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Influence of the cross field drift on stability of plasma systems: electrostatic and electromagnetic study DRAGANA PETROVIC, ANNE-MIE BOGAERTS, Research group PLASMANT, Dep. of Chemistry, University of Antwerp, Belgium — A general dispersion relation is derived for the coupled electron drift-driven and kinetic Alfven modes in a strongly collisional, weakly ionized plasma that includes the effects of cross field drift, parallel dynamics and ionisation. It is shown that the kinetic Alfven mode is totally damped without cross-field electron drift. A finite electron drift decreases the influence of the collisions and results in a weaker damping of the mode, enabling its appearance in the system. However, the kinetic Alfven mode is still damped and cannot become unstable due to this electron drift. The instability of the system thus originates only from the electron-drift driven mode which is destabilized when the cross-field drift exceeds some critical threshold value. It is shown that the ionisation of neutrals, as the dominant plasma production process, destabilize the plasma system, while the electron parallel dynamics has the opposite effect. The model and equations derived in the study are valid for any partially ionised plasma comprising a substantial amount of neutral atoms.

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