

Abstract Submitted
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Tilting at wave beams: a new perspective on the St Andrew's Cross¹ T R AKYLAS, MIT, T KATAOKA, Kobe University, S J GHAEMSAIDI, N HOLZENBERGER, T PEACOCK, MIT — The generation of internal gravity waves by a vertically oscillating cylinder that is tilted to the horizontal in a stratified fluid of constant buoyancy frequency, is investigated theoretically and experimentally. This forcing arrangement leads to a variant of the classical St Andrew's Cross that has certain unique features: (i) radiation of wave beams is limited due to a lower cut-off frequency set by the cylinder tilt angle to the horizontal; (ii) the response is essentially three-dimensional, as end effects eventually come into play when the cut-off frequency is approached, however long a cylinder might be. These results follow from kinematic considerations and are also confirmed by laboratory experiments. The kinematic analysis, moreover, suggests a resonance phenomenon near the cut-off frequency, where viscous and nonlinear effects are likely to play an important part. This scenario is examined by an asymptotic model as well as experimentally.

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