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## KORNII DENYSOVYCH TOVSTYUK (to the 90-th anniversary of his birthday)

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*So I fulfill a commandment of grandfathers and  
fathers-heroes.  
My torch is burning shining the way!  
I will ignite a spark for everybody who will follow me.  
And let everyone comprehend where the essence  
of the truth is.  
(K.D. Tovstyuk)*

On March 22, there will be the 90-th anniversary of the birthday of Kornii Denysovych Tovstyuk, an outstanding Ukrainian physicist, the founder of the semiconductor physics school in the western region of Ukraine, Doctor of Sciences in physics and mathematics, Professor, the corresponding member of the National Academy of Sciences of Ukraine, the twice laureate of the State Prize in science and engineering, the Honorary doctor of Yu. Fedkovych Chernivtsi National University, a public figure, and a fervent patriot of Ukraine.

The scientific masterpiece of K.D. Tovstyuk is amazing in its diversity, extending from the study of a wide class of semiconductor materials and the application of

group theory in the solid state physics to the discovery of the bulk accumulation effect in layered structures and the creation of a scientific basis for the technology of a new generation of high-power and high-capacity accumulators and hybrids on their basis.

The scientific activity of K.D. Tovstyuk began from studying the electron spectrum and electrophysical properties of germanium, to which his Ph.D. thesis was devoted (the dissertation was supervised by Prof. A.G. Samoiloivych). A considerable part of K.D. Tovstyuk's scientific masterpiece was associated with the research of features in the electron spectrum, the study of transport phenomena and their changes under the influence of various factors in anisotropic semiconductors, and the research of layered and narrow-gap semiconductors. To study the features in the spectra of charge carriers in anisotropic semiconductors, Kornii Denysovych enthusiastically used the methods of group theory and carried out a series of outstanding works in this direction. A special place belonged to the model of nonequivalent valleys, which was created by him and played an unordinary role in constructing theoretical models and interpreting experimental data obtained for anisotropic semiconductors.

Together with his disciples and colleagues, K.D. Tovstyuk also developed an experimental direction for studying the magnetic, galvanomagnetic, and optical phenomena in anisotropic semiconductors, in particular, the magnetic susceptibility and the nuclear magnetic resonance. In 1967, K.D. Tovstyuk defended his thesis for the Doctor's degree entitled "Peculiarities of the band spectrum and scattering mechanisms in anisotropic and nonparabolic semiconductors". In 1978, K.D. Tovstyuk was elected Corresponding member of the Academy of Sciences of the UkrSSR in the speciality "materials science of semiconductors" (the Branch of physical and engineering problems in materials science).

The works carried out by K.D. Tovstyuk together with his collaborators in correlation thermodynamics, the research of impurity states (both magnetic and nonmagnetic) and the determination of their influence on semiconductor properties, together with the studies of the intercalation effect on the properties of layered crystals, gave an impetus to the development of a new technological direction, whereas the laboratories headed by

him formed a recognized technological center for growing up anisotropic and narrow-gap semiconductors and developing novel technologies. Together with his collaborators, K.D. Tovstyuk studied the phase transitions, analyzed the peculiarities of the many-particle interaction in strongly anisotropic and narrow-gap semiconductors, used the group theory methods while constructing Green's function for the many-particle interaction, studied the lattice dynamics, the Jahn–Teller effect, and the vibronic interaction in strongly anisotropic semiconductors. He was an editor of transactions in semiconductor materials science (published in 1982, 1986, and 1989). In 1984, K.D. Tovstyuk published the monography “Semiconductor Materials Science” (Naukova Dumka, Kyiv, 264 pp.), which is actual till now for the researches in semiconductor physics.

The researches of the photo-electric properties in semiconductors, together with a progress in the technology of growing and creation of specimens with preset characteristics, formed a basis for implementing the anisotropic semiconductors into the industry. Another circle of K.D. Tovstyuk's scientific interests comprised his researches of the bulk accumulation effect in layered structures. It allowed him to lay the scientific basis for the technology of fabrication of a new generation of high-power and high-capacity accumulators, storage devices, as well as hybrids on their basis. Those developments were realized not only in the form of defended patents and author's certificates, but some of them were certified and introduced into the industry. K.D. Tovstyuk is an author of over 300 scientific works, 40 author's certificates and patents. His works were twice awarded the State Prize of Ukraine in science and engineering (in 1973 and 2001).

Kornii Denysovych Tovstyuk was born in a peasant family in the village of Mamaivtsi. Being an 11-year-old young man, he went to study to a gymnasium at Chernivtsi, but his native village remained his most favorite place for ever, “wandering” with him in his recollections during all his life. He often and eagerly came back there to his old mother. Kornii Denysovych devoted a good many poems to his Mamaivtsi natives (two poetic collections were published). At the gymnasium, K.D. Tovstyuk got a fundamental education. He knew well Ukrainian, Romanian, Russian, English, German, and French. He remembered plenty of Latin tags and used them *apropos* while talking. Kornii Denysovych possessed unordinary knowledge in history. In 1945–1950, K.D. Tovstyuk studied at the Faculty of Physics and Mathematics of the Chernivtsi State University. He graduated it with distinction and started to work

as an assistant at the Chair of Experimental physics. The talented collaborator was paid attention of Professor A.G. Samoiloivych, and, in 1953, K.D. Tovstyuk entered the postgraduate study at the Chair of Theoretical Physics headed by A.G. Samoiloivych. Half a year before the termination of the postgraduate study term, K.D. Tovstyuk defended his Ph.D. thesis.

In 1941–1943, Kornii Denysovych was a combatant of the Bukovyna Kurin. Under the Nazi occupation, Kornii Denysovych was repressed. In 1943, after having been tortured by Gestapo in a Kyiv prison (33, Volodymyrska Str.), he escaped the execution by a firing squad.

His meetings with such prominent Ukrainians as Oleg Olzhych, Olena Teliga, and Ulas Samchuk were not only imprinted for ever on his mind (Kornii Denysovych often lectured on this topic), but also made his life directed toward the serving a great purpose, the creation of independent Ukrainian state. His favorite clothes were embroidered shirts; Kornii Denysovych wore them every time and everywhere. At the time, when only two disciplines were lectured in Ukrainian to Ukrainian philologists at the Chernivtsi University – these were the Ukrainian language and literature, – physicists were taught almost every professional discipline in their native language. It was a large K.D. Tovstyuk's merit that his disciples, watching his example, were inspired by his spirit and unsubduedness.

A lot of forces and enthusiasm was put by K.D. Tovstyuk to the science management in the western region of Ukraine. In 1956, he organized a problem-oriented laboratory at the Chernivtsi State University (ChSU) aimed at semiconductor physics. He headed the Chair of Semiconductors at the ChSU in 1956–1968 and the Chair of Solid State Theory at I. Franko Lviv State University in 1968–1969. In 1969, following Kornii Denysovych's initiative and including his participation, the Chernivtsi branch of the Institute of Semiconductor Physics of the Academy of Sciences of the UkrSSR was organized, and K.D. Tovstyuk became its leader. The branch had two large problem-oriented laboratories subordinated to the Ministry of Defensive Industry of the USSR and the Ministry of Aircraft Industry of the USSR. He initiated and took an immediate part in the creation of electronic industry's enterprises in Chernivtsi. In 1991–2004, K.D. Tovstyuk headed the Lviv branch of repairable current sources (created by him) at the Institute for Problems of Materials Science of the National Academy of Sciences of Ukraine.

To a great extent, owing to K.D. Tovstjuk, the physical science blossomed in Chernivtsi. This town was gladly visited by V.E. Lashkaryov,

A.F. Prikhot'ko, M.M. Bogolyubov, I.R. Yukhnovskiy, and V.G. Litovchenko. K.B. Tolpygo, V.L. Bonch-Bruevych, and O.S. Davydov who lectured there, three industrial enterprises were organized and opened, and considerably more qualifying works became to be defended. Without exaggeration, K.D. Tovstyuk can be characterized as one of the founders of the semiconductor physics school in Ukraine. Under his supervision, there were defended 56 Ph.D. theses. Twenty one of those Ph.D's became Doctors of Sciences (these are I.V. Potykevych, Ya.S. Budzhak, M.P. Gavaleshko, A.V. Savytskyi, P.M. Staryk, D.M. Bercha, I.M. Rarenko, Yo.M. Stakhira, Z.V. Pankevych, Z.D. Kovalyuk, E.I. Slynko, B.A. Lukiyanets, V.I. Lytvynov, S.V. Melnychuk, A.F. Semyzorov, S.G. Kyvak, V.K. Dugaev, A.P. Khandozhko, Ya.V. Bobytskyi, I.I. Grygorchak, and A.D. Shevchenko).

Everything that Kornii Denysovych Tovstyuk made in his life was done for "his" Ukraine imagined in his dreams for a considerable period of his life. He spent the interesting dramatic life rich of unexpected traps, and it was only his sharp mind, lightning reflexes, and the fate that helped him to escape them.

Kornii Denysovych Tovstyuk died on September 16, 2004.

*D. Bercha, I. Blonsky, Ya. Bobytskyi, V. Boichuk,  
I. Grygorchak, M. Holovko, Z. Kovalyuk,  
D. Korbutyak, V. Litovchenko, B. Lukiyanets,  
S. Melnychuk, I. Mryglod, A. Savytskyi, I. Stasyuk,  
I. Stakhira, E. Slynko, M. Tkach, Korneliya Tovstyuk,  
N. Tovstyuk, O. Khandozhko, I. Yukhnovskiy*