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Recurrent analysis of the large scale structures in non-uniform magnetospheric flows

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Near Earth space (ionosphere, magnetosphere) is characterized by complicated dynamics and for modeling of such processes, especially at conditions of external non-stationary impact (bow shock), it is very important for estimation of determined and stochastic parts of the dynamics, as well as the possibility of the generation of large scale wave and fractal structures. In this work, a physical model of the plasma perturbations for experimental data treatment and their physical and theoretical interpretation is obtained. In this model, a nonlinear mechanism of interaction of the perturbations with spatially inhomogeneous space flows is considered. Numerical simulation of formation of such large scale flows are carried out. Time series of velocity flow and magnetic field components of the magnetospheric flows observed by THEMIS satellite mission are studied by virtue of nonlinear methods. For numerical treatment of these data a recurrent diagram method is used, which is effective for short data series. Recurrence is a fundamental feature of the dissipative dynamical systems, which is used for analysis of relaxation processes in the magnetotail. The results of nonlinear analysis of plasma perturbations for interpretation are compared with the signals obtained by Lorentz and Weierstrass function. By virtue of recurrent diagram method, a fractal nature of experimental signals and dynamical chaos parameters. The results of satellite and numerical simulation data are compared.

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Jacobson resonance: Inertial electromagnetic induction

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One of the criticisms of general relativity is that it does not explain the concept of inertia. Mach's principle stated that the inertia of a body is somehow due to the presence of other bodies in the universe. If this is true, then it is most especially relevant to formulate an understanding of space, and its causal relation to matter. In this regard, we propose that introduction of biological models appertaining to space, quantum theory and relativity may be prerequisite for understanding the connection of space and matter, photons and phonons. A new particle-wave equation, $mc^2 = BvLq$, formulates the conceptual framework for inertial electromagnetic induction (IEMI), perhaps representing the initial physical mechanism for non-ionizing radiation (NIR) bio effects. Derived from standard formulae, a new insight is introduced to provide an innovative, physiologic and efficacious approach to magneto-therapy. Specific experimental reports are cited wherein the modeling and EMF parameters were dictated by theory. It is hypothesized that Jacobson Resonance Theory is the missing link that Einstein sought for unifying the fundamental forces of nature: the electromagnetic, gravitational and nuclear forces. A generic expression for said theory may then be:

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