Problems (for 29.01.2015)

1. By using the perturbative approach, calculate the angle-differential cross section for the elastic electron scattering by hydrogen atom in its ground state.

2. Using the simple helium ground state wave function $\varphi(r_1, r_2) = \frac{Z^2}{\pi} e^{-Z(r_1+r_2)}$, where Z=27/16, calculate the form-factor and the cross section for the elastic electron scattering by the helium atom in its ground state.

3. What should be modified in solution of problem 1 to take into account the Pauli principle?