

**ADVANCING THE CREATIVE PHASES OF INNOVATION PROCESSES  
IN THE FIELD OF EDUCATION**

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***Abstract.*** *At the moment, serious changes are being made in the national policy in the field of education in our country. This is related to the transition to a person-centered pedagogy position. One of the tasks of a modern school is to open the possibilities of all participants of the pedagogical process, to give them the opportunity to show their creative abilities. Solving these problems is not possible without implementing the variability of educational processes, in connection with which there are various innovative types and types of educational institutions that require deep scientific and practical understanding. This article analyzes the stages of innovative processes in education.*

***Keywords:*** *innovation, innovative process, technology, pedagogical technology, educational innovative process.*

**Introduction.** The modern Uzbek school is a product of the extensive reforms that have been implemented in the national education system in recent years. The development of the educational system is driven by the creation, dissemination, and assimilation of innovations. In the field of education, an innovative process refers to the renewal and transformation of educational concepts, the content of curricula, teaching methods and techniques, and approaches to instruction and upbringing. The goal of innovation in education is to fundamentally transform the existing traditional elements of the education system or the relationships between them, thereby achieving a new qualitative state of the system. Ongoing reforms in the education sector point to deep transformations that include the democratization and humanization of the system, the renewal of educational management mechanisms,



and an objective demand for improving the quality of education. These changes underscore the necessity of preparing educators for innovative professional activity.

**Literature Review.** In her article titled “Developing Students’ Creative Abilities through Pedagogical Innovations”, published in the journal Pedagogical Technologies, G. Ibragimova explores the concepts of creativity and pedagogical innovation. She emphasizes that:

“The main criterion for innovative methods lies in their novelty, their grounding in scientific research findings, and their consistency with advanced pedagogical practices. Therefore, it is of great importance for educators engaged in innovative activities to understand the essence of what constitutes ‘novelty.’ What may appear completely new to one teacher may not be perceived as such by another. Likewise, for future educators, the degree of novelty of a particular method can vary significantly. For this reason, both current and prospective teachers should engage in innovative and creative activities voluntarily, based on their personal needs and motivations. This engagement is directly linked to their individual characteristics and psycho-personal traits.”

The scholarly research of educators such as O.Jamoliddinova, O.Musurmonova, M.Urozova, N.Egamberdieva, E.Yuzlikayeva, Sh.Sharipov and Sh.Shodmonova highlights the distinctive aspects of developing creativity in learners, which play a crucial role in shaping the professional and innovative readiness of future specialists. Their studies explore how fostering creative qualities influences social factors, individual activity, and methods for cultivating critical and creative thinking among students. The existing pedagogical conditions, didactic support, and the content of pedagogical creativity are thoroughly examined.

Understanding the essence of pedagogical innovations and integrating their methods into the practical experience of future teachers are of vital importance. To broadly introduce pedagogical innovations into educational institutions, it is necessary to foster an environment of novelty, cultivate specific moral-psychological conditions, and implement organizational, methodological, and psychological measures.



In this regard, it is essential to develop the creative functions of prospective teachers, systematically equip them with pedagogical innovations, and teach them to analyze and apply innovative methods effectively. This approach aims to enrich the professional competence of future educators and ensure the successful implementation of innovative pedagogical practices.

**Research methodology.** Creativity manifests as a set of skills related to a person's inventive and innovative qualities. It encompasses heightened sensitivity to problems, intuition, foreknowledge of outcomes, imagination, inquiry, and reflection.

Systematic study of learners' pedagogical needs, interests, and priority areas is essential, along with identifying effective ways to overcome psychological barriers that may hinder the organization of their creative activities. Organizing the teaching process based on ideas, concepts, and advanced pedagogical practices that address learners' creative interests and needs facilitates the development of meaningful and active approaches to nurturing creativity. Special attention should be paid to enhancing learners' creative skills and fostering their professional pedagogical competence, with the widespread use of modern information communication technologies, innovative strategies, interactive teaching methods, and technologies being particularly appropriate in this context.

The creation of an innovative environment within higher education institutions has a profound impact on the quality of training future teachers. This, in turn, directly influences their development and nurturing of creativity and inventiveness; without an innovative environment, these qualities tend to decline and stagnate. Due to learners' consistent adoption of innovations, conflicts among teachers within the pedagogical team decrease, and outdated patterns in professional activity are eliminated. The attitude of teachers towards innovation in the educational environment clearly reflects their openness to new approaches and change.

Furthermore, several scholars have expressed opinions regarding an individual's orientation toward pedagogical activity, including statements such as "the person's interest in the pedagogical profession and enthusiasm for engaging in this type of activity," "attitude towards children, passion for pedagogical labor, and





pedagogical vigilance.” Thus, an individual's orientation toward pedagogical work is determined by their outlook, interest in the teaching profession, and aptitude for working in this field.

Currently, a modern pedagogue and a highly qualified specialist cannot be considered such without understanding the nature of innovative movements in education, without comprehending the essence of innovative pedagogical activity, and without widespread familiarity with innovative teaching technologies.

In the exploration of innovative processes in education, a range of theoretical and methodological issues related to innovations and teachers' creative activity are being advanced. These include evaluation criteria for innovations, existing traditions and innovations, features of the innovation cycle, teachers' attitudes toward innovations, and so forth. Often, researchers focus on specific aspects of preparing teachers (educators) for innovative activity:

- Issues of implementing innovations in education systems;
- The role of research components within teachers' (educators') innovative activities;
- How teachers' social and cultural problems, the transition between mass and personal culture, and the harmony between individual and team activity are addressed;
- Main motives behind teachers' attitudes toward innovations, their readiness and motivation to incorporate new technologies into the educational process;
- The interrelation between teachers' innovative activities and reflective practices;
- Psychological issues in adopting pedagogical innovations within the educational system;
- Theoretical and methodological foundations of the essence, structure, and evaluation criteria of pedagogical innovations.

**Analysis and Results.** Among research efforts focused on preparing teachers for innovative activities, the work of M.V. Klarin occupies a significant place. In his studies, he links the development of innovation-related activities to the necessity of continuous education through the development and implementation of social and



cultural projects. This approach emphasizes individuals' freedom of choice, with learning activities playing a leading role and serving as a crucial, guiding tool in personal development—an effective method for engaging individuals in the educational process.

Organizing the innovative activities of educational institutions and managing changes within their content are intrinsically connected to methodological and technological innovations in teacher training. However, this process remains largely informal due to the absence of specific recommendations on preparing teachers for innovation and enhancing their capabilities.

The process of preparing teachers for innovative activity proceeds as follows: predicting the success of planned innovations and their various stages; comparing these innovations with other existing innovations; selecting the most effective and precise ones; assessing their relevance; evaluating the success of implementation; and finally, appraising the organization's ability to adopt innovation. This comprehensive approach aims to systematically enhance teachers' readiness for innovation and facilitate effective integration of new pedagogical practices.

Preparing teachers for innovative activity should be implemented along two main directions:

- Developing innovative readiness to perceive and understand new innovations;
- Teaching the ability to act in novel and unconventional ways.

T.M. Dovidenko emphasizes that for mastering any pedagogical innovation, three essential conditions must be met: "understanding, reflection, and personal readiness." An educator engaged in innovative activities should be an advanced, creative individual with broad interests, rich inner world, and a strong commitment to pedagogical innovations.

Innovative activity comprises motivational, technological, and reflective components. Organizing such activity requires careful management of students' knowledge acquisition and its regulation, which are of particular importance in



ensuring effective implementation and fostering an innovative pedagogical environment.

In the process of preparing teachers for innovative activity, the problems and obstacles can be viewed in the following situations:

1. Understanding the necessity of innovation, the willingness to engage in creative activities aimed at introducing new ideas into the educational institution, and confidence that efforts to implement innovations will yield positive results.

2. Alignment and consistency of personal goals with innovative activities, and the ability to overcome fears of creative failure through perseverance.

3. Developing teachers' readiness to perceive innovations effectively and forming skills to act creatively in new ways, which are essential for guiding educators toward successful engagement in innovative pedagogical practices.

**Conclusion.** While research in various scientific and methodological fields is undoubtedly essential and valuable, the primary unresolved challenge for all pedagogical scholars remains: how to effectively organize and manage the training of future educators for innovative professional activity.

At higher education institutions, it is imperative to develop and implement creative-oriented curricula that explicitly support the effectiveness of the reproductive, creative-research, and innovation stages in the development of students' creative skills and competencies, along with ongoing assessment of their progress.

Moreover, continuous improvement of instructional programs and technological tools aimed at fostering teachers' creative competence, as well as establishing modern informational and methodological support systems that facilitate the development of students' creative abilities, are crucial strategies for enhancing the overall efficiency of the educational process. These efforts are essential for cultivating innovative pedagogical environments and for preparing educators capable of successfully applying innovative practices in their professional activities.



**REFERENCES**

1. Aver'yanov, P.F., Chizh, A.G., Islamova, E.A. Priorities in Modernizing Education. Fundamental Research, 2008, No. 8, pp. 66–67.
2. Muslimov, N.A., et al. Developing the Pedagogical Innovation Activity. Tashkent, 2019.
3. Karimova, G., Azamatova, N. Criteria for Formation of Future Teachers' Professional Competence. // "Xalq Ta'limi" Journal. Tashkent, 2006, No. 3, pp. 54–57.
4. Rakhimova N. The importance of using innovation and pedagogical technologies in teaching the Uzbek language. World scientific research journal. 2024. Vol.24, Iss.1, pp.247-254.
5. N. Rakhimova. Interactive Methods of Teaching the Uzbek Language. Web of Teachers: Inderscience Research. 2023. Volume 1, Issue 2, pp.6-9.
6. N. Rakhimova. Methods of teaching the Uzbek language in professional education. Intent Research Scientific Journal-(IRSJ). 2023. Vol.2, Iss.5, pp.28-36.
7. N. Rakhimova. Professional education as an effective opportunity for youth to acquire vocational skills. European Journal of Pedagogical Initiatives and Educational Practices. 2025. Volume 3, Issue 1, pp.50-52.
8. N. Rakhimova. The importance of digital education in improving Uzbek language literacy and speech. International journal of advanced research in education, technology and management. 2023. Vol.1, pp.373-383
9. G. Narimonova. Interactive teaching methods in foreign language lessons // JournalNX- A Multidisciplinary Peer Reviewed Journal. Vol.10, Iss.12, pp.13-17 (2024)
10. G. Narimonova. Psycholinguistics as a tool for in-depth study of speech and language. - Science and Education. 2022, Vol.3, Iss.2, pp.546-550
11. Abdullayeva S., Narimonova G. External laws of language development. Proceedings of International Educators Conference. Vol.2, Iss.3, pp.59-62.



12. Наримонова Г. Ключевые тенденции развития русского литературного языка. Евразийский журнал академических исследований. Том 2, №6, стр.544-546.
13. Наримонова Г.Н. Внешние законы развития языка. НамГУ - научный вестник одарённых студентов. Том 1, № 1, стр.215-218
14. Narimonova G. Modern Information Technologies in Teaching the Russian Language. Journal of Pedagogical Inventions and Practices. 2023. Vol.27, pp.3-5.
15. Narimonova G. Changes in the Russian Language in the Modern Period and Language Policy. Texas Journal of Philology, Culture and History. 2023. Vol.25, pp.40-43.
16. Narimonova G. Key trends in the development of the Russian literary language. Eurasian Journal of Academic Research. 2023. Vol. 2, Iss. 6, pp. 544-546.
17. G.N. Narimonova. External laws of language development. Scientific bulletin of gifted students of NamSU. 2023. Vol. 1, Iss. 1, pp. 215-218.
18. Г. Наримонова. Ключевые тенденции развития русского литературного языка. Евразийский журнал академических исследований. 2022. Том 2, № 6, стр.544-546.
19. Наримонова Г.Н. Психологические аспекты изучения русского языка // «Методы и технологии в преподавании РКИ в контексте современных образовательных парадигм». Международная научно-практическая конференция. 2024. Наманган. 7-8 октября.
20. G.Narimonova, Z.Turgunpulatova. Methodology of teaching Russian language and literature // Ta'limning zamonaviy transformatsiyasi. 2024. Vol.7, Iss.5, pp.239-245.
21. G.Narimonova. Psycholinguistic bases of work with the text at the lessons of Russian language and literature // Western European Journal of Linguistics and Education. 2024. Vol.2, Iss.4, pp.164-172.
22. G. Narimonova. Interactive methods of teaching in foreign language classes // Scientific Bulletin of NamSU. Special issue, pp.891-896. (2024)





23. R.G. Rakhimov. Clean the cotton from small impurities and establish optimal parameters // The Peerian Journal. Vol. 17, pp.57-63 (2023)
24. R.G. Rakhimov. The advantages of innovative and pedagogical approaches in the education system // Scientific-technical journal of NamIET. Vol. 5, Iss. 3, pp.293-297 (2023)
25. F.G. Uzoqov, R.G. Rakhimov. Movement in a vibrating cotton seed sorter // DGU 22810. 03.03.2023
26. F.G. Uzoqov, R.G. Rakhimov. The program "Creation of an online platform of food sales" // DGU 22388. 22.02.2023
27. F.G. Uzoqov, R.G. Rakhimov. Calculation of cutting modes by milling // DGU 22812. 03.03.2023
28. F.G. Uzoqov, R.G. Rakhimov. Determining the hardness coefficient of the sewing-knitting machine needle // DGU 23281. 15.03.2023
29. N.D. Nuritdinov, M.N. O'rmonov, R.G. Rahimov. Creating special neural network layers using the Spatial Transformer Network model of MatLAB software and using spatial transformation // DGU 19882. 03.12.2023
30. F.G. Uzoqov, R.G. Rakhimov, S.Sh. Ro'zimatov. Online monitoring of education through software // DGU 18782. 22.10.2022
31. F.G. Uzoqov, R.G. Rakhimov. Electronic textbook on "Mechanical engineering technology" // DGU 14725. 24.02.2022
32. F.G. Uzoqov, R.G. Rakhimov. Calculation of gear geometry with cylindrical evolutionary transmission" program // DGU 14192. 14.01.2022
33. R.G. Rakhimov. Clean the surface of the cloth with a small amount of water // Scientific Journal of Mechanics and Technology. Vol. 2, Iss. 5, pp.293-297 (2023)
34. R.G. Rakhimov. Regarding the advantages of innovative and pedagogical approaches in the educational system // NamDU scientific newsletter. Special. (2020)
35. R.G. Rakhimov. A cleaner of raw cotton from fine litter // Scientific journal of mechanics and technology. Vol. 2, Iss. 5, pp.293-297 (2023)
36. R.G. Rakhimov. On the merits of innovative and pedagogical approaches in the educational system // NamSU Scientific Bulletin. Special. (2020)



37. R.G. Raximov, M.A. Azamov. Creation of automated software for online sales in bookstores // Web of Scientists and Scholars: Journal of Multidisciplinary Research. Vol. 2, Iss. 6, pp.42-55 (2024)
38. R.G. Raximov, M.A. Azamov. Technology for creating an electronic tutorial // Web of Scientists and Scholars: Journal of Multidisciplinary Research. Vol. 2, Iss.6, pp.56-64 (2024)
39. R.G. Rakhimov, A.A. Juraev. Designing of computer network in Cisco Packet Tracer software // The Peerian Journal. Vol. 31, pp.34-50 (2024)
40. R.G. Rakhimov, E.D. Turonboev. Using educational electronic software in the educational process and their importance // The Peerian Journal. Vol. 31, pp.51-61 (2024)
41. Sh. Korabayev, J. Soloxiddinov, N. Odilkhonova, R. Rakhimov, A. Jabborov, A.A. Qosimov. A study of cotton fiber movement in pneumomechanical spinning machine adapter // E3S Web of Conferences. Vol. 538, Article ID 04009 (2024)
42. U.I. Erkaboev, R.G. Rakhimov, N.A. Sayidov. Mathematical modeling determination coefficient of magneto-optical absorption in semiconductors in presence of external pressure and temperature // Modern Physics Letters B. 2021, 2150293 pp, (2021).
43. U.I. Erkaboev, R.G. Rakhimov, J.I. Mirzaev, N.A. Sayidov. The influence of external factors on quantum magnetic effects in electronic semiconductor structures // International Journal of Innovative Technology and Exploring Engineering. 9, 5, 1557-1563 pp, (2020).
44. Erkaboev U.I, Rakhimov R.G., Sayidov N.A. Influence of pressure on Landau levels of electrons in the conductivity zone with the parabolic dispersion law // Euroasian Journal of Semiconductors Science and Engineering. 2020. Vol.2., Iss.1.
45. Rakhimov R.G. Determination magnetic quantum effects in semiconductors at different temperatures // VII Международной научнопрактической конференции «Science and Education: problems and innovations». 2021. pp.12-16.
46. Gulyamov G, Erkaboev U.I., Rakhimov R.G., Sayidov N.A., Mirzaev J.I. Influence of a strong magnetic field on Fermi energy oscillations in two-dimensional



- semiconductor materials // Scientific Bulletin. Physical and Mathematical Research. 2021. Vol.3, Iss.1, pp.5-14
47. Erkaboev U.I., Sayidov N.A., Rakhimov R.G., Negmatov U.M. Simulation of the temperature dependence of the quantum oscillations' effects in 2D semiconductor materials // Euroasian Journal of Semiconductors Science and Engineering. 2021. Vol.3., Iss.1.
48. Gulyamov G., Erkaboev U.I., Rakhimov R.G., Mirzaev J.I. On temperature dependence of longitudinal electrical conductivity oscillations in narrow-gap electronic semiconductors // Journal of Nano- and Electronic Physic. 2020. Vol.12, Iss.3, Article ID 03012.
49. Erkaboev U.I., Gulyamov G., Mirzaev J.I., Rakhimov R.G. Modeling on the temperature dependence of the magnetic susceptibility and electrical conductivity oscillations in narrow-gap semiconductors // International Journal of Modern Physics B. 2020. Vol.34, Iss.7, Article ID 2050052.
50. Erkaboev U.I., R.G.Rakhimov. Modeling of Shubnikov-de Haas oscillations in narrow band gap semiconductors under the effect of temperature and microwave field // Scientific Bulletin of Namangan State University. 2020. Vol.2, Iss.11. pp.27-35
51. Gulyamov G., Erkaboev U.I., Sayidov N.A., Rakhimov R.G. The influence of temperature on magnetic quantum effects in semiconductor structures // Journal of Applied Science and Engineering. 2020. Vol.23, Iss.3, pp. 453–460.
52. Erkaboev U.I., Gulyamov G., Mirzaev J.I., Rakhimov R.G., Sayidov N.A. Calculation of the Fermi–Dirac Function Distribution in Two-Dimensional Semiconductor Materials at High Temperatures and Weak Magnetic Fields // Nano. 2021. Vol.16, Iss.9. Article ID 2150102.
53. Erkaboev U.I., R.G.Rakhimov. Modeling the influence of temperature on electron landau levels in semiconductors // Scientific Bulletin of Namangan State University. 2020. Vol.2, Iss.12. pp.36-42
54. Erkaboev U.I., Gulyamov G., Mirzaev J.I., Rakhimov R.G., Sayidov N.A. Calculation of the Fermi-Dirac Function Distribution in Two-Dimensional





- Semiconductor Materials at High Temperatures and Weak Magnetic Fields // Nano. 2021. Vol.16, Iss.9, Article ID 2150102.
55. Erkaboev U.I., Rakhimov R.G., Sayidov N.A., Mirzaev J.I. Modeling the temperature dependence of the density oscillation of energy states in two-dimensional electronic gases under the impact of a longitudinal and transversal quantum magnetic fields // Indian Journal of Physics. 2022. Vol.96, Iss.10, Article ID 02435.
56. Erkaboev U.I., Negmatov U.M., Rakhimov R.G., Mirzaev J.I., Sayidov N.A. Influence of a quantizing magnetic field on the Fermi energy oscillations in two-dimensional semiconductors // International Journal of Applied Science and Engineering. 2022. Vol.19, Iss.2, Article ID 2021123.
57. Erkaboev U.I., Gulyamov G., Rakhimov R.G. A new method for determining the bandgap in semiconductors in presence of external action taking into account lattice vibrations // Indian Journal of Physics. 2022. Vol.96, Iss.8, pp. 2359-2368.
58. U. Erkaboev, R. Rakhimov, J. Mirzaev, U. Negmatov, N. Sayidov. Influence of the two-dimensional density of states on the temperature dependence of the electrical conductivity oscillations in heterostructures with quantum wells // International Journal of Modern Physics B. **38**(15), Article ID 2450185 (2024).
59. U.I. Erkaboev, R.G. Rakhimov. Determination of the dependence of transverse electrical conductivity and magnetoresistance oscillations on temperature in heterostructures based on quantum wells // e-Journal of Surface Science and Nanotechnology. **22**(2), pp.98-106. (2024)
60. U.I. Erkaboev, N.A. Sayidov, J.I. Mirzaev, R.G. Rakhimov. Determination of the temperature dependence of the Fermi energy oscillations in nanostructured semiconductor materials in the presence of a quantizing magnetic field // Euroasian Journal of Semiconductors Science and Engineering. **3**(2), pp.47-52 (2021).
61. U.I. Erkaboev, N.A. Sayidov, U.M. Negmatov, J.I. Mirzaev, R.G. Rakhimov. Influence temperature and strong magnetic field on oscillations of density of energy states in heterostructures with quantum wells HgCdTe/CdHgTe // E3S Web of Conferences. **401**, 01090 (2023)



62. U.I. Erkaboev, N.A. Sayidov, U.M.Negmatov, R.G. Rakhimov, J.I. Mirzaev. Temperature dependence of width band gap in  $\text{In}_x\text{Ga}_{1-x}\text{As}$  quantum well in presence of transverse strong magnetic field // E3S Web of Conferences. 401, 04042 (2023)
63. Erkaboev U.I., Rakhimov R.G., Sayidov N.A., Mirzaev J.I. Modeling the temperature dependence of the density oscillation of energy states in two-dimensional electronic gases under the impact of a longitudinal and transversal quantum magnetic fields // Indian Journal of Physics. 2023. Vol.97, Iss.4, 99.1061-1070.
64. G. Gulyamov, U.I. Erkaboev, R.G. Rakhimov, J.I. Mirzaev, N.A. Sayidov. Determination of the dependence of the two-dimensional combined density of states on external factors in quantum-dimensional heterostructures // Modern Physics Letters B. 2023. Vol. 37, Iss.10, Article ID 2350015.
65. U.I. Erkaboev, R.G. Rakhimov. Determination of the dependence of the oscillation of transverse electrical conductivity and magnetoresistance on temperature in heterostructures based on quantum wells // East European Journal of Physics. 2023. Iss.3, pp.133-145.
66. U.I. Erkaboev, R.G. Rakhimov, J.I. Mirzaev, U.M. Negmatov, N.A. Sayidov. Influence of a magnetic field and temperature on the oscillations of the combined density of states in two-dimensional semiconductor materials // Indian Journal of Physics. 2024. Vol. 98, Iss. 1, pp.189-197.
67. U. Erkaboev, R. Rakhimov, J. Mirzaev, N. Sayidov, U. Negmatov, A. Mashrapov. Determination of the band gap of heterostructural materials with quantum wells at strong magnetic field and high temperature // AIP Conference Proceedings. 2023. Vol. 2789, Iss.1, Article ID 040056.
68. U.I. Erkaboev, R.G. Rakhimov. Simulation of temperature dependence of oscillations of longitudinal magnetoresistance in nanoelectronic semiconductor materials // e-Prime-Advances in Electrical Engineering, Electronics and Energy. 2023. Vol. 5, Article ID 100236.
69. U.I. Erkaboev, R.G. Rakhimov, N.Y. Azimova. Determination of oscillations of the density of energy states in nanoscale semiconductor materials at different



- temperatures and quantizing magnetic fields // Global Scientific Review. 2023. Vol.12, pp.33-49
70. U.I. Erkaboev, R.G. Rakhimov, U.M. Negmatov, N.A. Sayidov, J.I. Mirzaev. Influence of a strong magnetic field on the temperature dependence of the two-dimensional combined density of states in InGaN/GaN quantum well heterostructures // Romanian Journal of Physics. 2023. Vol. 68, Iss. 5-6, pp.614-1.
71. R. Rakhimov, U. Erkaboev. Modeling of Shubnikov-de Haas oscillations in narrow band gap semiconductors under the effect of temperature and microwave field // Scientific Bulletin of Namangan State University. 2020. Vol.2, Iss. 11, pp.27-35.
72. U. Erkaboev, R. Rakhimov, J. Mirzaev, N. Sayidov, U. Negmatov, M. Abduxalimov. Calculation of oscillations in the density of energy states in heterostructural materials with quantum wells // AIP Conference Proceedings. Vol. 2789, Iss.1, Article ID 040055.
73. R. Rakhimov, U. Erkaboev. Modeling the influence of temperature on electron Landau levels in semiconductors // Scientific and Technical Journal of Namangan Institute of Engineering and Technology. 2020. Vol. 2, Iss. 12, pp.36-42.
74. U.I. Erkaboev, R.G. Rakhimov. Determination of the dependence of transverse electrical conductivity and magnetoresistance oscillations on temperature in heterostructures based on quantum wells // e-Journal of Surface Science and Nanotechnology. 2023
75. У.И. Эркабоев, Р.Г. Рахимов, Ж.И. Мирзаев, Н.А. Сайидов, У.М. Негматов. Вычисление осцилляций плотности энергетических состояний в гетеронаноструктурных материалах при наличии продольного и поперечного сильного магнитного поля // Научные основы использования информационных технологий нового уровня и современные проблемы автоматизации : I Международной научной конференции, 25-26 апреля 2022 года. стр.341-344.
76. U.I. Erkaboev, R.G. Rakhimov. Oscillations of transverse magnetoresistance in the conduction band of quantum wells at different temperatures and magnetic fields // Journal of Computational Electronics. 2024. Vol. 23, Iss. 2, pp.279-290





77. У.И. Эркабоев, Р.Г. Рахимов, Ж.И. Мирзаев, Н.А. Сайидов, У.М. Негматов. Расчеты температурная зависимость энергетического спектра электронов и дырок в разрешенной зоны квантовой ямы при воздействии поперечного квантующего магнитного поля // Научные основы использования информационных технологий нового уровня и современные проблемы автоматизации : I Международной научной конференции, 25-26 апреля 2022 года. стр.344-347.
78. U.I. Erkaboev, R.G. Rakhimov, J.I. Mirzaev, N.A. Sayidov, U.M. Negmatov. Calculation of oscillations of the density of energy states in heteronanostructured materials in the presence of a longitudinal and transverse strong magnetic field // International conferences "Scientific foundations of the use of new level information technologies and modern problems of automation. 2022. pp.341-344
79. U.I. Erkaboev, R.G. Rakhimov, J.I. Mirzaev, N.A. Sayidov, U.M. Negmatov. Calculations of the temperature dependence of the energy spectrum of electrons and holes in the allowed zone of a quantum well under the influence of a transverse quantizing magnetic field // International conferences "Scientific foundations of the use of new level information technologies and modern problems of automation. 2022. pp.344-347
80. R.G. Rakhimov, U.I. Erkaboev. Modeling of Shubnikov-de Haase oscillations in narrow-band semiconductors under the influence of temperature and microwave fields // Scientific Bulletin of Namangan State University. 2022. Vol. 4, Iss.4, pp.242-246.
81. R.G. Rakhimov. The advantages of innovative and pedagogical approaches in the education system // Scientific-technical journal of NamIET. Vol. 5, Iss. 3, pp.292-296 (2020)
82. Р.Г. Рахимов, У.И. Эркабоев. Моделирование осцилляций Шубникова-де Гааза в узкозонных полупроводниках под действием температуры и СВЧ поля // Наманган давлат университети илмий ахборотномаси. 2019. Vol. 4, Iss. 4, pp.242-246



83. U.I. Erkaboev, R.G. Rakhimov, J.I. Mirzaev, N.A. Sayidov, U.M. Negmatov. Modeling the Temperature Dependence of Shubnikov-De Haas Oscillations in Light-Induced Nanostructured Semiconductors // East European Journal of Physics. 2024. Iss. 1, pp. 485-492.
84. M. Dadamirzaev, U. Erkaboev, N. Sharibaev, R. Rakhimov. Simulation the effects of temperature and magnetic field on the density of surface states in semiconductor heterostructures // Iranian Journal of Physics Research. 2024
85. U.I. Erkaboev, N.Yu. Sharibaev, M.G. Dadamirzaev, R.G. Rakhimov. Effect of temperature and magnetic field on the density of surface states in semiconductor heterostructures // e-Prime-Advances in Electrical Engineering, Electronics and Energy. 2024. Vol.10, Article ID 100815.
86. U.I. Erkaboev, Sh.A. Ruzaliev, R.G. Rakhimov, N.A. Sayidov. Modeling Temperature Dependence of The Combined Density of States in Heterostructures with Quantum Wells Under the Influence of a Quantizing Magnetic Field // East European Journal of Physics. 2024. Iss.3, pp.270-277.
87. U.I. Erkaboev, N.Yu. Sharibaev, M.G. Dadamirzaev, R.G. Rakhimov. Modeling influence of temperature and magnetic field on the density of surface states in semiconductor structures // Indian Journal of Physics. 2024.
88. U.I. Erkaboev, G. Gulyamov, M. Dadamirzaev, R.G. Rakhimov, J.I. Mirzaev, N.A. Sayidov, U.M. Negmatov. The influence of light on transverse magnetoresistance oscillations in low-dimensional semiconductor structures // Indian Journal of Physics. 2024.
89. Р.Г. Рахимов. Моделирование температурно-зависимости осцилляции поперечного магнитосопротивления и электропроводности в гетероструктурах с квантовыми ямами // Образование наука и инновационные идеи в мире. 2024. Vol. 37, Iss. 5, pp.137-152.
90. N. Sharibaev, A. Jabborov, R. Rakhimov, Sh. Korabayev, R. Sapayev. A new method for digital processing cardio signals using the wavelet function // BIO Web of Conferences. 2024. Vol. 130, Article ID 04008.



91. A.M. Sultanov, E.K. Yusupov, R.G. Rakhimov. Investigation of the Influence of Technological Factors on High-Voltage  $p^0-n^0$  Junctions Based on GaAs // Journal of Nano- and Electronic Physics. 2024. Vol. 16, Iss. 2, Article ID 01006.
92. U.I. Erkaboev, R.G. Rakhimov, J.I. Mirzaev, N.A. Sayidov, U.M. Negmatov. Influence of temperature and light on magnetoresistance and electrical conductivity oscillations in quantum well heterostructured semiconductors // Romanian Journal of Physics. 2024. Vol. 69, pp.610
93. У.И. Эркабоев, Р.Г. Рахимов, Ж.И. Мирзаев, Н.А. Сайидов, У.М. Негматов, С.И. Гайратов. Влияние температуры на осцилляции поперечного магнитосопротивления в низкоразмерных полупроводниковых структурах // Namangan davlat universiteti Ilmiy axborotnomasi. 2023. Iss. 8, pp.40-48.
94. U. Erkaboev, N. Sayidov, R. Raximov, U. Negmatov, J. Mirzaev. Kvant o'rali geterostrukturalarda kombinatsiyalangan holatlar zichligiga magnit maydon va haroratning ta'siri // Namangan davlat universiteti Ilmiy axborotnomasi. 2023. Iss. 6, pp.16-22
95. У.И. Эркабоев, Р.Г. Рахимов. Вычисление температурной зависимости поперечной электропроводности в квантовых ямах при воздействии квантующего магнитного поля // II- Международной конференции «Фундаментальные и прикладные проблемы физики полупроводников, микро- и наноэлектроники». Ташкент, 27-28 октября 2023 г. стр.66-68.
96. R.G.Rakhimov. Simulation of the temperature dependence of the oscillation of magnetosistivity in nanosized semiconductor structures under the exposure to external fields // Web of Technology: Multidimensional Research Journal. 2024. Vol.2, Iss.11, pp.209-221