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【173】Quench dynamics of nodal loops

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We analyse the dynamics and universality of Dirac and nodal loop gap closures under a continuous quench by employing the Landau-Zener formalism. We reveal that the scaling behaviour of the topological defect density can deviate from the prediction of the Kibble-Zurek mechanism when the gap closure is extended. This is also observed in the presence of multicriticality, where we recover different power laws depending on the path taken in parameter space. We further characterise this difference from topological defect generation in the form of dynamical vortex-antivortex pairs in momentum space. Our study offers new insights into the classification and detection of universality classes of topological phase transitions.

Authors: Dr RAMASUBRAMANIAN, Chitra (ETH Zürich); SIM, Ka Rin (ETH Zurich); MOLIGNINI, Paolo (University of Cambridge)

Presenter: SIM, Ka Rin (ETH Zurich)

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