

Special PHYSICAL MATHEMATICS SEMINAR

INTERNAL WAVE EXCITATION BY VERTICALLY- OSCILLATING BODIES

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ABSTRACT:

Just as water waves may be generated by an object bobbing vertically at the surface, so may internal waves be generated by an oscillating body within a density stratified fluid. However, the dynamics of the latter are quite different. For example, whereas surface waves radiate as concentric rings from a localized periodic source, internal waves are well known to propagate along wave-beams with fixed angle to the vertical.

Here, the properties of waves generated by a vertically-oscillating sphere in a uniformly stratified fluid are examined both theoretically and experimentally. Existing predictions for the wave amplitude and phase structure are modified to account for the effects of viscous attenuation. The principal effect of attenuation is to broaden the two peaks of the amplitude envelope on either flank of the wave-beam so that far from the sphere the wave-beam exhibits a single peak with a maximum along the centreline.

These qualitative observations are supported by laboratory experiments, which adapt the “synthetic schlieren” technique to visualize an axisymmetric wave-field.

TUESDAY, FEBRUARY 28, 2006

2:30 PM

Building 3, Room 270

Refreshments at 3:30 PM outside Room 3-270.



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