

In memory of Aleksandr Leonidovich Suvorov

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Aleksandr Leonidovich Suvorov, Director of the Russian Federation State Scientific Center ‘A I Alikhanov Institute for Theoretical and Experimental Physics’ (ITEP), suddenly passed away on June 18, 2005. Suvorov was born on November 15, 1943 in Sverdlovsk into a family of physicists; both his father Leonid Yakovlevich and his mother Zinaida Solomonovna graduated from the Physics Department of Leningrad State University. The father worked at the ITEP for many years in the Physical Chemistry laboratory, and his son Aleksandr Suvorov also chose the ITEP which he joined in 1960 as laboratory assistant. In 1961, Suvorov enrolled in the Moscow Engineering Physics Institute (MEPhI) and successfully graduated from there in 1967. Having graduated, Suvorov immediately returned to work at the ITEP where he climbed all the rungs of the ladder from engineer to Institute Director. In 1970, he submitted and defended his thesis for Candidate of Sciences, and in 1983 his thesis for Doctorate of Physico-mathematical Sciences. Both these theses were devoted to fundamental studies of the physics of radiation defects in solids. In this field, Suvorov developed novel experimental methods based on field-ion microscopy of radiation defects induced in materials by irradiation. In 1991, he became Professor at the MEPhI.

Between 2001 and his sudden death Suvorov was Director of the Russian Federation State Scientific Center ‘A I Alikhanov Institute for Theoretical and Experimental Physics’. In 2004, he was elected Chairman of the ITEP Scientific and Technical Council. Until 2003, he headed an affiliate of the MEPhI Chair (No. 38) Physics of Superconductivity and Nanostructures. In 2003, Suvorov endowed at the MEPhI a new Chair (No. 60) Radiation Physics of Condensed Media, which he occupied until his death. Suvorov was elected Deputy Chairman of the Scientific Council on Radiation Physics of Solids of the Russian Academy of Sciences (RAS), was a member of the Rosatom Scientific and Technical Council, and was a member of the MEPhI Learned Council on Conferring the DSc degrees.

Suvorov wrote and published three monographs, two popular-scientific books, and numerous review articles. He published more than 150 papers in refereed journals and obtained 36 invention certificates and patents (in Russia and abroad). He was one of the pioneers of field-ion microscopy research in solids in Russia and became an outstanding expert in radiation physics of the solids, in reactor materials research, and in surface physics. Suvorov in fact created and expanded at the ITEP an independent research field — the field-ion microscopy for the study of radiation defects on the surface and in the bulk of irradiated materials. Field-ion



Aleksandr Leonidovich Suvorov
(15.11.1943 – 18.06.2005)

microscopy makes it possible to gather unique information in various fields of science, including radiation solid-state physics, and specifically in monitoring the production and behavior of single point defects and their clusters, in establishing the structure of depleted zones at the sites of developing atomic collision cascades, when materials are irradiated by fast particle fluxes, in the identification and measurement of dislocation parameters and those of interfaces, in studying processes of materials spraying, and much more. We ought to emphasize that this method of analyzing the structure of electrically conducting materials is extremely specific, involves complications when extended to multi-component materials or materials having a low melting point, and so forth. Nevertheless, important success has been achieved in studies of even such materials using field-ion microscopy. At present, the techniques for materials research using field-ion microscopy are also being extended to the analysis of microstructures incorporating fissionable materials.

In his last years, Suvorov had initiated and supervised at the ITEP mastering of novel modern ultramicroscopic techniques: the tomographic probe-atomic, scanning tunneling, and atomic force microscopes for solid state research. These methods have been very successfully used at the ITEP both for studying various radiation-induced defects on and in the vicinity of the solid surface, and for studying and identifying biological objects, viruses among them.

Suvorov put in great effort at the ITEP to establish the Specialized Scientific and Technical Center of Atomic Scale Research in Radiation Physics of Condensed Matter and Reactor Materials Technology. The main purpose of setting up the Center was to join the efforts of specialists in various organizations of Rosatom, the Russian Academy of Sciences, and other departments in conducting joint research aimed at clarifying the causes of degradation of properties of reactor materials and searching for technologies that could extend their operational life. The Center currently uses, in addition to a Cameca tomographic atomic probe, a Digital Instruments scanning probe (scanning tunneling and atomic force) microscope and a Phillips scanning electron microscope, as well as a whole range of instruments developed and created at the ITEP: a time-of-flight atomic probe with magnetic lenses, field-ion microscopes (including a multifunctional field-ion microscope ‘aligned’ with the source of bombarding ions), scanning tunneling and atomic force microscopes, and field-emission microscopes-analyzers of various configurations for a wide range of applications.

Suvorov and his team obtained and published in journals an impressive number of results of fundamental importance in this field, which are related to the production and behavior of primary radiation defects, the development and evolution of atomic displacement cascades, the propagation of chains of focused atomic collisions, the sputtering of surface atoms, subthreshold effects, and so forth in solids (metals and alloys, semiconductors, and high-temperature superconductors).

Suvorov wrote numerous articles for public media and gave many interviews in connection with topics covering the future progress of science and with approaches to overcoming the evident serious difficulties.

Suvorov supervised the research of young postgraduates and competitors for candidate’s degrees and gave much time and energy to this work. Seven of them maintained theses for Candidates of Sciences under his guidance. Suvorov headed organizing committees of various international scientific forums and conferences and successfully organized and conducted the Moscow International Schools of Physics at the ITEP in 1998, 2001, and 2004 in Zvenigorod. He presented numerous interesting reports to many international conferences and symposia and published more than 30 papers in the last five years alone.

For four decades Suvorov devoted his energy and talent as a researcher to the Institute, its functioning, its expansion, and the proliferation of its scientific achievements. He greatly contributed to the wide recognition of the ITEP among Russian research centers and important centers abroad. Suvorov never lost faith in the final resurrection and renewed growth of science in Russia and insisted on the priority and necessity of creating a high-potential atomic-industry complex in our country.

The name Aleksandr Leonidovich Suvorov — a highly talented scientist and citizen, the founder of one of the most promising scientific fields in our country, namely, the field-

ion microscopy of irradiated solids — will be forever engraved in the history of our science.

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