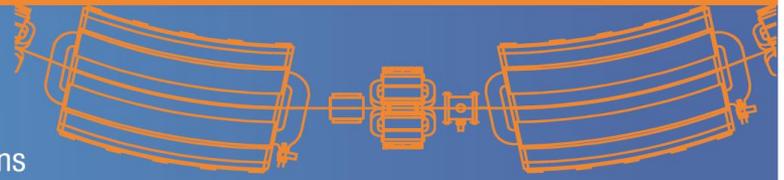




Ideas and technologies  
for a next-generation facility  
for medical research and therapy with ions



## GOALS

- Highlight the **potential of ion therapy** for cancer.
- **Share the current experience**: advantages and disadvantages of present implementations and ideas for future facilities. Identify potential directions for improvement. Identify synergies between the medical accelerators and other accelerator projects.
- Explore the possibility to advance towards the design for a **next generation medical research and therapy facility with ions in Europe**, identify a community that could contribute to this design, and assess the possibility to establish a dedicated collaboration resulting in a proposal to the European Commission.
- Identify some **basic parameters** for this facility, a set of **technical options**, and outline a possible **basic R&D programme**.

# ION THERAPY

1. How far are we in exploring the potential of carbon beams in terms of converting the physical and biological properties to the benefit of the patients?

Should the aim really be to compete with smallest proton centers?

Carbon probably will be a niche application anyway.

Unsolved issues regarding the full potential of particles/carbon - range uncertainty, especially moving organs - prevents effective treatment of 'big killers' lung, liver, pancreas - solvable by lots of imaging and faster/ more flexible accelerator

2. Success can only come by truly including all concerned disciplines - from the ion source to the patient environment and treatment planning. What has to be done to bridge the gap between bright accelerator physics ideas and real treatment requirements?

Is the limit of "conventional" synchrotron designs reached - should we optimize or go for completely new concepts?

Different communities, how do we find common points ?

# ACCELERATOR

Doctors/radiobiologists need something affordable now  
is it research institutes that are going to deliver it ?

Accelerator physicists (developments because of HL-LHCC, FCC, FAIR, CLIC etc  
want to explore possibilities to adapt for medicine, is it worth it ?

is it worth investing in a new design? for a linac ? for a synchrotron ?  
“incremental improvements” versus “novel approaches”

Need to compare Synchrotrons with Linacs.

And we should not forget the studies on other machines (cyclotrons, laser, plasmas...)

Can we come to a European Roadmap (as we have seen a Japanese one...)?

Compact, power consumption, cheaper, .....are arguments discussed by many  
speakers but there were some remarks that they are not the main issues ?

Which cost is reasonable for the society?

It would be useful to have a complete picture from the source to the patient, i.e. a  
general overview. Often, only some particular components are studied and optimized.

Should we try to put together a set of functional specifications?

How?

For what?

Is there a candidate user?

Shall we go for a cheap solution to help spreading or for a top performance with the best solution to the problems that we can think of?

# COLLABORATION

Can we join efforts?

- how do we get people committed? what are boundary conditions?

Can we form a collaboration ?

- real work
- consultants (partners)

Which institutes are willing to join?