

# Workpackage 7, Task 7.3

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SEEIIST HITRI+ KICK-OFF MEETING

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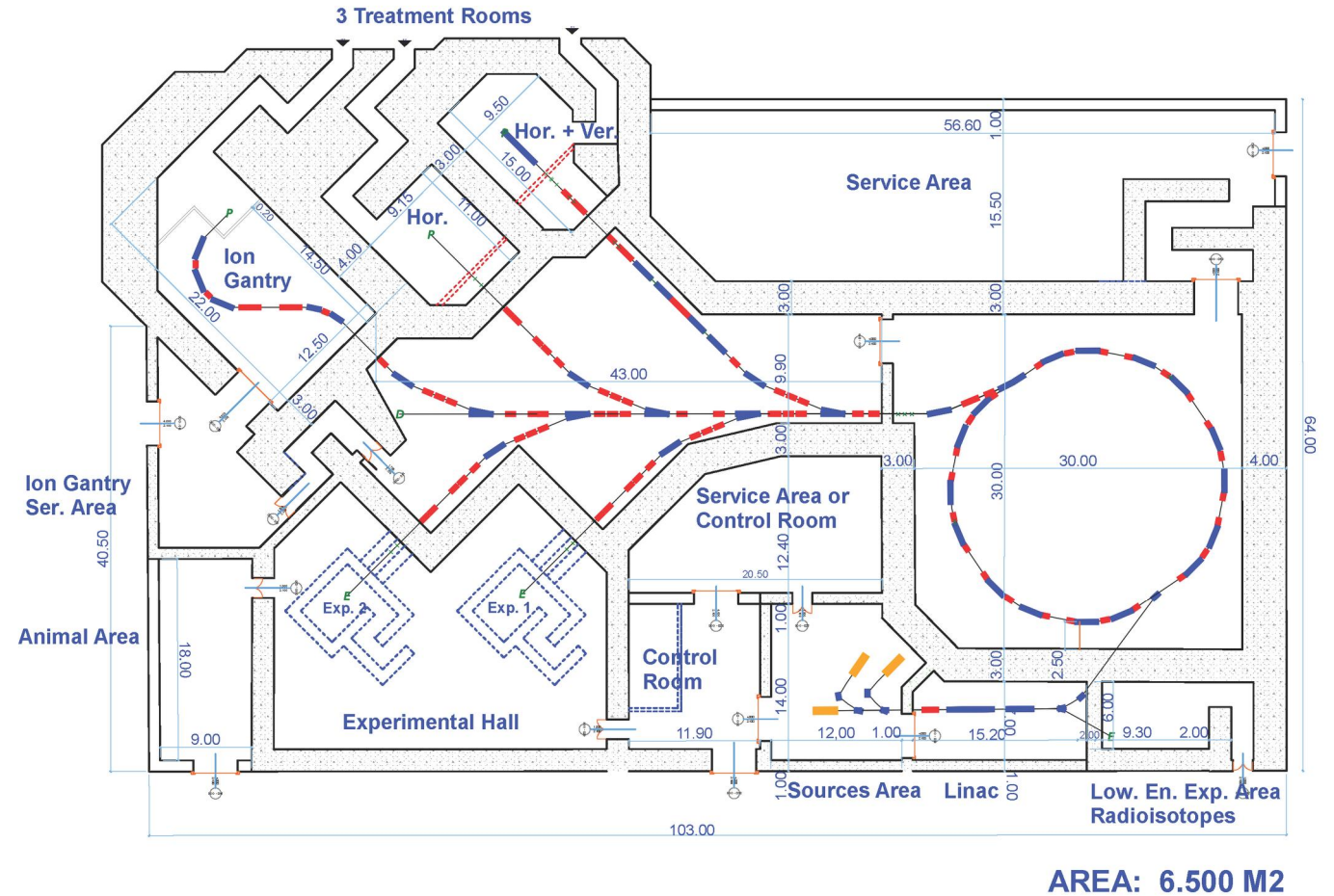
# Introduction

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- Partners: SEEIIST, CERN, CNAO, MedAustron
- Task leader: M. Sapinski (SEEIIST)
- Three sub-tasks:
  - 7.3.1: Operational modes: identification of specific requirements and challenges in operation due to switching between therapy and research operational modes.
  - 7.3.2: Beam transport lines: definition and improved layouts of the transport lines to the experimental and clinical areas, with special attention to safety due to switching between 2 modes, eg. beam dump, shielding.
  - 7.3.3: Beam instrumentation and QA: identification of advanced beam instrumentation options and of their possible application to present and future medical synchrotrons.

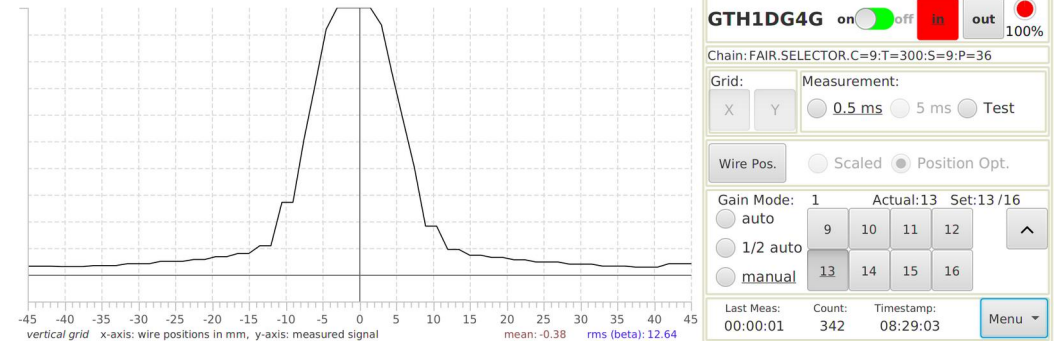
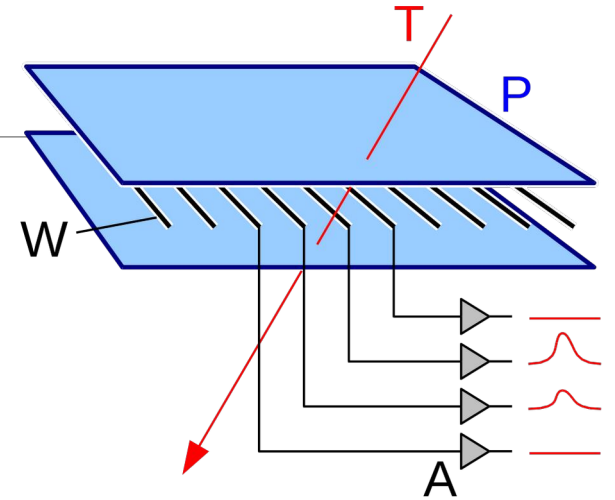
# SEEIIST particularities

- Beam intensity from the source: 600  $\mu\text{A}$  of  $^{12}\text{C}^{4+}$  (3x more than current facilities)
- Beam intensity in synchrotron:  $2 \cdot 10^{10}$  of  $^{12}\text{C}^{4+}$  (20x more than current facilities)
- Multi-Energy Extraction based on RF-KO slow extraction method, spill duration: 200 ms - 10 s
- FLASH: Fast extraction and/or fast-slow-extraction:
  - Spill duration: 0.2  $\mu\text{s}$  - 50 ms
  - Need instrumentation able to cover  $5 \cdot 10^7$  of dynamic range!



# Example:

- Multi-Wire proportional chambers (MWPC) are widely used to measure the extracted beams;
- At high beam currents the chambers saturate.
- Questions:
  - What beam size/position measurement technology should be used to capture beam intensities with dynamic range of  $\sim 10^8$ ?
  - Where should these detectors be placed to get optimal measurements?
  - How should they be used in different modes of operations?



# Synergies with other tasks, deliverables:

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- Connection to task 7.2, especially 7.2.3 (extraction and beam transport)
- Connection to WP11 (Controls and safety)
- Connection to WP10 (Multi-energy extraction)
  
- One IAEA trainee from Montenegro to work on transfer lines

Deliverable (D7.2):

Report on operational modes, beam transport and instrumentation (M36), March 31, 2024

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# Thank you for your attention!

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