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Zero-modes from tensor-monopoles

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Monopoles can be induced by band crossing points that generate a gauge-invariant vector field, the Berry curvature, whose flux is quantized. For instance, in 3D space, this flux corresponds to the first Chern number. In turn, the value of this topological invariant gives the number of unidirectional modes, or spectral flow, of the system. In this talk, I would like to show that certain confined zero-energy modes seem to be related to another topological invariant generated by the flux of a tensor-monopole. While this invariant was recently proposed in 4D lattices, I would like to discuss its relevance in 2D inhomogeneous continuous media with direct applications in astrophysical fluid models.

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