

A Chern-Simons appetiser

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Abstract:

Chern-Simons (CS) invariants were discovered as some irritating mathematical obstruction but today they have become important physical objects. In fact, their presence in physics is more common than one may think. They are found as anomalies in quantum field theories and as Lagrangians for gauge fields, including gravity and supergravity. They seem to play an important role in high T_c superconductivity and in recently discovered topological insulators. CS forms are also the natural generalization of the minimal coupling between the electromagnetic field and a point charge and even when the source is not point-like but an extended fundamental object, a membrane. A cursory review of these ideas is presented at an introductory level.