

Logunov Institute for High Energy Physics
(Protvino, Moscow region, Russia)
of the National Research Centre "Kurchatov Institute"
is organizing

the XXXIV International (ONLINE) Workshop on High Energy Physics
“From Quarks to Galaxies: Elucidating Dark Sides”,
November 22-24, 2022.

The purpose of this Workshop is to highlight and review the most pressing problems in gravitation and cosmology, hadron physics associated with QCD, general quantum field theory and also relevant historical, philosophical and methodological aspects, to get fresh information on progress in these fields and to provide an active discussion both of results and problems.

To this end a 1-hour general discussion session after each section of talks with a summary from the discussion leader will be arranged.

Topics to be discussed

- Gravitation & Cosmology
- QCD and related topics
- General Quantum Field Theory
- History, philosophy, methodology of QFT, QCD, gravitation and cosmology

Participation

Participation with review talks is by invitation of the Organizing Committee.

In the case of a proactive request the decision is made by the Organizing Committee.
The sessions will be **online** by appropriate software.

There is no registration fee.

Advisory Committee

- N. Achasov (Sobolev Institute of Mathematics, Novosibirsk)
- A. Andrianov (Physical Faculty, Saint Petersburg State University)
- I. Arefieva (Steklov Mathematical Institute, Moscow)
- I. Dremin (Lebedev Physical Institute, Moscow)
- A. Kataev (INR, Moscow)
- A. Likhoded (Logunov IHEP, Protvino)
- V. Savrin (Faculty of Physics, Lomonosov Moscow State University)
- O. Teryaev (JINR, Dubna)
- A. Zakharov (National Research Nuclear University, Moscow)
- V. Zakharov (Alikhanov ITEP, Moscow)

Structure of the workshop

Two sessions with 4-5 invited review talks of **40 minutes duration and 5 minutes for questions** and debates of a current character after each talk will be arranged every day. After every session one hour will be devoted to moderated open discussion of relevant general problems. **Only registered participants can follow the sessions and take part in the discussions.**

The session summaries are envisaged to be placed jointly in the arXiv (hep-ph).

Proceedings of the workshop will be published in **Physics of Elementary Particles and Atomic Nuclei** of the Joint Institute for Nuclear Research (JINR, Dubna)

Time-table

Sessions of 22 November

- 08:55-09:00 Opening Address

- **Morning session (09:00-12:50)**

D.S. Gorbunov (Moscow) 09:00-09:45

Valery Rubakov and Contemporary status of cosmology

A.A. Starobinsky (Chernogolovka) 09:45-10:30

Contemporary status of inflation

Coffee break 10:30-10:50

K.A. Postnov (Moscow & Kazan) 10:50-11:35

Gravitational wave astronomy and its implications for cosmology

A.F. Zakharov (Moscow) 11:35-12:20

Trajectories of bright stars and shadows near supermassive black holes as tests of gravity theories

General discussion (discussion leader D.S. Gorbunov) 12:20 - 12:50

Lunch 12:50 - 13:50

- **Afternoon Session (13:50-17:20)**

M. Yu. Khlopov (Rostov-on-Don/Moscow/Paris) 13:50-14:30

BSM physics and cosmology

D.S. Gorbunov (Moscow) 14:30-15:10

Higgs-scalaron inflation

Coffee break 15:10-15:30

N.V. Krasnikov (Moscow) 15:30 -16:10

Search for light dark matter. NA64 experiment.

Federico Lelli (Arcetri) 16:10-16:50

Interpretation of galaxy rotational curves

General discussion (discussion leader Yu.M. Zinoviev) 16:50 - 17:20

- **Evening Session (17:20 – 20:30)**

Enrique Alvarez (Madrid) 17:20-18:00

Unimodular gravity

Mikhail S. Volkov (Tours & Kazan) 18:00- 18:40

Massive gravity theories and Higgs mechanism for gravity

Eduardo Guendelman (Beersheba) 18:40-19:20

Life of the homogeneous and isotropic universe in dynamical string tension theories

V.O. Soloviev (Protvino) 19:20-20:00

Bigravity

General discussion (discussion leader A.F. Zakharov) 20:00 -20:30

Welcome party 20:30-22:00

Sessions of 23 November

- **Morning session (09:00 - 13:15)**

T. Khunjua (Tbilisi) 9:00-9:45

Dense quark matter: effective model approach

I.Ya.Arefeva (Moscow) 9:45-10:30

Holography approach to QCD

Coffee break 10:30-10:45

M.-P. Lombardo (Florence) 10:45-11:30

Phases of strong interactions: the lattice approach

Yu. Kharlov (Protvino) 11:30-12:15

Heavy-ion physics at LHC

General discussion (discussion leader TBA) 12:15-13:15

Lunch 13:15 - 14:30

- **Afternoon session (14:30 - 19:30)**

N. Achasov (Novosibirsk) 14:30-15:15

Four-Quark Nature of Light Scalar Mesons

A.Myagkov (Protvino) 15:15-16:00

New searches in ATLAS experiment

Coffee break 16:00-16:15

A. Kataev (Moscow) 16:15-17:00

Representation of the RG-invariant quantities in perturbative QCD through powers of the conformal anomaly

A. Kotikov (Dubna) 17:00-17:45

Fractional Analytic QCD for space-like and time-like processes

Z. Khaidukov (Moscow) 17:45-18:30

Chiral effects in QCD and other theories

General discussion (discussion leader O.V. Teryaev) 18:30-19:30

Sessions of 24 November

- Morning session (09:00-14:05)

V. I. Zakharov (Moscow) 09:00-09:40

Chiral effects: an update

D. I. Kazakov (Dubna) 09:40-10:20

RG Equations in Non-renormalizable Theories

S. Lyakhovich (Tomsk) 10:20-11:00

Unfree Gauge Symmetry

Coffee break 11:00-11:20

R. N. Rogalyov (Protvino) 11:20- 11:55

Screw calculus: from machinery to twistors

K. Turashvili (Tbilissi) 11:55-12:30

New Wine in an Old Bottle? Surprise with Angular Momentum

A. Biryukov (Samara) 12:30-13:05

Evolution of Quantum Systems: New Results

General discussion (discussion leader O.V. Teryaev) 13:05-14:05

Lunch 14:05 – 15:05

- Afternoon session (15:05-19:45)

G. D'Abamo (Albano Laziale) 15:05-15:45

Mass–energy connection without special relativity

B. Ivetic (Wien) 15:45-16:25

Covariant dynamics on the momentum space

V. A. Petrov (Protvino). 16:25-16:55

Relativity Theory: Genesis and Completion

Coffee break 16:55-17:15

S. Aristarkhov (Berlin) 17:15-17:55

Heisenberg's Uncertainty Principle and Particle Trajectories

Xiao-Song Wang (Henan) 17:55-18:35

Ether is alive! New derivation of the cosmological constant

General discussion (discussion leader V.A. Petrov) (18:35-19:35)

- 19:35-19:45 **Closing Address**

IMPORTANT DATES

- November 21, 2022 - end of registration
 - November 14, 2022 - end of abstract submission
 - November 19, 2022 - end of presentation submission
 - November 22, 2022 - start of the Workshop
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The Organizing Committee

V. Petrov Chairman	R. Ryutin Co-Chairman
V. Bornyakov	Y. Kharlov
V. Kotliar	R. Rogalyov
Yu. Pirogov	O. Zenin
R. Zhokhov	Yu. Zinoviev

<https://indico.ihep.su/event/hepftXXXIV>

hepft2022-hposi-questions@ihep.ru

Dear Colleagues,

We kindly ask you to submit the abstract of your talk (at least in a condensed form) via [this web-page](https://indico.ihep.su/event/hepftXXXIV) (or via e-mail, in case of problems).

This would help us to arrange the program and the corresponding discussions in advance.

Wishes to speakers

- As one can see from the program, our Workshop concerns various fields sometimes very different from each other, both conceptually and in technical terminology.

- That is why we would like to avoid excessive diversification and to try to preserve to a certain extent the unity of the high energy physics community.
- In this regard, we would like to ask all speakers, if possible, to kindly avoid, if possible, details that are understandable only to a narrow circle of deeply involved experts and to make the presentation simpler and clearer (thus more interesting!) to a wider circle of participants.
- We also believe that it would be of great importance to give, at least in a concise way, the conceptual motivation of your subject.

We are aware that this task can be rather difficult, so in no way the above wishes are mandatory and every speaker is, certainly, free to deliver her/his talk according to her/his own desire and convenience.

Wishes to discussion leaders

- It is assumed that each session will end with a general discussion (near one hour).
- The discussion is led by the discussion leader.
- The first part is assumed to be devoted to additional questions which bear a conceptual character, which are collected by technical coordinators and then sent to the discussion leader. It is meant that during the talk time only technical short questions not bearing a conceptual character are admitted. This is regulated by the chairperson.
- In the second part the discussion leader is asked to give a brief summary of the session's reports and a brief description of the most important unresolved problems related to the topic of the session.
- The allocation of time for discussion and summary is left to the discretion of the discussion leader.