Olga I. Yuzephovich
Senior Researcher

Birth date: June 8, 1975

Ph.D. in physics of superconductivity, 2002
Thesis: Vortex lattice commensurability effects in superconducting layered systems
Supervisor - Dr. Nina Ya. Fogel

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2005 – Research work – Technion, Haifa, Israel
2008–2015 – Research work (one month, yearly) – International Laboratory of High Magnetic Fields and Low Temperatures, Wroclaw, Poland

Research topics:
– superconductor–insulator transition in mesoscopic systems;
– transport phenomena and superconducting properties of thin superconducting films, granular Josephson media, self-assembled interfacial superconductor nanostructures based on semiconducting heterostructures $A^{IV}B^{VI}$ and superconductor-insulator artificial multilayered structures;
– vortex lattice structure, pinning and flux creep in low-dimensional systems.

Key achievements:
1. Reentrant superconductivity in parallel to the layers magnetic fields has been found for the first time on Mo/Si and W/Si multilayers. This effect was explained in terms of the intrinsic pinning and vortex lattice commensurability with the underlying layered structure. A lock-in effect has been found on Mo/Si superlattices and Vanadium thin films. Avalanche-like jumps of resistance vs magnetic field have been observed on Mo/Si superlattices with thick silicon interlayer. The jumps are periodic in inverse magnetic fields. A model of phase transitions between closely packed commensurate vortex lattices has been proposed.
2. The superconductivity of the two-layer semiconducting monochalcogenide heterostrutures PbTe/PbS, PbTe/PbSe and PbTe/YbS was found for the first time. Individual films constituting heterostructures are not superconducting. It was shown that the superconductivity in such systems is connected with band inversion in narrow gap semiconductor near the interfaces between semiconducting layers; superconducting layers are localized on the interfaces. The band inversion is caused by deformation fields of misfit dislocation grids. A model that explains the appearance of single-interface superconductivity is proposed.
3. Magnetic field tuned superconducting-insulator transition has been found in two-layer semiconducting monochalcogenide heterostrutures PbTe/PbS. It was established that the discontinuity of the superconducting interface is the necessary condition for the observation of superconductor-insulator transition and significantly affects its features: the fan-like set of curves *R(T),* the intersection of curves *R(B)* both in the perpendicular and parallel to the interface magnetic field, and the negative magnetoresistance.

Awards:
2013 - Diploma of the Kharkiv Regional State Administration and the Kharkiv regional council for a significant contribution to science and education of Slobozhanshchina
2010 - Award of the National Academy of Sciences of Ukraine for young scientists for a number of works "New quantum and size effects in mesoscopic superconducting structures"
2004 - Grant of the President of Ukraine for Young Physicist Research Works Competition
2003 - Ukrainian Academy of Science scholarship for studies in physics

Publications
Over 40 publications in refereed journals, mainly in the field of superconductivity

SOME OF LAST ARTICLES

1. N. V. Dalakova, E. Yu. Belyaev, Yu. A. Savina, O. I. Yuzephovich, S. V. Bengus, N. P. Bobrysheva
Superconductivity of ceramic samples $La_{1.85}Sr_{0.15}CuO_4$. (*in Russian*)
Bulletin of the Russian Academy of Sciences: Physics 78, 486 (2014)

2. S. V. Bengus, A. Yu. Sipatov, S. I. Yuzephovich
Suppression of superconductivity by strong magnetic fields in PbTe/PbS heterostructures with a superconducting interface.
Low Temp. Phys. 39, 695 (2013);

3. B. Kościelska, O. I. Yuzephovich, S. V. Bengus, A. Winiarski, W. Sadowski, M. Łapiński
Superconducting Properties of VN-SiO_2 Sol-Gel Derived Thin Films.
Acta physica polonica A, 121, 332 (2012)

4. O. I. Yuzephovich, S. V. Bengus, B. Koscielska, A. Witkowska
Superconductivity of 80NbN-20SiO_2 granular films.
Low Temp. Phys. 36, 1058 (2010)

5. O. I. Yuzephovich, M. Yu. Mikhailov, S. V. Bengus, A. Yu. Aladyshkin, E. E. Pestov, Yu. N. Nozdrin, A. Yu. Sipatov, E. I. Buchstab, N. Ya. Fogel
Interfacial superconductivity in bilayer and multilayer IV-VI semiconductor heterostructures.
Low Temp. Phys 34, 985 (2008)

Languages:
Russian, Ukrainian, English