

Physicist Alexey Ustinov Acquires Russian Mega Grant

The CFN Scientist Is Granted EUR 3.5 Million for the “Superconducting Metamaterials” Project

Alexey Ustinov, who has been working as professor at Karlsruhe Institute of Technology (KIT) and scientist at the DFG Center for Functional Nanostructures (CFN) since 2008, has acquired one of the much sought-after mega grants of the Russian Government. In the next two years, 150 million rubles corresponding to about EUR 3.5 million will be available for his “Superconducting Metamaterials” project. Ustinov plans to establish a research laboratory at the University of Science and Technology “MISIS” in Moscow.

The physicist will use the grant to set up a well-equipped laboratory with the corresponding staff in the Russian Federation and to advance his research at Karlsruhe and Moscow in the next years. The research laboratory will be established at the renowned National University of Science and Technology “MISIS” that has a long tradition in the field of condensed matter. Among the scientists teaching there were Alexei Abrikosov, Physics Nobel Prize winner in 2003 and specialist in the field of condensed matter, and Vadim Schmidt, whose publications and textbook on physics of superconductors are considered classic today.

Superconductors are materials that do no longer have any measurable electric resistance at a certain temperature. In the ideal case, current in an annular superconductor can flow for months without decay. Superconducting metamaterials are artificially produced structures with electromagnetic properties that cannot be found in nature. In contrast to normal metallic structures, superconducting metamaterials can be made smaller down to the micro- or nanometer range without losing their low-loss properties. It is the aim of the team of Ustinov in Moscow to develop loss-free metamaterials. These are of interest for circuits required for quantum computers.

Superconductors also are perfectly suited for studying quantum effects in metamaterials: This is where the research goals of Ustinov’s team in Moscow meet with those of CFN. In Karlsruhe, Usti-

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nov's team will study how quanta of electromagnetic field behave in superconductors. In current experiments, superconducting resonators are used to operate quantum bits and manipulate out their quantum states. Ustinov's bilateral commitment will strengthen cooperation of both universities, MISIS and KIT. However, KIT will remain his main place of work. In case of success, project funding in Russia may be extended by another two years.

About the Mega Grant

In spring 2011, 517 researchers worldwide applied for the Mega Grant that had been announced for the second time by the Russian Government. It was decided to give these grants to 39 scientists. Among them are two Nobel Prize winners, four scientists from Germany, six from France, and ten from the United States. The criteria applied for awarding the grant were scientific performance indicators, but also the viability of the programs and management and teaching qualities of the researchers played a role. A panel of 1299 international experts with half of them coming from Russia and half from abroad reviewed and evaluated the research projects. The final decision was made by the funding council of the Russian Government. The Mega Grant is intended to make Russia an attractive location of research for internationally renowned scientists after many academics left the country in the 1990s. In the past two years, the Russian Federation succeeded in setting up high-performance research groups and in boosting scientific innovation with its Mega Grants.

DFG Center for Functional Nanostructures (CFN)

DFG Center for Functional Nanostructures (CFN) focuses on an important area of nanotechnology, functional nanostructures. Its excellent interdisciplinary and international research is aimed at representing nanostructures with new technical functions and at making the first step from fundamental research to application. Presently, more than 250 scientists and engineers are cooperating in more than 80 partial projects at the CFN in Karlsruhe. The focus is placed on the areas of nanophotonics, nanoelectronics, molecular nanostructures, nanobiology, and nanoenergy. www.cfn.kit.edu

Karlsruhe Institute of Technology (KIT) is a public corporation according to the legislation of the state of Baden-Württemberg. It fulfills the mission of a university and the mission of a national research center of the Helmholtz Association. KIT focus-

**es on a knowledge triangle that links the tasks of research,
teaching, and innovation.**

This press release is available on the internet at www.kit.edu.