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Type: **Focus session invited talk**

Cosmic Structure Formation & Dark Matter Physics: Insights from Theoretical Modelling

Tuesday 2 December 2025 11:40 (30 minutes)

In this talk, I'll explore how theoretical modelling—particularly N-body simulations and semi-analytic approaches—can shed light on the nature of dark matter and the formation of cosmic structure. I'll highlight recent work on modelling classes of dark matter beyond Λ CDM, discuss approximate schemes that are especially useful for interpreting cosmological surveys, and examine how extended Press-Schechter frameworks can be adapted to general dark matter scenarios. I'll also touch on the role of subgrid models in linking dark matter physics to galaxy formation, and share some thoughts on where I see the most exciting opportunities for progress.

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