THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學

RESEARCH CENTRE FOR Nonlinear Analysis

DEPARTMENT OF APPLIED MATHEMATICS 應用數學系

PolyU-PDE Distinguished Lecture Series

The Instability of Critical and Under-dense Friedmann Spacetimes at the Big Bang as an Alternative to Dark Energy

Professor Blake TEMPLE
University of California, Davis, USA

Objective

This lecture series invites renowned experts in the fields of PDEs and related research areas, such as kinetic theory, to present their latest research findings. The series began in 2023 and lectures are held once a month.

Abstract

In the early 1930's Einstein rejected the static universe as unstable. Instead he embraced Eddington, Lemaitre and Hubble's theory of the Big Bang based on uniformly expanding Friedmann spacetimes. Here we prove that zero pressure Friedmann spacetimes are unstable at the Big Bang on large length scales, generic spacetimes accelerate away from Friedmann spacetimes, and the critical Friedmann spacetime of ΛCDM is most unstable of all. Aside from the fact that unstable solutions are unphysical, the analysis suggests that the cosmic acceleration might be the manifestation of an instability at the Big Bang, not a mysterious anti-gravitating Dark Energy.

About the speaker

Professor Blake TEMPLE is a Distinguished Professor of Mathematics at the University of California, Davis. He earned his Ph.D. from the University of Michigan in 1980 and held prestigious appointments at the Courant Institute, Rockefeller University, and the University of Wisconsin-Madison before joining UC Davis in 1986. A renowned expert in applied mathematics, Professor Temple's research spans shock waves, general relativity, and partial differential equations. He is particularly recognized for his work on shock wave cosmology and the Einstein equations, including his "Big Wave" theory regarding dark energy. His prolific scholarship includes numerous publications in PNAS, Physical Review A, and Memoirs of the AMS. Throughout his distinguished career, he has been honored as a Guggenheim Fellow, a Gehring Professor at the University of Michigan, and a visitor at the Newton Institute and IHES. He has delivered plenary addresses worldwide, contributing significantly to our understanding of fluid dynamics and gravitational physics.

Date:
April 27, 2026
(Monday)

Time:
5pm - 6pm

Venue:
TU101, PolyU

Research Centre for Nonlinear Analysis

www.polyu.edu.hk/ama/rcna

Contact agnes.sin@polyu.edu.hk