

HIRG participation in International Project of Scientific Cooperation

GROUPEMENT DE RECHERCHE EUROPEEN (GDRE)

(European Research Network)

Initiated by Barbara Erazmus: 2000

Coordinator: Klaus Werner (SUBATECH, Nantes)

Participating Institutes and local coordinators:

- JINR (Dubna) – R. Lednicky
- ITEP (Moscow, Russia) – A. Stavinsky
- BITP (Kiev, Ukraine) - Yu. Sinyukov
- WUT (Warsaw, Poland) – J. Pluta

Forms of activity:

1. Meetings every year in July at SUBATECH
2. Meetings in cooperating institutes
3. Common PhD supervision – system „co-toutelle”
4. Common research

Example 1.

XII GDRE WORKSHOP ON RELATIVISTIC HEAVY ION PHYSICS, WARSAW 2011

[Home](#)

[Practical Information](#)

[Agenda](#)

[Participants](#)

[Contact](#)

[Gallery](#)

[Home](#)

Agenda

Wednesday 14:15 room 111 Opening, chair: Barbara Erazmus

14:15 – 14:20 **Opening of the Workshop by the Dean of Faculty of Physics**, prof. Rajmund Bacewicz

14:20 – 14:30 **Heavy Ion Physics as seen from WUT**, J. Pluta (10 min.) [slides](#)

14:30 – 15:00 **Flow measurements in ALICE**, R. Snellings (30 min.) [slides](#)

15:00 – 15:30 **Femtoscopia overview from ALICE**, A. Kisiel (30 min.)

15:30 – 16:00 **Correlation studies in the Beam Energy Scan program at STAR**, H. Zbroszczyk (30 min.) [slides](#)

16:00 – 16:30 **Coffee Break**

16:30 – 17:00 **Status and plans of the ion program of NA61 at the CERN SPS**, K. Grebieszko (30 min.) [slides](#)

17:00 – 17:30 **Recent results from hHKM: radial, elliptic flows and HBT at RHIC and LHC**, Y. Karpenko (30 min.) [slides](#)

17:30 – 18:00 **Can laser tracks be used for alignment and calibration of the STAR TPC**, G. Agakishiev

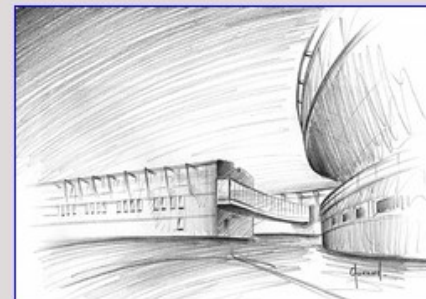
Example 2.



XV GDRE WORKSHOP Heavy Ions at Relativistic Energies

SUBATECH, Nantes, France

July 07 - July 13, 2013



Organizing Committee

[Klaus Werner \(Coordinator of GDRE, SUBATECH\)](#)
[Tanja Pierret \(workshop secretary, SUBATECH, office H204\)](#)

Accommodation

The ICAM residence (33, rue du Champ de Manoeuvres 44477 CARQUEFOU, contact person:
[Jacky DAVID](#), Head of the ICAM Student Residence, Phone: 00-33-(0)2.40.52.40.90), [ICAM office \(reception desk\) hours](#)

[Path from EMN to ICAM](#) [Map of Nantes](#) [ICAM info \(in English\)](#)

Participants

SUBATECH:

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KIEV:

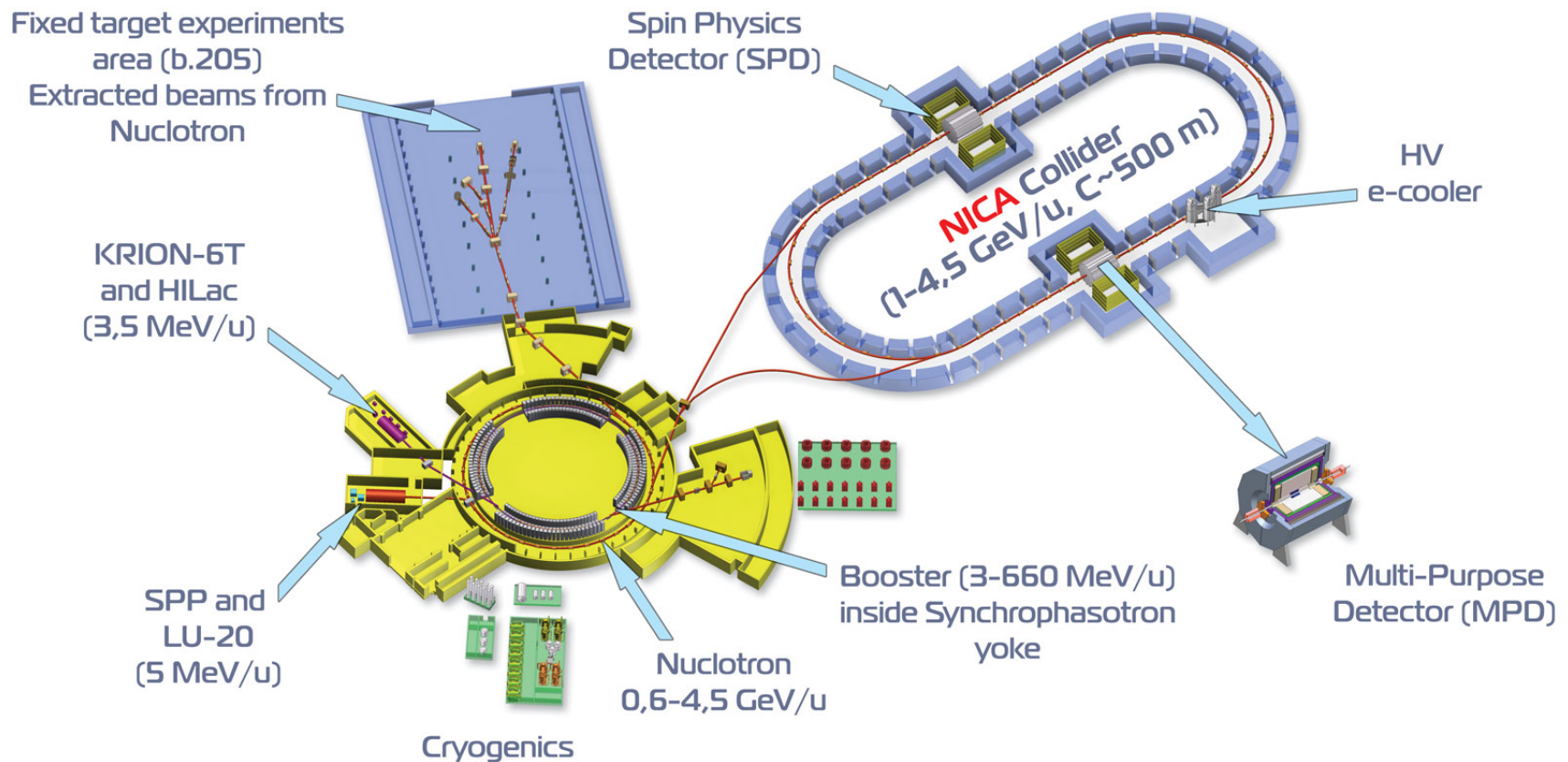
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ITEP:

[STAVINSKIY Alexei](#)
[ZHIGAREVA Nataliya](#)

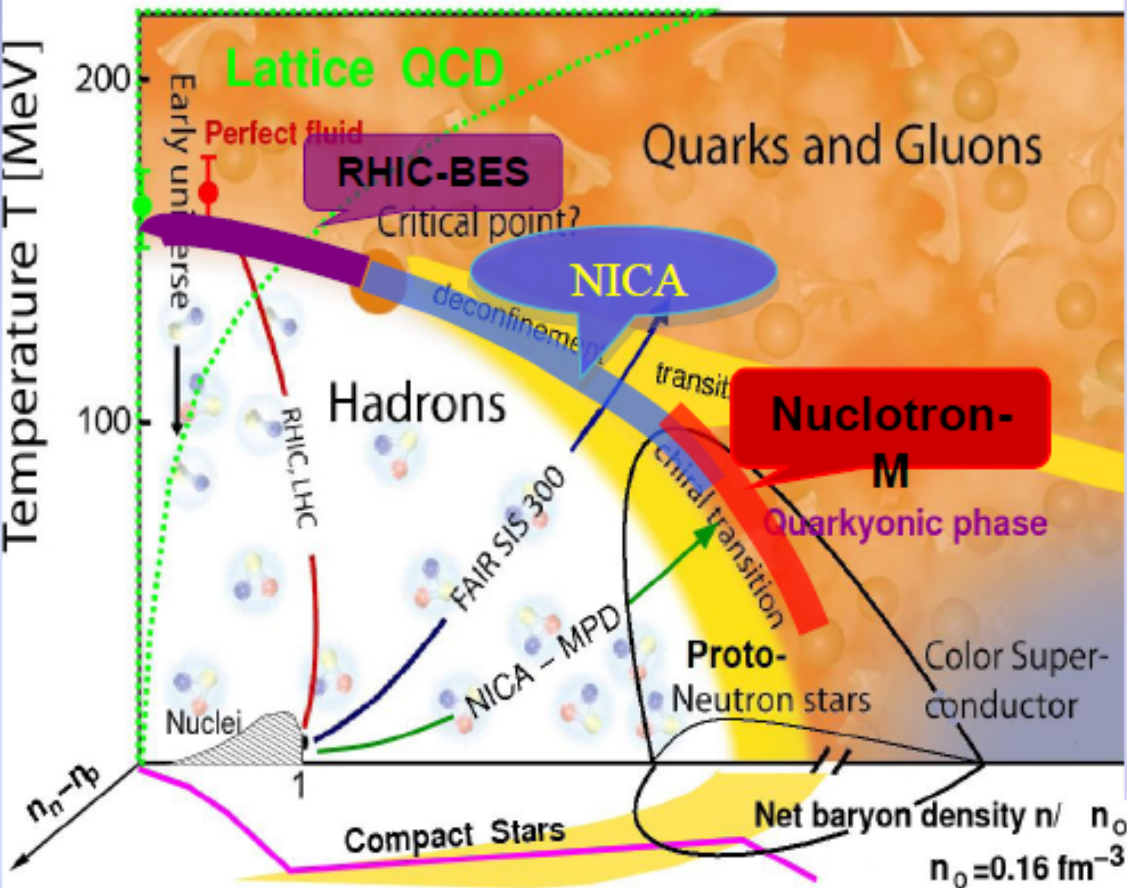
Warsaw participation in NICA/MPD project at Joint Institute for Nuclear Research in Dubna

Superconducting accelerator complex **NICA** (**N**uclotron based **I**on **C**ollider **f**Acility)



QCD phase diagram of strongly interacting matter

Deconfined matter (high ϵ, T, n_B):
 $\epsilon > 1 \text{ GeV}/\text{fm}^3$, $T > 150 \text{ MeV}$ or $n_B > (3-5)n_0$



Energy Range of NICA

The most intriguing and unexplored region of the QCD phase diagram:

- Highest net baryon density
- Onset of deconfinement phase transition
- Strong discovery potential:
 - a) Critical End Point (CEP)
 - b) Chiral Symmetry Restoration
 - c) Hypothetic Quarkyonic phase
- Complementary to the RHIC/BES, CERN, FAIR and Nuclotron-M experimental programs

Comprehensive experimental program requires scan over the QCD phase diagram by varying collision parameters : system size, beam energy and collision centrality

The Nuclotron/NICA beams

1a) Heavy ion colliding beams $^{197}\text{Au}^{79+} \times ^{197}\text{Au}^{79+}$ at

$$\sqrt{s_{\text{NN}}} = 4 \div 11 \text{ GeV} \quad (1 \div 4.5 \text{ GeV/u ion kinetic energy})$$
$$\text{at } L_{\text{average}} = 1 \times 10^{27} \text{ cm}^{-2} \cdot \text{s}^{-1} \quad (\text{at } \sqrt{s_{\text{NN}}} = 9 \text{ GeV})$$

1b) Light-Heavy ion colliding beams of the same energy range and luminosity

2) Polarized beams of protons and deuterons in collider mode:

$$p \uparrow p \uparrow \sqrt{s_{\text{pp}}} = 12 \div 27 \text{ GeV} \quad (5 \div 12.6 \text{ GeV kinetic energy})$$

$$d \uparrow d \uparrow \sqrt{s_{\text{NN}}} = 4 \div 13.8 \text{ GeV} \quad (2 \div 5.9 \text{ GeV/u ion kinetic energy})$$

$$L_{\text{average}} \geq 1 \times 10^{30} \text{ cm}^{-2} \cdot \text{s}^{-1} \quad (\text{at } \sqrt{s_{\text{pp}}} = 27 \text{ GeV})$$

3) The beams of light ions and polarized protons and deuterons for fixed target experiments:

$$\text{Li} \div \text{Au} = 1 \div 4.5 \text{ GeV /u ion kinetic energy}$$

$$p, p \uparrow = 5 \div 12.6 \text{ GeV kinetic energy}$$

$$d, d \uparrow = 2 \div 5.9 \text{ GeV/u ion kinetic energy}$$

4) Applied research on ion beams at kinetic energy

from 0.5 GeV/u up to 12.6 GeV (**p**) and 4.5 GeV /u (**Au**)

Cooperation with Joint Institute for Nuclear Research (JINR) in Dubna
Scientific project – „**Towards Extreme Baryon Densities**”
coordinators: R. Lednicky (Dubna), J.Pluta (Warsaw)

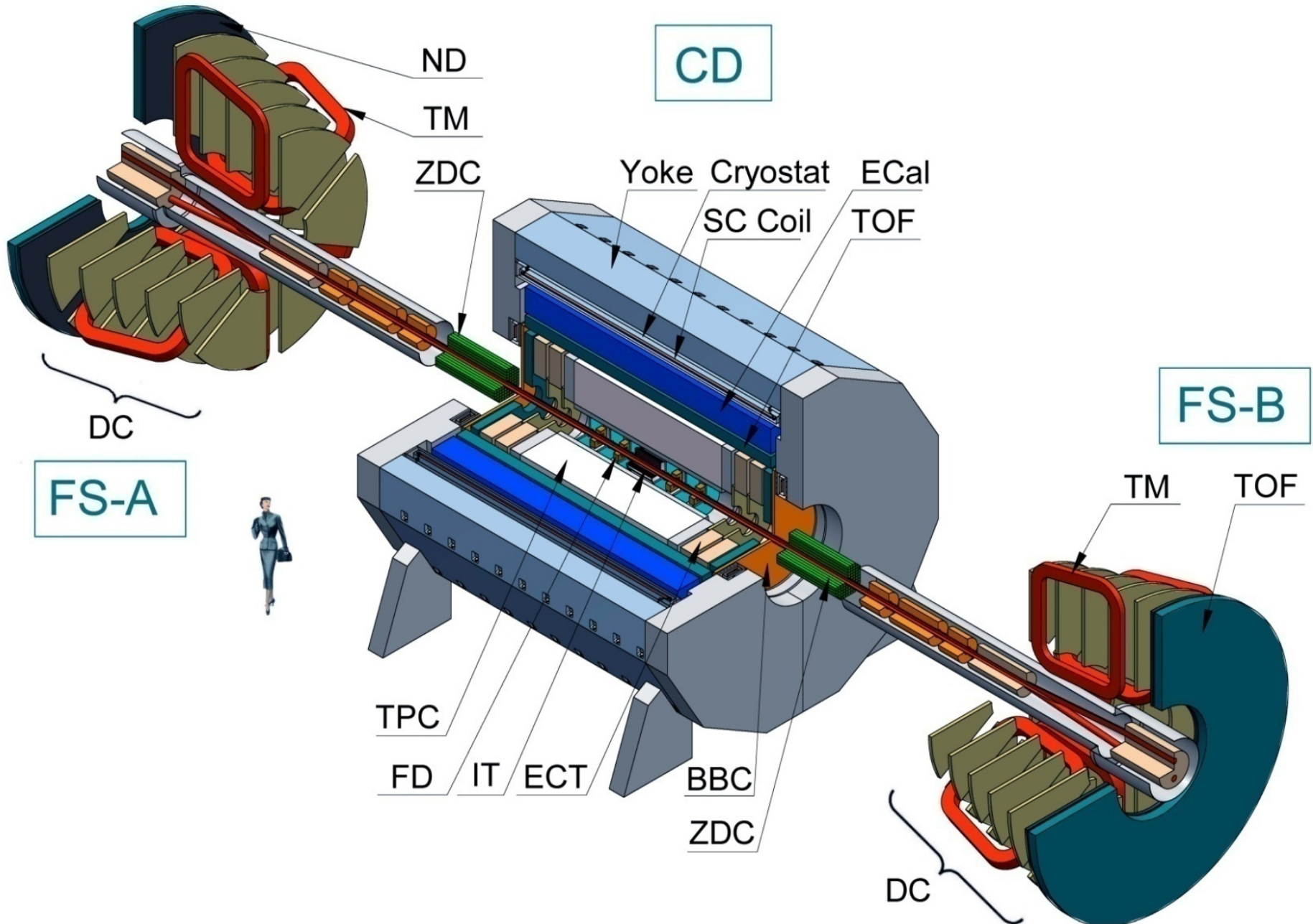
HIRG in the NICA/MPD project in Dubna

Team Leader: Marek Peryt

Participants:

- Daniel Wielanek: software, femtoscopy with MPD (PhD)
- Mateusz Piwek: Detector Construction Data Base (DCDB)
- Krzysztof Dynowski, Tobiasz Czopowicz: : Detector Control System (DCS)

NICA Complex - MPD



MpdRoot

Simulation and Analysis Framework for NICA/MPD Detectors

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The diagram shows a central detector structure with various components labeled. A person is shown for scale. The detector is mounted on a DC base. The main body contains a Yoke Cryostat, SC Coil, and TOF. The front part has FS-A and FS-B. The rear part has TM and TOF. The bottom part has TPC, IT, FD, ECT, BBC, and ZDC.

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Veksler & Baldin Laboratory of HEP

present & future accelerator facility

