THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics

SEMINAR

The Geometry of Chaos: From Lorenz's Butterfly to Spaceflight

by

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Date: September 22, 2026 (Tuesday)
Time: 3:00 - 4:00 p.m.
Place: Rm G25, Science Centre North Block, CUHK

ALL INTERESTED ARE WELCOME
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Abstract

This seminar is designed to be accessible to undergraduate students and presents chaos theory at an elementary, intuitive level. Simple deterministic laws can generate motion that becomes difficult to predict. Beginning with Lorenz's model of convection, we explore sensitive dependence on initial conditions and the geometry of the butterfly attractor. Then we show how Poincaré sections can help turn continuous trajectories into discrete return maps, leading to the stretching and folding illustrated by Smale's horseshoe. We then examine the three-body problem and show how geometric structures within complicated motion can guide spacecraft trajectories. Animations and physical intuition will guide the discussion, with no prior knowledge of chaos theory assumed.

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