EP 4: Heliosphere I

Zeit: Dienstag 8:30–9:45 Raum: AKM

Hauptvortrag EP 4.1 Di 8:30 AKM

Observations of the Global Interaction between the Heliosphere and its Galactic Environment: Results from the Interstellar Boundary Explorer (IBEX) — •Horst Fichtner[1] and Hans Fahr[2] — [1]Institut für Theoretische Physik IV, Ruhr-Universität Bochum, 44780 Bochum — [2]Argelander Institut für Astronomie, Universität Bonn, Auf dem Hügel 71, 53121 Bonn

The Sun moves through the local interstellar medium, continuously emitting ionized, supersonic solar wind plasma and carving out a cavity in interstellar space, called the heliosphere. The recently launched Interstellar Boundary Explorer (IBEX) spacecraft has completed its first all-sky maps of the interstellar interaction at the edge of the heliosphere by imaging energetic neutral atoms (ENAs) emanating from this region. A bright ribbon of ENA emission has been found that was unpredicted by prior models or theories. This ribbon is superposed on globally distributed flux variations ordered by both the solar wind structure and the direction of motion through the interstellar medium. The results indicate that the external galactic environment may have strong imprints on the outer heliosphere.

EP 4.2 Di 9:00 AKM

Kinetik nicht-maxwellscher Verteilungsfunktionen des turbulenten Sonnenwindplasmas — •Daniel Verscharen und Eckart Marsch — Max-Planck-Institut für Sonnensystemforschung, Max-Planck-Str. 2, 37191 Katlenburg-Lindau, Deutschland

Der Sonnenwind ist von turbulenten Fluktuationen auf nahezu jeder Skala durchsetzt. Dabei variieren sowohl elektrisches und magnetisches Feld als auch die Phasenraumkoordinaten der Sonnenwindteilchen. Dieses Verhalten muß sich in der Struktur der Phasenraumdichte widerspiegeln, die somit eine nicht-isotrope Verteilung annimmt. Messungen der Helios-Satelliten zeigten bereits in den 70er Jahren anisotrope Verteilungsfunktionen der Sonnenwindprotonen in der inneren Heliosphäre, deren Gestalt und Zustandekommen weitgehend unverstanden sind.

Der plasmakinetische Zusammenhang zwischen anisotropen Verteilungsfunktionen und der Sonnenwindturbulenz wird untersucht, wobei sich herausstellt, daß in den meisten Fällen von einer maxwellschen Verteilung, die eine direkte Anwendung der Magnetohydrodynamik (MHD) auf das turbulente Sonnenwindplasma rechtfertigen könnte, nicht ausgegangen werden darf.

EP 4.3 Di 9:15 AKM

Singular points of flow and field in ideal or slightly non-ideal MHD flows — •Dieter Nickeler, Marian Karlicky, and Miroslav Barta — Astronomical Institute Ondrejov AV CR, 25 165 Ondrejov, Czech Republic

The existence of singular points of plasma flows and magnetic fields in MHD is often correlated with reconnection scenarios. In this talk we want to shed some light on the "Anti-Reconnection" problem, as not every null point or stagnation point guarantees the existence of a reconnection process. We analyse possible configurations in the vicinity of these singular points to show how the geometrical and topological shapes of the non-ideal terms in almost ideal Ohm's law correlates with the geometrical and topological properties of the velocity fields and the magnetic fields.

EP 4.4 Di 9:30 AKM

A multifluid approach to describe the plasma passage over the solar wind termination shock — •Hans Fahr and Sergei Chalov — Argelander Institute for Astronomy, Dept.Astrophysik, University of Bonn, Auf dem Huegel 71 , 53121

It is well known that the solar wind plasma at distances larger 30 AU is a multifluid phenomenon with different ion populations centered around different energies (i.e. around a few eV, KeV, and MeV). To treat the solar wind passage over the termination shock we use a three-fluid approach considering solar wind ions, pick-up ions and anomalous cosmic ray ions as independent fluids that are dynamically and thermodynamically coupled to eachother. In a consistent view of the shock transition presented on the basis of this multifluid concept we not only can give as compared to Voyager-2 measurements the right representation of the shock precursor, but also give correct representations of the downstream plasma temperatures and the supersonic signature of the downstream solar wind plasma. The latter fact is especially relevant in view of recently obtained IBEX ENA data.