

THE UNIVERSITY



OF HONG KONG

*Institute of Mathematical Research  
Department of Mathematics*

## Seminar

# A Lie-theoretic trichotomy in Diophantine geometry and arithmetic dynamics

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### Abstract

How can the finite/infinite dichotomy of the Killing–Cartan classification of simple complex Lie algebras appear in Diophantine geometry? I will explain how this dichotomy is realized in the finiteness/infinitude of positive integral points on certain affine varieties related to cluster algebras and explore some of its implications for classical questions studied by Gauss, Mordell, Coxeter, Conway, and Schinzel in combinatorics and number theory. I will then switch gears to the arithmetic dynamics of cluster Donaldson–Thomas transformations, which refines the Diophantine dichotomy into a finite/affine/indefinite trichotomy as in the Kac–Moody classification of infinite-dimensional Lie algebras.

Date: October 8, 2025 (Wednesday)
Time: 11:00 am – 12:00 noon
Venue: KK-LG110, KK Leung Building, HKU

*All are welcome*