ProgramMidtermExam

on the discipline «**Additional chapters of scattering theory**» for undergraduates1 courses
of specialty «6D060500 – Nuclear physics »

The proposed MidtermExam program on discipline «**Additional chapters of scattering theory**» 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. Formulation of scattering theory in terms of representation theory
2. Type of scattering matrix
3. The discrete spectrum. The virial theorem
4. Same particles and statistical physics
5. Continuous spectrum
6. The scattering operator in the continuous case
7. Representation theory
8. Analytic properties of the wave function
9. Spectraltheory
10. The Green's function and perturbation theory
11. Applications of spectral theory
12. Operator algebra. The time Green's function
13. Translational representation for the solution of the wave equation in free space
14. The wave function in the semiclassical approximation
15. Translational representation for the solution of the wave equation in free space

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Basic:
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4. John R. Taylor Scattering Theory: The Quantum Theory of Nonrelativistic Collisions, 512 pages, Dover Publications, May 26, 2006
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Additionalliterature:
1. D.S. Sivia, Elementary Scattering Theory: For X-ray and Neutron Users, 216 pages, Oxford University Press; 1 edition,January 29, 2011
2. Roger G. Newton, Scattering Theory of Waves and Particles: Second Edition, 768 pages, Dover Publications; Second edition, June 19, 2013
3. R.Blumenhagen, D.Lüst, S.Theisen, Basic Concepts of String Theory, 784 pages, Springer; 2013 edition, October 4, 2012