

# Optical Acceleration of Ions and Perspective for Biomedicine

Bologna (IT) | November 4 – 5, 2011

Sala Refettorio, Istituto Storico Parri Emilia Romagna

Via Sant'Isaia 18

## Coulomb '11

**Optical Acceleration** has been first proposed thirty years ago but only in recent years the progress has been so rapid that applications to biomedicine have been proposed.

The development of **fully optical devices** for the treatment of tumours using proton beams is likely to be a very long process, since energies, intensities and beam quality presently achievable are far from clinical standards. However, radiobiology experiments are already being performed and post-acceleration might allow to develop preclinical studies in a **near future**. The physical research ranges from the development of new targets, the **exploration of new regimes** and extensive simulations for parametric scans. Experiments on transport are reported and new linacs suitable for post-acceleration are under investigation.

The meeting aims to present the activity of the major laboratories dedicated to optical acceleration and centres for **biomedical research** to focus the near and **long term perspectives**. The University of Bologna has a laboratory, where a nuclear reactor was installed, that might host a power laser based facility and we expect from the meeting to get some useful indications for such a **project** whose feasibility study is being developed.

### Info

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### PROGRAM

#### Friday, November 4th

- 9.15 Academic authorities opening address
- 9.30 Stephan Kraft (HZDR Institute for Radiation Physics, Dresden – DE)  
Present and future laser driven proton therapy program in Dresden
- 10.10 Paul Bolton (KPSI, Nara – JP)  
Developing Integrated Laser-Driven Ion Accelerator Systems
- 10.50 Victor Malka (LOA, Paris – FR)  
The SAPHIR project and status of laser proton acceleration activities at LOA
- 11.30 Coffee Break
- 12.00 Francesco Pegoraro (Università di Pisa – IT)  
Relativistic mirrors and wavebreak in thermal plasmas
- 12.40 David Neely (RAL, Didcot – UK)  
Multi-pulse ion acceleration effects and optimisation
- 13.20 Lunch
- 15.00 Ingo Hofmann (GSI, Darmstadt – DE)  
Ion optics of laser accelerated protons for therapy applications
- 15.40 Marco Borghesi (Queen's University, Belfast – UK)  
Development of laser-driven ion sources and application to radiobiology
- 16.20 Luca Serafini (INFN, Milan – IT)  
Status of the project PLASMONX
- 17.00 Coffee Break
- 17.30 Luis Silva (IST, Lisboa – PT)  
Monenergetic ion acceleration with shock waves
- 18.10 Pasquale Londrillo (INAF, Bologna – IT)  
Simulations of laser acceleration of protons with the PIC code ALaDyn

#### Saturday, November 5th

- 9.00 Michel Molls (Klinik Strahlentherapie, Munchen – DE)  
Laser based Hadron therapy: a report on the MAP-Cluster of Excellence and radiobiological results
- 9.35 Roberto Orecchia (CNAO, Pavia and Università degli Studi di Milano – IT)  
Hadrontherapy: research and clinical opportunities
- 10.10 Roberto Cherubini (LNL INFN, Legnaro – IT)  
Radiobiology of Hadrons and Clinical Applications
- 10.45 Coffee Break
- 11.15 Giuseppe Dattoli (ENEA, Frascati – IT)  
Models for cancer mass evolution and ENEA activity
- 11.50 Claudio Franceschi (Alma Mater Studiorum Università di Bologna – IT)  
Aging and radiations: a critical update
- 12.25 Patrizio Antici (Università La Sapienza, Rome – IT)  
Post-acceleration schemes for laser generated protons
- 13.00 Concluding Remarks  
Giorgio Turchetti (INFN, Bologna and Alma Mater Studiorum Università di Bologna – IT)  
Marco Sumini (Alma Mater Studiorum Università di Bologna – IT)
- 13.20 Lunch

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