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Contributed Talk - Violation of Bell inequality from squeezed coherent state of Inflationary perturbations. - Aurindam Mondal, Indian Statistical Institute, Kolkata

Friday 22 August 2025 17:00 (30 minutes)

In this project, we investigate the quantum nature of primordial perturbations by studying the violation of Bell inequality when the initial state is taken to be a coherent state rather than the usual Bunch-Davies vacuum. As inflation progresses, the coherent state evolves into a squeezed coherent state, and we derive an analytical expression for the expectation value of the Bell operator constructed from pseudo-spin operators. Our analysis shows that although the expectation value of the Bell operator initially deviates from the vacuum case, it asymptotically saturates to the same value. Notably, this saturation occurs more rapidly for non-zero coherent state parameters, indicating that a larger one-point correlation function accelerates the approach to maximal Bell inequality violation.

Session Chair : Kartik Prabhu