



THE XV-th INTERNATIONAL SCHOOL-CONFERENCE
"THE ACTUAL PROBLEMS OF MICROWORLD PHYSICS"

Minsk, Belarus, 27 August – 3 September, 2023

<https://indico.jinr.ru/event/3604/>

Scientific Program

August 27, Sunday

Arrival day

13:00 *Lunch*

19:00 *Dinner*

August 28, Monday

08:00–10:00 *Breakfast*

10:00 Section: **School-conference opening**

10:00 Welcome remarks

10:20 • G.Trubnikov “JINR Science: today and tomorrow” (45')

11:10 Common photo shoot

11:15 *Coffee*

12:00 Section: **Physics at NICA** (1h 45min)

• O.Rogachevskiy “Physics at NICA” (45')

• V.Kim “Physics with SPD experiment at NICA” (45')

13:30 *Lunch*

14:15 Section: **Invited lectures** (1h 30min)

• M.Ruan “Physics and status of the CEPC” (45')

• V.Voronin “International Center for Neutron Research on the base of PIK reactor” (45')

15:45 *Coffee*

16:15 Section: **Invited lectures** (2h 20min)

• S.Kilin “Quantum Competition” (40')

• V.Baryshevsky “Development of the generators of the radiation in the wide spectrum range from mm, THz to optical and X-ray wavelengths on the basis of Volume Free Electron lasers for Fundamental and Applied Linear Accelerator Physics collaboration” (FLAP, JINR) (40')

• N.Poklonski “Релятивистский потенциал углеродных нанотрубок с постоянным током” (40')

• N.Russakovich “Вхождение независимой Беларуси в состав ОИЯИ: как это было” (30')

19:00 *Welcome Party*

August 29, Tuesday

08:00–10:00 *Breakfast*

9:00 Section: **Recent results from LHC** (1h 30min)

- S.Shmatov “Physics beyond the Standard Model at the LHC” (45')
- Yu.Kulchitsky “Probe of Standard Model in pp collisions at 13 TeV by ATLAS and CMS at LHC” (45')

10:30 *Coffee*

11:00 Invited lecture

- A.Belushkin “Взаимодополняемость синхротронных и нейтронных методов в исследованиях конденсированных сред” (40')

11:45 Section: **Actual problems of QCD** (1h)

- S.Shimanskiy “The nonperturbative QCD problems and how to resolve them” (40')
- Yu.Kurochkin, S.Harkusha, Yu.Kulchitsky, N.Russakovich “Адрон как когерентное состояние партонов” (40')

13:00 *Lunch*

14:00 Section: **Applied research at NICA** (1h 45min)

- O.Belov “ARIADNA research programme at NICA: new gates for cooperation in materials sciences, life sciences and nuclear physics technologies” (45')
- A.K.Fedotov “Ленты ВТСП для миниускорителей частиц: увеличение силы пининга и сверхпроводящих критических параметров облучением протонами” (30')
- I.Svito “Critical parametrs of YBCO superconductive tapes irradiated with high-energy particles” (15')
- M.Paraipan “Investigation of the perspectives of accelerator driven subcritical reactors with ion beams” (15')
- N.Pukhaeva “Интенсивность и профиль пучка экспериментов MSTI ARIADNA” (15')

16:00 *Coffee*

16:30 Section: **Materials science for HEP** (1h 30min)

- K.Batrakov “Terahertz optics of graphene structures: absorption, lasing, influence of distributed feedback” (30')
- A.Silenko “Relativistic quantum-mechanical description and new properties of a graphene electron in external fields and free (2+1)-space” (30')
- A.Abiyev “Effect of Gamma rays on the TiN nanocrystals” (15')
- A.Asadov “The effects of high pressure on the crystal structure and vibration spectra of layered perovskite-like $\text{Nd}_2\text{Ti}_2\text{O}_7$ ” (15')

18:00 Poster session

- N.Dunin “Четырехканальная система детекторов на основе ФЭУ для измерения слабых фотонных излучений”
- A.Tatarinova “Radioisotope Power Supply for Perspective Electronic Devices Based on ZrO_2 Nanoparticles”
- I.Zarubina “Imaging of few-body states in nucleratrack emulsion”
- S.Omelianchuk ТВА
- A.Paulenka “Exact solutions of the Logunov-Tavkhelidze two-dimensional quasipotential equation with relativistic analogues of the harmonic oscillator potential”
- M.Ostashova “Estimation of the effective interparticle spacing for the fractal stellar medium in the solar neighborhood based on the GAIA DR2 data”
- Г.Горохов “Металл-полимерные композиты на основе трековых мембран как поляризаторы терагерцового излучения”
- Ф.Мисюк “Гетероструктуры графен/жидкий кристалл как компоненты терагерцовой фотоники”

19:00 *Dinner*

August 30, Wednesday

08:00–10:00 *Breakfast*

9:00 Section: **Heavy ion physics** (2h 15min)

- Yu.Oganessian “Heaviest nuclei and atoms” (45')
- M.Itkis “Super Heavy Nuclei: present and future” (45')
- S.Sidorchuk “Experimental studies of light exotic nuclei far from the beta-stability line” (45')

11:15 *Coffee*

11:30 Section: **Collider physics** (1h 30min)

- A.Kisselev “Physics beyond the Standard model at future lepton colliders” (45')
- P.Zarubin “Study of alpha-particle states in the fragmentation of relativistic nuclei (The BECQUEREL Project)” (45')

13:00 *Lunch*

14:00 Section: **Detectors at NICA** (2h 30min)

- V.Kekelidze “Вызовы проекта NICA” (45')
- S.Movchan “MPD TPC status” (30')
- А.Макаров, Г.Мещеряков “Сравнение экспериментальных и расчётных результатов контроля температурных режимов работы электроники ROC-камеры детектора TPC для эксперимента MPD” (15')
- A.S.Fedotov “The computer-aided design of cooling system for MPD detector of NICA” (30')
- A.Bazhazhin “Status of some parts of the TPC for the MPD at the NICA facility” (15')
- I.Zur “Prototype of a GEM detector with a metallized PET membrane as a Frisch grid” (15')

16:30 *Coffee*

17:00 Section: **Detectors** (1h 20min)

- N.Pukhaeva “Alignment of TOF700 and femtoscopy study at BM@N” (20')
- I.Gabdrakhmanov “Online processing and QA of the BM@N experiment” (15')
- N.Barlykov, V.Dudin “The Monte Carlo simulation of MiniSPD stand” (15')
- R.Akbarov “Silicon photomultipliers with deep pixels” (15')
- S.Chetverikov “Status of the specialized station SHINE for applied research in the field of ADS systems at NICA accelerator complex” (15')

19:00 *Dinner*

August 31, Thursday

08:00–10:00 Breakfast

9:00 Section: **Theory (lectures)** (1h 30min)

- O.P.Solovtsova, M.E.Kozhevnikova, O.B.Teryaev “Analytic perturbation theory: vacuum condensates from the electron-positron annihilation into hadrons data” (30')
- V.Andreev “Calculations of matrix elements for reactions with polarized fermions” (30')
- V.Zykunov “Electroweak corrections to dilepton production at LHC: the Drell-Yan process vs. the Photon Fusion mechanism” (30')

10:30 Coffee

11:00 Section: **Phenomenology** (2h)

- Yu.Kulchitsky “Two-particle Bose-Einstein correlations in pp-collisions at 13 TeV with ATLAS at LHC” (20')
- Yu.Kulchitsky “Study of KNO scaling in pp-collisions with ATLAS at LHC” (20')
- M.V.Galynskii “Double spin asymmetries in the elastic $e\vec{p} \rightarrow \vec{e}p$ and $e\vec{p} \rightarrow e\vec{p}$ processes in the case of parallel spins” (30')
- A.Skachkova “Exploring the possibility of studying the Drell-Yan process in the SPD (NICA) experiment” (30')

13:00 Lunch

14:00 Section: **Accelerator physics** (2h)

- I.Feranchuk “Superradiant parametric X-ray emission: characteristics and application” (20')
- V.Fimushkin “Polarized beams at the JINR accelerator complex” (30')
- D.Bychanok, E.Gurnevich, A.Sukhotski, G.Walynets, S.Huseu, S.Maksimenko “Quality factor measurements of 325 MHz half-wave resonators in superconductive state” (30')
- S.Anishchenko “Influence of multiple scattering on electromagnetic radiation produced by relativistic electron beams” (15')
- A.Karpuk “Стенд усилителей мощности гармонической ВЧ-станции коллайдера проекта NICA” (15')

16:00 Coffee

16:30 Section: **Cosmology** (2h 30min)

- A.Shalyt-Margolin “Primary Black Holes in the Early Universe, Quantum-Gravitational Corrections and Inflationary Cosmology” (40')
- A.Serdyukov “The evolving Gravitational Background and cyclic dynamics of matter in non-expanding Universe” (40')
- Yu.Vyblyi, I.Dudko “Модель скалярно-тензорной теории гравитации со скалярным полем, взаимодействующим с материей” (40')
- M.Ostashova “Fractal effects of the space distribution of stars in the solar neighborhood” (15')
- M.Serdyukova “The mass equivalence as a consequence of special-relativistic gravity” (15')

19:00 Dinner

September 1, Friday

08:00–10:00 *Breakfast*

9:00 Section: **Experiment reviews** (2h)

- M.Savina “Portals to dark matter and search perspectives at the LHC” (45')
- M.Kirsanov “Search for Light Dark Matter in the experiment NA64 at the CERN SPS” (45')
- V.Bleko “Collaboration FLAP. Investigations with electron beams of LINAC200 (JINR)” (30')

11:00 *Coffee*

11:20 Section: **Theory** (1h 40min)

- A.Baran, V.Kudryashov “Solution of the Schrödinger equation in the two Coulomb centers problem in the two-dimensions Lobachevsky space” (20')
- Yu.Grishechkin “Approximate analytical solutions of the quasipotential equations with confining potentials” (20')
- Yu.Chernichenko “Threshold S-factor and Leptonic Decay Widths for a Composite System of Two Arbitrary-Mass Relativistic Spinor Quarks” (20')
- V.Robuk “Сингулярные решения свободного уравнения Шредингера” (20')
- E.Kokoulina, M.Levchuk, M.Nevmerzhitsky, R.Shulyakovsky “Electromagnetic interactions of the deuteron at low and medium energies” (20')

13:00 *Lunch*

14:00 Section: **Theory and phenomenology** (2h 10min)

- Yu.Bystritskiy “Large relative phase induced by charmonium in baryon-antibaryon production in electron-positron annihilation” (20')
- A.Parkhomenko “Rare semileptonic $B^+ \rightarrow \pi^+ l^+ l^-$ decay in the Standard Model” (30')
- V.Plotnikov “Positively charged pions and kaons production in argon-nucleus collisions at 3.2 GeV/n in the BM@N experiment at the Nuclotron” (30')
- V.Haurysh “ π^0 , η , η' -meson to photon transition form-factor in the relativistic quark model” (15')
- S.L.Avakyan, E.Z.Avakyan “The role of pseudovector mesons in low-energy hadron physics” (15')
- E.Z.Avakyan, S.L.Avakyan “Rare meson decays” (15')

16:10 *Coffee*

16:40 Section: **Phenomenology** (2h)

- A. Ilyichev “Exact and leading order radiative effects in polarized SIDIS” (20')
- V.Yermolchik “High-precision simulation of polarization effects for processes on modern colliders using the Monte-Carlo event generator ReneSANCe” (20')
- V.Makarenko, D.Patskevich, V.Yanuts “Study of LFV processes with CMS at LHC” (20')
- V.Shalaev “Поляризациянные эффекты в процессах парного рождения мюонов” (15')
- D.Budkouski “Jet flavour discrimination and measurement of gluon jet fractions at LHC” (15')
- K.Slizhevskii “Search for dark matter produced in association with a leptonically decaying Z boson with the CMS Experiment at the LHC” (15')
- Iu.Korsakov “Studying muon pair production based on open data from CMS” (15')

19:00 *Conference Dinner*

September 2, Saturday

08:00–10:00 Breakfast

9:00 Section: **Theory** (1h 45min)

- E.Kokoulina “Phenomenology of high multiplicity” (30')
- A.Silenko “Manifestation of dark matter axions in relativistic dynamics of particle spins” (30')
- B.Farkhtdinov “Multiparticle production in ϕ^4 theory: method of singular solutions and numerical results” (15')
- E.Izotova “Relaxation timescales in the dynamics of quantum Ising spin chains” (15')
- A.Chernyshev “Associated production of Υ plus D in the improved color evaporation model” (15')

10:45 Coffee

11:15 Section: **Phenomenology** (1h)

- V.Andreev “Limits of CP-conserving Trilinear Gauge Boson vertices in $pp \rightarrow WW$ at CMS LHC” (20')
- A.Manko “Two-photon production WW pair at the LHC” (15')
- V.Kurylenka “Model-independent constraints on the coupling constants of the Z' boson with radiation corrections” (15')
- D.Sinegribov “Model-independent constraints on Z' -boson coupling constants with longitudinally polarised initial beams” (15')

12:15 Section: **Selected topics**

- A.Lobko “Dielectric laser acceleration: concept, achievements, challenges, and possible applications” (30')
- S.Sytova “Future of Nuclear Knowledge in Belarus and Nuclear Knowledge for Future” (20')

13:00 Concluding remarks

13:15 Lunch

14:00 Excursion to the Park of history “Grand Duchy of Sula”

See website: <https://parksula.by/>

19:00 Dinner

September 3, Sunday

08:00–10:00 Breakfast

Departure day

Check you departure time at the hotel lobby.