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Topological metadefects: tangles of dislocations

Topological defects such as vortices, dislocations or disclinations are fingerprints of order parameters resulting from broken symmetries. We introduce the new concept of topological defects of a higher order, that we propose to call metadefects, using as a generic example tangles of dislocations in cholesterics.

Tangles of dislocations are generated by a tensile strain in a cholesteric layer confined by capillarity between crossed cylindrical sheets.

Primary tangles result from the overlapping instability that breaks the D2 symmetry of the coplanar dislocations'pair called Lehmann cluster.

Upon a further application of the tensile strain, the primary tangles can be iteratively wound up into dextrogyre and levogyre helical pairs of dislocations conjectured formerly by Kleman, Friedel and Bouligand [2,3].

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