Global instabilities of internal gravity waves GAÉTAN LERISSON,
LadHyX, CNRS-École Polytechnique, SABINE ORTIZ, UME, ENSTA-Paristech
and LadHyX, CNRS-École Polytechnique, JEAN-MARC CHOMAZ, LadHyX,
CNRS-École Polytechnique — Internal gravity waves are particularly important
in the ocean where they are generated by different mechanisms, interaction of cur-
rents or tides with topography, or coupling with waves at the thermocline. By their
breaking they are thought to influence the deep ocean mixing and so contribute to
the thermohaline circulation. We reconsider the experiment and theory of Bourget
et al who considered stationary quasi-monochromatic beam to include the influence
of a uniform background horizontal flow. Specifically we consider two limit cases:
the non translating wave maker in which the waves are stationary and the wave
maker translation at the horizontal phase velocity which to the classical lee wave
problem of a sinusoidal mountain. We show that the global stability properties of
these different flows differ strongly whereas locally they involve the same unstable
gravity wave solution. This change in global stability is then linked to the absolute
or convective nature of the local instability which are for the first time determined
for a periodic base flow and for 2D wave packets.

Jean-Marc Chomaz
LadHyX, CNRS-École Polytechnique