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PERSONALIA

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In memory of Oleg Borisovich Firsov

Oleg Borisovich Firsov, an outstanding scientist and a greatly admired man, died on April 2, 1998. Both in this country and in the West he was well known as a physics theorist with a very wide scope of interests.

Oleg Borisovich Firsov was born in Petrograd on June 13, 1915 in the family of a military officer, a pilot in the Russian army. At five years of age, Firsov lost both his parents and then lived through a nightmare of orphanage during the civil war years. Having completed school, he enrolled in the physics and mathematics faculty of Leningrad University and graduated in 1938. He then started working at the Institute of Instrument Design of Leningrad University.

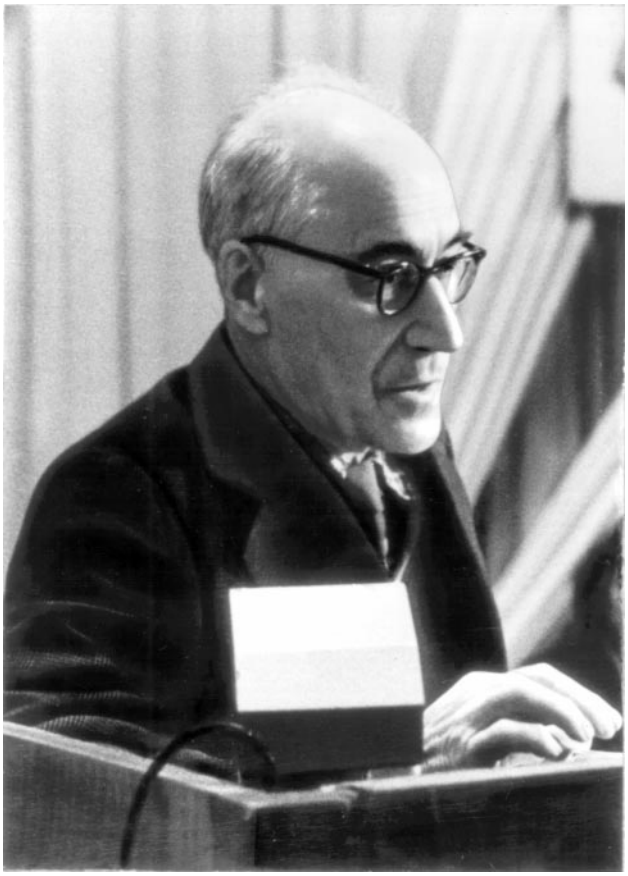
Mobilisation to the army during World War II was impossible owing to tuberculosis that was the result of his terrible childhood, so Firsov worked in the defence industry. Firsov's creative approach to anything he liked doing, his ingrained inventiveness allowed him to find a number of original design solutions for detonation systems, which made his contribution to the victory in the war.

After the war Firsov worked in the Leningrad Physico-Technical Institute. His supervisor was Yakov I Frenkel. Here Firsov carried out comprehensive research on gas discharge and published a series of papers, the basis for submitting and defending his Candidate of Sciences (PhD) thesis in 1947.

Firsov's studies in the quantum-mechanical theory of atomic collisions are the best known area of his work; the results brought him the DSc degree in 1956. For this work, in collaboration with other physicists, Firsov was given the Lenin Prize in 1972.

Firsov's work on gas discharge, on magnetically confined high-temperature plasma and on solid state-atomic particle interaction and his studies of fundamental problems of quantum and classical mechanics are equally important. His elegant solutions of a number of complicated problems in collision theory were included in the Landau and Lifshitz course of theoretical physics. Among them are the solution of the inverse scattering problem (reconstruction of the interaction potential from the known scattering cross section in classical mechanics), a rigorous calculation of the probability of resonance charge transfer in quantum mechanics, and a derivation of the universal atomic interaction potential known as the Firsov potential.

Firsov advanced a number of pioneering ideas in these 'frontline' fields of physics. Firsov's works on resonance charge transfer were of crucial importance for the magnetic fusion reactor problem. It became clear as early as 1951 that resonance charge transfer in hydrogen is an important process in the energy balance of a thermonuclear plasma. The rigorous theory developed by Firsov for this phenomenon remains important even now.



Oleg Borisovich Firsov

In 1957 Firsov suggested the idea of a plasma trap with reverse magnetic fields to solve the problem of stable confinement of a high-temperature plasma. His was the first calculation of the plasma particle loss rate in systems of this type; this calculation is still important.

In the 1970s Firsov continued his work on gas discharge and developed a quantitative theory of streamer propagation. He summarized the results of his gas discharge research in the well known monograph the *Theory of Spark Discharge*.

Oleg Borisovich Firsov became a classic for physicists dealing with the interaction between atomic particles and surfaces, owing to the Firsov potential and the Firsov formula for inelastic ion energy losses. This field of physics was greatly

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stimulated by the new approach, suggested by Firsov, to particle reflection at the surface. This approach made it possible to compute the characteristics of particle fluxes reflected from the surface for the first time.

In the last years of his life Firsov proposed and published a new solution to one of the most exciting puzzles in cosmology: the problem of hidden mass in the Universe.

The role Firsov played in physics as an individual was rather unique. All his life he avoided administrative responsibilities; however, his scientific credentials were so high and his moral principles so impeccable that he was able to exert significant influence on the organization of research in the physics of atomic collisions, in gas discharge physics and in solid-atomic particles interaction research.

Firsov succeeded in bringing up an impressive number of PhD and DSc students and had an enormous number of physics followers and friends; these included not only his direct students but also scientists who had fallen under the spell of his personality when he refereed their theses, including DSc theses. All of them were in awe of his kindness and love of people and knowledge.

Everyone honored with knowing him or learning from him will always cherish the memory of Oleg Borisovich Firsov.

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