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A novel Hamiltonian formulation of $1 + 1$ dimensional ϕ^4 theory in Daubechies Wavelet Basis

Friday 7 November 2025 18:00 (20 minutes)

We employ the wavelet formalism of quantum field theory to study field theories in the nonperturbative Hamiltonian framework. Specifically, we make use of Daubechies wavelets in momentum space. These basis elements are characterised by a resolution and a translation index that provides for a natural nonperturbative infrared and ultraviolet truncation of the quantum field theory. As an application, we consider the $1 + 1$ dimensional ϕ^4 theory and demonstrate the emergence of the well-known nonperturbative strong-coupling phase transition in the $m^2 > 0$ sector. The critical coupling obtained through this approach is then compared with results from other methods previously reported in the literature.

Parallel Session (for talks only)

Theoretical developments and applications beyond Standard Model

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