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Centre vortex geometry at finite temperature

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The geometry of centre vortices is studied in SU(3) lattice gauge theory at finite temperature to capture the key structural changes that occur through the deconfinement phase transition. Visualisations of the vortex structure in temporal and spatial slices of the lattice reveal a preference for the vortex sheet to align with the temporal dimension above the critical temperature. This is quantified through a correlation measure. A collection of vortex statistics, including vortex and branching point densities, and vortex path lengths between branching points, are analysed to highlight internal shifts in vortex behaviour arising from the loss of confinement. We find the zero-temperature inclination of branching points to cluster at short distances vanishes at high temperatures, embodying a rearrangement of branching points within the vortex structure. These findings establish the many aspects of centre vortex geometry that characterise the deconfinement phase transition in pure gauge theory.

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