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Stability of magnetic flux ropes with background flow HANS GOEDBLOED, FOM Institute DIFFER, RONY KEPPENS, Center for Plasma Astrophysics, K U Leuven — MHD stability of magnetic flux ropes is usually studied from the view point of perturbing a static equilibrium background, whereas the significant background flow that is usually present completely modifies the stability of such systems. A new theory, based on energy conservation and self-adjoint operators, permits the computation of the full spectrum of waves and instabilities of stationary plasmas. It involves the construction of a network of curves (the spectral web) in the complex omega-plane associated with the complex complementary energy, which is the energy needed to maintain harmonic time dependence in an open system. Vanishing of that energy, at the intersections of the mentioned curves, yields the eigenvalues of the closed system. Thus, for the first time, knowledge of the full complex spectrum of modes together with a connecting structure is obtained. This theory is applied to compute the complete spectrum of waves and instabilities of flux ropes in a thin accretion disk and of the rotating magnetized jets emitted from those disks. It yields specific stability criteria in terms of the helicities of the magnetic field and of the flow velocity that may be compared with observable parameters of the flux ropes.

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