UNION OF LIGHT ION CENTERS IN EUROPE

The Union of Light Ion Centers in Europe is a 5 years project started on 1st September 2009 focusing on hadrontherapy. hadrontherapy, i.e. the use of particle beams such as protons and carbon ions against tumours. Particle beams can reach the tumour more selectively sparing the surrounding normal tissues. Light ions, as carbon ions, have physical properties similar to those of protons but unique and more favorable radiobiological characteristics.

The European scientific community on hadrontherapy has been growing significantly during the last decade.

Different forms of co-operation have been established in this multidisciplinary field, e.g. a program called ENLIGHT hadrontherapy was the successful approach towards a systematic Europe wide multi-centre and multi-cultural research community. The highly technical field of hadrontherapy needs urgently large scale research infrastructures characterized by their complexity. hadrontherapy is supra-disciplinary at the outset since it cannot flourish without the active participation of high-level experts coming from a wide range of disciplines ranging from nuclear physics to information and communication technologies to medicine.

One of the major task of the project, in fact, is joining different competencies together and foster cooperation between different specialties providing access to hadrontherapy facilities.

ULICE activities range from research in radiobiology useful to identify tumours that would need the superior physical and radiobiological selectivity provided by particles given their difficult location close to critical normal organs and their scarce sensibility to conventional radiotherapy, to clinical protocols trough which patients are treated having as common basis all the clinical data collected by the participant institutions. The project stands on the great need of joining scientific results obtained by different institutions in different fields of excellence and translate them in a real benefit to the community.

Another important objective of the project is the communication between all the professional expertise involved just to focus the efforts on the same point and to ensure a better communication and understanding of all the data that can be transferred from a facility or a treating center to another.

The activities foreseen in the project have been organized into 3 pillars leaded by a technical coordinator each:

1. **Joint Research Activities** - focus on development of instruments and protocols: new gantry design, improvement of four-dimensional particle beam delivery, adaptive treatment planning, mechanisms for patient selection to the whole European Community and database development for specific tumours which can best be treated using carbon ion.

2. **Networking** - increasing cooperation between facilities and research communities wanting to work with the research infrastructure. Outputs will be (among others): a report on recommendations for strategically optimal locations for future RIs throughout Europe, training to new users

3. **Transnational access** - 2-step approach, using a combination of pre-defined (within ULICE) clinical trial programmes to allow researchers to visit the facility, and radiobiological and physics experiments to take place.

The consortium is composed by 20 beneficiaries, all of them world class European institutions in radiotherapy and applied research. They are all the existing and planned light ion facilities, University of Heidelberg, CNAO, coordinator of the project, ETOILE, ARCHADE, University of Marburg, MedAustron. Many University Hospitals are represented above all by Radiotherapy Departments as: Medical University of Vienna, the Catholic University of Louvain, the Medical University Aarhus, St. Radboud University. The contribution of research institutes is nevertheless fundamental as CERN, GSI,

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Technical University of Dresden, Karolinska Institute, Université Claude Bernard Lyon 1, INFN, Institute of Nuclear Physics Polish Academy of Sciences. Two industries acting in the field joined the project too, they are IBA and SIEMENS. Another partner of the project is ESTRO, a professional scientific society whose mission is to foster radiation oncology in all its aspects trough training of professionals subjects.

Public project website is available at:
http://ulice.web.cern.ch/ULICE/cms/index.php?file=home

ULICE members at CERN 12th July 2014 during the last ULICE meeting

The ULICE project is co-funded by the European Commission under FP7 Grant Agreement Number 228436