

# Spin Physics Detector



## Report of the SPD Spokespersons

Alexey Guskov (JINR, Dubna) & Victor Kim (PNPI, Gatchina)





# SPD Status and News Update since the 6th SPD Collaboration Meeting Samara, October 2023

- **SPD Status and News:**
  - **SPD Technical Design Report (TDR) at the PAC of January 2024**
  - **SPD Detector Advisory Committee (DAC) Review Status**
- **Collaboration News**
- **Miscellaneous**





# SPD Technical Design Report: the 2<sup>nd</sup> version

**We thank all of you for your hard work!**

JOINT INSTITUTE FOR NUCLEAR RESEARCH



April 15, 2024

**Technical Design Report of the Spin Physics Detector at NICA**

For the SPD collaboration

Version 2.00

arXiv:2404.08317v1 [hep-ex] 12 Apr 2024



## The 7-year Plan for the Development of JINR in 2024-2030 includes SPD Project in the First Stage



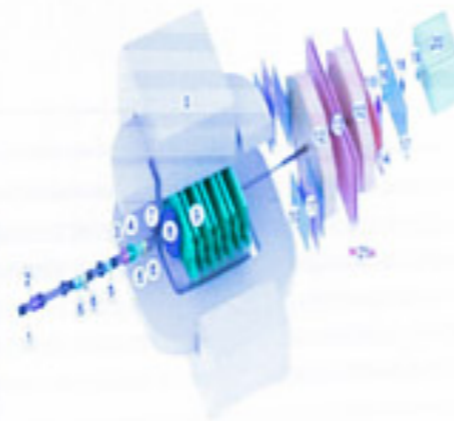
**SPD: 14 countries, 32 institutes, ~300 participants**

- SPD CDR was approved in Jan'2022;
- detectors prototyping/tests are ongoing;
- new version of TDR – Jan'2024;
- start of operation (Stage-I) – 2028;
- 50 papers and 70 conference reports.



**BM@N: 5 countries, 13 institutes, >200 participants**

BM@N setup for heavy ions (2022)



- Magnet SP-A1 B0
- Vacuum Beam Pipe B1
- B1, K, B2 D-4
- S&T Spher D, S
- Triggers BE + SPD D
- FID D1 + B, S
- CSC M + B
- TR 400 D
- D1A D
- TR 300 D
- S&T M
- PD D
- S&T SP1 D
- CSC D1 + B
- Beam Profile Monitor D
- FGD D
- FGD D
- H&B D

4<sup>th</sup> NICA run (2022-2023):

- 550M events Xe+CsI at 3.0A, 1.8A G
- analysis is ongoing;
- so far: 80 publications and 80 reports including "Quark Matter", "Strangeness in Quark Matter", etc

BM@N setup for SRC



First observation of the Short-Range Correlations in inverse kinematics:







# SPD Technical Design Report

**The 1st version SPD TDR: 23 January 2023**

**The 2nd version SPD TDR: 15 April 2024**

**JINR PAC: 22 January 2024**

**The JINR PAC has appointed  
SPD Detector Advisory Committee (DAC)  
for a thorough review of the SPD TDR.**



# **SPD in 7-year Plan of JINR 2024-2030**

**The 7-year Plan for the Development of JINR in 2024-2030 includes SPD Project:**

**presented in 23 January 2024 at JINR PAC  
by JINR Vice-Director V.D. Kekelidze**

**JINR PAC recommendation:**

**The PAC was very pleased by the detailed presentation of the draft of the new 7-year Plan for the Development of JINR for 2024-2030 made by V.D. Kekelidze.**

**The Committee strongly supports the established priorities in the area of particle physics and relativistic heavy-ion physics:**

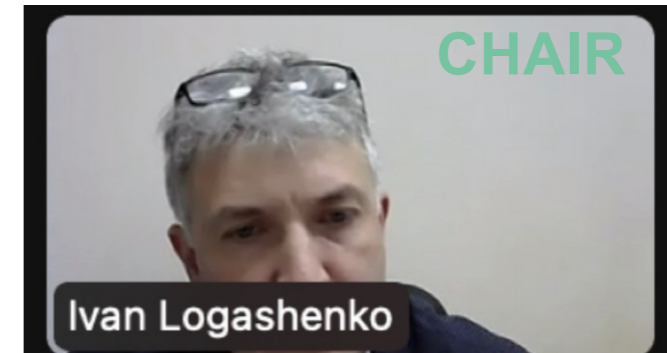
**....**

**- creation of the first stage of the SPD experimental setup for research in the field of spin physics;**

**....**



**Chair:** **Ivan Logashenko**  
Budker Institute of Nuclear Physics, Novosibirsk  
Expert in detectors, DAQ, data analysis



**Members:** **Xingtao Huang**  
Shandong University  
Expert in HEP Computing & Software



**Yuekun Heng**  
IHEP CAS, Beijing  
Manager of BESIII TOF system, central detector of Daya Bay and JUNO, an expert of scintillators and other detector systems



**Edouard Kistenev**  
BNL (retired in 2023)  
Experience with physics & hardware in PHENIX and sPHENIX Collaborations



# Interaction with DAC

**SPD representative group:**

**SPs, A. Korzenev, A. Zhemchugov, I. Denisenko, V. Ladygin**

**Meetings in February and March with DAC: February 6 and 27**

**DAC's List of questions: May 7**

**Answers to DAC: May 30**

**DAC Report to JINR PAC: June 6**

**JINR PAC Recommendation for Approval (?): June 21**



- ▶ **SPD R&D: optimization of physics signals, design optimization, subdetector prototype production and testing, preparation to production**



# An example of ongoing SPD R&D: Straw Tracker

JINR (Dubna), PNPI (Gatchina) and INP ME (Almaty)

T.L. Enik (JINR) and E.V. Kuznetsova (PNPI)

R&D straw tubes: ASIC solutions for readout electronics

- ▶ Straw Tracker R&D: SPD/SHiP/Dune/DRD1 at CERN SPS and PS to define requirements to the readout electronics

future test beams: PNPI (Gatchina), AANL (Yerevan)

Test measurements for ASIC: VMM3, VMM3a, Tiger

- 2021 (1 SPS beam), 2022 (3 SPS beams), 2023 (3 SPS beams), 2024 (2 SPS and 2 PS beams)

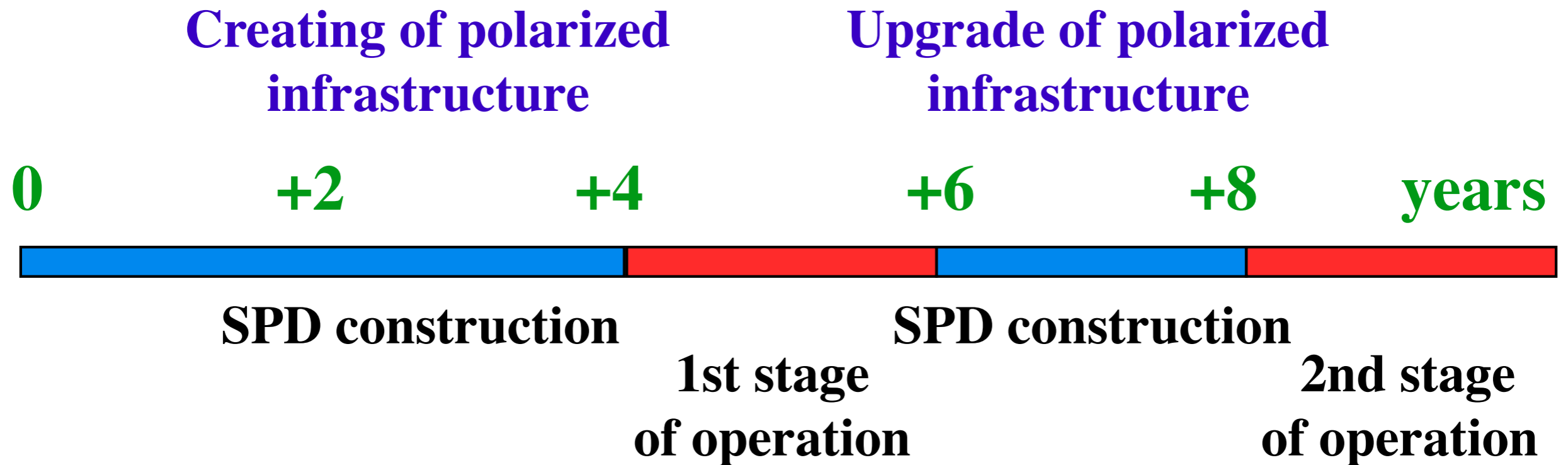
- SPD TDR based on the measurements





# SPD TDR: Tentative Plan

## Tentative operative Plan for the SPD Project



→ The next talk  
by the Collaboration Board Chair and Deputy Chair

**CB Chair: Egle Tomasi-Gustafsson (CEA, Saclay)**



**CB Deputy Chair: Armen Tumasyan (ANNL, Yerevan)**





# **SPD Collaboration: established in July 2021**

## **SPD Spokespersons:**

**Alexey Guskov (JINR, Dubna)**

**Victor Kim (NRC KI – PNPI, Gatchina)**

## **SPD Collaboration Board Chair:**

**Egle Tomasi-Gustafsson (CEA, Saclay)**

**deputy Chair: Armen Tumasyan (AANL, Yerevan)**

## **SPD Coordinators:**

**Hardware: Alexander Korzenev (JINR)**

**Software: Alexey Zhemchugov (JINR)**

**deputy: Danila Oleynik (JINR)**

**Physics: Igor Denisenko (JINR)**

**deputy: Amaresh Datta (JINR)**

**35 organizations from 15 countries > 400 participants**

**Aks for a task, If you are “lost in SPD”!**





# SPD Collaboration: SPD MoU status

## Signed (14):

Institute of Nuclear Physics (INP ME), Almaty  
Belgorod State University (BSU), Belgorod  
Petersburg Nuclear Physics Institute (NRC KI – PNPI), Gatchina  
Institute of Nuclear Problems (INP) BSU, Minsk  
Institute for Nuclear Research (INR RAS), Moscow  
Lebedev Physics Institute (LPI RAS), Moscow  
Moscow Engineering Physics Institute (MEPhI), Moscow  
Skobeltsyn Institute of Nuclear Physics (SINP MSU), Moscow  
Budker Institute of Nuclear Physics (BINP RAS), Novosibirsk  
Samara University (SamU), Samara  
St. Petersburg Polytechnic University (SPbPU), St. Petersburg  
St. Petersburg State University (SPbSU), St. Petersburg  
Tomsk State University (TSU), Tomsk  
A. Alikhanyan National Laboratory (AANL), Yerevan

## Preparation & Signing:

NRC KI, Moscow (ITEP)  
HSE, Moscow  
HITAS, Havana

**Discussions:** Vinca Institute for Nuclear Science, Belgrade, Serbia  
NRC – IHEP, Protvino  
Univ. Puebla, Mexico  
SAPHIR & UNAB, Santiago, Chile  
MISIS, Moscow

## SPD is still open for new strong groups!

## Some statistics about SPD collaboration



**MORE THAN 400  
MEMBERS**



**MORE THAN 160  
PUBLICATIONS**



**MORE THAN 10  
COUNTRIES**



# Funding Opportunities for SPD Teams

## **Announced:**

**NICA dedicated program  
of RF Ministry of Science and Higher Education (April 2024)**

**Elegible Teams with signed MoU:**

**universities and educational institutes, RAS institutes**

## **Anticipated:**

**JINR Grants for NICA Projects?**

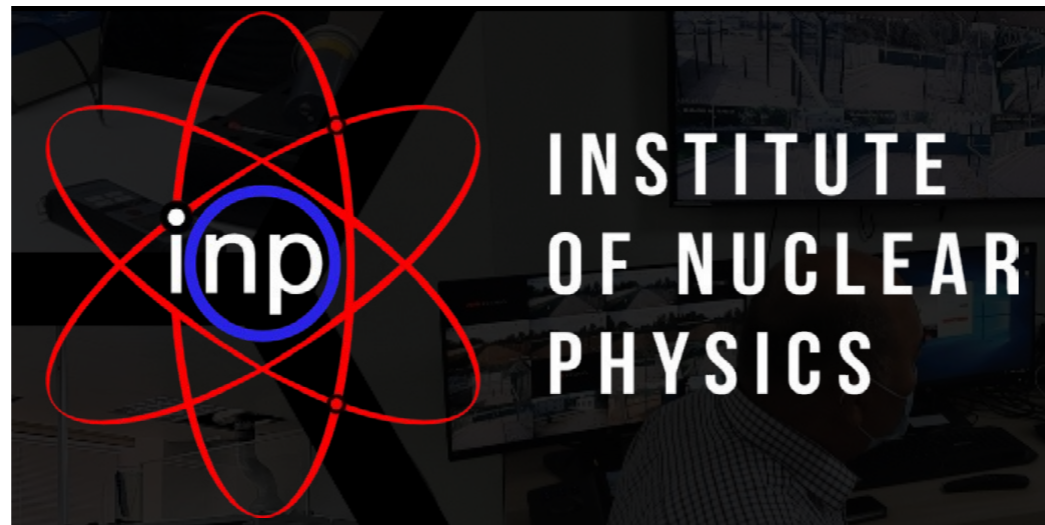


- **Attention!**  
**Exception: Monday 20 May Only!**  
**Afternoon Sessions will be held in another hall**
- **All lunches: at KBTU**
- **Collaboration Meeting Photo: sunny weather**
- **Poster session: Tuesday evening, 21 May**

**We thank**

**Host:**

**Institute of Nuclear Physics, Ministry of Energy RK**



**Venue:**

**Kazakhstan-British Technical University**



**We congratulate everyone with completion of SPD TDR.  
We thank all the SPD Teams for their valuable contributions!**

**SPD Collaboration is evolved into a new phase,  
which is requiring further consolidation our efforts  
and synergy between all the SPD members.**

**This 7<sup>th</sup> SPD Collaboration Meeting provides a good  
opportunity to move forward and make  
a significant progress toward the SPD Project.**

**We wish you a successful SPD Collaboration Meeting!**

