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ACADEMICIAN ISAAK KONSTANTINOVICH KIKOIN

(On His 50th Birthday)

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MARCH 28, 1958 marks the 50th birthday of the outstanding Soviet physicist, academician Isaak Konstantinovich Kikoin.

I. K. Kikoin was born on 28 March 1908 in Zhagar, a small city in what is now the Lithuanian S.S.R. His father was a schoolteacher. After completing his elementary schooling he entered the Pskov Agricultural Technical School, and in 1925 he enrolled at the Physico-Mechanical Faculty of the Leningrad Polytechnic Institute, from which he was graduated in 1930. He showed great interest in physics and mathematics even while in school. As a student of the Leningrad Polytechnic Institute Isaak Konstantinovich started working in 1928 at the Leningrad Physico-Technical Institute, with which he was continuously associated for many years, having become one of the outstanding representatives of the school of Soviet physicists, trained by academician A. F. Ioffe in that institute.

The first research performed by Isaak Konstantinovich, already in his student years (in the laboratory directed by Ia. G. Dorfman), concerned the nature of ferromagnetism.[1] Dating to that time are his first investigations of electric and galvanomagnetic properties of liquid metals[2-4,13]. These disclosed the presence of a Hall effect and of a change in the resistance in liquid metals in a magnetic field. Prior to these investigations, the presence of galvanomagnetic phenomena in liquid metals has not been ascertained; it was even assumed that these phenomena do not take place in liquid metals, which have no crystalline structure. Later, too, Isaak Konstantinovich turned to research on liquid metals. Working together with S. V. Gubar',[1] he showed experimentally that the temperature variation of the resistance of liquid metals is connected only with the change in the volume of the metal,

and not with a true temperature dependence of electric conductivity.

The first investigations on the study of liquid metals were completed by Isaak Konstantinovich upon his return in 1930 from a scientific tour through Holland and Germany, where he was sent after being graduated from the Institute (he worked for some time in Munich with W. Gerlach).

In 1933 Isaak Konstantinovich started a cycle of investigations on the internal photoeffect and the Hall effect in semiconductors.[7,9] These led to the discovery (together with M. M. Noskov) of a new phenomenon — the photoelectromagnetic effect in semiconductors (the Kikoin-Noskov effect).[8,10,11,16] The investigations concerned the fundamental properties of this phenomenon — the spectral distribution and the dependence on the light intensity, on the temperature, and on the magnetic field. During the course of these investigations still another phenomenon was discovered, the so-called transverse effect, quadratic in the magnetic field, taking place when the plane of the specimen makes an angle other than zero with the direction of the magnetic field.[12]

Simultaneously with these investigations, Isaak Konstantinovich began many new projects involving the study of the properties of metals. This was connected, to a certain extent, with the founding of the Ural' Physico-Technical Institute in 1932, into which I. K. Kikoin's laboratory was also incorporated. During the first five years of its existence, this institute was housed in the Leningrad Physico-Technical Institute, and in 1936 it transferred its activities to Sverdlovsk, where it still is in operation as the Institute of Metal Physics, Academy of Sciences, U.S.S.R. as part of the Academy's Ural' branch.

In 1934 I. K. Kikoin published a large monograph on the physics of metals, written jointly with Ia. G. Dorfman.[14] For many years this was the only book of this kind in the Russian language.

Isaak Konstantinovich's investigations in metal physics involved essentially two problems: superconductivity and galvanomagnetic phenomena in ferromagnets. In the field of superconductivity he succeeded (together with B. G. Lazarev[5,6]) in establishing a correlation between superconductivity and the Hall effect. Superconducting metals were found to have a very small Hall constant (two orders of magnitude less than nonsuperconducting metals). Together with S. V. Gubar', Isaak Konstantinovich made in 1939 a very precise measurement of the gyromagnetic effect in superconductors.[17,18] The Landé factor turned out to be unity, showing the diamagnetism of superconductors to be connected with electron currents rather than, say, with electron spins.

By investigating the temperature dependence of the Hall effect in ferromagnets (nickel) down to the transition through the Curie point, Isaak Konstantinovich confirmed the fundamental fact that the Hall emf in ferromagnets is actually determined by the magnetization of the specimen, and not by the intensity of the magnetic field.[15] An original experiment made possible reliable verification of this fact, important to the theory of ferromagnetism. Further experiments on copper-nickel and palladium-nickel alloys[19] have demonstrated that the Hall constant in paramagnets is determined by the magnetization, so that in general it consists of two parts, one being an "ordinary" constant, independent of the temperature, and the second following the Curie-Weiss, law as does the magnetic susceptibility of a paramagnet.

For the past few years I. K. Kikoin has been continuing his intensive research of the transverse photoelectromagnetic effect.[22-25] He has detected here an isotropy of the effect in germanium, and has experimentally established beyond doubt a connection between this anisotropy and the crystallographic structure of germanium.

Isaak Konstantinovich's work in the Ural' has been identified with many investigations of applied nature. Jointly with D. L. Simonenko, he developed a mass-spectographic method for the analysis of gases, and together with S. V. Gubar' and V. S. Obukhov he constructed a new kind of kiloammeter, based on the measurement of the magnetic field of the current-carrying conductors. In the measurement of tens of thousands of amperes dc (in electrolysis plants), this method has substantial advantages over the use of ordinary shunt instruments. Isaak Konstantinovich and his co-workers were awarded the Stalin prize for this development.[20]

In addition to the investigations mentioned above, I. K. Kikoin has led actively many other important research projects. His entire scientific activity is characterized by high creative initiative, constant originality in the approach to the solution of the studied problem, and extensive and deep erudition in problems of modern physical sciences.

From the very start of his scientific activity, Isaak Konstantinovich has been engaged in extensive pedagogical activity in academic institutions, and also in scientific-organizational work. He started teaching already while at the Physico-Mechanical Department of the Leningrad Polytechnic Institute, and continued at the Ural', where for eight years he was in charge of the Physics Faculty of the Ural' Polytechnic Institute. At present he holds the rank of Professor at the Moscow State University. A brilliant lecturer, Isaak Konstantinovich has won the love of the students and the respect of his colleagues. He has introduced many novelties in the physics education of our country and prepared original modern physics courses, always attempting to eliminate all purely formal and obsolescent material from the programs.

I. K. Kikoin's scientific activity was recognized by the Soviet scientific society. In 1943 he was chosen a corresponding member of the Academy of Sciences, and became a full member in 1953. This activity was also highly valued by the government — Isaak Konstantinovich was awarded orders of the Soviet Union and has won the title of a Stalin Prize Laureate. I. K. Kikoin reaches this significant age in his life, his 50th birthday, in the full bloom of his creative activity, in energetic and fruitful work.

The editorial staff of JETP congratulates Isaak Konstantinovich and sincerely wishes him good health and new creative successes for the benefit of our Fatherland.

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