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Radiative instability in stratified rotating flows[1] STEPHANE LE DIZES, XAVIER RIEDINGER, PATRICE MEUNIER, IRPHE, CNRS, Aix-Marseille University — We present new theoretical and experimental works which demonstrate the existence of an instability associated with the emission of internal waves in rotating flows when they are stably stratified along their rotation axis. A comprehensive stability diagram is obtained for both a potential flow and a Keplerian flow defined by their angular velocity $\Omega_P(r) = 1/r2$ and $\Omega_K(r) = 1/r^{3/2}$ respectively in an infinite domain ($r \in (1, \infty)$) as functions of the Rossby number (background rotation) and the Froude number (strength of the stratification along the rotation axis). Both flows are shown to become unstable in centrifugally stable regimes thanks to the stratification. Experimental evidence is also provided for the potential flow around a rotating cylinder. Measurements of the characteristic wavelength and frequency are compared to the theory and a good agreement is demonstrated. The same instability is shown to be active in compressible or shallow-water flows where acoustic waves or surface waves can be emitted.

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