We note that in the absence of currents, U = 0, we get according to (2.6) $\epsilon_{yx} = 0$.

Let us consider by way of an example a plasma with current, bordering on a currentless but sufficiently dense plasma, so that the condition $\delta_S < \delta$ is satisfied at all points of the transition layer. The dispersion equation for low-frequency ($\omega \ll \omega_{Hi}$) oscillations with $k_x \gg k_z$ breaks up in this case into two equations:

$$\left(1 - \frac{\omega^2}{c^2 k_x^2} \varepsilon_{xx}\right)\left[\varepsilon_{xy} - 2i\left(\varepsilon_{xx} - \frac{c^2 k_z^2}{\omega}\right)\right] = 0, \qquad (6.4)$$

the first of which ($\epsilon_{xx} = c^2 k_x^2/\omega^2$) describes stable magnetic-sound oscillations with frequency $\omega = k_x c_A$, and the second can be reduced to the form

$$\omega^2 - c_A^2 k_z^2 + \omega_{Hi} k_z U k_x / |k_x| = 0. \qquad (6.5)$$

We see that it describes surface waves of the Alfven type. Under the condition

$$U / c_A > k_z c_A / \omega_{Hi} \qquad (6.6)$$

we get a current-convective instability of these oscillations, which leads to the smearing of the sharp plasma boundary.

In conclusion it must be noted that the excitations of surface waves in a plasma with sharp boundary ($\lambda \gg \delta$), considered in the present paper, are due in final analysis to the current gradient and constitute, as already noted, the limiting case of a collisionless current-convective instability of an inhomogeneous plasma.[4] However, effects of this kind can take place also in the absence of current, but at a finite electron temperature. Then the surface waves are the limiting case of drift waves in a plasma with sharp boundary, which were considered in a paper by one of the authors.[6]

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Errata

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Formulas (40) and (42) should read:

$$\sigma_{12} = \frac{en_e}{H}, \quad \sigma'_{12} = \frac{e^2 n_e}{2mT} \operatorname{cth}\alpha,$$

$$\alpha_{12} = \frac{1}{T}\beta'_{12} = \frac{en_e}{2mT}\left\{\frac{1}{2}\operatorname{cth}\alpha + \alpha\frac{1+\operatorname{ch}^2\alpha}{\operatorname{sh}^2\alpha} - \frac{\zeta}{T}\operatorname{cth}\alpha\right\},$$

$$\beta_{12} = \frac{en_e}{m}\left\{\operatorname{cth}\alpha + \frac{1}{4\alpha} - \frac{\zeta}{\omega_H}\right\},$$

$$\gamma_{12} = \frac{n_e}{2m}\left\{\frac{3}{4}\operatorname{cth}\alpha + \alpha\frac{1+\operatorname{ch}^2\chi}{\operatorname{sh}^2\alpha} + \alpha^2\operatorname{cth}\alpha\frac{5+\operatorname{ch}^2\alpha}{\operatorname{sh}^2\alpha} - \frac{\zeta}{T}\left[\operatorname{cth}\alpha + 2\alpha\frac{1+\operatorname{ch}^2\alpha}{\operatorname{sh}^2\alpha}\right] + \left(\frac{\zeta}{T}\right)^2\operatorname{cth}\alpha\right\}, \qquad (40)^*$$

$$\widetilde{\alpha}_{12} = \frac{en_e}{2mT}\left\{\operatorname{cth}\alpha + \frac{3}{2\alpha} - 2\frac{\zeta}{\omega_H}\right\}, \qquad \widetilde{\gamma}_{12} = \frac{n_e T}{eH}\left\{\frac{15}{4} + 3\alpha\operatorname{cth}\alpha + \alpha^2\frac{1+\operatorname{ch}^2\alpha}{\operatorname{sh}^2\alpha} - 2\frac{\zeta}{T}\left(\frac{3}{2} + \alpha\operatorname{cth}\alpha\right) + \left(\frac{\zeta}{T}\right)^2\right\},$$

$$\sigma_{11} = e^2 J_0, \quad \alpha_{11} = \frac{1}{T}\beta_{11} = \frac{e}{T}(J_1 - \zeta J_0),$$

$$\gamma_{11} = \frac{1}{T}(J_2 - 2\zeta J_1 + \zeta^2 J_0) \qquad (42)$$

*ch ≡ cosh, sh ≡ sinh, cth ≡ coth.