

Abstract Submitted
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On the equilibrium of a extremely extended and diluted magneto-matter state subject to its weight. DANIEL BERDICHEVSKY, Independent Scholar — Solutions to the force relationship between the magnetic stresses and the self-gravitational force are discussed for a simple homogeneous distribution of matter coalescent to a magnetic field in a cylindrical geometry. Consideration are given to the needed permeability of the medium to make it capable of supporting many times the mass of the Sun, on an extension of several parsecs to kiloparsec. This state of self organization of matter and magnetic field (magneto-matter state) has proven useful interpretation for the explanation of anomalous thermodynamic of the gas of electrons contained in flux-tubes with a twist, low-beta, often observed at 1 AU in the interplanetary medium, Berdichevsky and Shefers, 2015. This state of matter, which most basic property, the freezing in the magnetic field, see e.g., Chew et al, 1956, has proved to exist in the regions where robotic observations in the near and far space perform detailed observations of magnetic fields, and extreme dilute plasma (commonly about 1000 to 0.1 or less ionized particles per cubic cm). This work is in many ways an extension of Alfvén work on magnetized space plasmas, Alfvén, 1942. Berdichevsky, D.B., and K., Schefers, ApJ, 803, 70, 2015, doi: 10.1088/0004-637X/805/1/70 Chew, G.F., M.L., Goldberger, and F.E. Low, 1956, the Royal Soc. London, section Math & Phys Sc., 236, pp. 112. Alfvén, H (1942). “Existence of electromagnetic-hydrodynamic waves.” *Nature* **150**: 405.. [doi:10.1038/150405d0](https://doi.org/10.1038/150405d0)

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