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Proceedings

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2. Transport phenomena, particle velocity distribution function

HT10	Mate Vass	Experimental mapping of electron swarms
P01-02-01	Luís L. Alves	Intercomparison of calculation techniques of the electron Boltzmann equation for the analysis of swarm parameters in CO_2
P02-02-01	Malika Benhenni	Transport and dissociation coefficients of helium,neon and argon dimer cations in their parent gases for low temperature modeling
P02-02-02	Vasco Guerra	CO_2 electron impact cross sections: a complete and consistent set and an assessment of dissociation
P03-02-01	Yui Okuyama	Effects of gas purity on negative ion mobility in O_2
P03-02-02	Ranna U. Masheyeva	Connection of the cage correlation functions with the diffusion coefficient of Yukawa liquids

3. Physical basis of plasma chemistry

GL1	Annemie Bogaerts	Modeling of CO_2 plasmas
HT6	Carlos D. Pintassilgo	Modelling of the temporal evolution of the gas temperature in N_2 discharges
P02-03-01	Nuno R. Pinhão	Measurement of the gas temperature in DBD discharges in $CH_4/CO_2/He$ mixtures: influence of power supply and helium concentration
P03-03-01	Nuno R. Pinhão	Oxidation of clofibric acid in water by electrical discharge and gamma radiation

4. Plasma surface interaction (boundary layers, sheaths, surface processes)

TL1	Daniil Marinov	Plasma-surface interaction: Heterogeneous processes of atmospheric gases.
HT11	Diego Mantovani	Plasma deposition of silver-DLC as robust antibacterial coatings for health applications
HT8	L.C.J. Heijmans	Plasma particle lofting
P01-04-01	Lucia Bónová	Alignment mechanism of carbon nanowalls synthesized by atmospheric PECVD method
P01-04-02	Gilles Cartry	H^- negative-ion surface production in low pressure hydrogen plasmas
P01-04-03	Oleksandr Galmiz	Bactericidal effect of plasma treatment on inner side of PTFE tubes
P01-04-04	Veronika Medvecká	Plasma assisted preparation of metal oxide nanofibers
P01-04-05	Anna Zahoranová	Low-temperature reduction of Graphene Oxide by atmospheric pressure hydrogen plasma
P02-04-02	Haruo Itoh	Charge accumulated on Dielectric-electrode and secondary ionization coefficient
P02-04-03	Aboubakar Kone	Investigation of the interaction of He/Ne plasma jet with a copper plate
P02-04-04	Roch Kwiatkowski	Interaction of pulsed plasma-ion streams with different energy fluxes with SiC and CFC samples
P02-04-05	Juergen Meichsner	Secondary negative ions in oxygen CCP

CONNECTION OF THE CAGE CORRELATION FUNCTIONS WITH THE DIFFUSION COEFFICIENT OF YUKAWA LIQUIDS

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The influence of external magnetic field on the cage correlation functions and directional correlation functions of three-dimensional Yukawa liquids was investigated via molecular dynamics computer simulations in a wide range of system parameters (coupling and screening strengths, and magnetic field). The diffusion coefficients, derived from the decay time of the directional correlation functions in both the directions perpendicular to and parallel with $\vec{B}$, are in very good agreement with diffusion coefficients obtained on the basis of the mean squared displacement of the particles.

Strongly coupled plasmas are characterized by a pair-interaction potential energy that dominates over the average kinetic energy of the particles. Systems with this property are present in a wide variety of physical settings and appear in various laboratory setups. The various physical phenomena taking place in such systems makes them an attractive subject for investigations [1,2]. In particular, the influence of magnetic fields on strongly coupled dusty plasmas has become an important topic in the last few years [3,4].

In this work, we investigated the influence of a static homogeneous external magnetic field on the quasi-localization of the particles - characterized quantitatively by cage correlation functions [5] - in strongly coupled three-dimensional Yukawa systems via computer simulations based on the molecular dynamics computer simulations approach. Also, particle migration, characterized by jumps of a certain length is associated with a diffusion coefficient, which is derived from the decay time of the directional correlation functions.

For our model system we adopt the screened Coulomb (Debye-Hückel or Yukawa) potential of the form:

$$\phi(r) = \frac{Q}{4\pi\varepsilon_0}\frac{\exp(-r/\lambda_D)}{r}, \tag{1}$$

where Q is the charge of the particles and λ_D is the screening (Debye) length. The ratio of the potential energy to the thermal energy is expressed by the coupling parameter

$$\Gamma = \frac{Q^2}{4\pi\varepsilon_0 a k_B T}, \tag{2}$$

where T is the temperature, $a = (3/4\pi n)^{1/3}$ is the Wigner-Seitz radius, and n is the particle number density. A homogeneous external magnetic field with an induction vector $\vec{B} = (0,0,B)$ is imposed on the system and the strength of this field is characterized by the dimensionless parameter

$$\beta = \frac{\omega_c}{\omega_p}\ , \tag{3}$$