

## ON THE CONDITIONS FOR SOLITON FORMATION IN THE GALACTIC ENVIROMENT

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**Abstract.** We discuss different astrophysical systems and establish conditions for the possible soliton creation. In the case of the galactic disk, necessary condition reads as marginal stability of the disk, for the spiral arms formation, establishing fine tuning mechanism between rotation, surface mass density distribution and thickness of the disk. As far as the accretion disk is concerned, there are several possibilities: when the self-gravity of the disk is included in the dynamics, there is certain ration of angular velocity and thickness of the disk requested for the solitary vortex formation. Similar formation occurs in the Earth's atmosphere and ionosphere. In the later one, magnetic field effects are incorporated leading for the specific balance between depth of the layer, Coriolis frequency and magnetic frequency.