

PLASMON DISPERSION IN QUANTUM WIRES AT FINITE-TEMPERATURE

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Abstract. We have investigated the effect of temperature on plasmon dispersion in a GaAs – based quasi one-dimensional electron gas (Q1DEG) by finding the roots of the temperature dependent dielectric function of the system in which the local field correction has been included through a one-dimensional generalized or temperature dependent Hubbard approximation (T-HA). We have compared T-HA plasmon frequencies with zero-temperature Hubbard approximation (HA) results and obtained the increase in plasmon energy with increasing temperature. We have also recalculated the plasmon frequencies of a single quantum wire in random phase approximation (RPA) at both zero- and finite-temperatures. Our results show lower energy for HA plasmons in comparison with those in RPA not only at zero-temperature but also at finite-temperature.