Na poziv Društva fizičara Srbije, 23. aprila 2007. godine u 11 sati u Sali 2, Srpske akademije nauka i umetnosti (I sprat), Knez Mihailova 35,

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Member of the OECD Working Group on Nuclear Physics

održaće predavanje koje će obuhvatiti sledeće tri teme:

I The role of Organization for Economical Co-operation and Development (OECD) for the future long term plans of Nuclear Physics

II INFN activities on particle therapy: a status report

III EXCYT: the RIB Facility at INFN-LNS

Posetu organizuju**:**
Institut za nuklearne nauke "Vinča"
Ministarstvo za nauku i zaštitu životne sredine Republike Srbije
Italijanski institut za kulturu u Beogradu
Srpska akademija nauka i umetnosti
Društvo fizičara Srbije

U prilogu se nalazi kratak sadržaj predavanja**:**

I. The role of Organization for Economical Co-operation and Development (OECD) for the future long term plans of Nuclear Physics

G. CUTTONE
INFN-LNS & Member of the OECD Nuclear Physics Working Group

A Nuclear Physics Working Group in 2006 has been named by OECD for a period of two years. Its members have been appointed by the governments of interested OECD and non-OECD countries (all countries would participate on the same terms). Delegations would consist of senior program managers from funding agencies and, at their discretion, laboratory officials, representatives of national advisory bodies, and prominent members of national scientific communities. Intergovernmental organizations (for example, CERN) have been invited to send delegations and to take part in the deliberations on equal terms. In addition, the organized scientific community (for example, IUPAP, NUPECC, ESF) have been invited to participate. Specifically, the Working Group could request that one or more community groups provide the information and advice that it needs. As in past GSF activities, success would depend on the establishment of a constructive partnership between the scientists and the agency officials, with each side preserving its own area of authority and expertise.

Outcome
The outcome of the activity would be a concise policy-level report containing findings and conclusions regarding the optimal evolution of Nuclear Physics at an international level during the next 10-15 years. The report would be of an advisory nature, and would not be prescriptive regarding any particular national project or program. The two principal components of the report would be:

1) A “Roadmap” with a spectrum of potential future large facilities and projects during the next 10-15 years, based on recognized high-level scientific goals, and in the context of other scientific disciplines.

2) An analysis of trends and concerns that is relevant for long-term planning and priority-setting by government officials and scientific organizations, with an emphasis on prospects for international coordination and cooperation.

A status report of this WP activities will be presented paying particular attention to the possible applications in other fields (medicine, biology, safety…)

II. INFN activities on particle therapy: a status report

G. CUTTONE
Istituto Nazionale di Fisica Nucleare - Laboratori Nazionali del Sud, Italy

Isituto Nazionale di Fisica Nucleare (INFN) is the Italian institution charged to develop and organize research in nuclear and sub nuclear physics and its application in other fields
In particular in the last years particular attention has been devoted to the application of light particles (Protons and ions) combating cancer.
In particular at Laboratori Nazionali del Sud in Catania the first and until now unique Italian proton therapy facility has been realized.
INFN experience in the field of hadron therapy including the development of a new and original generation of particle accelerators will be extensively presented.

III. EXCYT: the RIB Facility at INFN-LNS

G. CUTTONE
Istituto Nazionale di Fisica Nucleare - Laboratori Nazionali del Sud, Italy

EXCYT (EXotics with CYclotron and Tandem) is an ISOL facility located at INFN-LNS to produce and accelerate radioactive ion beams. The primary heavy ion beam provided by the K-800 Superconducting Cyclotron (up to 80 MeV/amu, 1 pμA) generates, in a target-ion source complex (TIS), the required nuclear species which will be post-accelerated by the 15 MV Tandem.
For some ion beam such as for Li, the higher extraction efficiency from the TIS is obtained by positive ionisation. Then the injection into the Tandem is suitable only after a charge exchange (CEC) to obtain negative ions.

The commissioning of the facility has been concluded by delivering a ^{8}Li beam to the Big Bang experiment at 28.1 MeV and 10.2 MeV. The production of the radioactive lithium (8,9) beams were performed by

injecting a $^{13}C^{4+}$ primary beam of 45 MeV/amu on a graphite target up to a beam power of about 150W, while the ionisation was achieved by using a Tungsten positive surface ioniser. The maximum ^{8}Li yield obtained was about 1×10^{7} pps, however the need of the charge exchange and an unexpected low transmission in the tandem coupling line and through the tandem decrease this maximum yield at the experimental point to a few 10^{4} pps.
We are confident to decrease such losses matching the design calculations by adding more diagnostics and with a fine realignment of the magnetic elements. However, the tandem transmission efficiency will be always affected by the terminal voltage: values ranging between 10-37% have been obtained during the commissioning by changing the terminal voltage between 2.5 to 7MV.

The charge exchange process has been characterised off-line and the results obtained at the EXCYT facility confirm our previous observations and expectations such as the efficiency at different beam energies and the isotopic shift effect. Since the CEC showed an increase of efficiency by decreasing the lithium beam energy, we decided to lower the TIS extraction. The best operating point was found experimentally at 10 kV permitting to obtain higher CEC efficiency (3.6% circa) with negligible beam losses over the HV platforms with respect to higher Li beam energy.

Finally, a presentation of the facility will be given with particular concern to the Radioprotection aspects, TIS, to the CEC and to the results of lithium beams production together with the future improvements and plan.