



World of MEPhi

November' 18



**DO GOOD
DEEDS!**

MEPhI IMPROVES ITS POSITION IN TOP-100 OF THE “PHYSICAL SCIENCES”

On November 7, the Times Higher Education (THE) has published results of subject ratings which were presented at the Research Excellence Summit “Institutional transformation towards world-class research in the natural sciences”.



MEPhI entered the TOP-100 best universities in the world (78th place in the world and 2nd among Russian universities) in the subject ranking «Physical Sciences» 2019. The University has improved its position by 11 places compared to last year.

It is important to note that for the sixth year in a row MEPhI is in the TOP 100 of this rating – the best result among all Russian universities.

13 performance indicators are used in the preparation of the subject rankings, which are grouped into five areas: teaching (learning environment); research (volume, income and reputation); citation (research impact); international interaction (employees, students and research); income from production activities (knowledge transfer).

MEPhI IS AMONG THE LEADERS OF THE PROJECT 5-100

On October 27, at the 11th meeting of the Council on Global Competitiveness Enhancement of Russian Universities among Global Leading Research and Education Centers, 21 Project 5-100 universities have been reporting on the implementation of their roadmaps on competitiveness enhancement and presenting their further development strategies.

Following the meeting, the Council recommended to the Ministry of Science and Higher Education of the Russian Federation to continue supporting all the winning universities – 21 universities-participants of the Project 5-100. The winning universities were divided into three groups:

First group: HSE, MEPhI, NSU, MIPT, ITMO University, MISiS, TSU.

Second group: KFU, RUDN University, Sechenov University, SPb-PU, TPU, University of Tyumen, UrFU.



Third group: IKBFU, FEFU, Samara University, ETU “LETI”, UNN, SUSU.

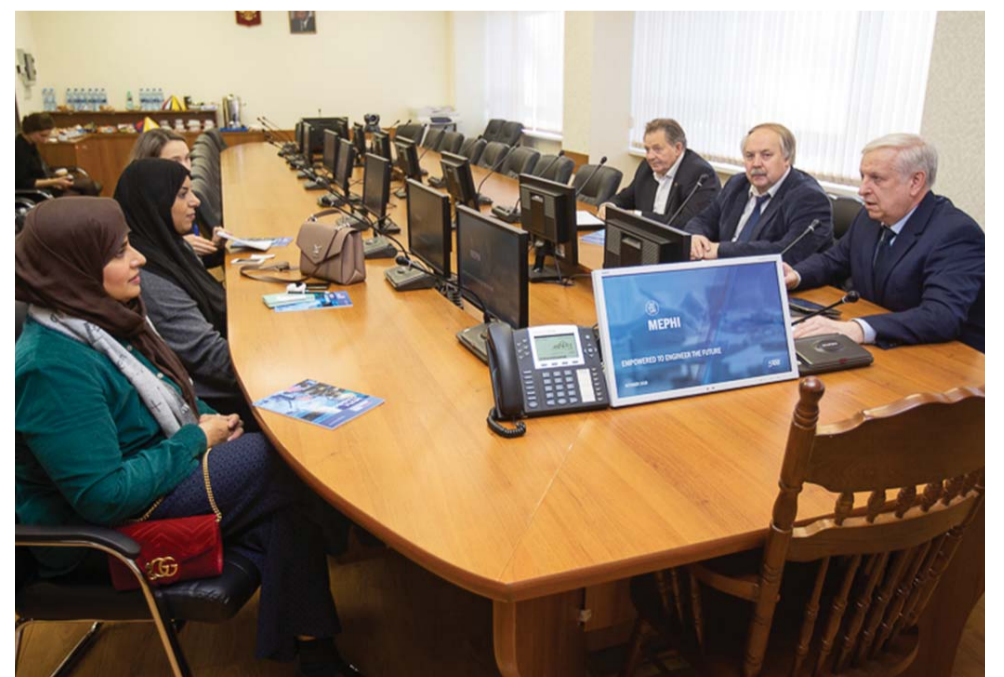
It should be noted that Universities being reorganized into the three groups will involve further differentiated financial support provided by the State to the universities featured in one of the three groups with regard to the state subsidiary allocated to each institution.

DELEGATION FROM QATAR DISCUSSED PROSPECTS OF COOPERATION WITH REPRESENTATIVES OF MEPhI

November 6, MEPhI has welcomed a delegation from the Qatar University, which included the Vice President for Research and Graduate Studies Mar-iam Ali S A Al-Maadeed and Executive assistant Mashael Ali Kh I Al-Badr.

MEPhI was represented by the first vice-rector Oleg Nagornov, Professor of the Laser and plasma technologies office Sergey Kireev, and Director of the Institute for Nanoengineering in Electronics, Spintronics and Photonics Nikolai Kargin.

The purpose of the visit was to discuss international cooperation between MEPhI and Qatar University in the field of research and postgraduate studies. Both sides presented their universities and expressed hope for further cooperation.



sPHENIX PROJECT: HOW SCIENTISTS STUDY “SOUP” THAT GAVE RISE TO UNIVERSE

Research conducted with the help of the Relativistic Heavy Ion Collider (RHIC) has shown that the original state of the Universe was a “soup” known as quark-gluon plasma, which is an almost ideal liquid.

Its properties are now being studied by the sPHENIX international collaboration involving the National Research Nuclear University MEPhI. Prof. Gunther Roland of the Massachusetts Institute of Technology, who co-heads the sPHENIX project, told a collaboration meeting at MEPhI about the course of the studies and how they could benefit mankind.

The quark-gluon plasma is a high-temperature state, in which the matter of the Universe existed moments after the Big Bang (after a period of its accelerated expansion, when it reached the size approximately equal to that of the solar system). There are several hypotheses that matter can exist in this state in the center of very dense stars.

Researchers from the sPHENIX collaboration have endeavored for the last 15 years either to confirm or deny these hypotheses, while trying to determine the properties of the quark-gluon plasma.

«We have discovered that this is the most ideal liquid in existence. But it is still unclear how this property is related to the components of quark-gluon plasma. As it follows from its name, it consists of quarks and gluons. But we are yet to clarify how they interact

and if there are any new bound states formed of quarks and gluons that can produce such liquidity at the output,» told Gunther Roland, co-head of the sPHENIX collaboration.

This is why sPHENIX scientists are working to build a powerful «microscope» to be able to look into quark-gluon plasma and investigate details of its microscopic structure.

«The liquid properties are in fact plasma’s long-distance properties, or, in other words, those in the longwave area. We know that plasma consists of point quarks and gluons very close to one another. Something very interesting happens during the transition from point items to properties of quark-gluon plasma. This is why we are working on a «microscope» that will show what happens between these two extreme scales of distances,» he said.

Studying quark-gluon plasma is one of the determinative probes into the fundamental properties of nature, he went on to say. The ability of quark-gluon plasma to be an almost ideal liquid has something to do with a strong interaction between its components, and what this interaction is all about is yet to be described.

However, plasma is also one of a series of strongly bound materials that can be found in almost all the various fields of physics. Some of these exist only in theory (the string theory is one example), while some can only be reproduced in a laboratory environment (such as ultracold atom systems). This is the reason why the



sPHENIX collaboration, while exploring quark-gluon plasma, seeks not only to elucidate strong interaction properties, which in itself is of great scientific value, but also to relate this research to other areas of research.

The sPHENIX collaboration is the successor of the PHENIX experiment, but the equipment to be used in a sPHENIX installation has little in common with its predecessor. Working in the same building, the researchers use the same power supply and cooling system. But the equipment that records collisions and identifies all sub-atom particles is of a totally new variety, because data recording systems should have fundamentally different capabilities to describe the origin of quark-gluon plasma’s properties.

The new project involves 15 or so countries, over 75 research institutes and several hundred experts, including Russian scientists and engineers. «One of the main aims of our visit to Russia and the MEPhI is to expand our team. We have discussed the Russian university’s contribution to the experiment in minute detail. Our work together with certain types of detectors that will make up part of the sPHENIX installation goes back a long time and has been fruitful,» Gunther Roland said.

According to the researcher, MEPhI is expected to play a major role in creating calorimeters, new recording sub-systems that did not exist before. This new type of calorimeter type is a key element of the sPHENIX project.



DONOR DAY

Donor day is great! Take our word for it, and if you don't believe – come the next time, and not just to watch but to take part!

The action, which took place on October 30, was an anniversary one for MEPhI. For the tenth time the University didn't remain indifferent to the problems of people who are in need of blood and its components.

104 people took part in the action, among them were students, teachers and employees of the University. Each donor donated 15-20 minutes of personal time and 500 milliliters of blood. The result: 52 liters, which are so much in need of victims of burns and injuries, people who have undergone complex operations, women in severe childbirth, cancer patients and other recipients.

Participants donated blood in the library. The venue resembled a student holiday rather than a place for medical procedures.



«Oh, we met just by chance, and not when it's needed to pass laboratory class or to prepare for the test!» reached from the queue for registration. Students supported doubters, chatted cheerfully, participated in quizzes, left notes, drank sweet tea, ate sweets and, of course, did a very important thing!

Ilya Shaposhnikov, a transfusiologist of the field team of the Federal Medical and Biological Agency, told about the procedure of blood donation and gave valuable recommendations that will be useful to future donors: «The procedure of blood donation is standard: a person comes with an identity document, is checked in the donors base to find out whether there were any

rejections or refusals earlier. Then the doctor ask the person about diseases, measures physiological indicators and hemoglobin, determines the blood group. The donor drinks tea and if the tests are positive, the person goes for blood donation.

During the blood donation there are some changes in the body: pressure is reducing, blood sugar level lowers, and to prevent deterioration of health, a person should increase the volume of fluid in the body and increase sugar level in advance. If the donor's pressure is normal, then before the procedure he needs to drink two cups of tea with sugar and eat a dozen cookies, if the pressure is low – you need to drink a liter of water with high mineralization and a cup of strong coffee. It is also good to warm up and do exercises before the procedure.

It is recommended to donate blood every two months, but according to my personal observations, it is better to undergo the procedure every four months, since frequent and regular blood donation can lead to a drop in hemoglobin level and a decrease in the iron in the body.»

After the procedure, the students did not go away, but stayed for tea, continued to communicate, sitting at large tables or lounging on colorful ottomans.

This is a great, but simply implemented exploit. Do not be indifferent to the problems of others, take care and give the world a piece of yourself!

