

Abstract for a regular oral presentation :
**Oscillatory Rayleigh-Bénard Convection in elasto-viscoplastic
Carbopol gels**

by Christel Métivier¹, Mohamed Darbouli, Frédéric Brochard² and
Albert Magnin³

Rayleigh-Bénard convection is studied in an elasto-viscoplastic gel, the widespread used and studied Carbopol gel. The transition from conductive to convective regime is determined by the Schmidt-Milverton principle which leads to a critical value of the inverse of the Yield number $1/Y_c$. However, an oscillatory motion in the gel is observed below $1/Y_c \approx 60$ in the only case of slip walls. Particles within the gel describe periodically loops close to their initial positions for $16.5 < 1/Y < 25$ as shown in Figure 1. For larger values of $1/Y \approx 50 < 1/Y_c$, loops are still obtained but particles move away progressively from their initial position. The oscillations take the form of periodic traveling waves (TW). We demonstrate that elastic effects play the major role in the occurrence of oscillations.

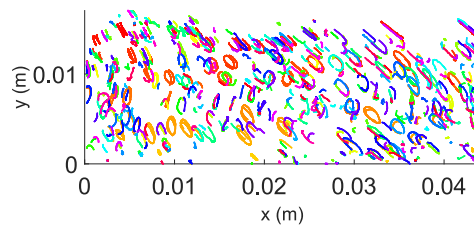


FIGURE 1 – Trajectories obtained in the gel ($\tau_y = 0.03$ Pa) for $1/Y = 25$. One color corresponds to one tracked particle. For a sake of clarity, all tracked particles trajectories are not represented.

1. Christel.metivier@univ-lorraine.fr; Laboratoire d’Energétique et de Mécanique Théorique et Appliquée, UMR 7563 (Université de Lorraine, CNRS), France

2. Institut Jean Lamour - Université de Lorraine, France

3. Laboratoire Rhéologie et Procédés - Université Grenoble Alpes, France