

# **Advanced quantum mechanics of many-body systems (2024/2025)**

## **List of questions for the oral exam**

- 1) Description of a quantum many-body system. Occupation number representation.
- 2) Quantization of a harmonic chain.
- 3) Crystal lattice oscillations, phonons, specific heat of solids.
- 4) Quantization of free electromagnetic field.
- 5) Casimir forces.
- 6) Electronic gas.
- 7) Time evolution of quantum systems.
- 8) Linear response theory.
- 9) Green's functions in the many-body problem.
- 10) Ferromagnetism in itinerant Fermi system. Stoner theory.
- 11) Weakly interacting bosons. Bogolyubov theory.
- 12) Superconductivity, BCS theory.