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Instabilities of pancake vortices modelled by rotating ellipsoids in a stratified fluid[1] PATRICE MEUNIER, IRPHE, Aix Marseille Univ., CNRS, Marseille, France — It is now well known that oceans contain very energetic vortices with a long lifetime. However, it is still unclear how these vortices destabilise and how much energy and mixing they can provide at different scales. We investigate here the destabilisation of an axisymmetric vortex in a stratified and non-rotating environment. The vortex is modeled by a rotating ellipsoid with various diameters and heights. The flow is visualised by shadowgraph, synthetic schlieren and Particle Image Velocimetry. Two types of instabilities have been observed, one being located on the side of the ellipsoid and the other being located at the top and bottom. The first instability is linked to the radiative instability, which is well known in the case of a rotating cylinder, and which emits internal waves with an azimuthal wave number equal to 1. The second instability generates an axisymmetric layering pattern which is reminiscent of the double diffusive instability (between angular momentum and density), observed and described theoretically in a rotating environment. This second instability might be responsible for the layering pattern found above oceanic vortices, which probably leads to a large localised mixing.

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Patrice Meunier
IRPHE, Aix Marseille Univ., CNRS, Marseille, France

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