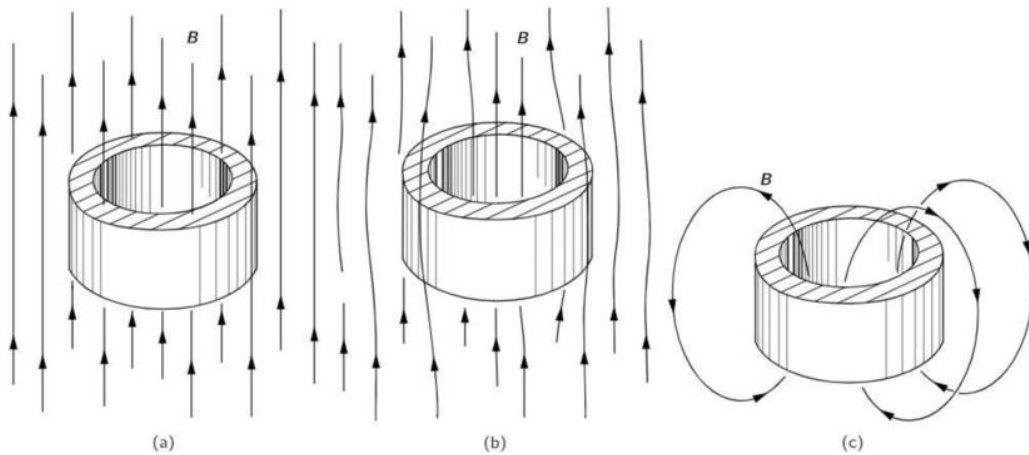


Solid state physics

Problems 5

Deadline: 29. November 2020. 24:00

- 1) Superconductor is a perfect diamagnet. Please explain this statement.
- 2) Explain the following sketches of a process, which demonstrate the Meissner-effect. What is changed between the steps?



- 3) Gibbs free energy in the normal and the superconducting states are denoted by G_n and G_s . Plot the difference of G_n and G_s as a function of the external magnetic field and the temperature. Show the regime, where this difference is negative.
- 4) According to Eq. (8.13) and Eq. (8.15) give the position dependence of the current, $\mathbf{j}(x)$.
- 5) What is the stable configuration of vertexes in a type-II superconductor?
- 6) What is the origin of the attractive effective force between the electrons in a Cooper-pair?
- 7) Introduce the design and the operation of SQUID.