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PERSONALIA

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Yuriĭ Andreevich Ossipyan (on his seventieth birthday)

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February 15, 2001 is the 70th birthday of Yuriĭ Andreevich Ossipyan, Member of the Russian Academy of Sciences, outstanding physicist and science manager, Director of the Institute of Solid State Physics, Chairman of the Presidium of the Chernogolovka Scientific Center of the Russian Academy of Sciences.

While still a graduate student, Yu A Ossipyan wrote his first scientific paper on the theory of martensite phase transitions in metals at low temperatures dominated by quantum tunnel transitions. It was published later in *Dokl. Akad. Nauk SSSR*. In 1955, he graduated from the Physico-Chemical Department of the Moscow Institute of Steel and Alloys, and two years later, from the evening school at the Mechanico-Mathematical Department of Moscow State University. His profound education in physics and mathematics became very handy in future years. As his teachers, he names Boris Nikolaevich Finkel'shteĭn, one of the founding fathers of theoretical quantum chemistry, and Georgiĭ Vyacheslavovich Kurdyumov, who was his science advisor in student years and later at the Institute of Metal Physics, where Yuriĭ Ossipyan made a series of experimental studies on atomic crystal structure of metal alloys using X-ray techniques.

The next step was to study the mechanical properties of filamentary crystals (whiskers) with a strength approaching the theoretical limit. To explain the observed phenomena, he had to use the fundamentals of the dislocation theory for the solid state. Dislocation physics became the main avenue of Yuriĭ Andreevich's research in the 1960s – 1980s. One of the first results produced by his research was the experimental discovery of a new physical phenomenon — the photoplastic effect in semiconductors. It was found that optical excitation could substantially affect the plastic properties of semiconductor crystals. Further research on the spectroscopy of plastically deformed structures conducted by Yu A Ossipyan together with his collaborators and students led to the discovery of a whole range of novel phenomena. Amongst them were the electroplastic effect and the discovery of an electric charge on dislocations in semiconductors, clusters of 'dangling' valence bonds on dislocation nuclei in silicon, and the inversion of conductivity type occurring in semiconductors upon introduction of dislocations. Elegant experiments on high-frequency conductivity led to the discovery of quasi-one-dimensional electron bands due to dislocations, and of combined electron resonance on dislocations in silicon. It was also established that a magnetic field could affect the plastic deformation of superconductors. It was thus shown that the state of an electron system has a great impact on the plastic deformation, i.e. on the movement of dislocations through the crystal, and that in its turn the introduction of dislocations changes the properties of an electron system in plastically deformed crystals.

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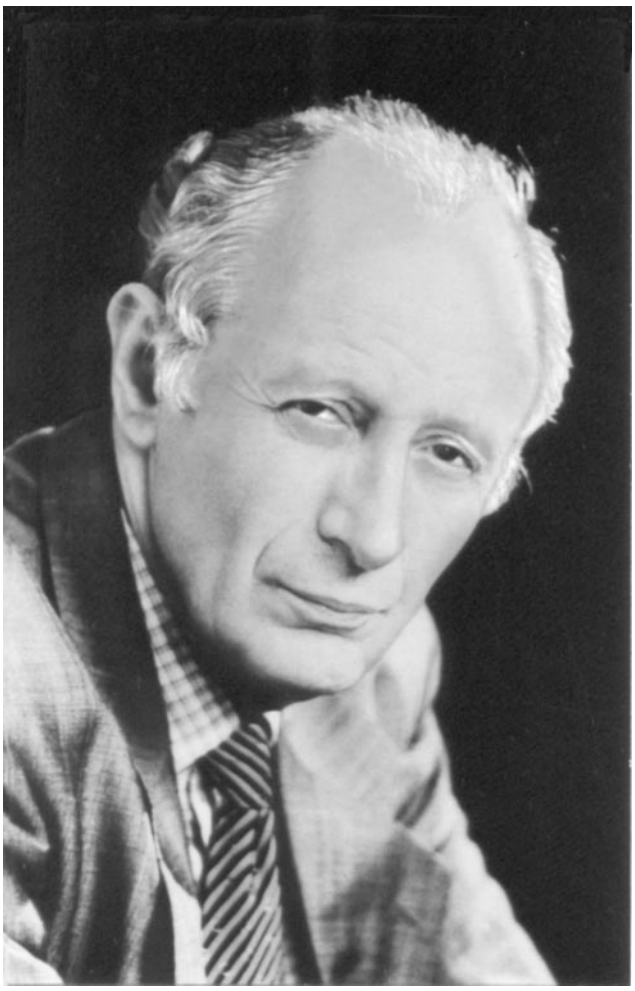

Yuriĭ Andreevich Ossipyan

The achievements of Yuriĭ Andreevich and his science school in developing a new field of research in solid-state physics were acknowledged world-wide. In 1984, Yu A Ossipyan won one of the highest awards of the USSR Academy of Sciences — the P N Lebedev Gold Medal, and subsequently the A P Karpinsky International Prize and Gold Medal.

In the mid-1980s, with the discovery of high-temperature superconductivity, Yuriĭ Andreevich began at once to study the properties of this new class of materials and in fact took charge of the research on high-temperature superconductivity (HTSC) in our country. On his initiative, the Institute of Solid State Physics, RAS (Chernogolovka) conducted a number of investigations on the structural and physical properties of crystals of high-temperature superconductors, in particular, the pattern of crystal twinning, the structure of magnetic flux in superconductors, the anisotropy of conductivity, the optics of the superconducting and normal phases in single-crystal high-T_c superconductors. Now he is doing intensive research

on the mechanical and physical properties of fullerites and nanocomposite carbonic materials based on fullerene molecules and nanotubes. Members of Ossipyan's school designed a technology for growing perfect and sufficiently massive fullerite crystals and conducted fundamental research of the spectra of photoluminescence, absorption and excitation of perfect fullerite crystals and of their transport properties. They have started experimenting with electric doping of fullerites by metal atoms.

The grand oeuvre of Yuriĭ Andreevich's lifetime has been the founding and nurturing of the Institute of Solid State Physics of the Russian Academy of Sciences: choosing and training its scientific staff, attaining and maintaining its high scientific level of research. The decision to establish a broad-profile physics institute in the Moscow suburb of Chernogolovka was made in February 1963. To begin with, the new institute was headed by its Managing Director G V Kurdyumov and Deputy Director Yu A Ossipyan. While choosing the scientific personnel of the institute and handling logistics problems, Yu A Ossipyan had the active support of academy members P L Kapitza, N N Semenov, A I Shal'nikov, and Yu V Sharvin. In 1973, Yu A Ossipyan became the director of the institute. Now the ISSP is one of Russia's major physics institutes, an acclaimed scientific center doing a vast range of research in condensed matter physics and material science. Yu A Ossipyan pays special attention to training the new generation of scientists and creating a science school. For around forty years, he has headed the Department of Solid State Physics at the Moscow Physico-Technical Institute; for the last few years, he has also been the Director of the Moscow Regional Affiliate of Moscow State University. One of the departments of the Moscow Institute of Steel and Alloys has an affiliate based at the Institute of Solid State Physics. This makes it possible to organize groups of talented students from MPhTI, Moscow State University and MISA and bring them to the Institute of Solid State Physics for education and scientific practice, so that they can easily join in the activities of its scientific departments.

Yu A Ossipyan continues to engage in scientific management activities on a grand scale. He is a member of the Presidium of the Russian Academy of Sciences, Chairman of the Presidium of the Chernogolovka Scientific Center, Chairman of the Scientific Council on Condensed Matter Physics and Chairman of the Russian Committee of Crystallographers, Chairman of the Committee of Russian Scientists for Disarmament, Chairman of the Section of Cosmic Technology and Materials at the Space Council of the Russian Academy of Sciences and the Russian Aerospace Agency, member of COSPAR, board member of the European Physical Society, and a member of several academies abroad. His wide scope of knowledge and outstanding intuition enable him to be the active editor-in-chief of several journals: *Kvant*; *Surface Science: X-ray, Synchrotron and Neutron Studies*; *Materials Research*, and *Physics of Low-Dimensional Structures*.

For his achievements in science and scientific management, Yu A Ossipyan has received the highest awards from the government. In 1986, he was made Hero of Socialist Labor; in 1999, he was awarded the 2nd degree Order for Services to the Homeland.

Yu A Ossipyan's friendly and kind disposition, his gentle manner, his charm and inborn culture attract numerous people. He is full of energy and new projects, and carries on with his intensive and efficient work. This is wonderful indeed!

His friends, colleagues and pupils, and everyone who has been fortunate to become his close associate, to work side by side with him and enjoy his company, wish Yu A Ossipyan good health, happiness and new success in his work.

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