# Inelastic light scattering by 2D electronic system with SO coupling in a strong magnetic field

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Two-dimensional (2D) system with Bychkov-Rashba type spin-orbit (SO) interaction subjected to a strong perpendicular magnetic field is considered. The magnetic field is supposed to be so high that only zero Landau level is occupied, i.e. $\nu < 2$, where $\nu$ is the filling factor. In such a system the intersubband plasmon exists with dispersion law [1]

$$\omega_0(q) = \Delta\sqrt{1+\delta\nu\frac{qa^2}{a_B}\exp(-qa^2/2)},$$

where $\Delta$ is the spin sublevel separation, $a_B$ is the Bohr radius, $a$ is the magnetic length, $\delta\nu$ is the filling factor difference of lower and upper spin sublevels.

We consider resonance Raman scattering associated with transitions between spin sublevels. It is shown that the plasmon peak $\omega_0(q)$ in the spectrum of scattered light occurs for arbitrary polarizations of the incident and scattered waves. A specific situation arises if the incident wave is circularly polarized and its wave vector is normal to the structure plane while linearly polarized scattered beam is tilted to the normal. In such a situation the intensity of plasmon peak in scattering cross section contains a term which is sensitive to the sign of the effective Rashba SO constant but is invariant with respect to simultaneous change of the magnetic field direction and incident light chirality. This allows one to experimentally define the sign of the Rashba constant.

[1] R.Z.Vitlina, L.I.Magarill, A.V.Chaplik, JETP, **113**, 282 (2011).