SYGP 2: Posters

Time: Monday 16:00–16:30 Location: Poster.V

SYGP 2.1 Mon 16:00 Poster.V

Impact plasma study for middle velocity micro sized particle — •Yanwei Li[1,2,3], Ralf Srama[1,2], Yiyong Wu[3], and Sebastian Bugiel[2] — [1]Universität Stuttgart, Stuttgart, Germany — [2]Max Planck Institute for Nuclear Physics, Heidelberg, Germany — [3]Harbin Institute of Technology, Harbin, China

Micron-sized olivine and iron particles have been accelerated in order to characterize their impact plasma. The experiments were carried out at the 2MV accelerator at the Max Planck Institute for Nuclear Physics in Heidelberg. The particle diameters and velocities were 0.3˜1.2μm and 3˜7km/s, respectively. The targets were polished Aluminum surfaces. Based on the experimental results, impact charge has a relationship with particle mass m and velocity v like Q=kmαvβ. The velocity range chosen generates does not lead to a full particle vaporization but rather generate a large amount of ejected fragments. The charge generation mechanism and its interaction with ejected particles is discussed. These fragments affect the impact charge values and lead the difficulties to find out the values of k, α and β. Furthermore, olivine particles could create more impact charge compared to iron particles. Two physical phenomena are considered: the influence of the particle shape and the ionization energy of the materials. The ionization energy of magnesium, iron and aluminum strongly affects the charge yield of the hyper-velocity impact process.

SYGP 2.2 Mon 16:00 Poster.V

Senkrechte Wellen in magnetisierten Plasmen — •Dominik Ibscher und Reinhard Schlickeiser — TPIV, Ruhr-Universität Bochum, 44780 Bochum, Deutschland

Mit Hilfe der kinetischen Theorie werden Wellen untersucht, die sich senkrecht zu einem homogenen ungekrümmten Magnetfeld ausbreiten. Nach einer kurzen Einführung zur mathematischen Beschreibung von Plasmen werden die Dispersionsrelationen für gyrotrope Verteilungsfunktionen vorgestellt. Diese werden für senkrechte Wellen im nichtrelativistischen Grenzfall näher analysiert. Dadurch lassen sich schließlich allgemeine Kriterien zur Stabilität des Plasmas ableiten. Diese werden auch für die Spezialfälle von Plasmen mit isotroper und Bi-Maxwellverteilung genauer analysiert.

SYGP 2.3 Mon 16:00 Poster.V

Experimental investigations on expanding magnetic flux ropes — •Philipp Kempkes[1], Felix Mackel[2], Sascha Ridder[2], Thomas Tacke[2], and Henning Soltwisch[2] — [1]MPI for Plasma Physics, 17491 Greifswald — [2]Ruhr-Universität Bochum, 44780 Bochum

Twisted magnetic flux ropes show complex dynamic behaviour on different temporal and spacial scales. A prominent example for these confiugurations are arch-shaped solar prominences which can be stable for long periods before becoming eruptive. The FlareLab experiment is designed to investigate the evolution of expanding arch-shaped magnetic flux ropes. Recently, the experiment has been equipped with a new plasma source which provides more flexibility in the magnetic field configuration. It is aimed at following the model considerations proposed by Titov and Démoulin [1] as a descriptive model for a certain class of solar phenomena. First results obtained with the improved plasma source are presented in this contribution. Differences of the magnetic topology as compared to the previous plasma source design are shown and the corresponding influence on the discharge evolution is investigated.

[1] V.S. Titov and P. Démoulin, Astron. Astrophys. **351**, 707 (1999)

SYGP 2.4 Mon 16:00 Poster.V

On solar wind ion kinetics in correlation with short-wavelength transverse waves — Sofiane Bourouaine and •Eckart Marsch — Max-Planck-Institut für Sonnensystemforschung, 37191 Katlenburg-Lindau

We present new results from a study with Helios data of the correlations between the temperature anisotropies of solar wind protons and alpha-particles and their differential streaming and the average power of waves at short wavelengths (about 10 to 100 proton inertial lengths). We find that both the normalized differential ion speed as well as the proton temperature anisotropy increase with growing relative wave power. Moreover, as long as the normalized (to the Alfven speed) differential speed stays below 0.5, the alpha-particle temperature anisotropy also correlates positively with the mean relative amplitude of the transverse fluctuations. In addition we obtain that the alpha-to-proton temperature ratio anti-correlates with the helium ion abundance. All these findings appear to be consistent with expectations from kinetic theory for the resonant interaction of the ions with Alfvén/ion-cyclotron waves, and for the resulting wave dissipation.

SYGP 2.5 Mon 16:00 Poster.V

Fragmentation of current sheets and vortex sheets in stationary incompressible MHD — •Dieter H. Nickeler[1,2], Marian Karlicky[1], Miroslav Barta[1], and Thomas Wiegelmann[2] — [1]Astronomical Institute Ondrejov, 25165 Ondrejov, Czech Republic — [2]MPS, Katlenburg-Lindau, Germany

Fragmentation of current sheets and vortex sheets is an important process connected with eruptive space plasma processe, including magnetic reconnection. Slow changes of magnetic structures in the solar atmosphere and planetary magnetospheres by variation of boundary conditions or other external parameters lead often to the formation of current and vortex sheets. These current or vortex sheets can trigger micro-instabilities, which cause resistivity or viscosity on fluid scales. Consequently resistive instabilities like magnetic reconnection can occur and the systems evolves dynamically. The notion of quasi-magnetohydrostatic evolution can explain the quasi-static phase of many space plasma before an eruption occurs. Examples are eruptive flares, coronal mass ejections and magnetospheric substorms. Within this investigation we use the theory of (quasi-)steady MHD by including nonlinear, stationary plasma flows and show how stationary plasma flows along the magnetic field lines can also be responsible for the existence or generation of fragmentation of current and vortex sheets.