Spin Physics Experiments with SPD at NICA

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on behalf NICA-SPD team

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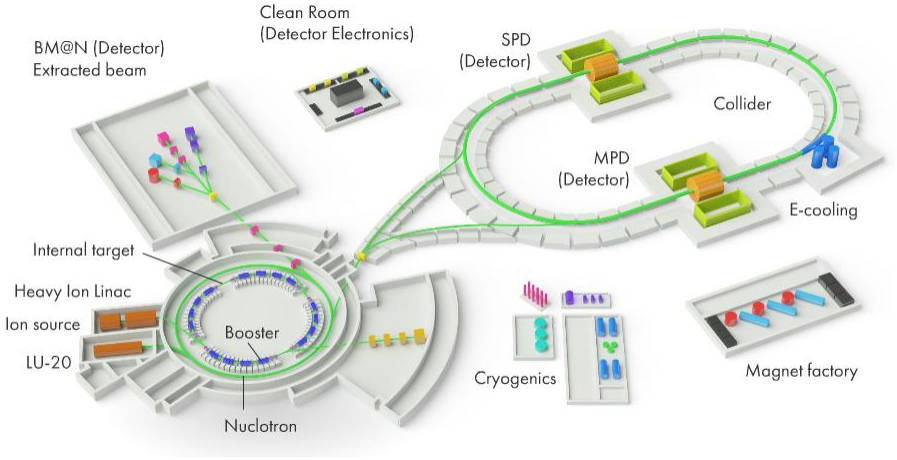
2. Polarized beams and polarimetry
3. SPD detector
4. Proposed measurements
   - Drell-Yan
   - Prompt photons
   - Reactions with high P_T



INTRODUCTION. MEGAPROJECT NICA

Megaproject NICA

The NICA project which is under implementation at the Joint Institute for Nuclear Research underlies the “NICA Complex” megaproject. At present, JINR has 18 full member states from Europe, Asia and Latin America. Thus, the NICA project approved by the JINR international bodies is in fact already an international project. 30 countries are interested and taking part in its implementation. Additional agreements are signed with Germany, China, the US, CERN and SAR. Contracts are signed with many organizations from Russia, Czech Republic, Austria, Bulgaria and Ukraine.

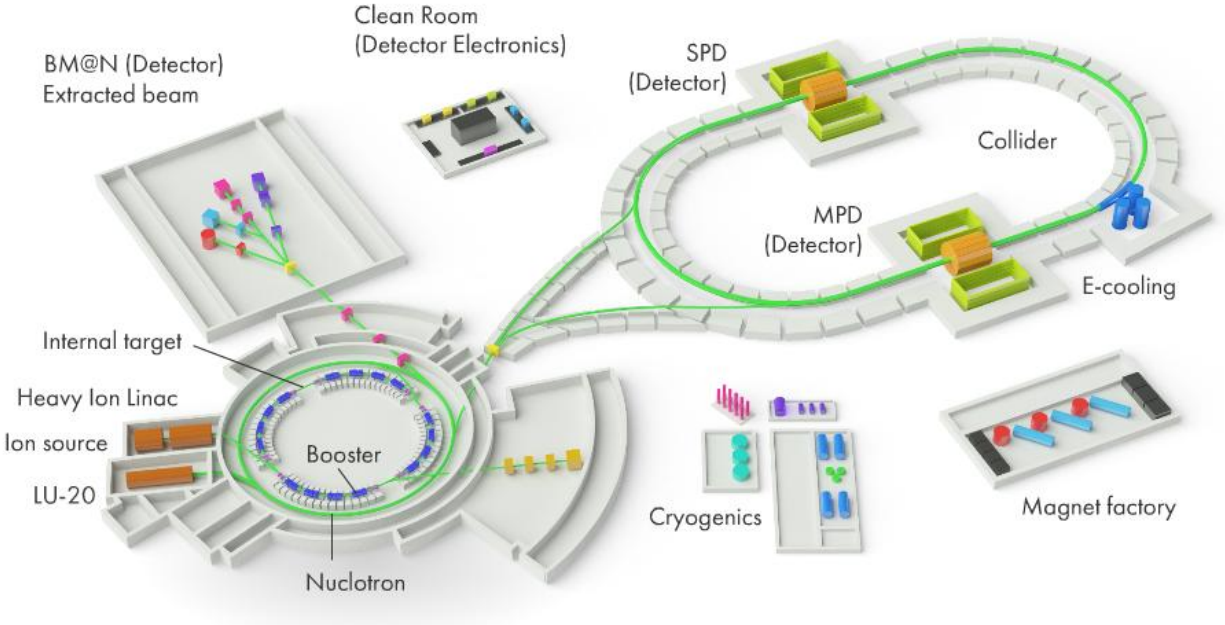
Australia	Moldova
Azerbaijan	Mongolia
Armenia	Poland
Belarus	Romania
Bulgaria	Russia
Brazil	Serbia
Vietnam	Slovakia
Germany	USA
Greece	Czech Republic
Georgia	Ukraine
India	Uzbekistan
Italy	France
Kazakhstan	SAR
China	Japan
DPRK	CERN

INTRODUCTION.NICA COMPLEX

Polarised beams
LU-20
Nuclotron
Extracted beam
Internal target station
SPD (Detector)

Heavy Ions
Ion sourse (KRION-6T)
Heavy Ion Linac (HILac)
Booster
BM@N (Detector)
MPD (Detector)

Collider
E-cooling
Cryogenics
Magnet factory



Specific scope elements of the project NICA/MPD/SPD facility are expected to include:

- Injection complex,
- new superconducting Booster synchrotron (that will be located inside the yoke of the decommissioned Synchrophasotron),
- the existing superconducting heavy ion synchrotron Nuclotron (being developed presently to match the project specifications),
- collider having two new superconducting storage rings,
- new beam transfer channels.

INTRODUCTION. SPD PROJECT

- **Letter of Intent** presented at this PAC in summer 2014, where:
  - the physics program of the experiment was developed;
  - requirements to NICA polarized beams were formulated;
  - desired detector characteristics and sketch of the facility were given;
- A few presentation at international conferences about the physics potential and program of the SPD were given;
- Several workshops on spin physics at NICA were organized:
  - NICA-SPIN-2013, Дубна, 17-19.03.2013
  - SPIN-Praha-2013, 7-13.07.2013
  - NICA-SPIN-2014, Praha, 11-16.02.2014
  - SPIN-Praha-2015, 26-31.07.2015
  - DSPIN2013, DSPIN2015

arXiv: 1408.3959

Nec sine te, nec tecum vivere possum. (Ovid)*

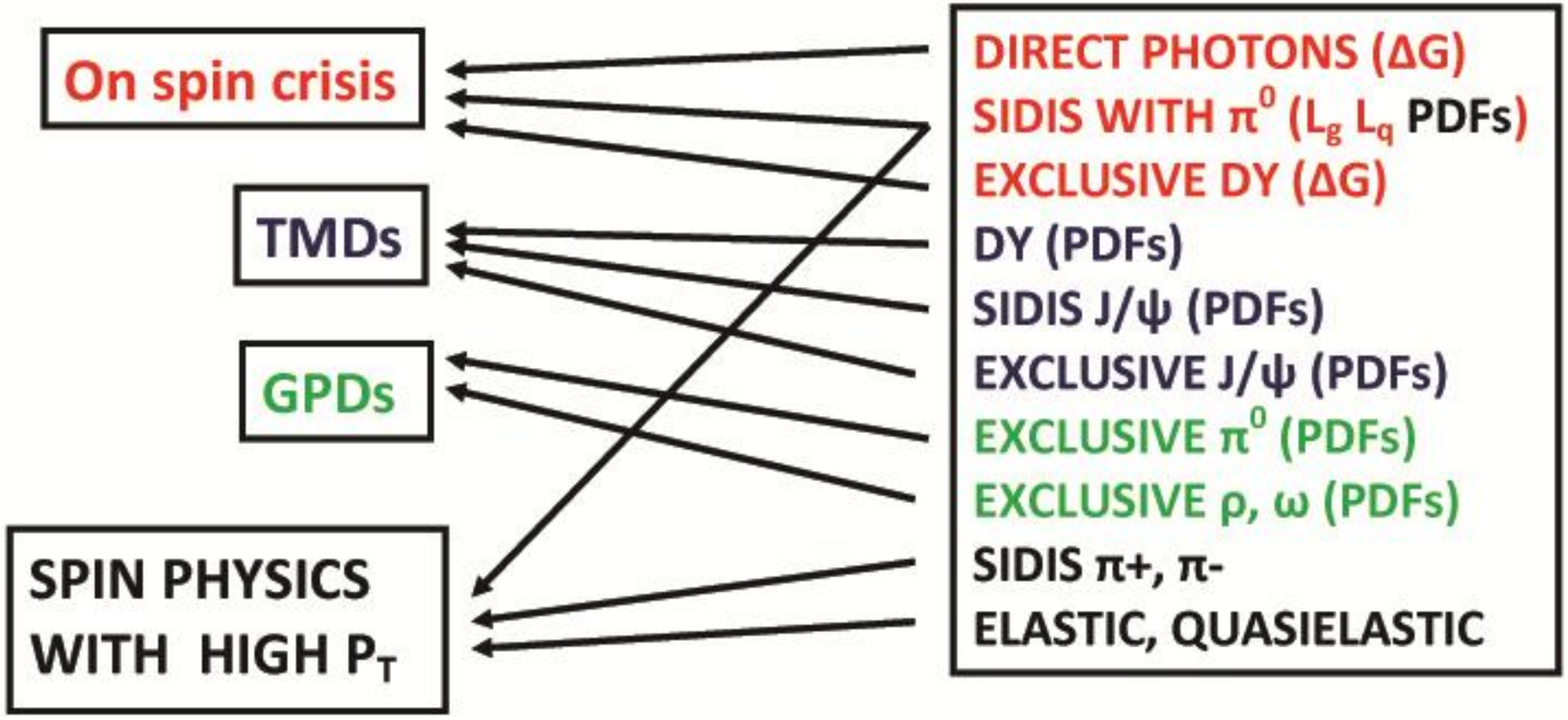
Spin Physics Experiments at NICA-SPD with polarized proton and deuteron beams.

Compiled by the Drafting Committee:
I.A. Savin, A.V. Efremov, D.V. Peshekhonov, A.D. Kovalenko, O.V.Teryaev, O.Yu. Shevchenko, A.P. Nagajcev, A.V. Guskov, V.V. Kukhtin, N.D. Topilin.

(Letter of Intent presented at the meeting of the JINR Program Advisory Committee (PAC) for Particle Physics on 25–26 June 2014.)

In 2017 New stage of the project is started:
From LOI
to
CDR (Conceptual Design Report)

INTRODUCTION. SPD PROJECT. PROPOSED MEASUREMENTS.



INTRODUCTION. SPD PROJECT. ROADMAP

- Setting up of working groups from JINR researchers (Aug.-Sep. 2017) **DONE**;
- Drawing of a simplified detector set-up and simulations of basic physics processes (Oct. 2017- Feb. 2018) **ONGOING**;
- Development of a simplified design of the detector and costing (Mar. - May 2018) **ONGOING**;
- Negotiations for an international collaboration and sharing of the responsibilities for the design and construction of the facility (Sep. 2017- Dec. 2018) **ONGOING** :
  - Charles University, Faculty of Mathematics and Physics, Prague
  - Technical University, Faculty of Nuclear Science and Physics Engineering, Prague
  - INFN section of Turin and University of Turin
  - Institute for High Energy Physics, Protvino
  - Tomsk State University
    - Writing up of a formal JINR project for the SPD design *(Conceptual Design Report, CDR)* and its submission to this PAC:
      - status report (January 2018);
      - submission for the PAC meeting in Jan. 2019;
    - Signing of MoU based on "*Regulations for the organization of experiments conducted by international collaborations using the capabilities of the JINR basic facilities*" http://www.jinr.ru/wp-content/uploads/JINR_Docs/Regulation_for_the_organization_of_experiments_eng.doc (Feb. – Apr. 2019);
    - Setting up of the collaboration and election of the management bodies (May – Sep. 2019);
- Preparation of the Technical Design Report (2019 – 2020)
- Signing up of contracts for construction of the main systems: magnet, tracking system, muon range system, EM calorimeter, local polarimetry, trigger and DAQ system, etc. (2020);
- Construction of the detector (2021-2025)
- First measurements – 2025.

INTRODUCTION. SPD PROJECT. WORKING GROUPS

- Interim Steering Committee

  (13 members, up to formation of the international collaboration)
- Physics program
  - Theory
  - Simulations
  - Local polarimetry
- Detector
  - Overall design
  - Magnet
  - Vertex detector
  - Tracking
  - FEE
  - Trigger & DAQ
  - TOF-RPC ??
  - ECAL
  - Muon range system
- Software

This International Workshop on Spin Physics Experiments at NICA (SPIN-Praha-2018) is the next in the series of meetings on problems of symmetries and polarization phenomena in Particle and Nuclear Physics and Astrophysics related to the particles' spin.

This Workshop is devoted to the NICA Spin Physics Program at the JINR, design of the Spin Physics Detector (SPD) there and its physics potential, and setting-up of an international collaboration to design, build and perform experiments with this detector. In addition, theoretical and experimental aspects of the ongoing and upcoming spin physics experiments in the accelerator centers around the world will be discussed.
NICA Spin Detector site: http://spd.jinr.ru

Dates of the Workshop: July 9-13 2018

The workshop Web site http://spd.jinr.ru/spin-praha-2018 is now open for registration and abstract submission. Please, register at your earliest convenience and not before the dead line of 10 June 2018.