
Photographer - Nadezhda Sharykina (c) IHEP


RUPAC XXII


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Russian Particle Accelerator Conference
IHEP PROTVINO 2010
September 27 - October 1


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BINP Colliders
VEPP-2000 E = 1 GeV
Round beams
In operation 2009 - ...
RuPAC'10 D.Shwartz
VEPP-4M E = 1 - 5 GeV
Energy calibration 10^{-6}
In operation 2000 – 2013 (?)
RuPAC'10 S.Nikitin
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Alexander
GOLUBEV
ITEP
Moscow


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ІФВЕ
ІНЕР


Vsevolod
KAMERDZHIEV
FZJ
Juelich, GE


-2010
IHEP


Michael
VOROGUSHIN
NIEFA
S.-Petersburg


RuPAC-2018
ИЯФ
ИЯФ


AQUA
MINERALE
AQUA
MINERALE


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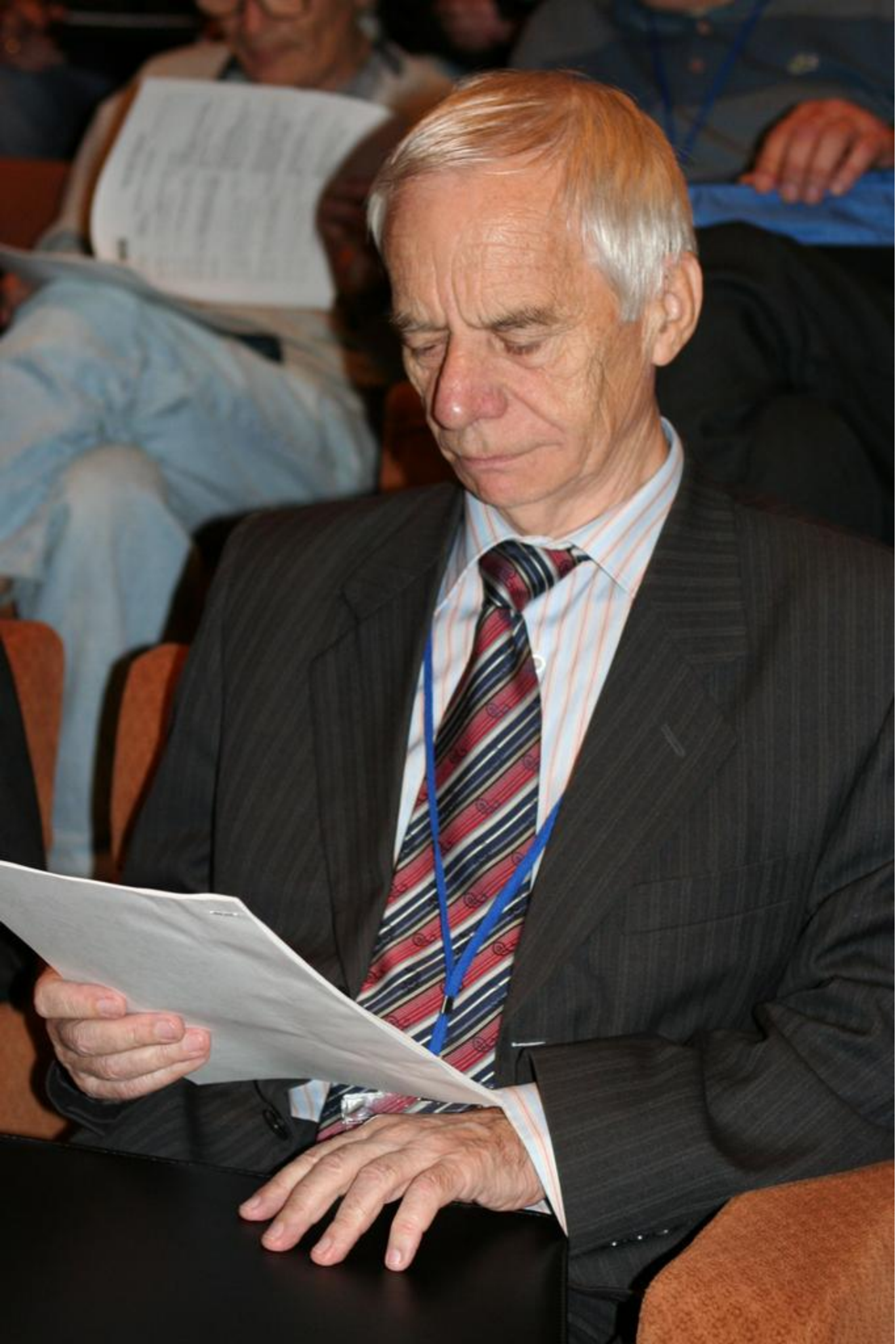


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synchro-
betatron
booster
900 MeV
SND
converter
E ≈ 1 GeV
(per beam)
L ≈ 1×10^32 cm^-2 sec^-1
(1×1 bunch)


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Орг. комитет
Andrey
KLEYMENOV
IHEP
Protvino


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ГАРДЕРОБ
WC
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Combining the above equation with the equation
charge tune shift one obtains
$$\delta\nu_{SS} = \delta\nu_{SC}\sqrt{\frac{\pi}{2}}\frac{\sigma_z}{C}\gamma^2(1+\beta^2)$$
For NICA parameters the space charge tune shift is significa
smaller than the tune shift due to beam space charge
Small β^* results small σ_z and, consequently, small $\delta\nu_{SC}$
Large value of σ_z/β^* results in phase averaging for high order
resonances and significantly mitigates the beam-beam effects
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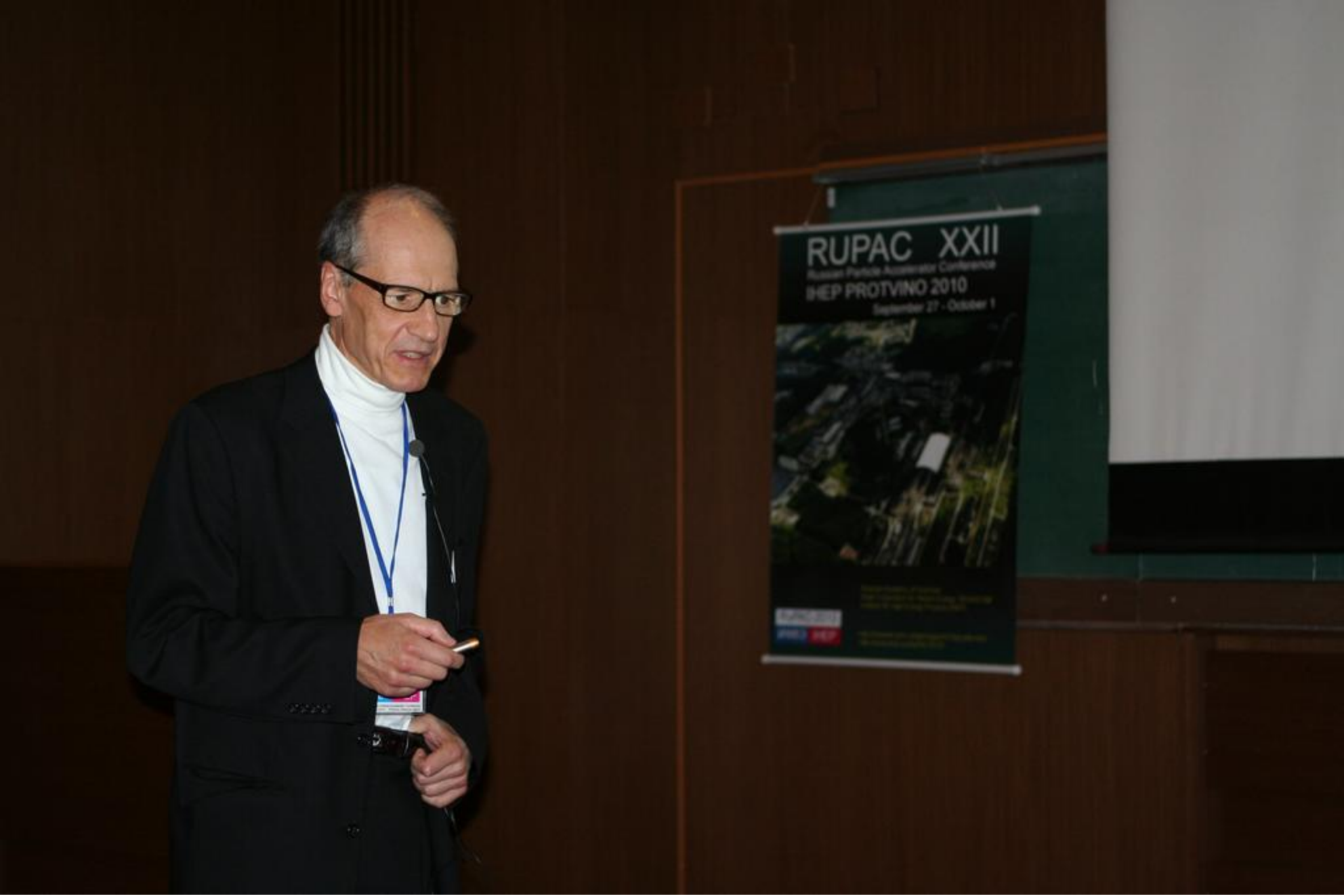
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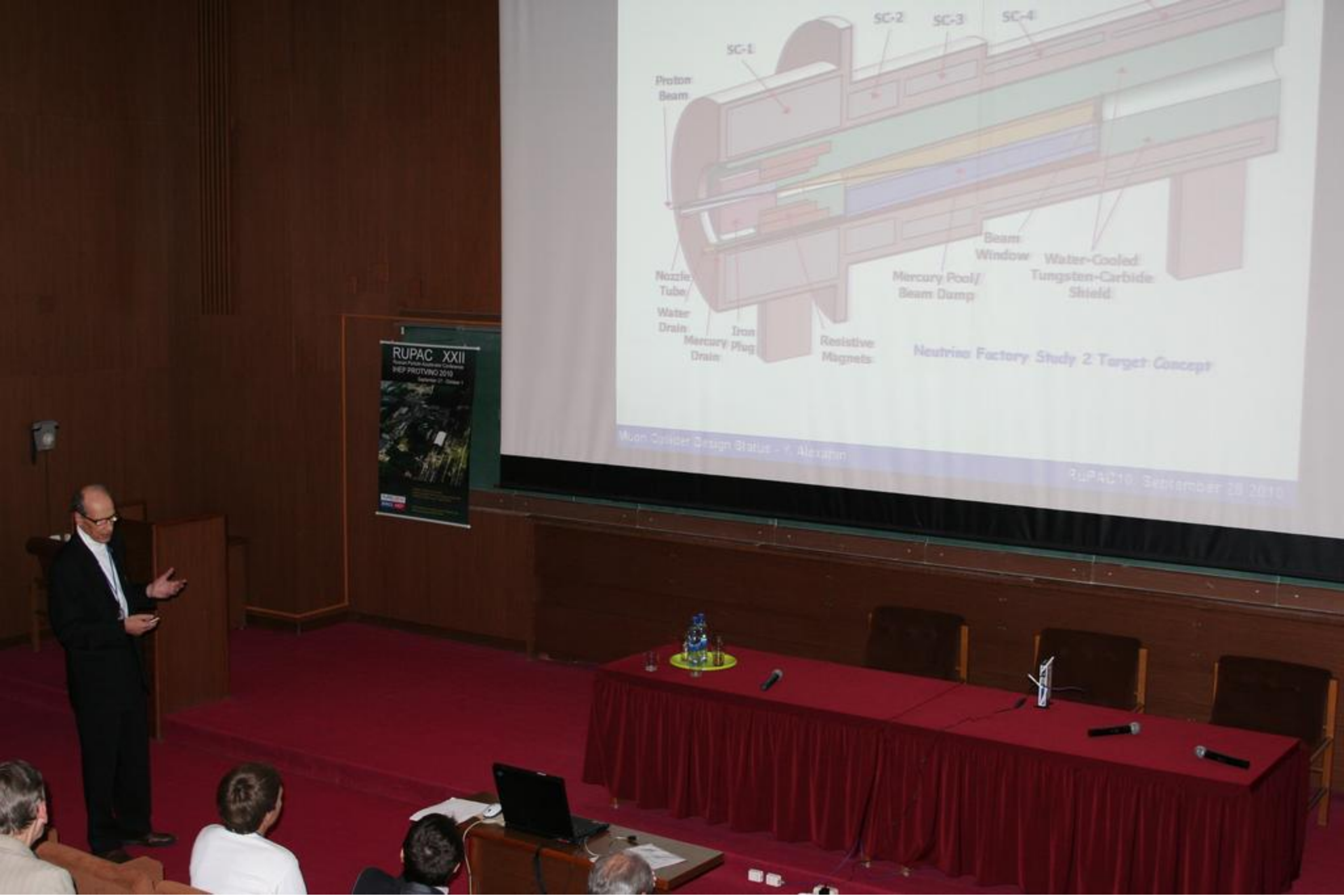
SC-1
SC-2
SC-3
SC-4
Proton Beam
Nozzle Tube
Water Drain
Mercury Drain
Iron Plug
Resistive Magnets
Mercury Pool/ Beam Dump
Beam Window
Water-Cooled Tungsten-Carbide Shield
Neutrino Factory Study 2 Target Concept
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4 TeV Muon Collider @ Fermilab
Muon Collider Design Status - Y. Alexahin
RuPAC10. September 28 2010
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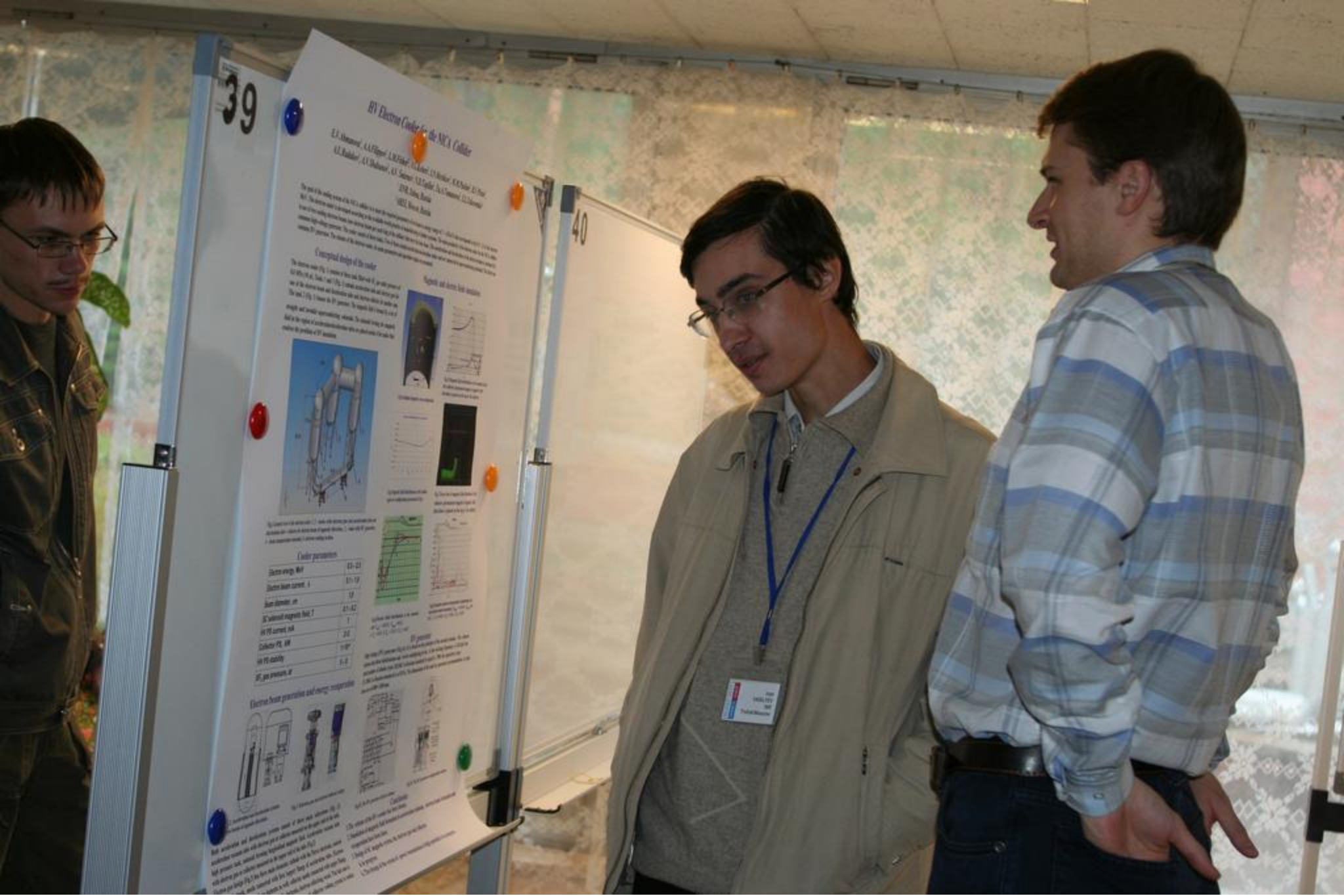
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ТРУДЫ
JACoW


4,6
ЕЛЬ
ПОЖАРЕ


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Valery
SEROV
INR
Troitsk/Moscow


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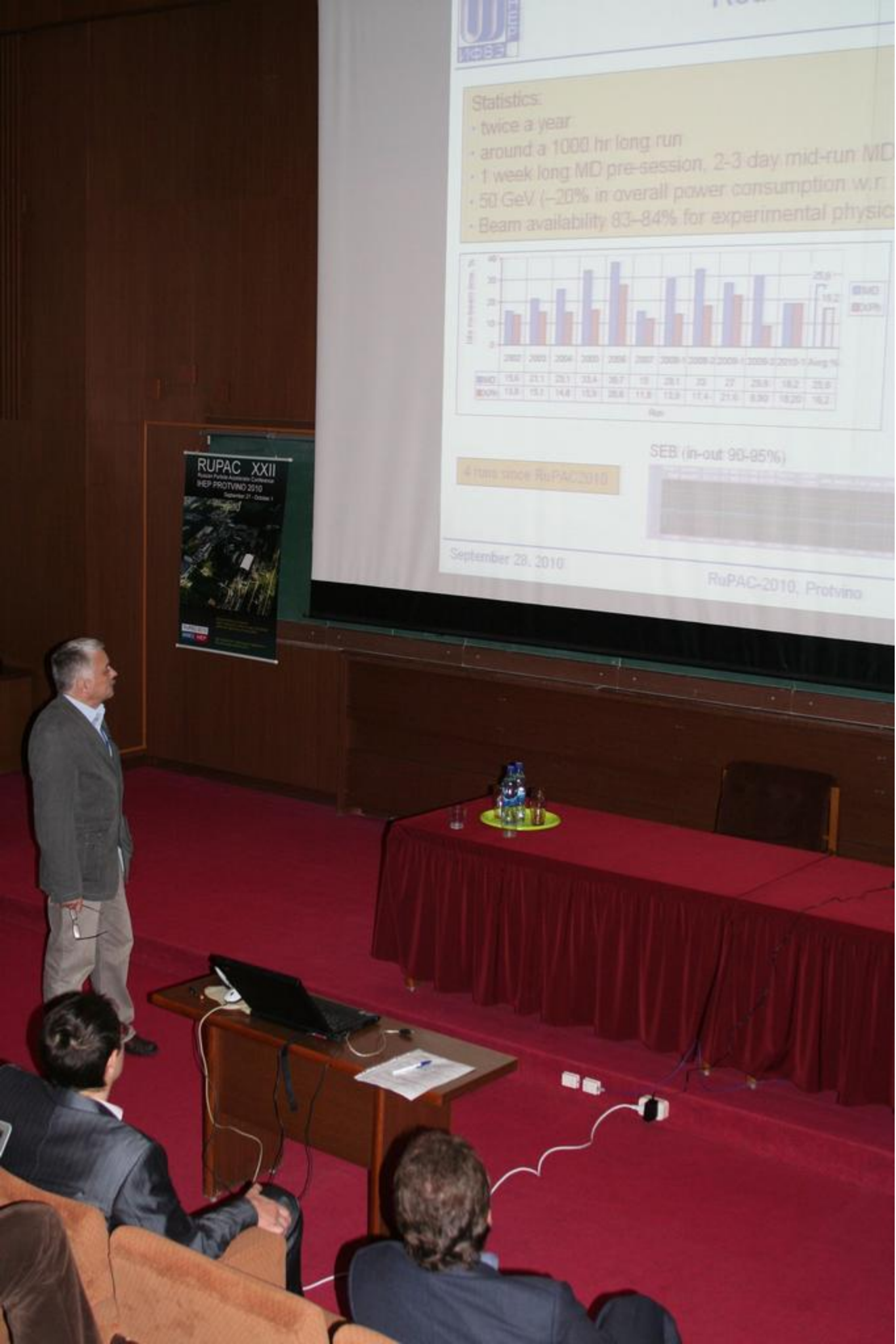
27.09-01.10.2010 Protvino, Moscow region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Statistics:
· twice a year
· around a 1000 hr long run
· 1 week long MD pre-session, 2-3 day mid-run MD
· 50 GeV (–20% in overall power consumption w.r.
· Beam availability 83–84% for experimental physic
4 runs since RuPAC2010
SEB (in-out 90-95%)
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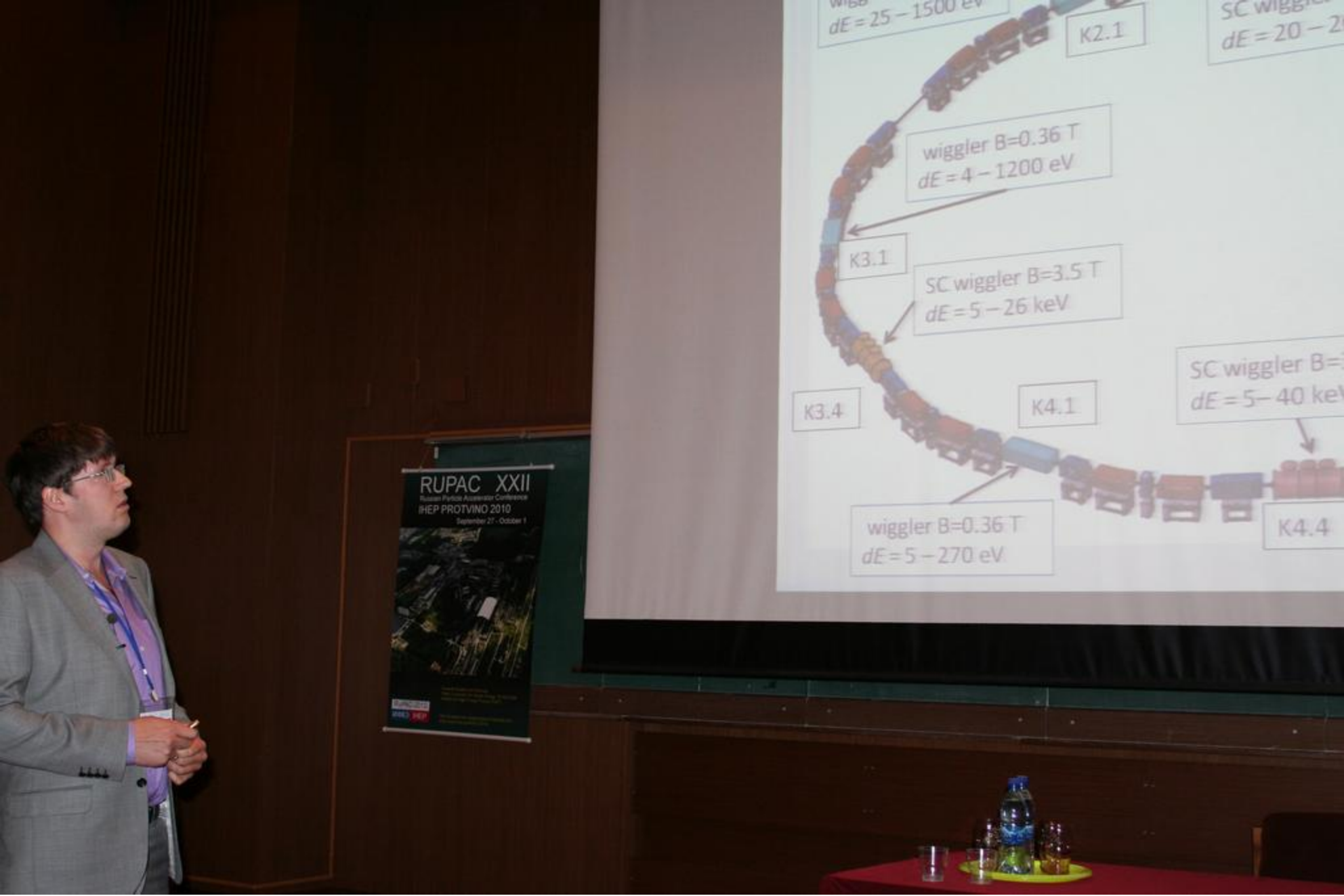
6.2.2 PROJECT BS-2 – Alternative Project


Vladimir
RCHUGANOV
RRC KI
Moscow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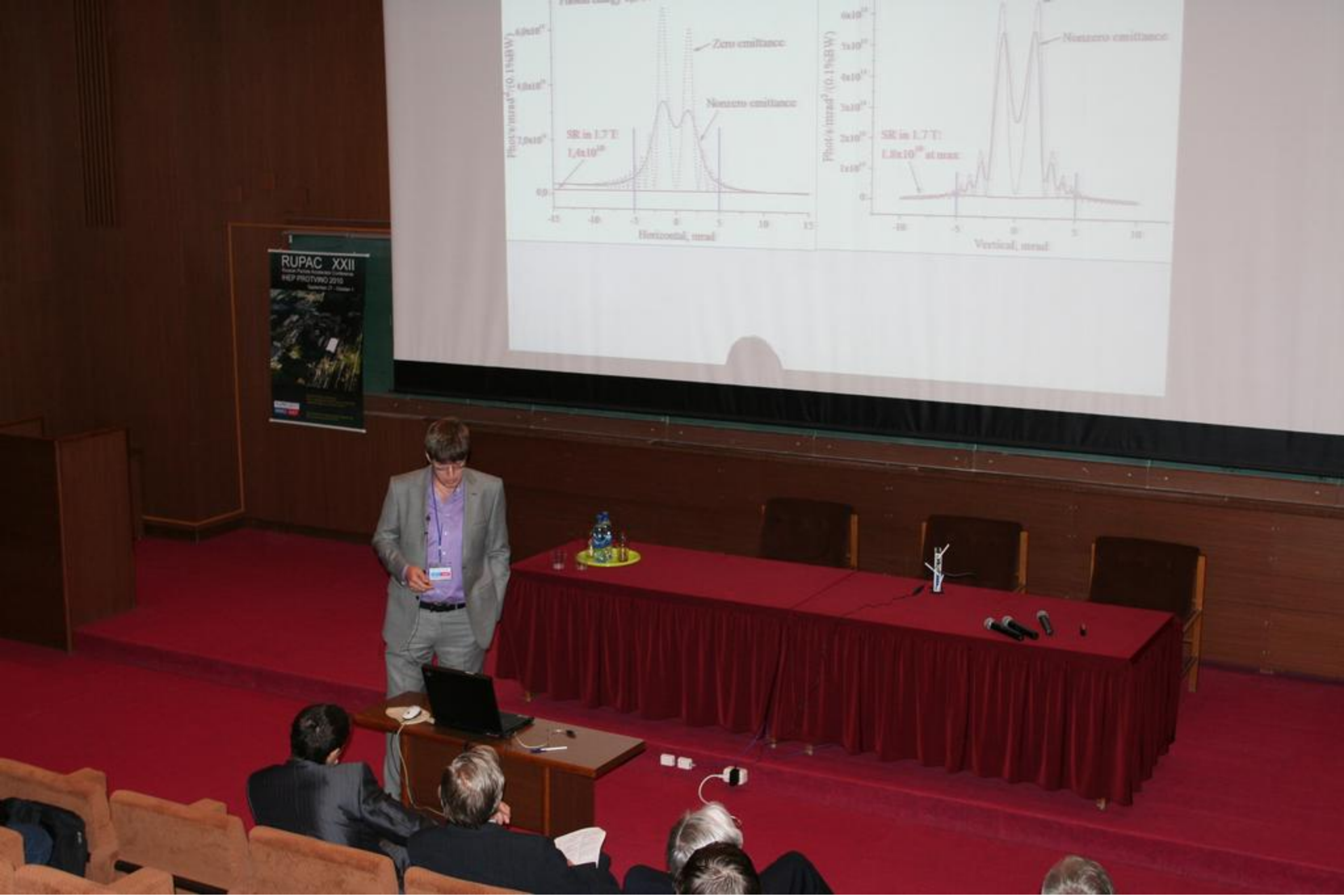
K2.1
wiggler B=0.36 T
dE = 4 – 1200 eV
K3.1
SC wiggler B=3.5 T
dE = 5 – 26 keV
K3.4
K4.1
SC wiggler B=
dE = 5– 40 keV
wiggler B=0.36 T
dE = 5 – 270 eV
K4.4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Zero emittance
Nonzero emittance
SR in 1.7 T:
Horizontal, mrad
Vertical, mrad


Event Generator
Event clock format:
Event code byte
+ External bus byte
Input-Output Ports:
Optical (SFP transceiver):
- Event stream: 125 M-Events/sec
- Bit rate: 2.5 Gbps
Electrical:
- RF 500 MHz input (PECL)
- 50 Hz input (TTL, cycle triggering)
- 8 External event triggers (TTL)
- 8 External bus inputs (TTL)
- 4 outputs from 8 x Counters
Event sources:
- 8 External triggers
- 2 Internal sequence RAMs (1ms)
- VME bus triggers
- Upstream EVG
External bus sources:
- 8 External inputs (TTL)
- 6 Internal from counters
Event clock is always synchronized to RF 500MHz!!!
Data transmitted in "event byte":
- 19 functional events (12 from external sources, 16 generated internally)
- 2 service events (basically for time stamping)
Data transmitted in "external bus byte":
- 1 MHz clock for time stamping (external)
- Machine clocks – BR-CLK, SR-CLK and COINC-CLK (internally generated by counters)
Yuri Chernousko, 28 Sept 2010
diamond
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TIMING SYSTEM OF THE
PLEX ITEP-TWAC
C RF ITEP Moscow, Russia
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correction
4-matching solenoid
5-90 degree solenoid
6 technical straight
7,8,9- matching


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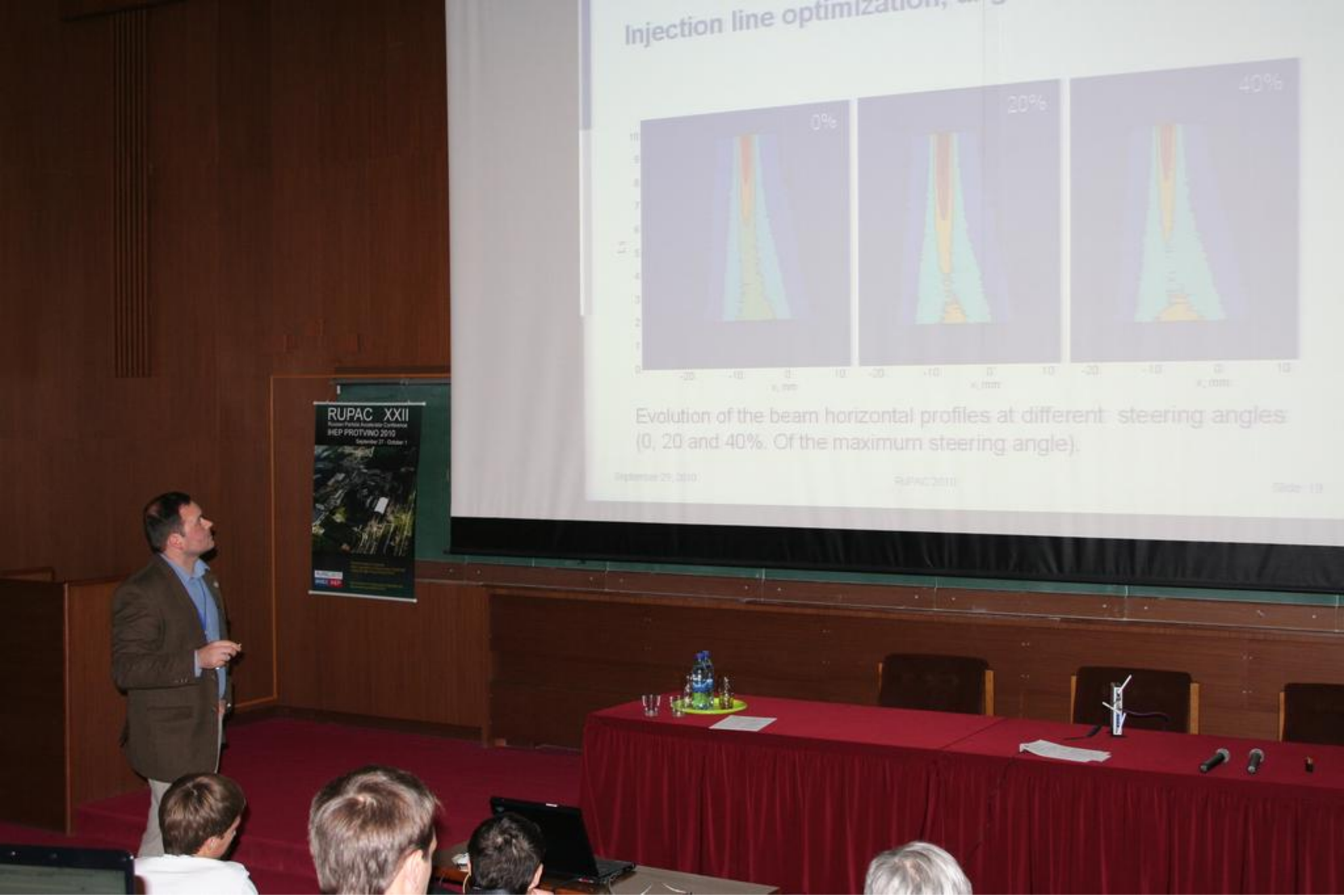
Injection line optimization,
0%
20%
40%
Evolution of the beam horizontal profiles at different steering angles
(0, 20 and 40%. Of the maximum steering angle).
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SMIRNOV
JINR
Dubna


8 ШО


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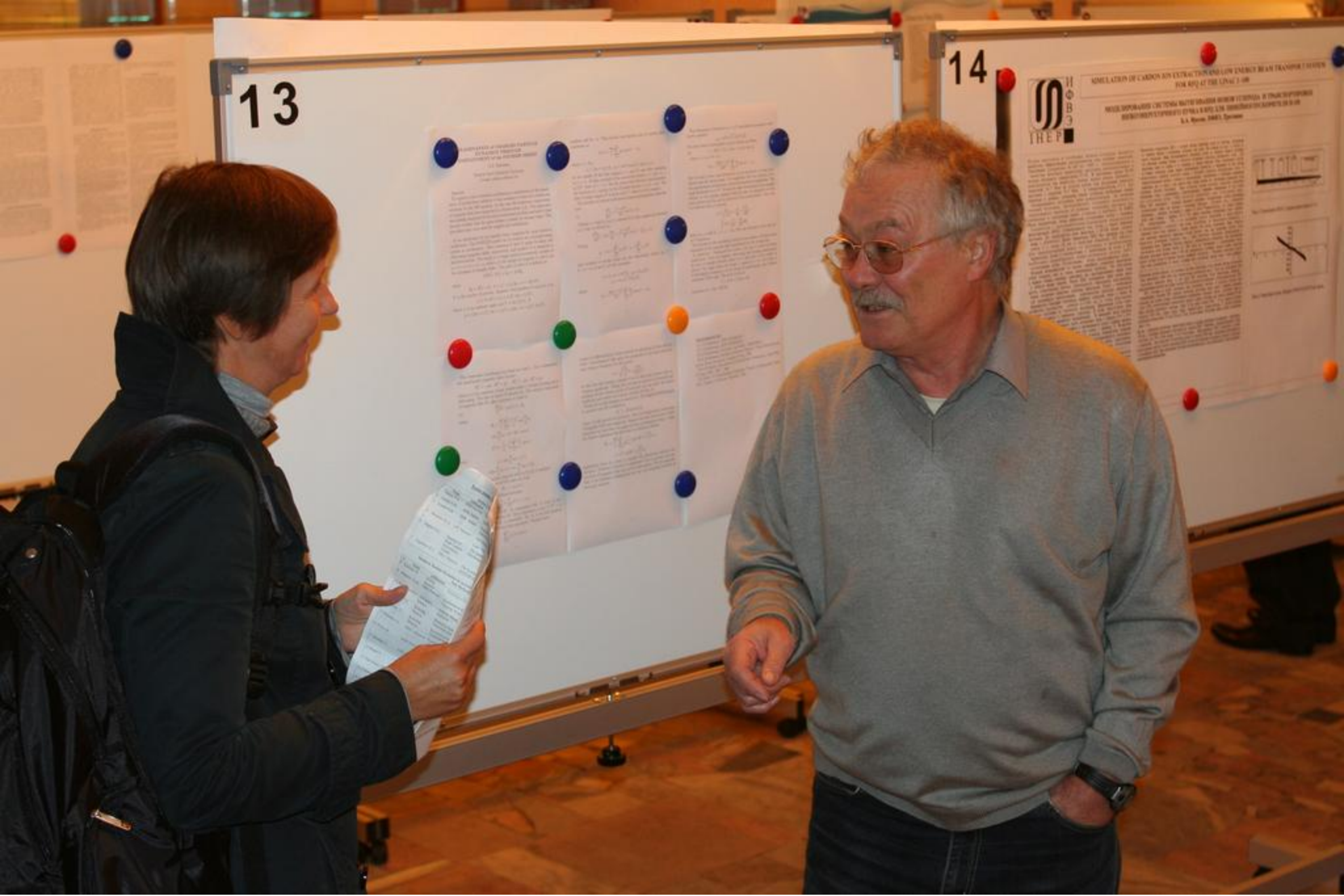
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Electron Cooling Experiments
in CSR


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30.09.2010


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Vyacheslav
ZHABITSKY
JINR
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plasma discharge at which the magnetic field
formation of other interesting configurations of beams is poss
The plasma lens provides formation of hollow beams of ions i
wide range of parameters that allows to consider it as a possib
variant of a terminal lens for realization of inertial thermonuc
synthesis.
The plasma lens can be used for transformation of beams wit
Gaussian distribution of particles density in a beams with
homogeneous spatial distribution.
Application of the several plasma lenses which are in different
stages of the plasma discharge, presumes to create some nontr
spatial configurations of ions beams.
The plasma lens represents the universal tool for investigation
plasma discharges.


$$\frac{dI}{dt} = \frac{2Q}{}$$
$$\Delta\tilde{I}_2 = \Delta(I_2 \exp(i\varphi_2)) = iI_2 \exp(i\varphi_2)\Delta\varphi_2$$
$$\Delta\varphi_2(t) = \frac{2\pi\alpha L}{\Lambda}\frac{\Delta E(t-T)}{E}$$
$$\Delta E = e\,\mathrm{Re}\,\Delta(\hat{U}_e + \hat{U}_1 + \hat{U}_2) = e\,\mathrm{Re}(\Delta\hat{U}_2)$$
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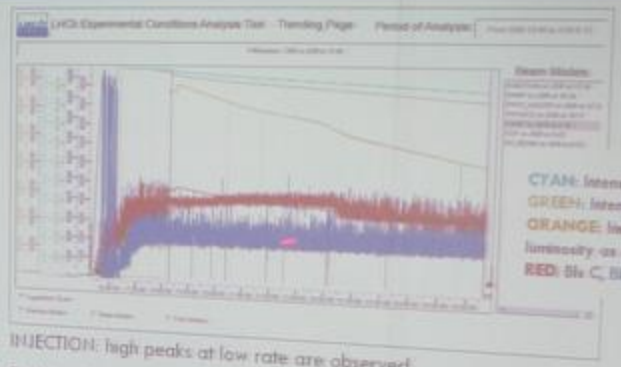
PERFORMANCE WITH BEAM



CYAN: Intensity, Beam 2
GREEN: Intensity, Beam 1
ORANGE: Instantaneous luminosity as measured by BLS
RED: Bls C, BLUE: BLS A

- INJECTION: high peaks at low rate are observed
- RAMP: as the energy of the beam approaches 3.5TeV occasional losses are getting higher in intensity, but still at a lower rate
- COLLISIONS: the rate of signal is dominated by the p-p collisions in the IP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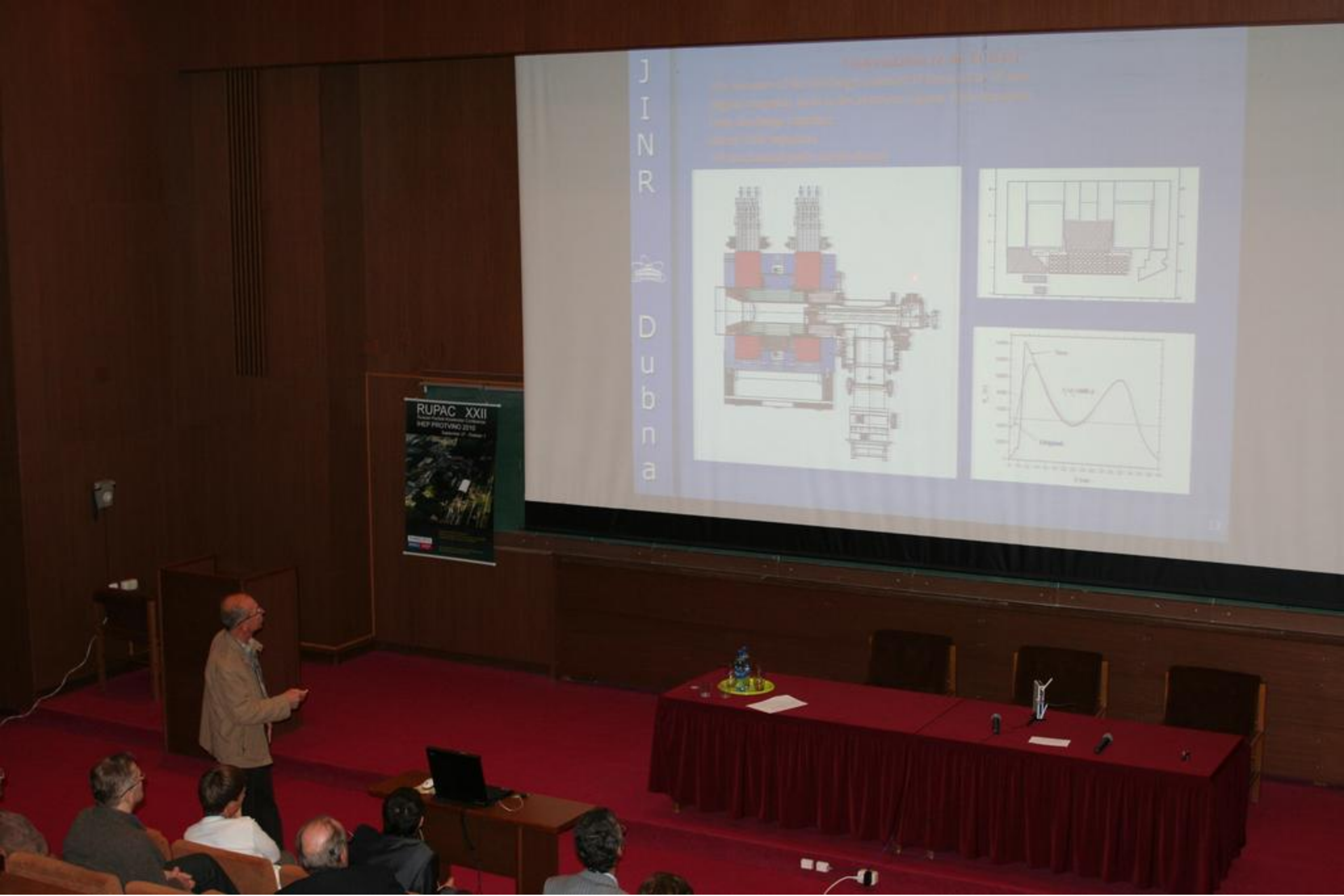
Yury
ROGOVSKY
BINP
Novosibirsk


IHEP


Alim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