



THE CHINESE UNIVERSITY OF HONG KONG  
*Department of Physics*  
COLLOQUIUM

# Optical Hydrodynamics: From Soliton to Shock Wave

*by*

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*Date: March 4, 2011 (Friday)*  
*Time: 4:00 - 5:00 p.m.*  
*Place: L2, Science Centre, CUHK*

*(Light refreshments will be served 20 minutes prior to the colloquium.)*

ALL INTERESTED ARE WELCOME  
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## Abstract

It is well-known that optics and fluid dynamics share common ground from wave perspective. Nonlinear optics can further reveal richer phenomenological fluid-type behavior in optics. Inspired by this fluid analogy of wave dynamics, we exploit in spatial nonlinear optics to develop an optical hydrodynamics. Using coherent laser light in a nonlinear crystal, we experimentally observe ideal fluid behavior, including dispersive shock waves, soliton and vortex flow. More complex interactions, e.g. nonlinear Huygens' Principle will also be discussed. At last, we will introduce a novel imaging concept based on nonlinear optical hydrodynamics, which can potentially lead to develop a brand new type of super-resolution microscopy.

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