# Stability of the Transverse Magnetic Surface Mode of a Semi-Infinite Vlasov-Poisson Plasma

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The surface wave dispersion relation is kinetically evaluated to determine the frequencies of the normal modes and the corresponding damping rate for transverse magnetic mode surface wave. Such surface wave is known as surface polariton in solid state physics and a wave of partly electromagnetic and partly electrostatic nature. Assuming that the semi-infinite Vlasov-Poisson plasma is separated from a vacuum by the interface z = 0, the kinetic result is obtained after resorting to some approximation to deal with the surface wave integral which involves complex algebraic structure and Maxwellian distribution function contained in the plasma dielectric function. [1] It is interesting that the structure of normal mode frequency is similar to that of ion-acoustic surface wave frequency. The damping rates, known as Landau damping, are calculated for the two asymptotic cases of $\omega_{pe} >> ck_x$ and $\omega_{pe} << ck_x$ where $\omega_{pe}$ is the electron plasma frequency, c is the speed of light and $k_x$ is the wave number.

[1] A. F. Alexandrov, L. S. Bogdankevich, A. A. Rukhadze, Principles of plasma electrodynamics, Berlin, Springer (1984)