Abstract Submitted
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Oblique Collisions of Internal Gravity Wave Beams[1] T.R. AKYLAS, HUSSAIN KARIMI, MIT — Nonlinear interactions between two colliding internal gravity wave beams in a stratified fluid are studied theoretically, making use of small-amplitude expansions. Such collisions can give rise to secondary wave beams with frequencies equal to the sum and difference of the frequencies of the primay beams, a mechanism that is believed to contribute to the energy cascade from the tides to ocean mixing. Earlier work has been confined to the special case when the propagation directions of the primary beams, and hence the induced higher-order beams, lie in the same vertical plane. Here, the general three-dimensional (3D) configuration where the colliding beams approach each other obliquely, is considered. Based on suitable radiation conditions, the wave characteristics and direction of secondary beams are deduced, thus generalizing the known selection rules for plane collisions to the 3D case. Moreover, explicit expressions for the induced-beam profiles are derived and their dependence on obliqueness of collision is examined.

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