and ions forms a so-called dusty plasma. A self-consistent study of different modes of propagation in a dusty plasma presents several difficulties. One of these is that the equilibrium charges on dust grains are determined by ambient potentials and if wave phenomena modify these potentials, so the grain charge will be affected. In the presente work, we study the effects of the dust particles on the propagation and absorption of the Alfvén waves in the stellar winds. We describe the dusty plasma in the framework of kinetic theory including the effect of capture of plasma electrons and ions by the dust particles. We have shown that the presence of dust particles with variable charge modifies the plasma properties and affects the propagation and absorption of the Alfvén wave in such plasma systems.

PAINEL 205

NUMERICAL CALCULATIONS OF THE PROPERTIES OF ALFVÉN WAVES

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It is widely recognized that Alfvén waves are responsible for the propagation of low frequency eletromagnetic disturbances along the ambient magnetic field in magnetized plasmas. Presently, there is signifcant interest in understanding how the large energy content of a long wavelength Alfvén wave can be transferred to ambient plasma particles. These topics are connected with several areas of contemporary plasma astrophysical research including magnetic reconection, solar corona heating, stellar winds, etc. Particularily in space plasmas Alfvén waves play a major role in many naturally occurring interactions. For example, changes in the auroral current magnitude and spatial configuration, or changes in the magnetospheric configuration, involve propagation of information by Alfvén waves. Alfvén waves may play a fundamental role in the solar wind and winds of late-type stars (Jatenco-Pereira and Opher, 1989b, 1989c). Alfvén waves may also be active in driving the winds of early-type stars (Jatenco-Pereira and Opher 1989a). In the Wolf-Rayet stellar winds, Alfvén waves is also important (cf. dos Santos et. al, 1993a, 1993b). We are elaborating a parallel numerical code for studying the propeties of nonlinear Alfvén waves in astrophysical plasmas. The code is being implemented in a Beowulf cluster built on a pc plataform. In the first studies we analized a number of numerical techniques that have been implemented in parallel algorithms to evaluate the behavior of electric and magnetic fields involved in the problem. Among these different methods is the variational method and the variational method with finite-element, finite-volume, finite-difference, and the finite difference on time domain - FDTD methods. Our studies indicate that the FDTD method compared with the others offers more accuracy, memory requirements, computing efficiency, flexibility and versability. The FDTD method requires minimum preprocessing before applying it to solve our problem. The goal of this investigation is to understand the properties of Alfvén waves, in particular nonlinear waves. Particular properties being investigated are creation of electric currentes and mode conversion.

PAINEL 206

ACCRETION AND THE POSITION OF Be/X-RAY SOURCES IN DPP DIAGRAM

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In this work the relation between spin period (P_{spin}) and orbital period (P_{orb}) of neutron stars accreting matter from the envelope of a Be star companion is investigated. We use the model of Be envelope of Poeckert-Marlborough(1978) and data from the literature to establish a quantitative analysis of the problem. The hypothesis of equilibrium spin (P_{eq}=P_{spin}), in which on the average centrifugal repulsion at the magnetospheric boundary equals gravitationally induced infall, is considered. The diagram spin period-orbital period (dpp) has been shown to be a tool of forecast and diagnostic in high-mass x-ray binaries, since these systems occupy different positions in dpp according to the mass transfer process. Using the dpp, we suggest the type of mass transfer process which occurs in the binary systems having P_{spin} and P_{orb} determined (37 sources), as well as the luminosity class of some optical counterparts with unknown classification.

PAINEL 207

EXCESS OF POSITRONS OVER ELECTRONS IN THE EARTH'S ENVIRONMENT

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Possible physical mechanisms that permit formation of excess of positrons over electrons at energies above 10 MeV in the near Earth's environment are examined as due to nuclear interactions between protons and neutral atoms. We examined proton sources such as the inner radiation belt, and primary and secondary cosmic rays for the interactions in exosphere. The decays of the reaction products $\pi^{\pm} \rightarrow \mu^{\pm} \rightarrow e^{\pm}$ are considered for the fluxes of positrons and electrons. The geometry of the Earth's magnetic field permit these decay leptons to produce excess of positrons over electrons at altitudes of ~500 km. An experiment the Alpha Magnetic Spectrometer (AMS), with sophisticated detector system, on board the space-shuttle Discovery, has observed in the equatorial region of the Earth large excess of positrons with e^+/e^- ratios of ~ 3. Our estimates of the ratios with Monte Carlo simulations and SHIELD code calculations of nuclear reactions in matter are in agreement with the observations of the AMS experiment.

PAINEL 208

GENERALIZED HYDRODYNAMICAL SHOCK STRUCTURE IN THE PRESENCE OF COSMIC RAYS

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We investigate the time asymptotic structure of an hydrodynamical shock wave modified by the backreaction from diffusive acceleration of cosmic-rays. The basic theory previously developed by Axford et al. (1977, 1982) and Drury and Voelk (1981) for a polytropic gas is generalized to the case of an imperfect fluid, independent of the specific equation of state adopted. By including viscosity and heat conduction, we obtain new general junction conditions as first integrals. By numerically integrating the equations we obtain the profiles for the velocity and pressure of the background gas as well as the one for the cosmic ray pressure. We compare and discuss the results of our calculations with previous studies in the literature.(W. I. Axford, E. Leer, G. Skadron, Proc. 15th. Int. Conf. on Cosmic Rays (Plovdiv) **11**, 132 (1977); W. I. Axford, E. Leer, J. F. McKenzie, Astron. Astrophys., **111**, 317 (1982); L. O'Drury, H. J. Völk, Astrophys. J., **248**, 344 (1981)).

PAINEL 209

DISPERSIVE EFFECTS IN RELATIVISTIC OUTFLOWS

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In this work we delineate the physical picture for the propagation of electromagnetic oscillations in moving plasmas. We present calculations devoted to describe the dispersive features of the radiation which is propagating inside of a magnetoactive plasma. A classical and a relativistic treatment have been employed. We have deduced that if the outflow is moving with small velocities, the general motion of plasma does not affect the propagation of transverse electromagnetic waves. The waves are refracted according to the ordinary refraction law deduced for non-moving magnetoactive plasma. The global movement does not change the dispersion relations and the shapes of the corresponding curves are maintained unaltered. Under a relativistic formulation for moving magnetoactive plasma, we have derived the equations, which describe the propagation of electromagnetic waves into a moving medium. The flow velocity affects the plasma dispersion properties and it is responsible for new dispersion branches; transverse and longitudinal perturbations. The dispersive curves exhibit unusual regions where the electromagnetic perturbations have or not propagation. The ordinary and extraordinary electromagnetic modes, which belong to magnetoactive plasma, are modified and described by new relations of dispersion whose points of resonance also are in explicit dependence with the plasma velocity. The results presented in this work, may be applied in order to incorporate suitable corrections to the dispersive models, developed to explain the anomalous features of the observed lines or continuum radiation, associated with astrophysical relativistic outflows, which are present in blazars, relativistic jets in AGNs, quasars and microquasars.

PAINEL 210

A MODEL FOR THE INNER ENGINE OF GAMMA RAY BURSTS

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Based on the possibility of a transition to strange quark matter inside neutron stars, we show that the influence of the magnetic field expected to be present in neutron star interiors has a dramatic effect on the propagation of a laminar deflagration, generating a strong acceleration of the flame in the polar direction. This results in a strong asymmetry in the geometry of the just formed core of hot strange quark matter which will resemble a cylinder orientated in the direction of the magnetic poles of the neutron star. We show here that this geometrical asymmetry gives rise to a bipolar emission of the thermal neutrino-antineutrino pairs produced in the process of strange quark matter formation. These neutrino-antineutrino pairs annihilate into electron-positron pairs just above the polar caps of the neutron star giving rise to a relativistic fireball, thus providing a suitable form of energy transport and conversion to gamma-emission that can explain short gamma ray bursts. We compare various features of our model with recent observations of gamma ray bursts.