Research

Mechanics Seminar

TRAPPED WAVES AND COLLISIONS

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Abstract.

According to quantum mechanics all particles in the universe have the properties of waves and vice versa. Hence, to comprehend the nature and its manifestation, it is indispensable to understand waves. A phenomenon called trapped wave is an example of a situation in which a wave behaves like a "particle". Indeed, a trapped wave is a wave that remains trapped in a certain region, bouncing back and forth, until it reaches a certain threshold and escapes out - what resembles light bouncing in a laser cavity. Trapped waves have been studied mainly in the context of the forced Korteweg-de Vries (fKdV) model, little is known about this phenomenon in the full Euler equations framework. In this talk I will revisit trapped waves solution for the fKdV equation and analyze its features in details. Besides, we will provide a description of the dynamic of trapped wave collisions. One characteristic noticed is that, although the dynamic of one wave is affected by the other one, statistically this feature is not evident. I will also present findings from our study on trapped waves solutions for the Euler equations, which shows waves trapped in a low-pressure region. This talk is based on results already published and in progress in collaboration with Marcelo V. Flamarion (UFRPE) and Paul Milewski (University of Bath).