

Session Program

1–5 Dec 2025

Multi-canonical methods and lattice field theory

Talks

ECT*, Aula Renzo Leonardi
Strada delle Tabarelle 286, I-38123 Villazzano (Trento)

Monday 1 December

09:00

Talks

Session | **Location:** ECT*, Aula Renzo Leonardi, Strada delle Tabarelle 286, I-38123 Villazzano (Trento)

09:00–09:20 **Director's Welcome**

09:20–09:40 **Introduction**

Speaker
Gurtej Kanwar

09:40–10:20 **Logarithmic linear relaxation method for non-Abelian gauge theories at finite temperature**

Speaker
David Mason

10:20

11:00

Talks

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11:00–11:40 **The density of states in finite-temperature $Sp(4)$ Yang-Mills theory**

Speaker
Fabian Zierler

11:40–12:20

Applying normalising-flow-based density of states to 2D $U(1)$ lattice gauge theory with a θ -term

Speaker
Simran Singh

12:20

14:00

Talks

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14:00–14:40 **Machine-Learned Density of States in Multicanonical Simulations**

Speaker
KWAME APPIAH

14:40–15:20 **Expanded Ensemble Method for Bubble Nucleation**

Speaker
Jaakko Hällfors

15:20

16:00

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16:00–16:40 **A canonical formulation of lattice QCD with physical quark masses**

Speaker
Ludovica Pirelli

16:40

Tuesday 2 December

09:00

Talks

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09:00–09:40 **Variance reduction with machine-learned flows**

Speaker

Fernando Romero-Lopez

09:40–10:20 **Tackling the Signal to Noise problem with Stochastic Automatic Differentiation**

Speaker

Guilherme Catumba

10:20

11:00

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11:00–11:40 **Results for fermionic observables by using a two-level sampling method**

Speaker

Dr Jacob Finkenrath

11:40–12:20

The QCD Sphaleron Rate: A First-Principles Determination from Inverse-Problem Techniques

Speaker

Roberto Dionisio

12:20

14:00

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14:00–14:40 **The smeared R-ratio in isoQCD from first-principles lattice simulations**

Speaker

Francesca Margari

14:40–15:20 **Implications of Yukawa interactions in scalar sector**

Speaker

Muhammad Saad

15:20

16:00

Talks: Discussion

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17:00

Wednesday 3 December

09:00

Talks

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09:00–09:40 **Energy-based diffusion models for complex actions**

Speaker

Gert Aarts

09:40–10:20 **Diffusion models for U(2) and SU(2) lattice field theory**

Speaker

Thomas Ranner

10:20

11:00

Talks

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11:00–11:40 **Equivariant Diffusion-based Sampling for Lattice Field Theory**

Speaker

Octavio Vega

11:40–12:20 **Machine learning a fixed-point action for the O(3) non-linear sigma-model in d=2**

Speaker

Liane Backfried

12:20

14:00

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14:00–14:40 **Continuous normalizing flows for the quantum rotor**

Speaker

Miranda C.N. Cheng

14:40–15:20 **Revisiting collective-variable guided sampling with normalizing flows**

Speaker

Marylou Gabrié

15:20

16:00

Talks: Discussion

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17:00

Thursday 4 December

09:00

Talks

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09:00–09:40 **Nested sampling for gauge theories**

Speaker

Urs Wenger

09:40–10:20 **Crafting Analytic Normalizing Flows**

Speaker

Mathis Gerdes

10:20

11:00

Talks

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11:00–11:40 **Enhanced sampling methods to mitigate topological freezing**

Speaker

Timo Eichhorn

11:40–12:20 **Fighting topological freezing in $SU(N)$ Yang--Mills theories with the PTBC algorithm**

Speaker

Andrea Giorgieri

12:20

14:00

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14:00–14:40 **Exploration of parallel tempering to reduce topological freezing**

Speaker

Victor Manuel Granados Pinto

14:40–15:20 **Accelerating Parallel Tempering with Neural Transports**

Speaker

Saifuddin Syed

15:20

16:00

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17:00

Friday 5 December

09:00

Talks

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09:00–09:40 Free energy difference with Jarzynski equality: Interfaces in the lattice ϕ^4 theory

Speaker

Lorenzo Verzichelli

09:40–10:20 A scalable flow-based approach to mitigate topological freezing

Speaker

Elia Cellini

10:20

11:00

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11:00–11:40 SU(N) eigenstates with Physics-Informed Neural Networks

Speaker

Dr Simone Romiti

11:40–12:20 Monte Carlo methods for data mining in complex systems.

Speaker

Michele Caselle

12:20