National Technical University "Kharkov Polytechnic Institute"
(NTU "KhPI")
Physics and Technology Faculty

Department of General and Experimental Physics

Proposals for cooperation

ABOUT US

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Staff: professors - 3 persons, D. Sc. – 2 persons,
PhD (assistant professors, researchers) – 22 persons

RESEARCH FIELDS

Structural states, properties, and the energy spectrum quasi-low-dimensional systems with nanostructured lattice defects, i.e.

- **theory of defects and localized states,**
- **domain and coherent phase boundaries in crystals and layers,**
- **grafen, nanotubes, metals intercalated graphite.**

Photostimulation of changes in the complex glassy chalcogenides contactless diagnostics

Non-destructive contactless optical methods (laser and spectral ellipsometry, reflectometry, interferometry for basic and applied research)

Computer modeling and simulation of physical processes (educational and scientific aspects)

RESEARCH ACHIEVEMENTS

1. Effect of thermomagnetic instability $YBa_2Cu_3O_{6+x}$ structure
2. Structural phase transition 2H-$NbSe_2$ → 4H-$NbSe_2$ in quasi-two-dimensional system with Se vacancies (experiment)
3. The spectrum and the localization conditions for a charge carrier in the functionalized nanowires are found (theory)
4. Domain walls in modulated spiral multiferroics with periodically arranged topological defects (theory)
5. The properties of the films near the state of structural instability
6. The original method of laser correlation spectroscopy of nanoparticles in colloidal environments developed
7. Set of non-destructive contactless optical methods (laser and spectral ellipsometry, reflectometry, interferometry) for investigation of radiation-induced processes on metal surfaces

RECENT MAIN PUBLICATIONS

1. A. Feher, S.B. Feodosyev, I.A. Gospodarev, E. S. Syrkin, V.I. Grishaev // Chapter 19. Phonon Spectrum and Vibrational Thermodynamic Characteristics of Graphene Nanofilms / Graphene Science Handbook: Nanostructure and Atomic Arrangement - CRC Press , 2016 – P. 289-304
2. V.V. Eremenko, V.A. Sirenko, I.A. Gospodarev, E.S. Syrkin, S.S. Saxena, A. Feher S.B. Feodosyev, I.S. Bondar, K.A. Minakova /Effect of step-edge on spectral properties and planar stability of metallic bigraphene / /Low Temp. Phys. – 2016. – V. 42, №.2. – P.134-141.
3. V.A.Lykah, E.S.Syrkin. Quantum Behavior of the Twin Boundary and the Stacking Fault in hcp Helium Crystals. J. Low Temp. Phys. 2015, V. 181, pp. 10-29
4. Haoxue Han, L. G. Potyomina, A. A. Darinskii, Sebastian V., and Y. A. Kosevich. Phonon interference and thermal conductance reduction in atomic-scale metamaterials. Phys. Rev. B 89, 180301(R) – 2014
5. E. Fertman, E. Syrkin, V. Lykah, V. Denisenko, A Beznosov , P Pal-Val, L Pal-Val, A. Fedorchenko, D Halyavin, and A. Feher. Structural phase transition in La23/Ba1/3MnO3 perovskite: Elastic, magnetic, and lattice anomalies and microscopic mechanism. AIP Advances (2015); V.7 p. 077189

RECENT MAIN PUBLICATIONS

6. V.A.Lykah, E.S.Syrkin. Local oscillations in different models of coherent bcc-hcp boundary in ^{4}He and metals. Phys. status solidi (b), vol. 248, pp. 1392-1398; 2011 7. V.A.Lykah. Domains and Domain Walls in Multiferroic Ferroelectric-Ferromagnet and Control of Its Modulation. // Ferroelectrics, 2010, - V. 398, No~1. - P. 71 - 76.
8. Mamaluy AA , Braude J.S., Onishko O.N. Structural change in single crystals NbSe2 after high-temperature treatment — Journ. of Alloys and Compounds, v 486,1-2, 2009, p.859-863
9. V.I. Bilozertseva, D.A. Gaman, H.M. Khlyap, A.A. Mamalui, N.L. Dyakonenko, L.G. Petrenko, Nanostructured $NaBiTe_2$ Thin Films and Their Properties // Journal of nano- and electronic physics, Vol. 4 No 1, 01019(5pp) (2012).
10. A. A. Galuza, V. K. Kiseliov, I. V. Kolenov, A. I. Belyaeva, Y. M. Kuleshov. Developments in THz-Range Ellipsometry: Quasi-Optical Ellipsometer // IEEE Transactions on Terahertz Science and Technology. - 2016. - Vol. 6, no. 2. - P. 183-190.
11. A.I. Belyaeva, A.A. Galuza, V.K. Kiseliov, I.V. Kolenov, A.A. Savchenko, E.M. Kuleshov, S.Yu. Serebriansky / Quasioptical scale modeling of the influence of metal surface localized defects based on the optical ellipsometry data // Telecommunications and Radio Engineering, 74 (2):171-181 (2015)

PROPOSALS FOR COOPERATION

We invite to cooperate in the field of theoretical and experimental research of new low dimensional materials and films, the methods of their structure and properties tuning

We invite to cooperate in developing educational projects due to our 15 year experience in successful implementation of international projects in e-learning area including computer modeling and simulation