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Compressible Kelvin - Helmholtz instability in super-magnetosonic regimes[1] FRANCESCO PEGORARO, FRANCESCO CALIFANO, MATTEO FAGANELLO, FRANCESCO PALERMO, Pisa University, ANNA TENERANI, LPP France — With a two fluid plasma model, we investigate the nonlinear competition of different plasma instabilities involving the interplay of large and small spatial scales in a magnetized plasma with a sheared flow and the role of the in-plane magnetic field and of the density inhomogeneity. This investigation is of interest for the study of the interaction between the solar wind and the Earth's magnetosphere in regions where the velocity shear generates rolled-up vortices. We investigate the transition from sub to super magnetosonic regimes. By varying the shear flow velocity amplitude, we show the possibility of generating quasi-perpendicular magnetosonic shock structures. The onset of the Kelvin - Helmholtz instability generates large scale vortices. The shocks are generated by those vortices for which the magnetosonic Mach number is of the order of unity or larger. Compressible effects as well as density variations play a crucial role in the vortex formation process and, in particular, on the vortex velocity propagation.

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Francesco Pegoraro
Pisa University

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