



University Centre, Joint Institute for Nuclear Research, Dubna, Russia
Institute of Experimental and Applied Physics IEAP, CTU, Prague
Adam Mickiewicz University, Poznan

Sixth International Summer Student School
**Nuclear Physics Methods and
Accelerators in Biology and Medicine**

Dubna, 2 - 12 th July 2011



Topics

- Nuclear Physics Methods
- Particle Accelerators
- Nuclear Medicine
- Nuclear Methods in Life Sciences
- Radiobiology
- Medical Imaging
- Radiation Detectors
- Trends in Biology

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School Proceedings
will be published by AIP

2011



University Centre, JINR,
Joint-Centre, 6, 141980
Dubna, Moscow region, Russia

Tel: +7(495) 65330
Fax: +7(495) 65301

E-mail: biomed11@ic.jinr.ru
Web: <http://ic.jinr.ru/biomed11/>

VIII International Workshop

APPLICATION OF LASERS AND STORAGE DEVICES IN ATOMIC NUCLEI RESEARCH

Recent Achievements and Future Prospects

June 22 - 25, 2009
Poznań, Poland



[Click here to see more Poznań pictures...](#)

Poznań is one of the largest Polish cities situated almost in the middle on the line connecting Warsaw and Berlin, on the Warta River. Poznań is the capital, economic and cultural center of the region of Poland called Wielkopolska (Greater Poland). It has almost 20 universities and colleges (academies) and a large proportion of the population are students, which makes the atmosphere in the bars and on the streets youthful and lively. The city is well known for its beautiful old part. More information about Poznań you can find [here](#).

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The Workshop will take place at the Faculty of Physics of AMU in Poznań-Morasko, situated about 10 km north of the Poznań city center (see the [City Scheme](#))



The subject of the VIII Poznań Workshop is broadened combining two key technologies of modern research: lasers and ion storage techniques. This combination has opened new research opportunities for investigations in atomic and nuclear physics, for detection of quantum effects in particle ensembles as well as for precision spectroscopy especially for testing fundamental interactions and symmetries.

The topics to be discussed are:

- ❖ Test of fundamental interactions and symmetries by atomic-physics techniques
- ❖ Nuclear properties by use of laser and storing techniques
 - spins, moments, charge radii, masses and nuclear half lives
- ❖ Spectroscopic routes to superheavy elements
- ❖ Hyperfine fields in simple and complex atoms
- ❖ Production and spectroscopy of exotic atoms
- ❖ Trace analysis by nuclear fingerprints
- ❖ Development and applications of laser ion source; production and use of pure isomeric beams using laser ionization
- ❖ Development and applications of polarized radioactive beams
- ❖ Cooling and trapping techniques for radioactive beams
- ❖ Development and applications of gas catchers, ion guides and gas-jets
- ❖ Powerful pulsed lasers in nuclear research

Joint Institute for Nuclear Research, University Centre
Adam Mickiewicz University, Poznan, Poland
SECOND INTERNATIONAL SUMMER STUDENT SCHOOL

19-30 June, 2003
Poznan, Poland

NUCLEAR PHYSICS METHODS AND ACCELERATORS IN BIOLOGY AND MEDICINE

TOPICS

Nuclear Medicine

Radiation Physics in Medicine

Fundamentals of Ionizing Radiation Dosimetry
and Radiobiology

Accelerator Complexes in Medicine

Electron, Photon, and Hadron Radiotherapy

Modern Imaging Technologies for Medicine

Ionizing Radiation in Medicine
and Other Applied Fields

Supported by
JINR's Programme "Bogoliubov-Infeld", Czech Technical University,
Russian Federal Programme "Integration"

For information

University Centre, Joint Institute for Nuclear Research, 141980 Dubna, Moscow Region, Russia
Fax/Phone: (7 09621) 65851/65089, E-mail: judina@uc.jinr.ru
Adam Mickiewicz University, Faculty of Physics, Umultowska 85, 61-614 Poznan, Poland
Fax/Phone: ++48(61)8257018/8295169, E-mail: nawrocik@amu.edu.pl
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46 KARPACZ WINTER SCHOOL OF THEORETICAL PHYSICS QUANTUM DYNAMICS AND INFORMATION: THEORY AND EXPERIMENT

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6-th Symposium on Vacuum based Science and Technology

in conjunction with

10-th Annual Meeting of the German Vacuum Society (DVG)

organized by



Institute of Mechatronics,
Nanotechnology
and Vacuum Technique
Koszalin University of Technology



Clausius
Tower
Society

in cooperation with

BalticNet PlasmaTec Association

under the auspices of:

Polish Vacuum Society PTP
German Vacuum Society DVG
Shanghai Vacuum Society SVS
www.chinesevacuum.com CVC

September 20-22, 2011

Koszalin - Kołobrzeg, Poland

Frank Laboratory of Neutron Physics, 17 December 2010.
Loading the active zone of the IBR-2 reactor with nuclear fuel



The Henryk Niewodniczański
INSTITUTE OF NUCLEAR PHYSICS
POLISH ACADEMY OF SCIENCES

BD/ 48 /2011

Krakow, 27th April 2011

Professor A.G.Olshevski
Director of Laboratory of Nuclear Problems
Joint Institute for Nuclear Research

Dear Aleksandr Grigorievich,

It is my pleasure to inform you about the results of a fruitful cooperation between the Cyclotron Section of the Institute of Nuclear Physics Polish Academy of Sciences, managed by Mr J. Sulikowski, the group of employees of the Department of New Accelerators LNP JINR, managed by Dr.G.A.Karamysheva, and Dr.I.V.Amirkhanov, the chief of the Division of Computational Physics of LIT JINR.

The isochronous cyclotron AIC144 was used for eye melanoma proton radiotherapy of the first nine patients. The successful irradiation of those patients was conducted between February and April 2011.

The mode was calculated, some time ago, by means of the *Cyclotron Operator HELP 2009* program complex, developed by Mr I.N.Kiyan under the direction of Dr.R.Taraszkiewicz and Dr.I.V.Amirkhanov. Thanks to the accuracy of calculations, the proton beam was successfully accelerated without any experimental iterations, empirical fine tuning or corrections of frequency of the RF-generator and presented a good stability.

In April 2011 the *Cyclotron Operator HELP 2011* was installed on AIC144 server and the work on restoration the main operational mode parameters to values calculated in 2009 was performed by Mr I.N.Kiyan. The optimization of the isochronous magnetic field, the proton phase motion and the first harmonic of working magnetic field were also conducted. As a result, the extraction coefficient of the proton beam increased on average 2.2 times as compared to the previous value. It is still possible to increase the proton beam extraction by the factor of two.

I would like to express my deep satisfaction of the results achieved during our co-operation. I would also like to express the hope that this collaboration will be continued and developed in the future.

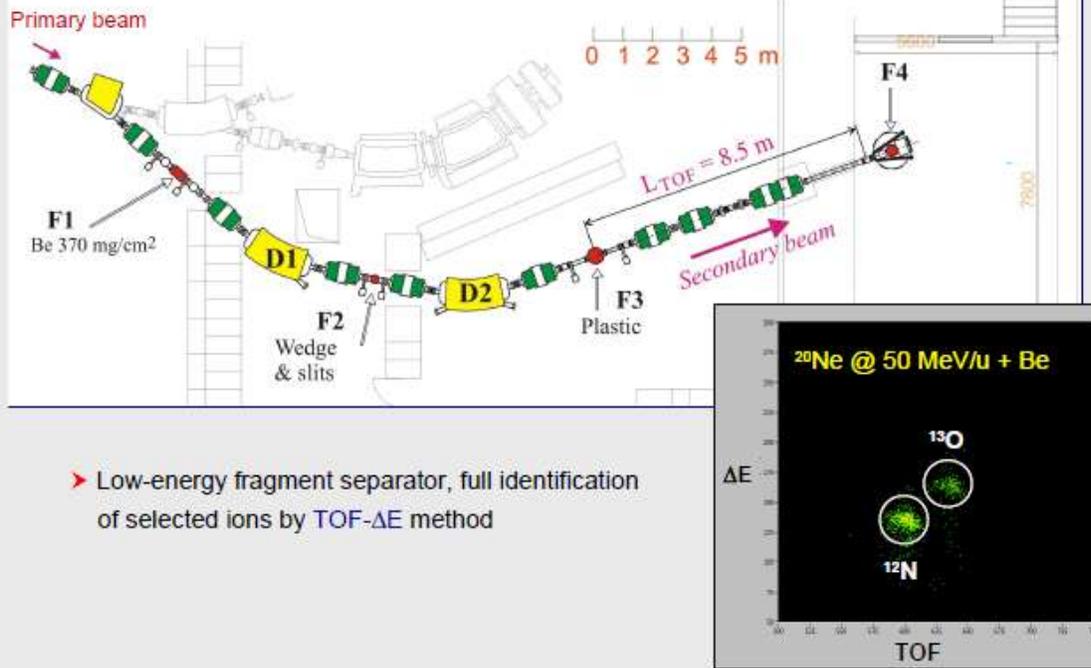
Yours sincerely,

Pawel Olko

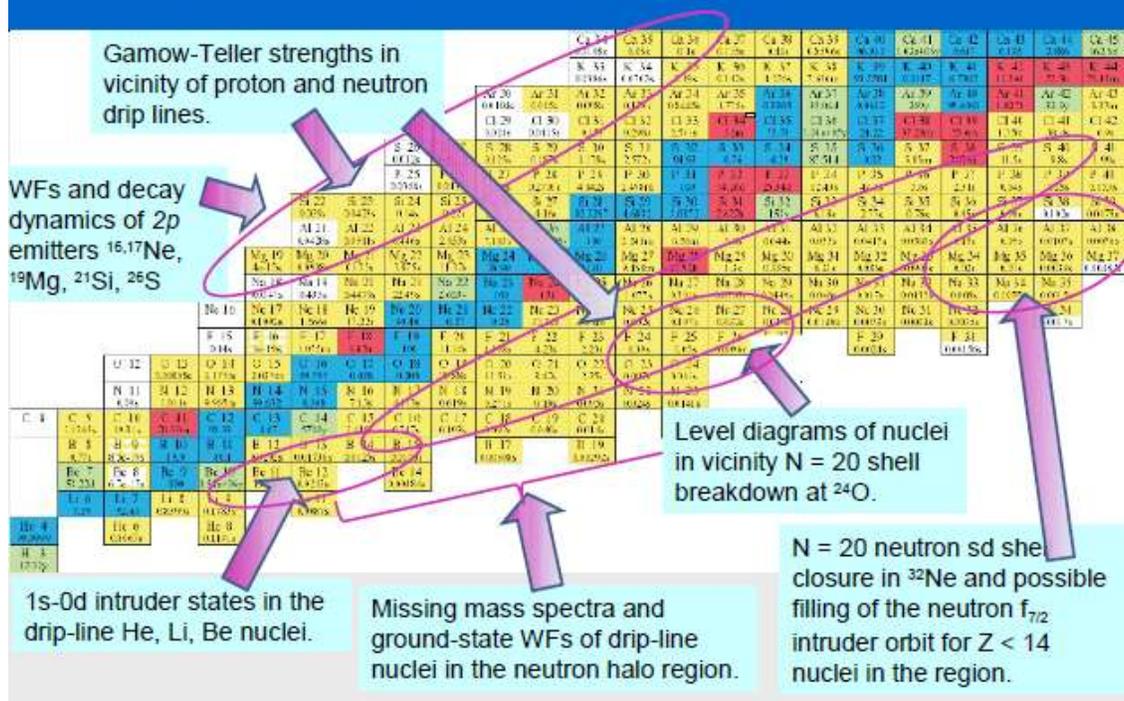
Scientific Deputy Director



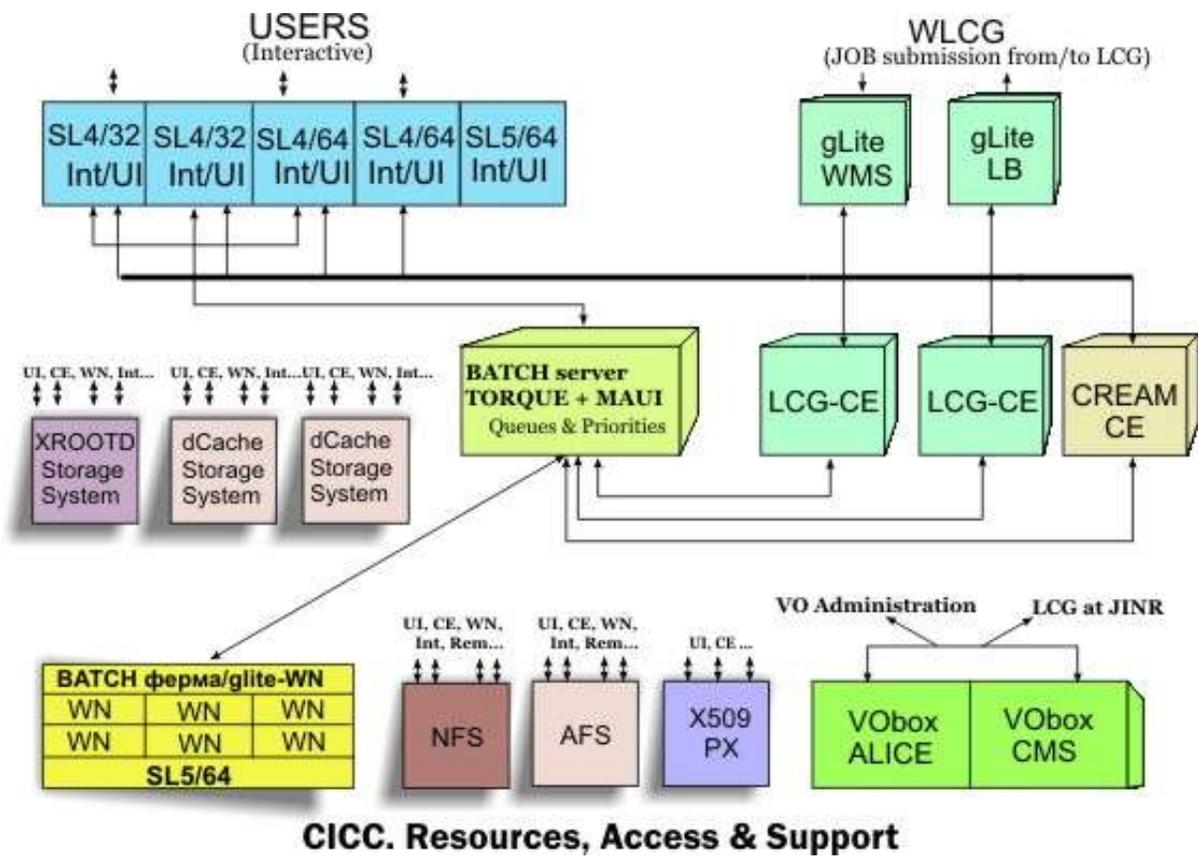
ACCULINNA @ FLNR, Dubna



Research plans at ACCULINNA-2



From talk of M.Pfutzner at Dubna Symposium 100-year of atomic nucleus, 11-12 march, 2011



The Resources of the LIT/JINR Central Information Computing complex are configured in such a manner that access to resources and their use is possible both for local user, and for users of the WLCG/EGEE global infrastructure



Picture from the LIT/JINR Central Information Computing complex

GRID 2010



Joint Institute for Nuclear Research Laboratory of Information Technologies

4th International Conference
"Distributed Computing and Grid-technologies in Science and Education"
28 June-3 July 2010, Dubna, Russia

Topics:

- questions of creation and experience of exploitation of grid-infrastructures;
- methods and technologies of distributed computations; architecture and algorithms;
- network infrastructure for distributed data processing and storing;
- algorithms and methods of solving applied problems in distributed computing media;
- theory, models and methods of distributed data processing;
- distributed information systems: construction technologies and usage experience;
- Grid applications in science and education: physics, chemistry, biology, biomedicine, Earth sciences, etc.;
- Grid applications in business;
- cloud computing and consolidation of distributed resources.

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Contacts:

JINR, Laboratory of Information Technologies
141980, Russia, Moscow region, Dubna, Joliot Curie Street, 6
Phone: (7 496 21) 64019; 62308; 64797
Fax: (7 496 21) 65145
grid2010@jinr.ru, <http://grid2010.jinr.ru/>



МЕЖДУНАРОДНАЯ АКАДЕМИЯ НАУК
РУССКАЯ СЕКЦИЯ





NA61/SHINE at CERN SPS The experimental facility



SPS detector

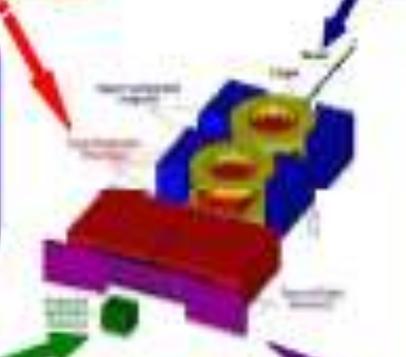
NA61 uses the New European Laboratory (NEL) SPS detector, a detector used for the NA61 experiment. The detector consists of a central tracking system (the SPS) and a calorimeter system (the SPC). The SPS is a detector used for the NA61 experiment, and the SPC is a detector used for the NA61 experiment.

Beam and target detector

NA61 uses a beam and target detector system to detect particles from the beam. The beam and target detector system consists of a beam detector and a target detector. The beam detector is used to detect the beam particles, and the target detector is used to detect the target particles. The beam and target detector system is used to detect particles from the beam.

Beam and target detector

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Use of high resolution

High resolution is used to detect particles from the beam. The high resolution detector is used to detect particles from the beam. The high resolution detector is used to detect particles from the beam.

Proposed upgrade to detector - PPS

The PPS detector is the latest in particle detectors. It is a detector used for the NA61 experiment. The PPS detector is used to detect particles from the beam. The PPS detector is used to detect particles from the beam.

Features of the PPS

- High resolution
- High energy
- High precision

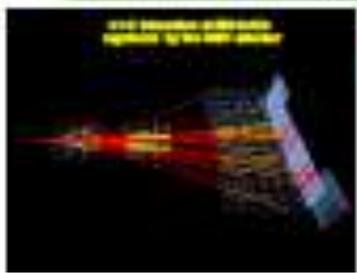
Benefits of the PPS

- High resolution
- High energy
- High precision

PPS detector and beam line

NA61/SHINE detector system

NA61/SHINE detector system is used to detect particles from the beam. The NA61/SHINE detector system is used to detect particles from the beam. The NA61/SHINE detector system is used to detect particles from the beam.



NA61/SHINE is a particle detector system used for the NA61 experiment. It is a detector used for the NA61 experiment. The NA61/SHINE detector system is used to detect particles from the beam. The NA61/SHINE detector system is used to detect particles from the beam.



Marek Gazdzicki



W.Nawrocik

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