

# Spin Physics Detector



## **Report of the SPD Spokespersons**

**Alexey Guskov & Victor Kim**

# News Update since the 3rd SPD Collaboration Meeting, October 2022





# SPD Technical Design Report: the 1<sup>st</sup> version

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

JOINT INSTITUTE FOR NUCLEAR RESEARCH



February 12, 2023

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

The SPD collaboration

Version 1.00

# SPD Technical Design Report

## **The first version SPD TDR:**

**presented in 23 january 2023 at JINR PAC by A. Guskov**

## **JINR PAC recommendation:**

**The PAC encourages the team to update the project, taking into account the current availability of materials and equipment, as well as their cost.**

**The Committee recommends JINR management to appoint a Detector Advisory Committee for a thorough review of the SPD TDR.**

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

**presented in 23 January 2023 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.**

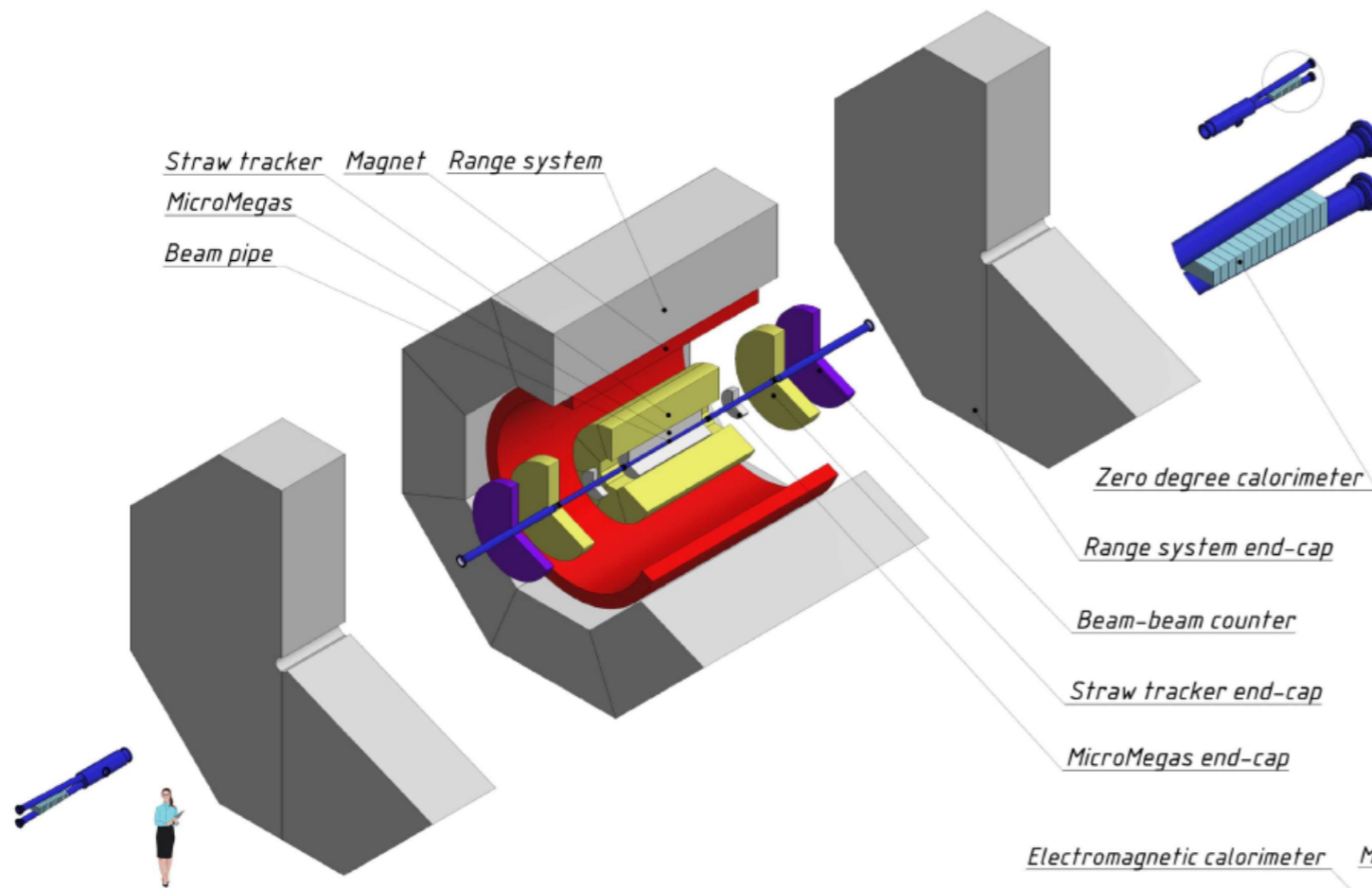
**The Committee strongly supports the established priorities in the area of particle physics and relativistic heavy-ion physics:**

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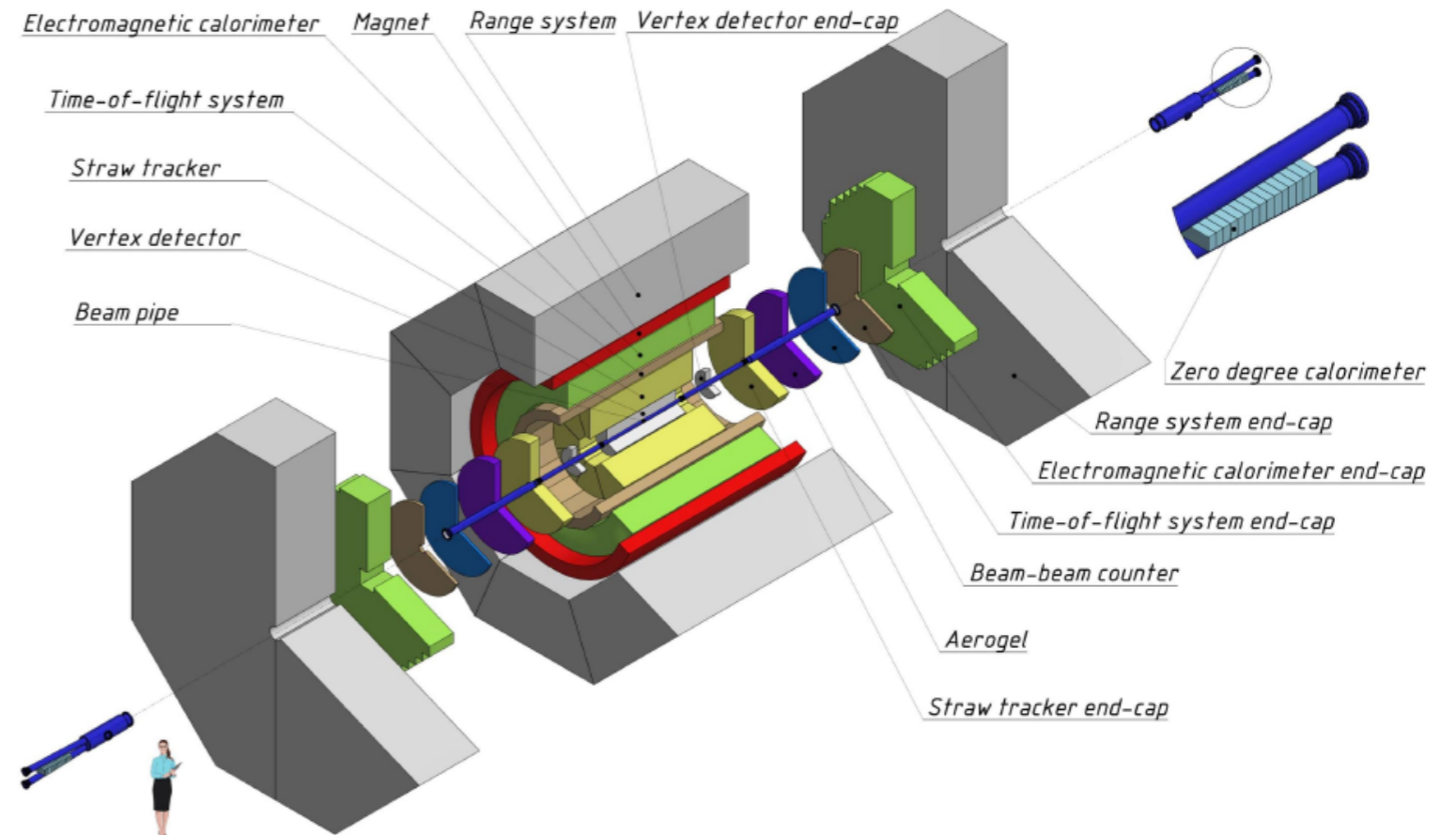
**- creation of the first stage of the SPD experimental setup for research in the field of spin physics;**

....

# SPD Technical Design Report



**<- SPD: the Stage I Layout**



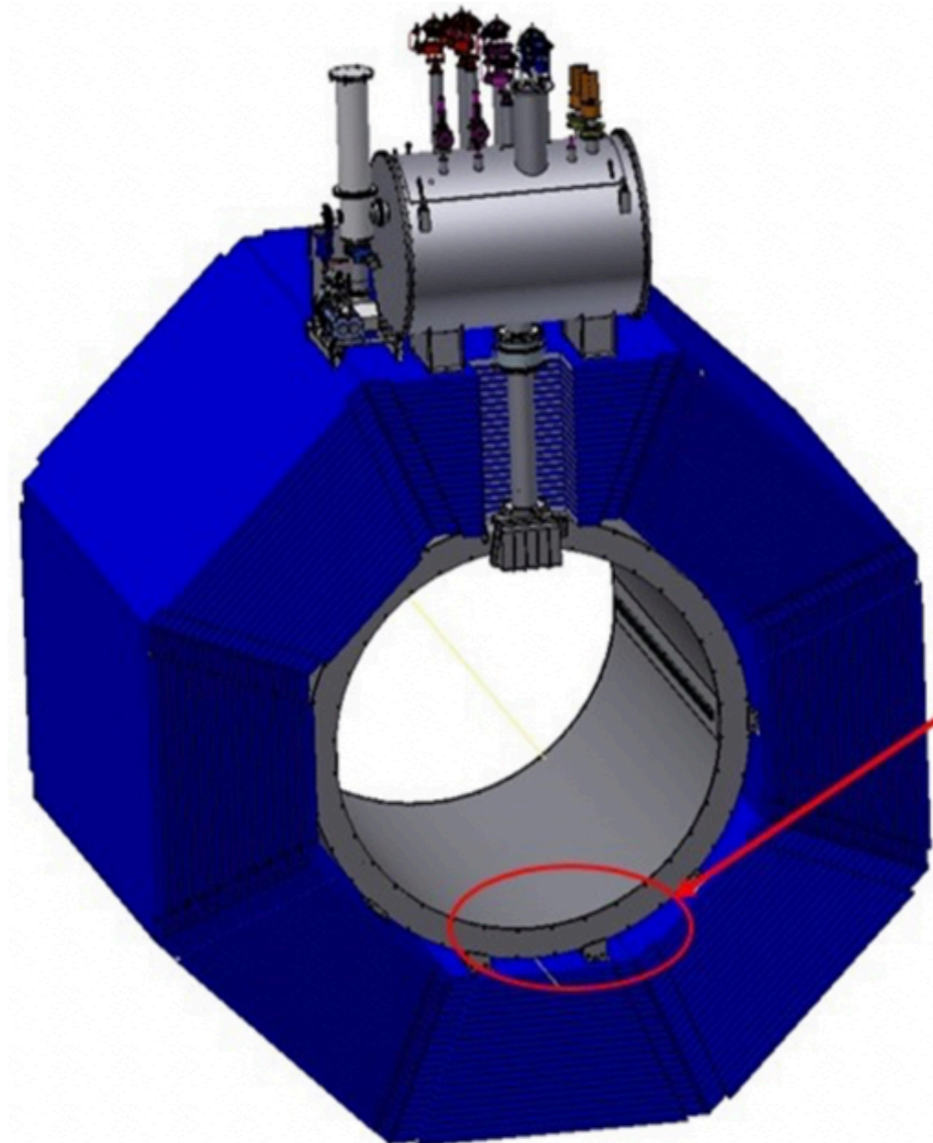
**SPD: the Final Layout of the Stage II ->**

## An Important Decision of SPD Technical Board (6 December 2022)

SPD Magnet Committee reviewed two concepts of SPD Magnetic System:

- LHEP JINR, Dubna (Nuclotron-cable based)
- BINP RAS, Novosibirsk (Rutherford-cable based – a la Panda) **<- accepted**

**Superconducting Solenoid  
1 Tesla**



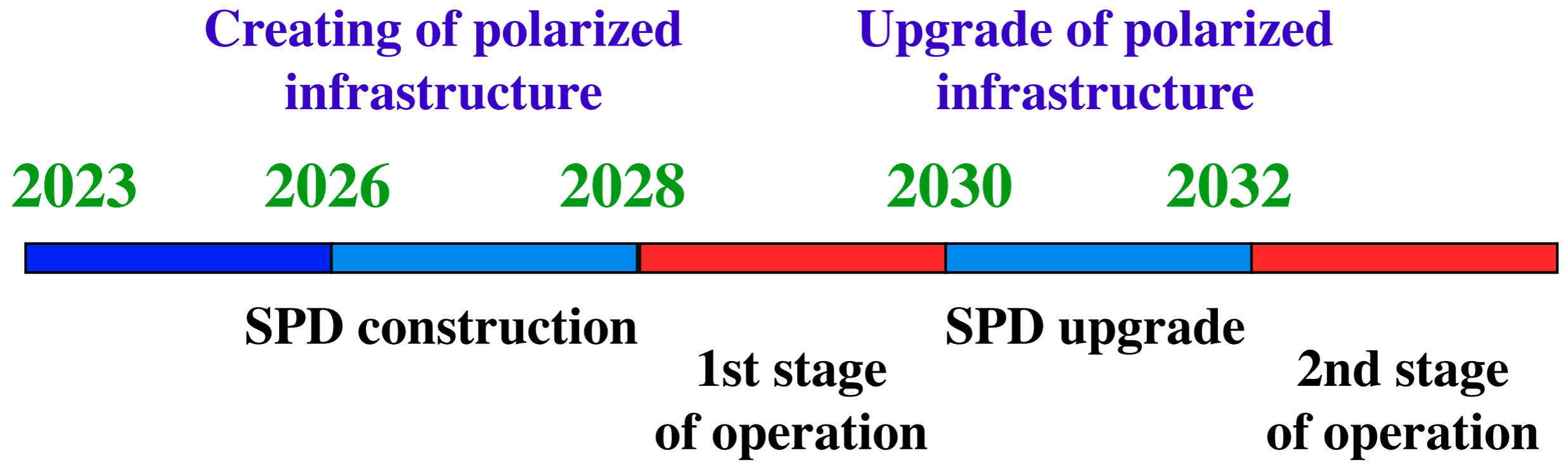
Subsystem	Option	Stage	Cost, M\$
SPD setup	Vertex detector:		
	– DSSD	II	7.3
	– MAPS	II	13.5
	Micromegas Central Tracker	I	0.9
	Straw tracker	I+II	3.0
	PID system:		
	– TOF	II	2.0
	– Aerogel PID system	II	2.4
	Ecal		
	– mock-up	I	0.4
		I+II	8.3
	Range system	I+II	16.1
	ZDC	I+II	0.6
	BBC (inner+outer)	I+II	0.6
	Magnetic system		
	Novosibirsk option	I+II	8.3
	JINR option	I+II	7.3
	& cryogenic infrastructure		
	Novosibirsk option	I+II	6.4
	JINR option	I+II	6.1
	Beam pipe		
	– Al	I	0.1
	– Be	II	0.4
General infrastructure		I	1.2
		I+II	1.7
Detector Control System		I	1.0
		I+II	1.8
Data Acquisition System		I	0.8
		I+II	1.3
Computing		I	5
		I+II	15*
TOTAL COST	stage I		44.4
	stage I+II		82.3

\* + 4.5 MUSD/year for tapes at the Stage II



# SPD Technical Design Report

## Tentative operative Plan for the SPD Project



# Join SPD Working Group Meetings!

Weekly Meetings: Software, Hardware, Physics & MC

Bi-Weekly: Physics & MC

Monthly: Physics & MC



Technical coordinator  
**Alexander Korzenev**  
[korzenev@jinr.ru](mailto:korzenev@jinr.ru)



Physics coordinator  
**Igor Denisenko**  
[iden@jinr.ru](mailto:iden@jinr.ru)



Software coordinator  
**Alexey Zhemchugov**  
[zhemchugov@jinr.ru](mailto:zhemchugov@jinr.ru)

## News from SPD Collaboration

-> The next talk by the Collaboration Board Chair  
Egle Tomasi-Gustafsson



## New SPD Team:



**Institute of Nuclear Physics (INP KZ), Almaty, Kazakhstan  
founded 1957: nuclear physics and nuclear technology**

Sayabek Sakhiyev – **Group Leader**, Dr. Sci., PhD, professor

Maulen Nassurlla – **Deputy Group Leader**, PhD

Nassurlla Burtebayev - **senior researcher (SPD Tracker)**, Dr. Sci., PhD, professor

Nurzhan Saduyev - **senior researcher (SPD Tracker)**, PhD

Nurzhan Yerezhep - **researcher (SPD Tracker)**

Saken Shinbulatov - **researcher (SPD Tracker)**

Zhanibek Kurmanaliyev - **researcher (SPD BBC)**, PhD Student (*INP&JINR associate*)

Demezhan Myktybekov - **researcher (SPD Tracker)**, PhD Student (*INP&JINR associate*)

Asel Mukhamedjanova - **researcher (SPD Tracker)**, PhD Student (*INP&JINR associate*)

**SPD Collaboration Board: INP KZ accepted in 5 March 2023**

**SPD - INP KZ MoU: signed in 22 March 2023**

## **SPD Team reorganization: Tomsk State University(TSU)**

Sergey Filimonov – Group Leader, PhD

Valeri Lyubovitskij – senior researcher, PhD, Dr. Sci., Prof

Irina Shreyber – senior researcher, PhD

Olesia Kuchinskaia – senior researcher, PhD

Vladimir Ivantchenko – senior researcher , PhD

Evgueni Tcherniaev – senior researcher, PhD

Alexey Zhevlakov – senior researcher, PhD (*TSU&JINR associate*)

Vladislav Borsch – researcher

Ramdas Makhmanazarov – researcher, PhD student

Artur Gapchenko – student

Lev Milovantsev – student

Yuri Anikin – student

**Straw Tracker: read-out electronics, etc.**

**Physics&MC: quark and gluon TMDs, etc.**

**SPD – TSU MoU: signing in progress**

## SPD MoU status

### Signed (10 - since April 2022):

AANL, Yerevan

INP KZ, Almaty

INR RAS, Moscow Lebedev PI RAS, Moscow

MEPhI, Moscow

NRC KI - PNPI, Gatchina

SamU, Samara

SINP MSU, Moscow

SPbPU, St. Petersburg

SPbSU, St. Petersburg

### Signing:

BSU, Belgorod

TSU, Tomsk

<- 5 signed since the 3rd SPD Coll. Meeting in October 2022

### Seeking for a new SPD membership potential:

#### - visits

A. Guskov, V. Tereschenko: Gomel, Belarus, January 2023

A. Guskov, A. Zhemchugov: South Africa, February 2023

V. Kim, T. Enik: Almaty, Kazakhstan, Fall 2022 - Winter 2023

- **discussions** Vinca Institute for Nuclear Science, Belgrade, Serbia
- Xinjiang Technical Institute of Physics and Chemistry, China
- Univ. Puebla, Mexico

## SPD is open for new strong groups!



# Funding Opportunities for SPD Teams

## JINR Grants for NICA Projects, etc.

(application deadline - 5 March 2023):

**Organizations with Signed MoU from JINR Member States**

**Applied (>40 applications, 10 from SPD):**

MPD, BM@N, SPD, NICA Complex, Ariandna, etc.

**Granted SPD teams:**

AANL, Yerevan

NRC KI - PNPI, Gatchina

SamU, Samara

SINP MSU, Moscow

SPbSU, St. Petersburg

**Grants 2023:** 0.7-1.2 MRUR/6 months for Dubna visits and Team members local support

**Total:**  $\approx 7$  MRUR  $\approx 0.1$  MUSD

**Anticipated:**

**NICA dedicated program  
of RF Ministry of Higher Education (June? 2023)**

**Elegible Teams with signed MoU:**

universities and educational institutes (MSU?, SPbSU?), RAS institutes



# SPD Conference Activity 2022

## 18 SPD Talks at International Conferences

- 1) *A. Datta*, *Quarkonium Physics at SPD NICA, Quarkonia as Tools 2022, 9-15 January 2022, Aussois, France, remote talk*
- 2) *A. Zhemchugov*, *Применение метода максимального правдоподобия для оценки параметров траекторий элементарных частиц в задаче реконструкции внутреннего детектора эксперимента SPD NICA, Inform. and Telecommun. Techno. and Math. Modeling of High-Tech Systems 2022*
- 3) *V. Bautin*, *VMM3a ASIC as a potential front-end electronics solution for future Straw Trackers (ITTMM 2022), Moscow, Russia, April 18-22, 2022*
- 4) *E. Kokouлина*, *MiniSPD stand for testing Si-detector, XXIX Int.Seminar Nonlin.. Phenom. in Complex Systems, Minsk, Belarus, June 21-24, 2022*
- 5) *E. Kokouлина*, *Study of soft photons at SPD/NICA setup, XXIX Int.l Seminar Nonlin. Phenom. in Complex Systems, Minsk, Belarus, June 21-24, 2022*
- 6) *Yu. Uzikov*, *Possible Physics Studies at the First Stage of the NICA SPD Programme, LXXII International Conference “Nucelus-2022: Fundamental problems and applications”, Moscow, July 11-16, 2022*
- 7) *A. Guskov*, *Gluon physics at SPD (JINR), Correlations in Partonic and Hadronic Interactions (CPHI2020), 07-10 March 2022, Duke University, Durham, NC, remote talk*
- 8) *A. Guskov*, *NICA-SPD project, International Workshop on Hadron Structure and Spectroscopy 2022 (IWHSS-2022), Geneva, Switzerland*
- 9) *I. Denisenko*, *SPD experiment at JINR, 9th International Conference on Quarks and Nuclear Physics (QNP2022), 5-9 September 2022. Conference center Gustav Stresemann Institute, Bonn, Germany, remote talk*
- 10) *Yu. Uzikov*, *Suggestions for studies at the first stage of the NICA SPD physical programme, The IV International Scientific Forum “Nuclear science and Technologies”, 26-30 September 2022, Kazakhstan, Almaty*
- 11) *T. Enik*, *Straw detectors in the future experiments, The IV International Scientific Forum “Nuclear science and Technologies”, 26-30 September 2022, Kazakhstan, Almaty*
- 12) *V. Bautin*, *Online Gas Gain Monitoring System, The XXVI Int. Scien. Conf. of Young Scientists and Specialists (AYSS-2022), 24-28 October, Dubna*
- 13) *D. Rusov*, *Deep tracking for the SPD experiment, The XXVI Int. Scien. Conf. of Young Scientists and Specialists (AYSS-2022), 24-28 October, Dubna*
- 14) *A. Guskov*, *SPD detector at NICA, XVIII Mexican Workshop on Particles and Fields, November 21-25 2022, Puebla city, Mexico, remote talk*
- 15) *A. Datta*, *Spin Physics Detector (SPD) at NICA, The 6th International Conference on Particle Physics and Astrophysics (ICPPA-2022), 29 November – 2 December, Moscow, Russia*
- 16) *E. Kokouлина*, *MiniSPD test bench for testing of SPD detector prototypes, The 6th International Conference on Particle Physics and Astrophysics (ICPPA-2022), 29t November - 2 December, Moscow, Russia*
- 17) *A. Zelenov*, *Test beam measurements and realistic simulations for the SPD straw drift tubes, The 6th International Conference on Particle Physics and Astrophysics (ICPPA-2022), 29t November - 2 December, Moscow, Russia*
- 18) *A. Zhemchugov*, *Spin Physics Detector at NICA, Sixth Biennial “Workshop on Discovery Physics at the LHC” (Kruger2022), 5-9 December 2022, Kruger National Park, SAR*



## News about the next SPD Collaboration Meeting in Samara

-> The next talk by  
Vladimir Saleev



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

**Now SPD Collaboration is evolving into a new stage,  
which is requiring consolidation and fostering our efforts.**

**This 4<sup>th</sup> SPD Collaboration Meeting gives a chance to  
move forward and make a good progress with SPD Project.**

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