# Electromagnetic plasma turbulence driven by electron-temperature gradient

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A simplified local model of a tokamak plasma is derived in the low-beta limit of gyrokinetics in a slab of constant magnetic field curvature and gradient. The ordering adopted was chosen in order to retain Alfvénic perturbations to the magnetic field, while ordering out compressive perturbations, in a similar manner to [1]. In the electromagnetic regime, we demonstrate the existence of the novel "Thermo-Aflvénic instability" that arises due to a deviation from isothermality of the total temperature along the perturbed field line. This instability both destabilises Kinetic-Alfvén waves and enhances the conventional curvature-driven ETG instability, driving turbulence on scales above the electron skin depth. Assuming critical balance [2], it is shown that the resultant turbulent heat flux is larger than that due to the electrostatic ETG modes, presenting a significant departure from the expected picture of the electron turbulent heat transport.

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**References:**

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