

20th LOMONOSOV CONFERENCE ON ELEMENTARY PARTICLE PHYSICS**Foreword**

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The 20th Lomonosov Conference on Elementary Particle Physics was held online at the Moscow State University (Moscow, Russia) on August 19-25, 2021 under the patronage of academician Victor Sadovnichy, the Rector of the Moscow State University. The 20th Lomonosov Conference was dedicated to the Russian National Year of Science and Technology.

The conference was organized by the Faculty of Physics of the Moscow State University in cooperation with the Joint Institute for Nuclear Research (Dubna) and the Institute for Nuclear Research of the Russian Academy of Sciences. A reasonable support in organizing of the event was provided by the Interregional Centre for Advanced Studies and the Bruno Pontecorvo Neutrino and Astrophysics Laboratory (MSU).

One of the goals of the conference was to bring together scientists, both theoreticians and experimentalists, working in different fields. The conference has produced a high interest in the world scientific community and the organizers received a lot of applications to present a talk at the conference from scientists all over the world. In total there were more than 400 participants from 35 countries. The number of applications for presenting talks at the conference significantly exceeded the capacity to allocate oral talks during the usual six working days of the Lomonosov conferences. There were in total 232 talks including 114 plenary (25-20 min) and 118 sessions (20-10 min) presentations during 7 working days of the conference.

The physics programme of the 20th Lomonosov Conference includes reviews and original talks on a wide range of items such as neutrino and astroparticle physics, electroweak theory, fundamental symmetries, tests of Standard Model and beyond, heavy quark physics, non-perturbative QCD, quantum gravity effects, physics at the future accelerators.

As early as in 1983 the first of the series of conferences (from 1992 called the «Lomonosov Conferences»^{БТМ}) was held at the Department of Theoretical Physics of the Moscow State University (June 1983, Moscow). The second conference was held in Kishinev, Republic of Moldavia, USSR (May 1985).

After the four years break this series was resumed on a new conceptual basis for the conference programme focus. During the preparation of the third conference (that was held in Maykop, Russia, 1989) a desire to broaden the programme to include more general issues in particle physics became apparent. During the conference of the year 1992 held in

Yaroslavl (Russia) it was proposed by myself and approved by many participants that those irregularly held meetings should be transformed into regular events under the title «Lomonosov Conferences on Elementary Particle Physics».

Since the conference of the year 1993 (the 6th Lomonosov Conference on Elementary Particle Physics) all of the subsequent conferences of this series were organized at the Moscow State University on a regular basis each odd year under the title the Lomonosov Conference on Elementary Particle Physics. A wide variety of interesting things, both in theory and experiment of particle physics, astrophysics, gravitation and cosmology, were included into the programmes. It was also decided to enlarge the number of institutions that would take part in preparation of the events.

Mikhail Lomonosov (1711-1765), a brilliant Russian encyclopedist of the era of the Russian Empress Catherine the 2nd, was world renowned for his distinguished contributions in the fields of science and art. He also helped to establish the high school educational system in Russia. The Moscow State University was founded in 1755 based on his plan and initiative, and the University now bears the name of Lomonosov.

There was a tradition to publish the conferences proceedings as a collection of review and research papers prepared by the conference speakers on the presented talks basis. It started in 1994 when publication of the volume «Particle Physics, Gauge Fields and Astrophysics» containing articles written by the speakers of the 5th and 6th Lomonosov Conferences was supported by the Accademia Nazionale dei Lincei (Rome, 1994). Proceedings of the 7th and 8th Lomonosov Conference (entitled «Problems of Fundamental Physics» and «Elementary Particle Physics») were published by the Interregional Centre for Advanced Studies (Moscow, 1997 and 1999). Proceedings of the 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th and 19th Lomonosov Conferences (entitled «Particle Physics at the Start of the New Millennium», «Frontiers of Particle Physics», «Particle Physics in Laboratory, Space and Universe», «Particle Physics at the Year of 250th Anniversary of Moscow University», «Particle Physics on the Eve of LHC», «Particle Physics at the Year of Astronomy», «Particle Physics in the Year of Tercentenary of Mikhail Lomonosov», «Particle Physics in the Year of Centenary of Bruno Pontecorvo», «Particle Physics in the Year of Light», «Particle Physics at the Silver

Jubilee of Lomonosov Conferences», «Particle Physics in the Year of 150th Anniversary of the Mendeleev's Periodic Table of Chemical Elements») were published by World Scientific Publishing Co. (Singapore) in 2001, 2003, 2005, 2006, 2009, 2011, 2013, 2015, 2017, 2019 and 2021 respectively.

The success of the 20th Lomonosov Conference was largely ensured by contributions of the International Advisory Committee and Organizing Committee. On behalf of these Committees I would like to warmly thank the session chairpersons, the speakers and all of the participants of the 20th Lomonosov Conference.

We extremely appreciate continuous support of the Lomonosov Conferences from Nikolay Sysoev, the Dean of Faculty of Physics of the Moscow State

University. We are grateful to Andrey Fedyanin, the Vice Rector of the Moscow State University for very important support in organizing the event. We are also thankful to Grigory Trubnikov, the Director of the Joint Institute for Nuclear Research, Viktor Matveev, the Scientific Leader of the Joint Institute for Nuclear Research, Maxim Libanov and Grigory Rubtsov, the Director and Vice Director of the Institute for Nuclear Research of Russian Academy of Sciences for the support in organizing the 20th Lomonosov Conference.

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