Suppression of Wall modes in rapidly rotating Rayleigh-Bénard convection

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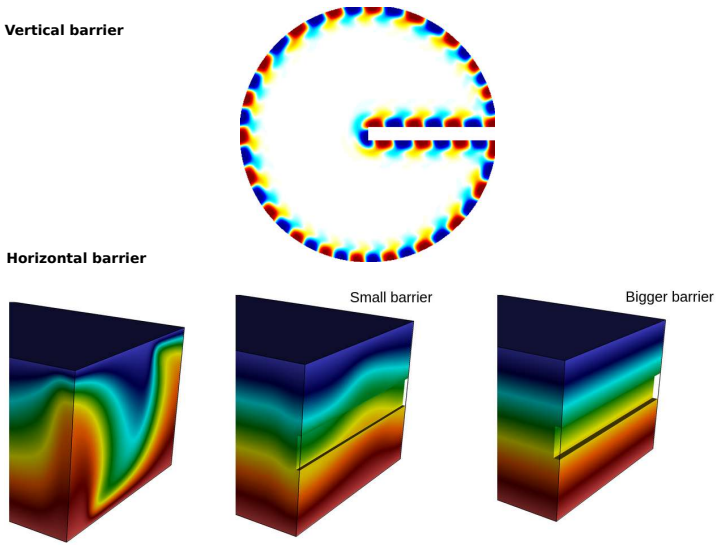
Studying heat transport in rapidly rotating Rayleigh-Bénard convection is of major importance for geophysical flows. In order to make laboratory measurements of the bulk heat flux in the geostrophic turbulence regime, experiments are performed in tall (to increase to Rayleigh number) and thin (to avoid centrifugal effects) cylinders. However, robust wall modes localized at the vertical boundaries develop ([1], [2]) and perturb the measurement of the heat flux which can represent 60% of the total heat flux. These modes are very robust to perturbations of the overall shape of the container [3] which might be due to their topological origin. We show that adding narrow horizontal fins on the vertical walls allows us to reduce sufficiently the contribution of the wall modes heat flux making it negligible compared to the bulk heat flux in the geostrophic turbulence regime [4] .



Références

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