Contribution ID: **5** Type: **Talk**

Lattice defect networks in 2d Yang-Mills

Wednesday 26 November 2025 12:35 (25 minutes)

In the context of quantum field theory (QFT), there are no known examples of non-topological fully local theories. In the topological case, constructing a fully local theory is equivalent to finding all defects. We extend this framework to non-topological theories, proposing that defects might arise from quantising classical degrees of freedom. This idea seems particularly plausible within the context of Lagrangian field theory. In this project, we test these assumptions in the setting of two-dimensional Yang-Mills theory.
Using a refined lattice approach, we are able to construct defect networks in pure Yang-Mills theory in two dimensions. This refinement preserves the locality of individual defects while maintaining compatibility with the solvability of the theory via subdivision invariance. We also explicitly demonstrate that the building blocks of these defect networks close under fusion. This is based on our recent paper [1].

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Session Classification: II