

Program MidtermExam
on the discipline «**Introduction to the theory of supersymmetry**» for undergraduates I
courses of specialty «6M060400 – Physics »

The proposed MidtermExam program on discipline «**Introduction to the theory of supersymmetry**» is made according to the discipline syllabus. The program determines the requirements for the levels of mastering the academic discipline: what the student should have *an idea* after studying the course for 7 weeks, which should know what *skills* and *habits* should be formed.

At MidtermExam, students will be asked two theoretical questions and one task.

Midterm addresses the following questions:

1. Continuous integrals and point particles.
2. Historical review of the gauge theory.
3. Secondary quantization.
4. Harmonic oscillators.
5. The strings of Nambu-Goto.
6. Boson strings.
7. From the path integral to the operators.
8. Superstrings.
9. Two-dimensional supersymmetry.
10. Trees.
11. Local two-dimensional supersymmetry.
12. Quantization of the Green-Schwarz action in cone variables.
13. Conformal field theory and the Kac-Moody algebra.
14. Conformal field theory.
15. Super conformal perfume.

BIBLIOGRAPHY

Basic:

1. *M. Kaku*: Introduction to superstrings and M- Theory, Springer, 624 (1999).
2. *J. Wess, J. Bagger*: Supersymmetry and Supergravity, Princeton University Press (1992).
3. *E. Witten*, "Constraints on supersymmetry breaking", Nucl. Phys. **B202**, 253(1982).
4. *S.P. Martin*, "A supersymmetry primer", ArXiv:hep-ph/9709356.
5. *J.D. Lykken*, "Introduction to supersymmetry", ArXiv:hep-th/9612114.
6. *A. Bilal*, "Introduction to Supersymmetry", ArXiv:hep-th/0101055.
7. *D.I. Kazakov*, «Supersymmetric expansion of the Standard model of fundamental interactions», the works of the summer school of the «Dynasty» foundation «Physics of fundamental interactions», (2006).
8. *M. Shifman, A. Vainshtein*, "Instantons Versus Supersymmetry: Fifteen years later," ArXiv:hep-th/9902018.

Additional literature:

1. Krasnikov N V, Matveev V A hep-ph/9703204
2. *Y.A. Golfand, E.P. Likhtman*, JETP Lett. **13** 452 (1971)
3. Volkov D V, Akulov V P *Phys. Lett. B* **46** 109 (1973)
4. Wess J, Zumino B *Nucl. Phys. B* **70** 39(1974)