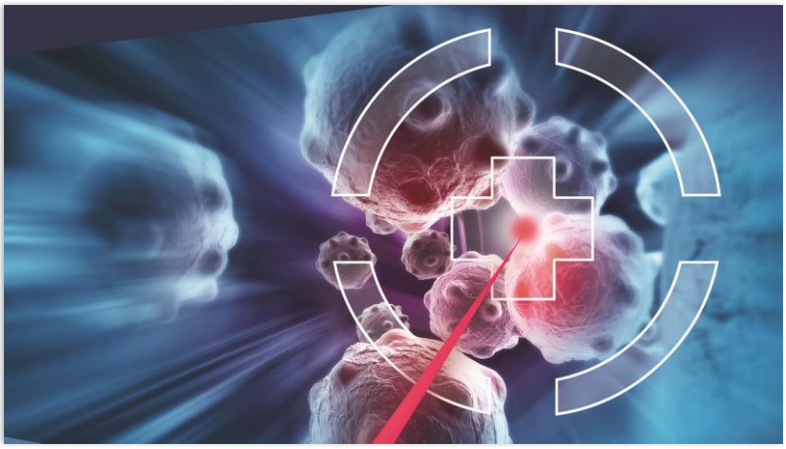
4 M€ Funding Awarded to Medical Accelerators Network

Cancer is a major health problem and it is the main cause of death between the ages of 45 - 65. Although significant progress has been made in the use of particle beams for cancer treatment, extensive research is still needed to maximize healthcare benefits. Improving ion beam therapy for enhanced cancer treatment is the goal of a new European research and training network that will focus on the Optimization of Medical Accelerators (OMA).

The OMA project joins 24 institutions from all across Europe and will be coordinated by the Cockcroft Institute in the UK during its 4 year duration. The consortium has been awarded almost 4 M€ by the European Commission to train 15 Early Stage Researchers and carry out a cutting edge R&D program into treatment facility design, numerical simulations for the development of advanced therapies, and novel imaging techniques.



Prof. Carsten P. Welsch, Head of the Liverpool Accelerator Physics Group, initiated and will coordinate the network. He said: “The field of particle therapy has steadily developed over the last 6 decades, first in physics laboratories, and starting in the late 90’s in dedicated clinical installations. By March 2013 about 110,000 people had received treatment with particle beams, the vast majority having been treated with protons and around 15,000 patients with heavier ions such as helium, carbon, neon, and argon.”

“OMA will push the limits in treatment facility design, imaging techniques and treatment optimization through advanced numerical studies. A network of European universities, research centers, clinical facilities and industry partners with outstanding expertise in this area will jointly develop advanced schemes to assure the best possible cancer care for patients.”

Competition for receiving such funding is extremely high with average success rates of the order of only 5%. Moreover, OMA is the first and only EU network that has ever received a final evaluation mark of 100%, amongst thousands of proposals that have been submitted to date.

Prof. Welsch adds: “I am absolutely delighted about this fantastic result. In close collaboration with our project partners we will provide a broad and interdisciplinary training program to our Fellows to develop them into outstanding researchers. We will also organize

many events for the wider research community to stimulate knowledge exchange and generate a lasting impact."

The project is currently recruiting for its Fellowship positions that will be based at institutions across Europe. Outstanding researchers from around the world are invited to submit their application by 28. February 2016.

CNAO (Centro Nazionale di Adroterapia Oncologica) is the first medical accelerator facility for deep hadrontherapy with C^{6+} and protons in Italy, whose mission is to provide hadrontherapy treatments and to perform research in the related fields. The CNAO Foundation is also a Centre of Research and Development, whose activities range from clinical and radiobiological research to translational research with the objective of providing continual improvements in the capacity to cure.
The main accelerator of CNAO is a synchrotron (Fig. 1). Outside the main ring there are four extraction lines leading the extracted beam into three treatment rooms. An experimental room already exists, it should be equipped and the beam line should be realized. In order to devote such a room to research, the experimental beam will be available for different types of experiments and for several external research groups.
The realisation of CNAO is based on a strong collaboration network, the CNAO Collaboration, that links CNAO with the most important Institutions in Italy and abroad. This network has guaranteed through the years and also in the future the collaboration of outstanding personalities and expertise to the programmes of the CNAO Foundation. In addition, it has been a fundamental mean of formation for the people of CNAO that, through the years, has acquired expertise unique in Italy and also in the World.

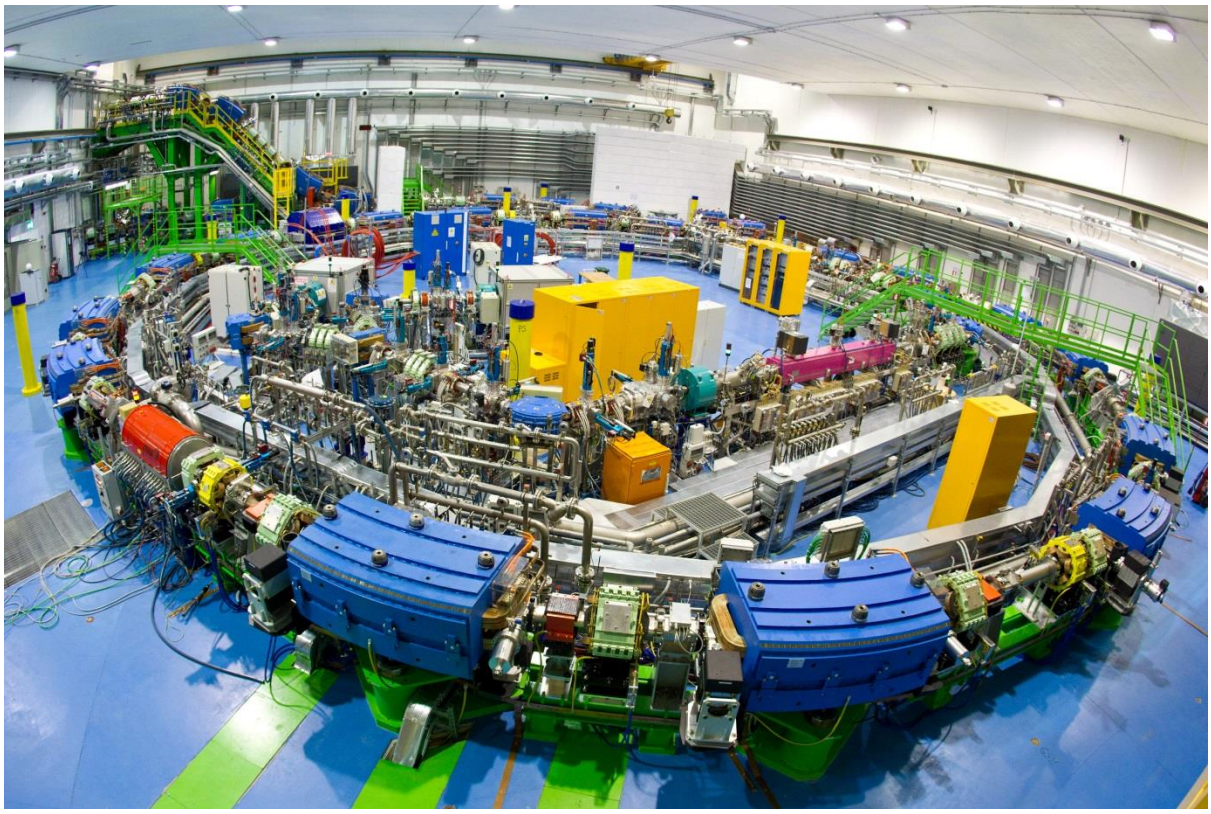


Figure 1: View of the CNAO synchrotron hall.

In the frame of the OMA Project, two research and training programmes will be activated at CNAO.
The first one, titled *Light ion therapy software for data exchange,* is focused on creating a common bus that shall enable any present and future package to easily interconnect in a

complex and widely distributed hadrontherapy facility environment. In order to enable devices to exchange events with a wide range of frequencies, a synchronization system shall be prototyped: it shall be able to drive different media (multiple fibers and copper) in a mixed architecture, with a star distribution system that supports daisy-chain on each line. The research program shall be strongly based on IOT approach.

The second project activated at CNAO will be *Tumor tracking in particle therap*y. The selected candidate will be involved in the design, implementation, experimental assessment and clinical transfer of an integrated system and related strategies for tumour tracking in active beam scanning particle therapy at the CNAO premise (www.fondazionecnao.it). Activities envisage the refinement of the interfacing between the CNAO Optical Tracking System (OTS) already available for patient set-up verification and applied for external-internal correlation modelling, and the CNAO Dose Delivery System (DDS) developed by CNAO and the National Institute of Nuclear Physics (INFN). Figure 2 represents a detail of one of the CNAO treatment rooms.

Figure 2: One of the three CNAO treatment rooms.

The selected candidate will be affiliated to the CNAO-Bioengineering Unit and the CARTCAS laboratory (www.cartcas.polimi.it) of the Bioengineering Section of the Department of Electronics and Information (www.deib.polimi.it) of the Politecnico di Milano (www.polimi.it).

To find out more about OMA, visit: http://www.oma-project.eu.

A brief video announcing all OMA positions is now available: https://youtu.be/U9Qhxbpe5W8.

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