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Eureka Journal of Artificial Intelligence and Data Innovation (EJAIDI)

ISSN 2760-5000 (Online) Volume 01, Issue 02, December 2025

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COTTON RAW MATERIAL DRYER TECHNOLOGY

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Abstract

The requirements for the design of a drying drum are determined based on the indicators of the main characteristic of a grafted cotton as a drying object. The moisture content of tangled cotton harvested in cotton harvesters is on average 10-18%, which in this case cannot be transferred to long storage or operation. If the moisture content of tangled cotton is higher than 13-14%, then biological processes take place in the pollen and heat is released from microorganisms in the cotton. On the basis of this, a breakdown occurs. This in its case affects the physicochemical nature of the fiber. In addition to it, a high level of moisture reduces the working performance of the machine as well as the cleaning efficiency when cleaning cotton and Jinning it.

Keywords: Conditioning moisture, technological moisture, bark, cotton moisture, dryer, moisture content, fiber separation, dried corn, dried bark, dirt, dry cotton, relative humidity.

Introduction

The standards for conditioning moisture content and technological moisture content of cotton differ significantly. The conditioning moisture standard is established based on the requirement for long-term storage of cotton in bales. In contrast, the technological moisture standard is determined in such a way that cotton cleaning and fiber separation processes are highly productive, while the quality and degree of fiber cleanliness remain high.

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The technological moisture content is generally considered to be 6–7% for high-grade seed cotton and up to 6% for fiber, while for lower-grade cotton it is 8–9% for seed cotton and up to 7–8% for fiber.

Fiber, which is the most valuable component of cotton, mainly consists of cellulose with small amounts of pectic substances and waxy compounds covering the fiber surface. The seeds contain a scaly husk and pulp. The husk is composed of cellulose, lignin, proteins, and minerals. The seed kernel mainly consists of proteins and fats, while the seed coat (mote/murtak) contains proteins, carbohydrates, organic acids, and mineral acids.

The components of seed cotton differ significantly in their geometric, physical, chemical, and thermodynamic properties.

According to scientific research conducted at the Production Scientific Center "Cotton Industry", when the moisture content of Grade I seed cotton increases from 8% to 9%, fiber defects increase by 0.3–0.4%. When the moisture content of Grade III–IV cotton increases from 9% to 14–16%, fiber defects increase by 40–50%.

Therefore, the moisture content of cotton must be adjusted to the standard values by air conditioning. This task is performed by drum-type dryers at cotton ginning enterprises.

Functions of Cotton Dryers. Cotton dryers are used to reduce the moisture content of cotton to the conditioning level during acceptance and to the technological level during processing operations at cotton ginning and cotton-processing enterprises.

Technological Requirements for Cotton Dryers. During the drying process, neither the fiber nor the seeds should be overheated or subjected to mechanical damage. For this purpose, the temperature of the fiber should not exceed 373–378 K, and that of seed cotton should not exceed 338–343 K.

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The drying process must be continuous, the moisture removal must be controllable, and a high degree of drying uniformity must be ensured.
In the design of a cotton dryer, it is advisable to perform drying simultaneously with cleaning. The loading and unloading of cotton into the dryer should be mechanized, and the control of drying process parameters should be automated.

- The classification of cotton raw material drying is as follows:
- By method of heat transfer to cotton: convective, contact, and mixed;
- By operation period: batch (periodic) and continuous;
- By the direction of heat carrier movement relative to cotton: co-current (direct-flow) and counter-current;
- By method of heating the heat carrier: using a flame air heater or mixing air with combustion gases;
- By method of interaction between cotton and the heat carrier: layered, hanging, and mixed.

Depending on the structural design of the dryer, dryers can be classified as air fountain, belt, chamber (room), tower, and drum-type.
Depending on the function they perform in the technological process of fiber processing, cotton dryers can be classified accordingly.

The main technological parameters of cotton drying include:
1. Amount of moisture released during drying – W%

$$w = \frac{G_1 - G_2}{G_k} 100\,\%; \qquad (1)$$

Here: G_1 – initial weight of cotton;
G_2 – weight of cotton after drying;
G_k – weight of cotton in absolutely dry state.

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2. Amount of moisture evaporated during drying:

$$w = G_1 - G_2 \quad \text{or} \quad w = \frac{V_2(w_1 - w_2)}{100 + w_2}; \qquad (2)$$

Here, W_0 and W_1 - the moisture content of cotton, both initial and after drying, expressed as a percentage.

3. Dryer capacity for wet cotton – U_1 :

$$U_1 = \frac{U_2(100 + w_1)}{100 + w_2}; \qquad (3)$$

Here U_1, U_2 - Dryer capacity for wet and dry cotton.

4. Fiber drying uniformity index - η_T :

$$\eta_T = \frac{w_T}{0{,}7 w_2}; \qquad (4)$$

Here, w_T – moisture content of the dried fiber.

5. Seed uniform drying index - η_m :

$$\eta_m = \frac{w_m}{0{,}46 w_2^{1{,}275}}; \qquad (5)$$

Here, w_m – moisture content of the dried seed cotton.

6. Uniformity index of seed hull drying - η_P :

$$\eta = \frac{w_P(1 - p_T - p_m)}{w_2 - p_T w_T - p_m w_m}; \qquad (6)$$

Here w_P – Moisture content of the dried seed hull;

p_T – Relative fiber content in cotton;

p_m – Relative seed content in cotton;

1- $p_T - p_m$ – Relative hull content in cotton p_P .

7. Dryer cleaning efficiency during drying -K:

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$$K = \frac{C_3(C_1 - C_2)}{C_1(C_3 - C_2)}100\% \qquad (7)$$

C_1, C_2- cotton contamination before and after drying, %
C_3- ontamination of waste, %
8. Amount of heat required to evaporate 1 kg of moisture in the drying drum – Q:

$$Q = \sum_{i=1}^{n} q_i \ , \qquad (8)$$

here q_i – Heat consumption by drying elements.

$$q_1 = i_n - c_T \vartheta_1 = 2491{,}1 + 1{,}97(T_2 - 273) - c_T(\vartheta_1 - 273), \qquad (9)$$

here $i_n = 2491{,}1 + 1{,}97(T_2 - 273) -$ T_2 Amount of heat in the hot air released by the temperature difference;

ϑ_1 – Initial temperature of cotton, ^{0}K;

C_s = 4,1868- Specific heat capacity of water

The aforementioned indicators serve as the basis for evaluating the technological performance of a drying device. Based on these indicators, the appropriate method for drying cotton is determined.

Characteristics of Cotton as a Drying Material. As is known, seed cotton primarily consists of fibers and seeds. The fiber is covered with a thin waxy layer, which mainly contains cellulose and a small amount of pectin. On the other hand, the seed consists of the kernel and the surrounding hull.

The fact that both fiber and seed are multi-component also affects their drying behavior. Drying cotton and its components requires careful control of temperature and process conditions to ensure efficiency and prevent damage to the fiber or seed.

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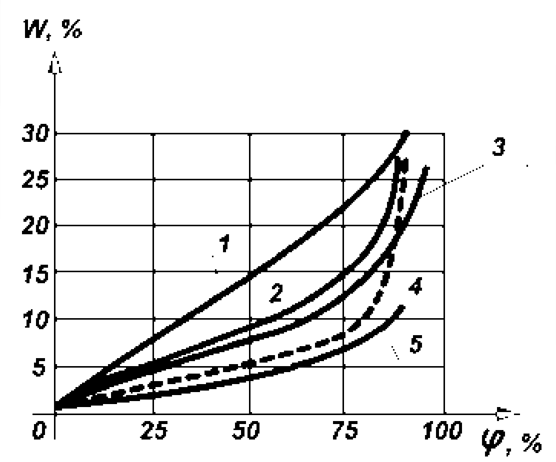

Figure 1. Change in moisture balance depending on the relative humidity of air φ in cotton components: 1 – seed hull; 2 – seed hull; 3 – cotton; 4 – seed hull; 5 – fiber.

The process of moisture absorption from the air by dry cotton and its components over time at a relative air humidity of φ = 40% and a temperature of T = 300 K is shown in Figure 2.

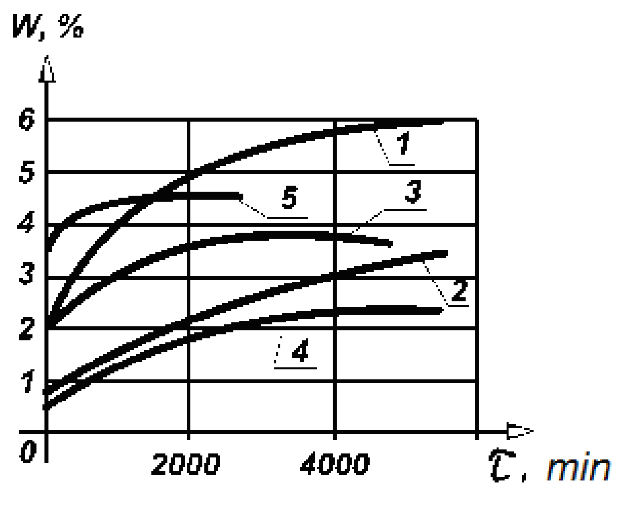

Figure 2. Change in moisture content of cotton components over time due to absorption from air at $T = 300^0 K$ and $\varphi = 40$ %: 1 – seed hull; 2 – cotton; 3 – cotton; 4 – cotton burr; 5 – fiber.

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It can be seen that the moisture balance is first achieved in the fiber and then in the seeds.
The fact that this is also reflected in the rate of moisture uptake by cotton and its components is shown in Figure 3.

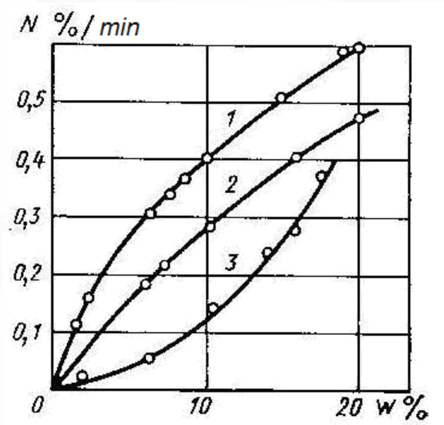

Figure 3. Graphs of moisture buildup in cotton and its components:
1 – fiber; 2 – seed cotton; 3 – seed.

It can be seen from this that the fiber dries the fastest, the seed material dries the slowest, and the moisture uptake rate of seed cotton is intermediate.

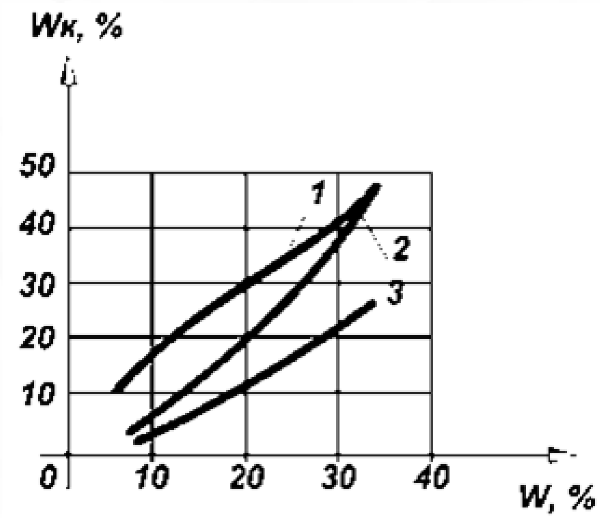

Figure 4. Relationship between moisture in cotton components and cotton moisture w: 1 – hull; 2 – seeds; 3 – fiber (cellulose).

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Each moisture indicator of seed cotton corresponds to specific moisture values of the fiber, seed hull, and burr contained within it. This relationship is illustrated in Figure 4.

As seen from the graph, fiber dries rapidly when exposed to hot air, whereas the seed dries relatively more slowly. Therefore, the heating temperature of each cotton component plays a crucial role in the drying process. During cotton drying, the temperature of the fiber should not exceed 373–378 K (100–105 °C), the seed 333 K (60 °C), and the technical seed 358 K (80 °C).

If these temperature limits are exceeded, the mechanical properties of the fiber, as well as the germination and technological quality of the seeds, are adversely affected. The drying rate of cotton is also significantly influenced by the relative velocity of the heat carrier, which should be maintained within the range of 1.00–1.45.

REFERENCES

1. Parpiev, A.P., Usmanqulov, A., et al. Drying of Seed Cotton. Tashkent: “Fan va Texnologiyalar”, 2009.
2. Handbook on Primary Cotton Processing. Edited by F.B. Omonov. Tashkent: Voris-Nashriyot LLC, 2008.
3. Zikriyoev, E. Primary Cotton Processing. Tashkent: Mehnat, 2002.
4. Omarov, A.Y., Qayumov, A.X. Machine-Building Technology. Tashkent: “Uzbekistan”, 2003, 384 p.
5. Qayumov, A.X., Kabulov, M. Design of Mechanical Assembly Workshops. Tashkent: “Fan va Texnologiyalar”, 2007, 286 p.
6. Qayumov, A.X. Repair of Technological Machines. Tashkent: “Iqtisod-Moliya”, 2013, 582 p.
7. Dedakhanov, A.O., Muradov, R.M. “The Importance of Automation of Machines in Cotton Cleaning Enterprises.” Education and Science in the XXI Century, Issue 21, Vol. 2, 2021, pp. 829–833.

Eureka Open Access Journals
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Eureka Journal of Artificial Intelligence and Data Innovation (EJAIDI)

ISSN 2760-5000 (Online) Volume 01, Issue 02, December 2025

https://eurekaoa.com/index.php/11

8. Dedakhanov, A.O. “Methods and Means of Storing Cotton Raw Materials.” Economics and Society, No. 4(95)-1, 2022, pp. 554–556.
9. Dedakhanov, A.O. “Moisture Distribution during the Cotton Raw Material Drying Process.” Neo Science Peer Reviewed Journal, Vol. 26, October 2024, pp. 22–27. ISSN: 2949-7701. (SJIF 2024: 6.784)
10. Dedakhanov, A.O. “Dry Cotton in Cotton Cleaning Enterprises: Fiber Wetting Technique and Technology.” Web of Technology: Multidimensional Research Journal, Vol. 2, Issue 10, October 2024, pp. 44–46. (IFSIJ JIF: 7.425)
11. Dedakhanov, A.O. “Technology of Drum Dryers for Seed Cotton.” Namangan Institute of Engineering and Construction. Journal of Mechanics and Technology, 2023, No. 4 Special Issue, pp. 142–147. ISSN 2181-158X, (05.00.00 No.79).
12. R.G. Rakhimov. Clean the cotton from small impurities and establish optimal parameters // The Peerian Journal. Vol. 17, pp.57-63 (2023)
13. 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)
14. F.G. Uzoqov, R.G. Rakhimov. Movement in a vibrating cotton seed sorter // DGU 22810. 03.03.2023
15. F.G. Uzoqov, R.G. Rakhimov. The program “Creation of an online platform of food sales” // DGU 22388. 22.02.2023
16. F.G. Uzoqov, R.G. Rakhimov. Calculation of cutting modes by milling // DGU 22812. 03.03.2023
17. F.G. Uzoqov, R.G. Rakhimov. Determining the hardness coefficient of the sewing-knitting machine needle // DGU 23281. 15.03.2023
18. 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

Eureka Journal of Artificial Intelligence and Data Innovation (EJAIDI)
ISSN 2760-5000 (Online) Volume 01, Issue 02, December 2025

https://eurekaoa.com/index.php/11

19. F.G. Uzoqov, R.G. Rakhimov, S.Sh. Ro'zimatov. Online monitoring of education through software // DGU 18782. 22.10.2022
20. F.G. Uzoqov, R.G. Rakhimov. Electronic textbook on "Mechanical engineering technology" // DGU 14725. 24.02.2022
21. F.G. Uzoqov, R.G. Rakhimov. Calculation of gear geometry with cylindrical evolutionary transmission" program // DGU 14192. 14.01.2022
22. 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)
23. R.G. Rakhimov. Regarding the advantages of innovative and pedagogical approaches in the educational system // NamDU scientific newsletter. Special. (2020)
24. 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)
25. R.G. Rakhimov. On the merits of innovative and pedagogical approaches in the educational system // NamSU Scientific Bulletin. Special. (2020)
26. 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)
27. 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)
28. R.G. Rakhimov, A.A. Juraev. Designing of computer network in Cisco Packet Tracer software // The Peerian Journal. Vol. 31, pp.34-50 (2024)
29. 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)

Eureka Journal of Artificial Intelligence and Data Innovation (EJAIDI)
ISSN 2760-5000 (Online) Volume 01, Issue 02, December 2025

https://eurekaoa.com/index.php/11

30. 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)
31. 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).
32. 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).
33. 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.
34. 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.
35. 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
36. 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.
37. Gulyamov G., Erkaboev U.I., Rakhimov R.G., Mirzaev J.I. On temperature dependence of longitudinal electrical conductivity oscillations in narrow-gap

ISSN 2760-5000 (Online) Volume 01, Issue 02, December 2025

https://eurekaoa.com/index.php/11

electronic semiconductors // Journal of Nano- and Electronic Physic. 2020. Vol.12, Iss.3, Article ID 03012.
38. 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.
39. 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
40. 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.
41. 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.
42. 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
43. 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.
44. 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.

Eureka Open Access Journals
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Eureka Journal of Artificial Intelligence and Data Innovation (EJAIDI)
ISSN 2760-5000 (Online) Volume 01, Issue 02, December 2025

https://eurekaoa.com/index.php/11

45. 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.
46. 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.
47. 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).
48. 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)
49. 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).
50. 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)
51. U.I. Erkaboev, N.A. Sayidov, U.M.Negmatov, R.G. Rakhimov, J.I. Mirzaev. Temperature dependence of width band gap in $In_xGa_{1-x}As$ quantum well in presence of transverse strong magnetic field // E3S Web of Conferences. 401, 04042 (2023)

Eureka Journal of Artificial Intelligence and Data Innovation (EJAIDI)
ISSN 2760-5000 (Online) Volume 01, Issue 02, December 2025

https://eurekaoa.com/index.php/11

52. 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.
53. 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.
54. 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.
55. 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.
56. 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.
57. 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.
58. 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

Eureka Journal of Artificial Intelligence and Data Innovation (EJAIDI)
ISSN 2760-5000 (Online) **Volume 01, Issue 02, December 2025**

https://eurekaoa.com/index.php/11

59. 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.
60. R. Rakhimov, U. Erkaboev. Modeling of Shubnikov-de Haaz 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.
61. 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.
62. 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.
63. 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
64. У.И. Эркабоев, Р.Г. Рахимов, Ж.И. Мирзаев, Н.А. Сайидов, У.М. Негматов. Вычисление осцилляции плотности энергетический 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.

Eureka Journal of Artificial Intelligence and Data Innovation (EJAIDI)
ISSN 2760-5000 (Online) Volume 01, Issue 02, December 2025

https://eurekaoa.com/index.php/11

65. 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
66. 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.
67. 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
68. 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
69. 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.
70. 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)

Eureka Journal of Artificial Intelligence and Data Innovation (EJAIDI)
ISSN 2760-5000 (Online) Volume 01, Issue 02, December 2025

https://eurekaoa.com/index.php/11

71. 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
72. 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.
73. 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
74. 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.
75. 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.
76. 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.
77. 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.
78. Р.Г. Рахимов. Моделирование температурно-зависимости осцилляции поперечного магнитосопротивления и электропроводности в

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ISSN 2760-5000 (Online) Volume 01, Issue 02, December 2025

https://eurekaoa.com/index.php/11

гетероструктурах с квантовыми ямами // Образование наука и инновационные идеи в мире. 2024. Vol. 37, Iss. 5, pp.137-152.
79. 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.
80. 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.
81. 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
82. 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.
83. 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
84. 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.
85. 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.