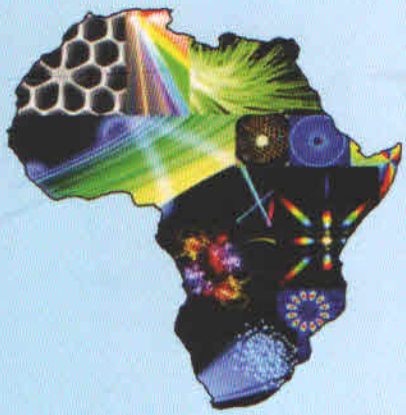

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43 - The effect of a warm electron beam on fast electron-acoustic nonlinear potential structures in multi-electron species plasmas

Parallel Track A: Astrophysics and Space Physics, Plasma, Gravitation and Cosmology - Wednesday 13 July 2016 15:00

Primary author: *MBULI, Lifa Nicholas (University of the Western Cape/SANSA)*

Co-authors: *MAHARAJ, S.K. (South African National Space Agency (SANSA) Space Science, P.O. Box 32, Hermanus 7200, Republic of South Africa/Department of Physics, University of the Western Cape(UWC), Robert Sobukwe Road, Bellville 7535, Republic of South Africa); BHARUTHRAM, Ramesh (Department of Physics, University of the Western Cape(UWC), Robert Sobukwe Road, Bellville 7535, Republic of South Africa); SINGH, S.V. (Indian Institute of Geomagnetism, New Panvel(West), Navi Mumbai 410218, India/Department of Physics, University of the Western Cape(UWC), Robert Sobukwe Road, Bellville 7535, Republic of South Africa); LAKHINA, G.S. (Indian Institute of Geomagnetism, New Panvel(West), Navi Mumbai 410218, India/Department of Physics, University of the Western Cape(UWC), Robert Sobukwe Road, Bellville 7535, Republic of South Africa)*

Arbitrary amplitude fast electron-acoustic solitons are studied in a multi-electron component plasma with cool, warm and hot electrons and cool ions treated as inertial (adiabatic) fluids. The warm electrons are treated as drifting relative to other plasma species. Effects of the beam drift speed on the existence regions of fast electron-acoustic solitons and their coexistence are examined. We also investigate the effect of warm electron beam drift speed on the existence of supersolitons. The relevance of our results in connection to the generation mechanism of various electrostatic turbulences such electrostatic hiss, magnetic burst noise, auroral kilometric radiation(AKR), broadband electrostatic noise(BEN) and other nonlinear wave phenomenon is also discussed.

44 - Sustainable numerical scheme for molecular dynamics simulation of the dusty plasmas in an external magnetic field

Poster Session - Monday 11 July 2016 16:48

Primary author: *DZHUMAGULOVA, Karlygash (IETP, al Farabi KazNU)*

Co-author: *RAMAZANOV, Tlekkabul (IETP, al Farabi KazNU)*

The method, which allows one to carry out computer simulation of system of the charged particles in a strong external homogeneous magnetic field with the time step that is independent on the Larmor oscillation time, was generalized for the case of the presence of the surrounding background for the moving particles. An example of such a system is complex dusty plasma. In this type of complex plasma charged microparticles of solid state move in the background plasma of ions, electrons and atoms (molecules). Under the influence of the magnetic field B particle with specific charge q / m performs the rotation at the Larmor frequency. It is also influenced by the friction force that occurs when it moves in the external environment. In work [1] on the basis of the Taylor expansion of the position and velocity vectors the numerical scheme, which is resistant to a change in time step at a large external magnetic fields, was obtained. The time step in this scheme is independent on the Larmor period of oscillation. In our work we have put the frictional force in the Velocity Verlet scheme, performing all these steps, described in [1], for obtaining of the sustainable scheme. We deduced the new stable second-order numerical scheme for solving the equations of motion of particles in an external homogeneous stationary magnetic field and the background environment. In this scheme a choice of the time step is not limited by the relation between time step and Larmor frequency. So, correctly taking into account a strong magnetic field and friction force, which both depend on the particles velocities, we obtained solution resistant to a change in the time step within the second-order Velocity Verlet propagation scheme.References 3. Q. Spreiter and M. Walter, J. Comput. Phys. 152, 102 (1999).

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