

# 学术报告

## Some Models for the Interaction of Long and Short Waves in Dispersive Media

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**Time:** 15:30-16:20, Jun 21 (Thursday) , 2018

**Venue:** Room 111, Center for Applied Mathematics

**Abstract :** It is universally accepted that the cubic, nonlinear Schrödinger equation (NLS) models the dynamics of narrow-bandwidth wave packets consisting of short dispersive waves, while the Korteweg-de Vries equation (KdV) models the propagation of long waves in dispersive media. A system that couples the two equations seems attractive to model the interaction of long and short waves and such a system has been studied over the last few decades. However, there are several concerns regarding the above system which have been ignored thus far. The main problems at hand can be summed up as

A) Only the system of linear Schrödinger-KdV has ever been derived in which the two equations appear at different time scales; and

B) Even though numerous papers have studied the NLS-KdV system, unfortunately they all appeared to have quoted one another regarding its derivation and applications. Tracing through hundreds of those references, the exact derivation of the NLS-KdV system was nowhere to be found. Thus, it appears that all the works heretofore studying the NLS-KdV system are just dealing with the mathematical aspects of a hypothetical system that has never been derived.

In this talk, we will address those concerns. It will be shown unequivocally that the NLS-KdV system (or even the linear Schrödinger-KdV system) cannot be resulted from the full Euler equations formulated in the study of water waves. In the process of so doing, we also propose a few alternative models for describing the interaction of long and short waves.

**欢迎大家参加！**