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Type: **Talk**

Symplectic Quantization : Disclosing the Deterministic Framework Behind Quantum Field Theory}

Friday 7 November 2025 17:00 (20 minutes)

We introduce Symplectic Quantization, a functional approach to quantum field theory that samples quantum fluctuations directly in Minkowski space-time, bypassing the traditional importance sampling techniques that are restricted to imaginary-time. Our method evolves fields via deterministic Hamilton-like equations in an auxiliary time parameter τ . We prove that the microcanonical correlation functions are equivalent to those generated by a Minkowskian canonical theory where quantum fluctuations are weighted by the factor $\exp(iS/\hbar)$, S being the original action of the system. As a benchmark we study a free scalar field theory in $1+1$ dimensions, where we are able to reconstruct the full real-time dynamics of the Feynman propagator. We also recover the Schwinger–Dyson equations, including contact terms, clarifying the role of the generalized Hamilton equations within this framework. These results demonstrate that our framework can recover the complete structure of free quantum field theory in real time, establishing a solid foundation for applications to interacting quantum field theories.

Parallel Session (for talks only)

Theoretical developments and applications beyond Standard Model

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