

Optical Acceleration of Ions and Perspective for Biomedicine

Bologna, November 4 – 5, 2011

Sala Refettorio, Istituto Storico Parri Emilia Romagna

Via Sant'Isaia 20

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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