Examination topics
Mathematical topics in many body quantum physics
Summer Semester 2016/17

1. Spectrum of 1-body Schrödinger operator.

2. N body Schrödinger operator and the HVZ Theorem about its essential spectrum.

3. Scattering theory for 1-body Schrödinger operators.

4. Scattering theory for N body Schrödinger operators.

5. Bosonic Fock spaces, creation/annihilation operators.

6. Fermionic Fock spaces, creation/annihilation operators.

7. Wick quantization.

8. Coherent vectors.

9. Van Hove Hamiltonians.

10. Slater determinants, ground state of a quadratic fermionic Hamiltonian.

11. Hartree-Fock method.

12. Bosonic squeezed states and quadratic Hamiltonians

13. Bogoliubov approximation for the Bose gas.

14. Landau's argument for superfluidity.

15. Fermionic Gaussian states nd quadratic Hamiltonians

16. Hartree-Fock-Bogoliubov approximation for the Fermi gas and superconductivity.