

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Thermo-electrohydrodynamic

internal waves in annular geometry¹ HARUNORI YOSHIKAWA, Universite Nice Sophia Antipolis, ANTOINE MEYER, OLIVIER CRUMEYROLLE, INNOCENT MUTABAZI, Universite du Havre — An electric field applied to a dielectric fluid with a temperature gradient generates a body force on the fluid, which can be regarded as thermal buoyancy associated with an electric effective gravity. We consider the internal waves due to this thermoelectric force in annular geometry, where the force field is centro-symmetric. The Earth's gravity is neglected. This configuration is of relevance to large-scale geophysical flows. The dispersion relation of the waves is determined by a spectral method, with or without taking into account the fluid viscosity. The effects of geometry curvature and of a thermoelectric feedback are discussed. The oscillatory instability of the circular Couette flow under the thermoelectric body force and its relation with the waves will also be discussed.

¹Authors acknowledge the financial support from the CNRS under the program PEPS-PTI OndInterGE.

Harunori Yoshikawa
Universite Nice Sophia Antipolis

Date submitted: 31 Jul 2014

Electronic form version 1.4