Magnetic helicity: marker of solar eruptivity

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Résumé

Magnetic helicity occupies a peculiar place in plasma physics: despite being one of the few invariant in ideal magnetohydrodynamics (MHD), its actual estimation, in laboratory experiments, observations and even numerical domains, remains arduous. Magnetic helicity is a quantity that is tightly related with the level of entanglement of magnetic field lines in a plasma. Recent developments in the theory of its measurements have nonetheless allowed to open fresh investigation of its properties. They reveal that magnetic helicity could be a key element to understand a central problem of solar physics: the trigger of solar eruptions. Using numerical simulations, a quantity derived from magnetic helicity, the helicity eruptivity index, has been observed to be tightly linked with the eruptivity of the magnetic system of different numerical models of solar active events. Preliminary observational results also shows a close relationship between the activity of solar active center and the helicity eruptivity index.

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