PHYSICAL KINETICS

- **15 October**
  LECTURE 1

  Liouville theorem, distribution function and Boltzmann equation. Hypothesis of molecular chaos and collision integral. Examples of electron collisions in solids. Detailed balance. Maxwell, Bose-Einstein and Fermi-Dirac distributions.

- **17 October**
  LECTURE 2

  τ - approximation for collision integral. Diffusion equation, linear response, conductivity and the Einstein relations. Magnetoresistance, the Hall effect and thermo-power for electrons in metals.

- **22 October**
  LECTURE 3

  Derivation of Hydrodynamics from Kinetics. Kinetic coefficients of atomic gases.

- **24 October**
  LECTURE 4

  Self-consistent field and collision-less dynamics for plasma. Plasma oscillations and the Landau damping. Plasma echo.

- **29 October**
  LECTURE 5

  Diffusion approximation for the Boltzmann equation. Fokker-Plank equation for heavy particle in a gas of light particles

- **31 October**
  LECTURE 6

  Hot electrons in semiconductors and weakly ionised plasma. Electron temperature, current-voltage characteristics, the energy relaxation rate.

- **5 November**
  LECTURE 7

  Coulomb collisions in plasma. Landau collision integral for the Coulomb scattering. Heat transport from electrons to ions. Running away.

- **7 November**
  LECTURE 8

  Boundary problem for kinetic equation. Normal and anomalous skin-effect.

- **12 November**
  LECTURE 9

  Kinetics of cascade processes. Ballistic phonons in dielectrics. Non-local phonon thermo-conductivity.

- **14 November**
  LECTURE 10

  Dynamical Deriavation of Boltzmann Equation.

- **19 November**
  LECTURE 11

  Fluctuations of distribution function. Equilibrium and non-equilibrium noises. Example: Noise of hot electrons in semiconductors.

- **21 November**
  LECTURE 12
  Quantum kinetics. Wigner function and kinetic equation. Magnetic resonance. Bloch equation. Longitudinal and transverse relaxation rates. Dynamic Line Narrowing of the ESR on conducting electrons

- **26 November**
  EXERCISES - 1

- **28 November**
  EXERCISES - 2