



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

**Turbulent Spot and Scalar Flash in  
Transitional Pipe Flow**

*by*

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*Date: August 29, 2017 (Tuesday)*

*Time: 10:30 - 11:30 a.m.*

*Place: Rm G26, Science Centre North Block, CUHK*

ALL INTERESTED ARE WELCOME

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**Abstract**

Two years ago, in collaboration with Professors Parviz Moin and Ron Adrian, I demonstrated the feasibility and accuracy of direct computation of the Osborne Reynolds' pipe transition problem without the unphysical, axially periodic boundary condition. Here we use this approach to investigate two important open issues in pipe transition. Namely, the splitting of turbulent spot as first discovered by Rune Lindgren in 1959 in his Ph.D. thesis, as well as the scalar flashes as first observed and sketched by Osborne Reynolds in his celebrated 1883 paper.

Specifically, I will talk about how we address, albeit partially, using direct numerical simulations on a 500 radii long pipe, the following three questions: (1) What is the dynamics of turbulent spot generation in pipe transition, and how is it related to boundary layer transition? (2) How is the succession of scalar flashes created in the first place, and what happens to the flashes further downstream in the fully-developed turbulent region? (3) What is the dynamics of turbulent spot splitting in pipe transition, and is there any possible connection between the instantaneous strain rate field and the spot splitting?