

# Dispersion of Collective Modes in Electron Quantum Wire Over Liquid Helium in a Magnetic Field

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We consider the dispersion of plasma oscillations in non-degenerate quasi-one-dimensional electron system basing on surface electron system over liquid helium. We applied the random phase approximation (RPA) formalism to two-subband model in presence of magnetic field and obtained the response functions basing on binomial approach to electron wave function. The validity of binomial approach is estimated in wide range of magnetic fields to be better than 10 - 15 %. The dispersion laws of RPA are compared with those obtained previously in quasi-crystalline approximation both without and in presence of magnetic field. The dispersions in both approaches are similar qualitatively especially in long wavelength limit though quantitative difference is available at high enough wave numbers close to the upper edge for first Brillouin zone. The difference between the results of two approaches is especially expressed for transversal mode where the depolarization shift increases appreciably the threshold frequency in optical transversal mode in comparison with that in quasi-crystalline approach.

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