelj (Co-host)
- F Fehima (Co-host)
- WEBCAST (Co-host)
- AJ Aaruni Jha
- a abudzynska

1

yes no go slower go faster mor



Heavy Ion Therapy Masterclass School

School Lectures

Timetable: <https://indico.cern.ch/event/1024183/>

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Timetable Heavy Ion Therapy MasterClass School 17 May 2021

17 May 2021, 08:23 → 22 May 2021, 19:00 Europe/Zurich

Webcast There is a live webcast for this event

Watch



Statistics

Total: 33 h

- Lectures: 15 h
- Hands-on 7.5 h
- Students sessions: 5 h
- Social Events: 5 h

**Recordings and presentations
available in the timetable
for the ones at different time zones
Immediately at lunch break and evening**



Heavy Ion Therapy

Contact

hitm.adm@cern.ch



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Heavy Ion Therapy Masterclass School

Questions and Discussions

N. of Questions: 274+

QUESTIONS FOR EXPERTS - Eyy...

docs.google.com/document/d/1QXE17wai8QvNlWEcr1mcy7GgTuqGfUjY4nCADrc2v0/edit#

Epapayotc Gmail Motivational Letter... Charged particle cr... AtomicNuclearProp... Positron Emitters LINAC Sarajevo - G... Sarajevo LINAC pro... EXFOR: Experiment...

1. is it possible to measure proton beam shape using a camera?
2. How do you measure fwhm/sigma
3. Reliability of indirect beam current measurement using a beam profile monitor signal?
4. Do you know what size and emittance they have beams from the SEEIIST accelerator at fast mode ?
5. What about measure resonances and Beam stability?
6. Normally how much of the beam will be lost in a ion-therapy session?
7. Doesn't the measurement by induction change the beam itself?
Can kindly tell me again the definition of " tune " ?
Your e-mail please ?
8. I think we can put a second camera on a lot of places to measure beam. Is it right?
9. Is the emittance of a synchrocyclotron similar to synchrotron?
10. Can we use cyclotron for carbon ion acceleration ?
11. Any specific diagnostic challenges for FLASH?





Gender equality and students presentations

Statistics

Out of a total of 36 speakers in plenary, 15 female
 Plus 23 student's presentations plus the students from uni Benha (Egypt)

Timetable: <https://indico.cern.ch/event/1024183/>



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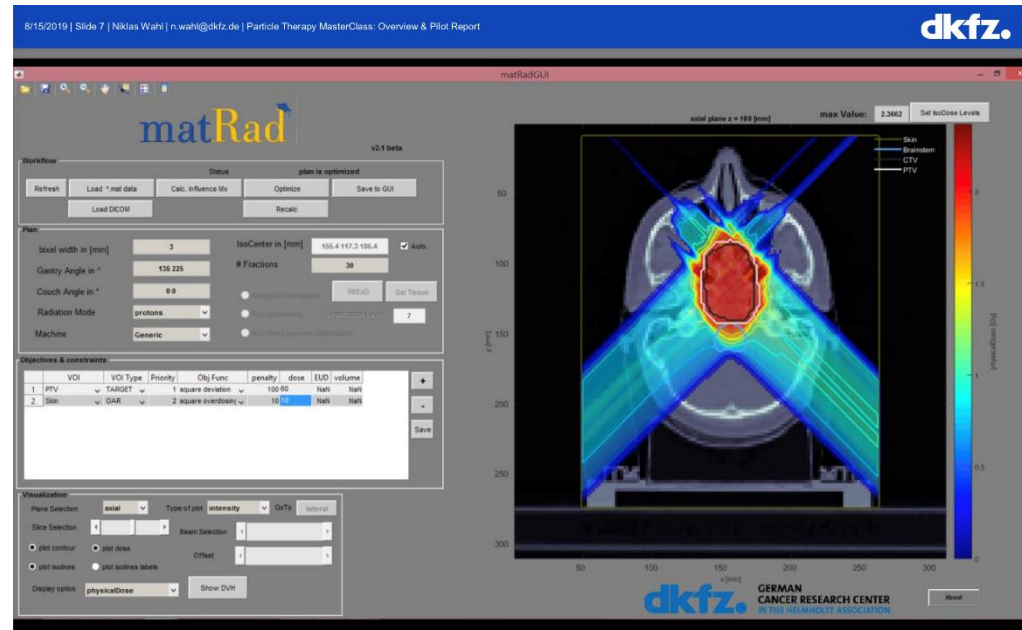


Heavy Ion Therapy Masterclass School

matRad Treatment Planning toolkit

Thanks to: Niklas Wahl and Hans-Peter Wieser
matRad, developed by Heidelberg DKFZ www.matrad.org

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125 participants delivered matRad hands-on results

Deadline: Mon 24 May



Contact
hitm.adm@cern.ch

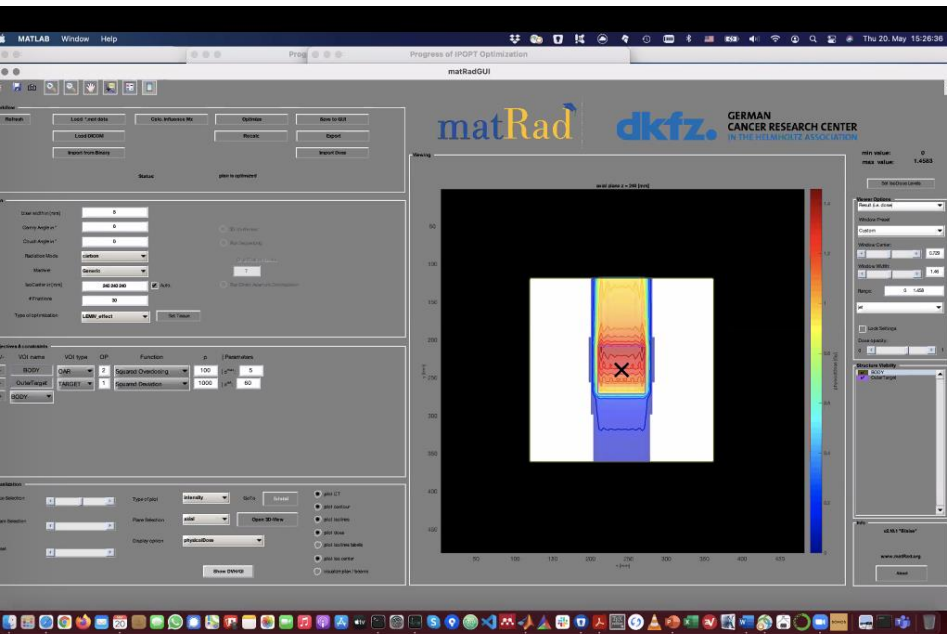
matRad - an open-source toolkit for dose calculation and optimization



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101008548



matRad Treatment Planning toolkit



Computational tools

From Dr Sonali Bhatnagar to Everyone:
the doc file is very helpful

From Besa Sadiku to Everyone:
Me to like Dr. Sonali, I miss any step, and my results are not the same that you're explaining us,

From Adin Alić to Everyone:
Computations are now really slow.

From Dr Sonali Bhatnagar to Everyone:
but hats off to you both for keeping patience with us. we are all working hard and trying to learn so the goal is achieved...
To work after your class, makes me miss on the social interactions sessions as earning matrad is important learning



matRad Treatment Planning toolkit

Biological Treatment planning

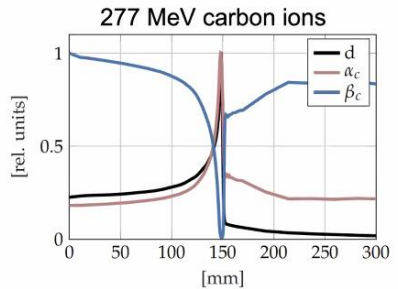
For **each** tabulated carbon ion energy E_0 and for **each** cell type: \rightarrow triplet of curves $d(E_0, z), \alpha_c(E_0, z, T), \beta_c(E_0, z, T)$

$$RBE = \frac{d_x}{d_1} \Big|_{iso-effective}$$

biological effect

$$RBE \times d = \sqrt{\frac{\epsilon}{\beta_x} + \gamma^2} - \gamma = \sqrt{\frac{\alpha_c d + \beta_c d^2}{\beta_x} + \left(\frac{\alpha_x}{2\beta_x}\right)^2} - \frac{\alpha_x}{2\beta_x}$$

adapt dose influence concept to radio-sensitivity parameters for fast evaluation of ϵ_i for different intensities w during optimization.



From NIKLAS WAHL to Everyone:
the blue area is bigger for carbon ions due to the fragmentation tail

Polls

Question: in Progress

Attendees are now viewing questions 147 of 229 (6)

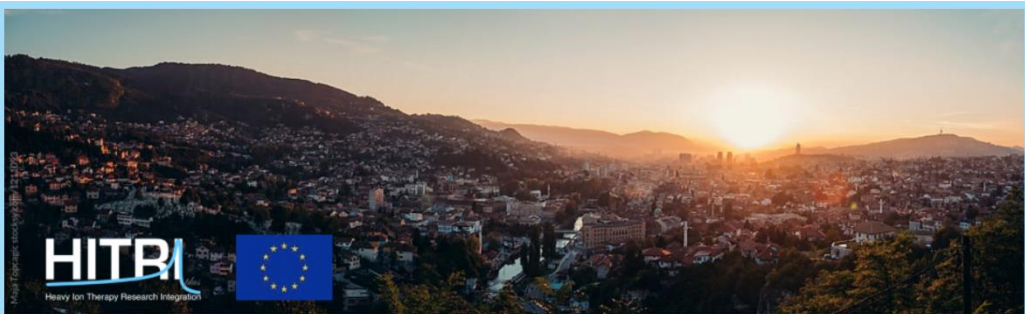
1. Do you have MATLAB licenses?

Yes

No



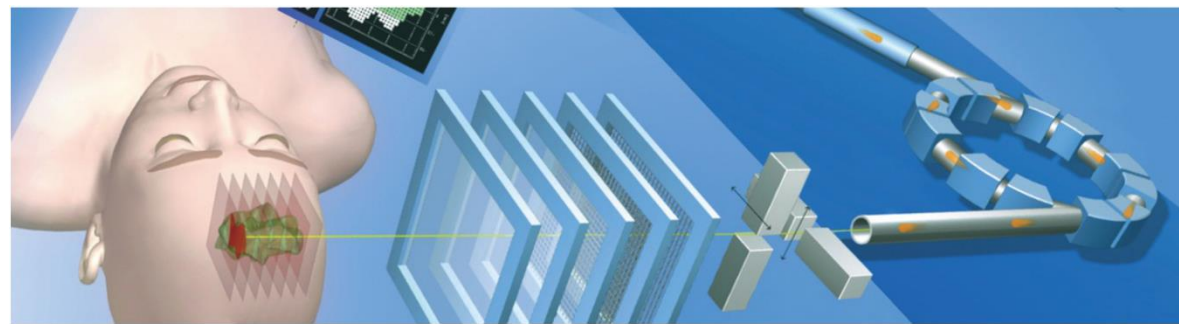
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Heavy Ion Therapy Masterclass School
<https://indico.cern.ch/e/HeavyIonTherapyMasterClass>

Full week course

The HITRIplus HITM school will continue **supporting a growing community**



Particle Therapy Masterclass
<https://indico.cern.ch/event/840212/>

One day activity

The Particle Therapy MasterClass, is aimed at high-school students (16-18), to motivate them to choose related university studies.

Sustainability RESULTS of POLLS

Future Tutors

Particle Therapy Masterclass in Sarajevo and Tuzla

- A Particle Therapy Masterclass was held in Sarajevo, and then in Tuzla, organized by the Department of Physics of the Faculty of Sciences. It is a global project of the world's top laboratories to popularize science, in which students are given the opportunity to be scientists for one day. The masterclass is a full-day activity for high school students and consists of introductory lectures given by renowned scientists, university staff and researchers from CERN.
- The interest was much greater than could objectively be accepted. In Tuzla, the masterclass was held in two schools, while the Sarajevo masterclass was held entirely online. Students had the opportunity to get acquainted with the principles and work of the master program, but also to work independently and interpret the optimization of radiotherapy treatment.

Zoom Meeting: Thanks for the video Prof
 Participants (158)
 Search
 YF Yiota Foka (Co-host, me)
 AM Aristeidis Mamaras (Host)
 Melika Damadzic (Co-host)
 DS Damir Skrijelj (Co-host)
 F Fehima (Co-host)
 MH Mahmoud Hanafy Mahmoud... (Co-h...
 WEBCAST (Co-host)
 AJ Aaruni Jha





Heavy Ion Therapy Masterclass School

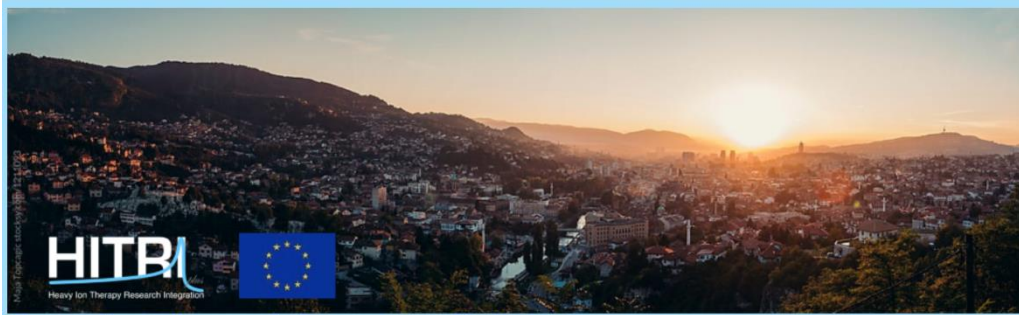
Thanks to all supporting institutes



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Heavy Ion Therapy Masterclass School

Thanks to all lecturers, speakers, moderators...

Speakers and Lecturers:

1. Amer Ajanović
2. Elena Benedetto
3. Uta Bilow
4. Giovanni Bisoffi
5. Manuella Cirili
6. Haris Dapo
7. Mirza Dautbasic
8. Manjit Dosanjh
9. Ana Đorđević
10. Angelica Facoetti
11. Yiota Foka
12. Piero Fossati
13. Nadia Gambino
14. Christian Graeff
15. Milkos Jaksic
16. Silvia Meneghello
17. Uros Mitrović
18. Silvia Molinelli
19. Monica Necchi

Institutes:

- ICL
- SEEIIST
- TU Dresden
- INFN
- CERN
- ANKARA Univ./TARLA
- UNSA
- ENLIGHT/SEEIIST/CERN
- CERN
- CNAO
- GS/EMMI
- MedAustron
- MedAustron
- GSI
- IRB
- CNAO
- Cosylab JSC
- CNAO
- CNAO

20. Ester Orlandi
21. Matej Polzelnik
22. Marco Pullia
23. Ash Ravikumar
24. Mimoza Ristova
25. Mariusz Sapinski
26. Joao Seco
27. Rebecca Taylor
28. Markus Stock
29. Dasa Stupica
30. Albana Topi
31. Slavisa Tubin
32. Viviana Vitolo
33. Vasilis Vlachoudis
34. Maurizio Vretenar
35. Niklas Wahl
36. Hans Peter Wieser

- CNAO
- Cosylab JSC
- CNAO
- CERN
- UKIM
- SEEIIST
- DKFZ
- ICL
- MedAustron
- Cosylab JSC
- GSI
- MedAustron
- CNAO
- CERN
- CERN
- DKFZ
- LMU





**Thanks to all co-organisers
and assistants dream teams**

Programme Committee:

Y. Foka, chair (GSI/EMMI)
A. Gazibegović-Busuladžić (UNSA)
N. Sammut (Uni. Malta)
M. Sapinski (SEEIIST)
J. Seco (DKFZ)
M. Vretenar (CERN)
N. Wahl (DKFZ)
H.P. Wieser (LMU)

Scientific Assistants:

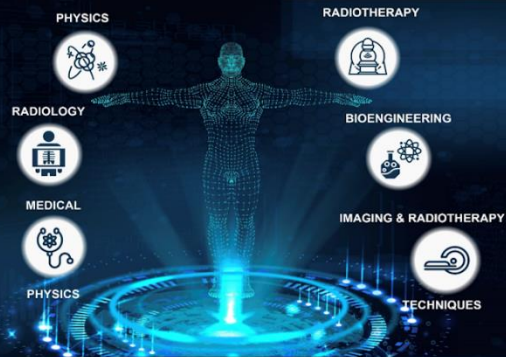
A. Mamaras (AUFh/CERN)
A. Kapić (EPFL/CERN)
D. Škrijelj (UNSA/DKFZ)
R. Taylor (ICL/CERN)

Heavy Ion Therapy MasterClass School

17 - 22 May 2021
Online Course

The program is intended for the students of the following disciplines Medical Physics, Physics, Radiotherapy, Radiology, Bioengineering and Imaging and Radiotherapy Techniques and early stage researchers.

In collaboration with



Topics

- Particle Therapy
- Treatment Planning
- Accelerator Physics
- Beam Delivery
- Radiation Protection
- Imaging
- Biophysics
- AI/ML for Particle Therapy

Scope

Focus on Heavy Ion Therapy Treatment Planning Systems (TPS) including lectures, treatment planning tool demonstrations, hands-on exercises and student projects.

Programme Committee

- Y. Foka (GSI/EMMI, Chair)
- A. Gazibegović-Busuladžić (UNSA)
- N. Sammut (Uni. Malta)
- M. Sapinski (SEEIIST)
- J. Seco (DKFZ)
- M. Vretenar (CERN)
- N. Wahl (DKFZ)
- H.P. Wieser (LMU)

Scientific Assistants

- A. Mamas (AUs/CERN)
- A. Kapić (EPFL/CERN)
- D. Škrjatelj (UNSA/DKFZ)
- R. Taylor (ICL/CERN)

SIGN UP NOW TO THE FIRST HEAVY ION THERAPY COURSE!

Registration link: <https://indico.cern.ch/e/HeavyIonTherapyMasterClass>
Registration deadline: 15 May 2021



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Heavy Ion Therapy Masterclass

17th May - 21st May 2021
Evening Socials



From 18:00



MON

Introductory Drinks

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Language Cafe

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Dress Code: Impress Us.

FRI

Career Fair

Discussion with experts on career paths
Speakers: CERN, GSI, CNAO, DKFZ & Cosylab
Dress Code: Formal Attire

Thanks to the Artists Teams

Thanks for participating !

Thanks for feedback!

Stay tuned for future events!

Special Thanks to **SpatialChat** for facilitating Social Events



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