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## Solar and Interplanetary Turbulence: Lagrangian Coherent Structures

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The dynamics of solar and interplanetary plasmas is governed by coherent structures such as current sheets and magnetic flux ropes which are responsible for the genesis of intermittent turbulence via magnetic reconnections in solar supergranular junctions, solar coronal loops, the shock-sheath region of an interplanetary coronal mass ejection, and the interface region of two interplanetary magnetic flux ropes. Lagrangian coherent structures provide a new powerful technique to detect time- or space-dependent transport barriers, and objective (i.e., frame invariant) kinematic and magnetic vortices in space plasma turbulence. We discuss the basic concepts of Lagrangian coherent structures in plasmas based on the computation of the finite-time Lyapunov exponent, the Lagrangian averaged vorticity deviation and the integrated averaged current deviation, as well as their applications to numerical simulations of MHD turbulence and space and ground observations.