

Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Surface Waves in a Semi-Bounded Collisional Plasma MODJTABA MOAIED, YURIY TYSHETSKIY, SERGEY VLADIMIROV, The University of Sydney — Surface waves (SWs) in a plasma half-space are studied taking into account electron-neutral collisions. The spectrum and damping of SWs are obtained. It is shown that the SWs are strongly damped for wavelengths less than a minimum wavelength which is significantly depends on plasma parameters. The relative importance of collisional and Cherenkov damping of SWs is investigated and is graphically shown for a range of plasma parameters and SW wavelengths. The SWs are electromagnetic waves which propagate along the interface between two different media with different signs of the dielectric permittivities. SWs have had applications in many different fields and are the subject of many theoretical, numerical and experimental investigations. In most of previous works,^{1,2,3} the entire analyses are carried without inclusion of collisions between particles. Yet collisions can be significant in low-temperature plasmas. The collisions in a quantum plasma are shown to significantly affect the SW properties.⁴ In this work, we investigate the effects of collision on the SW properties for classical plasmas. The collisions in a collisional plasma are shown to play an important role in damping of SWs, changing the wavelength range in which SWs are weakly damped, compared to those in a collisionless plasma.

¹R. L. Guernsey (1969).

²S. V. Vladimirov and M. Y. Yu (1994).

³A. A. Rukhazde and B. Shokri (1998).

⁴Yu. Tyshetskiy et al. (2012).

Modjtaba Moaied
The University of Sydney

Date submitted: 11 Jul 2013

Electronic form version 1.4