EP 4: The Sun and Heliosphere - Poster Session

Zeit: Montag 17:30–19:00 Raum: Vorraum KGI-Aula

EP 4.1 Mo 17:30 Vorraum KGI-Aula

Observation of Sunspot Penumbrae with Hinode — •Morten Franz, Rolf Schlichenmaier, and Wolfgang Schmidt — Kiepenheuer Institut für Sonnenphysik, Freiburg, Germany

Sunspots appear in places where strong magnetic flux tubes penetrate the photosphere, thereby suppressing the convective energy transfer. This leads to a lower solar surface temperature, which will appear as a dark spot to the observer. Large spots consist of an umbra (dark center) and a penumbra (a semi-dark ring surrounding the umbra). Observations with resolution better than one arcsec reveal a substructure of the penumbra: an alternating pattern of bright and dark filaments extending outwards from the umbra into the quiet sun. These inhomogeneities are presumably caused by magnetic flux tubes that guide a constant flow of hot plasma towards the outer boundary of the penumbra. This flow is known and observed as the Evershed flow. Spectropolarimetric measurements, especially those of the net circular polarization (NCP) derived from the asymmetry of the Stokes V profile, provide information on the relation between gas flows and the magnetic field in the atmosphere of the penumbra. If a sunspot is examined at different positions on the solar disk, one may resolve the three-dimensional structure of the plasma flows and the magnetic fields. In this contribution, we present data from the spectropolarimeter of the Solar Optical Telescope onboard Hinode of a sunspot at different position on the solar disk. Furthermore, we explain how NCP and Doppler shift can be used to gain a deeper understanding of the topology of the plasma flow and the magnetic field in the penumbra of a sunspot.

EP 4.2 Mo 17:30 Vorraum KGI-Aula

Coronal loop model including ion kinetics — •Sofiane Bourouaine[1], Christian Vocks[2], and Eckart Marsch[1] — [1]Max-Planck-Institut für Sonnensystemforschung, 37191 Katlenburg-Lindau, Germany — [2]Astrophysikalisches Institut Potsdam, 14482 Potsdam, Germany

We present a kinetic coronal loop model including collisions and wave-particle interactions to study the mechanisms of loop heating. The model is based on a quasilinear treatment of the Vlasov equation for the reduced velocity distribution functions of the protons, which are the only ions considered in the loop plasma. We assume that linear Alfvèn waves penetrate the loop from its footpoints and heat the protons via wave-particle interactions and wave absorption. Through Coulomb collisions between protons and electrons some thermal energy can be transferred to the electrons. Furthermore, it is shown that in case of a nearly homogeneous flux-tube cross section, an almost flat temperature profile occurs along the major part of the loop with an enhanced plasma density. These plasma parameter profiles are consistent with those of loops having temperatures between 1 and 1.5 MK as observed in EUV emission. However, if the magnetic field lines are more strongly diverging from the footpoints to the loop apex, the proton heating is found to be more uniform, resulting in a higher temperature and lower density along the loop. These profiles are similar to those observed in X-ray loops.

EP 4.3 Mo 17:30 Vorraum KGI-Aula

Cool loops in the solar transition region above the chromospheric magnetic network — •Hardi Peter, Sven Bingert, and Pia Zacharias — Kiepenheuer-Institut für Sonnenphysik, Freiburg

Maps of the solar transition region in emission lines formed over a temperature range around 100.000 K show loop-like structures which have been interpreted previously as being "luke-warm" loops actually following magnetic field lines connecting opposite polarities in the chromospheric magnetic network. New 3D MHD models challenge this picture and suggest that the low-lying loops indicate the presence of currents and do not follow the magnetic field lines.

We will discuss these results and compare the EUV emission line spectra synthesized from the 3D MHD models to observations from SUMER/SOHO and EIS/Hinode in terms of Doppler shifts, line widths and temporal variability to support our conclusions.

EP 4.4 Mo 17:30 Vorraum KGI-Aula

On the Cutoff Behavior of Solar Magnetic Flux Tube Waves — •Reiner Hammer[1], Zdzislaw E. Musielak[2], and Swati Routh[2] — [1]Kiepenheuer-Institut für Sonnenphysik, Freiburg, Germany — [2]University of Texas at Arlington, U.S.A.

The solar (sub)photosphere generates various types of waves by convective flows and by oscillations. Many of these waves can travel upward and contribute to the heating of the upper atmosphere and to dynamical phenomena like spicules. The ubiquitous photospheric 5-min oscillations have recently been observed to cause various effects in the upper atmosphere. However, such waves cannot easily traverse the photosphere and chromosphere as vertically propagating compressive waves, because of cutoff restrictions. Therefore it has been suggested that they travel as longitudinal waves inside flux tubes that are inclined to the vertical. We argue that in such inclined tubes transverse waves, which have much lower cutoff restrictions, should also be excited. Moreover we show that linear torsional tube waves have no cutoff as long as the flux tubes are thin, which can well be assumed in the photosphere. As soon as the tubes widen in the chromosphere, however, long period torsional waves are reflected.

EP 4.5 Mo 17:30 Vorraum KGI-Aula

Signature of mass supply to quiet coronal loops — H. Tian[1,2], •E. Marsch[1], C.-Y. Tu[2], J.-S. He[2], and G.-Q. Zhou[2] — [1]Max-Planck-Institut für Sonnensystemforschung, Katlenburg-Lindau, Germany — [2]Department of Geophysics, Peking University, Beijing, China

We compare the significant NeVIII blue shifts, which are visible as large blue patches on the Doppler-shift map of a middle-latitude quiet-Sun region observed by SUMER, with the coronal magnetic-field structures as reconstructed from a simultaneous photospheric magnetogram by means of a force-free-field extrapolation. We show for the first time that coronal funnels also exist in the quiet Sun. The region studied contains several small funnels that originate from network lanes, expand with height and finally merge into a single wide open-field region. However, the large blue shifts of the NeVIII line are not generally associated with funnels. A comparison between the projections of coronal loops onto the solar x-y-plane and the NeVIII dopplergram indicates that there are some loops that reveal large NeVIII blue shifts in both legs, which is reported for the first time, and some loops with upflow in one and downflow in the other leg. Our results suggest that strong plasma outflow, which can be traced by large NeVIII blue shift, is not necessarily associated with the solar wind originating in coronal funnels but appears to be a signature of mass supply to coronal loops.

EP 4.6 Mo 17:30 Vorraum KGI-Aula

Influence of photospheric plasma motion on the generation of electric currents — •setareh javadi[1], Jörg Büchner[1], and jean carlo santos[1,2] — [1]Max-Planck-Institut für Sonnensystemforschung-mps,max-planck-str.2,37191,katlenburg-lindau,germany — [2]Instituto National de Pesquisas Espaciais-INPE, av.dos astronautas,1758,jd. da granja,12227-010,sao jose dos campos,sao paulo,brazil

to investigate the relation between photospheric horizontal plasma motion and the evolution of chromospheric and coronal plasma and magnetic field, 3D MHD simulation was performed.This simulation uses a potential extrapolation of the line-of-sight(LOS) component of the observed photospheric magnetic as initial condition. For instance, we took the magnetic field associated to an EUV BP observed on 2006 December 19 by Hinode. The influences of different velocity patterns on the generation of electric currents are investigated.

EP 4.7 Mo 17:30 Vorraum KGI-Aula

Particle Propagation in a Fisk-type Heliospheric Magnetic Field — •Oliver Sternal[1], Adri Burger[2], Bernd Heber[1], Horst Fichtner[3], and Phillip Dunzlaff[1] — [1]Institut für Experimentelle und Angewandte Physik, Christian-Albrechts-Universität zu Kiel, Leibnizstr. 11, 24118 Kiel, Germany — [2]School of Physics, North-West University, 2520 Potchefstroom, South Africa — [3]Institut für Theoretische Physik, Lehrstuhl IV: Weltraum- und Astrophysik, Ruhr-Universität Bochum, Germany

The propagation of energetic particles in the heliosphere is to a large extent influenced by the heliospheric magnetic field. The particle flux can be modelled numerically and the solutions can be compared with spacecraft observations. The HMF structure is still part of ongoing discussions, so different approaches need to be taken into account in particle propagation models.

In this contribution we present time-dependent numerical simulations of the 7 MeV electron flux in the heliosphere for a Parker and a Fisk-type HMF configuration. We compare our model results to Ulysses measurements.

EP 4.8 Mo 17:30 Vorraum KGI-Aula

Temporal and spatial distribution of upstream particle events as observed by SEPT/STEREO — Mathias Mann, •Andreas Klassen, Raul Gomez-Herrero, Reinhold Müller-Mellin, and Bernd Heber — Universität Kiel, 24118 Kiel, Germany

The presence of energetic particles < 1 MeV upstream of the Earth's bow shock, which are streaming from the magnetosphere in the Sun direction is well known since 1960s. The origin of these particles was explained in two ways : (1) leakage of magnetospheric particles accelerated within magnetosphere, and (2)acceleration at the bow shock. Most of such upstream events were observed near the bow shock up to distances of 200 Re (Re, Earth's radius).

We use observations of upstream electrons (55-85keV) and protons (190-220keV) detected at STEREO-A and STEREO-B between 2006, day 354 through 2007, day 243 to estimate the temporal and spatial distribution of upstream events as a function of distance from the Earth. We detected upstream events up to distances of 6500 Re from Earth and compared the rate of appearance, spatial distribution and energy range of upstream particle events for both Stereo spacecraft.

EP 4.9 Mo 17:30 Vorraum KGI-Aula

Pitch Angle Scattering of Solar Energetic Particles — •Wolfgang Dröge[1] and Julia Kartavykh[2] — [1]Institut für Theoretische Physik und Astrophysik, Universität Würzburg, D-97074 Würzburg, Germany — [2]Ioffe Physical-Technical Institute, St. Petersburg 194021, Russia

The modeling of solar particle propagation offers the possibility to derive transport coefficients and to test the validity of theories describing the interaction of energetic charged particles with magnetic field fluctuations. Based on numerical solutions of the focused transport equation we present fits to several solar events, with emphasis on a detailed modeling of the particles' angular distributions. We discuss the question whether pitch angle diffusion coefficients calculated from different suggested models and different assumptions about the nature of magnetic fluctuations in the solar wind can lead to measurable differences in observables such as the rigidity dependence of the mean free path and the angular distributions of solar particles.

EP 4.10 Mo 17:30 Vorraum KGI-Aula

Compositional variations in magnetic clouds with ACE/SWICS — •Roland Rodde[1], Lars Berger[1], Muharrem Köten[1], Thomas Zurbuchen[2], and Robert F. Wimmer-Schweingruber[1] — [1]Institut fur Experimentelle und Angewandte Physik, University of Kiel, D-24098 Kiel, Germany — [2]University of Michigan, Atmospheric, Oceanic and Space Sciences, 2455 Hayward St., Ann Arbor, MI 48109, USA

Magnetic Clouds (MCs) are a subgroup of Interplanetary Coronal Mass Ejections (ICMEs) showing a smooth rotation in their magnetic field vector and often enhanced magnetic field s trength. From ICME studies a wide variety of compositional anomalies compared to normal solar wind is known (Richardson and Cane 2004). Enhanced iron charge states, enhanced O7/O 6 ratios, and enhanced helium to proton ratios are common examples. From fitting the magnetic field inside a MC the trajectory of a spacecraft through the flux-rope MC can be reconstructed, allowing us to obtain spatially resolved compositional d ata. The considered MCs were observed from 2001 to 2007 using the magnetometer and the SWICS (Solar Wind Ion Composition Spectrometer) instrument onboard ACE (Advanced Compositio n Explorer). A total number of approx. 50 MCs were investigated, most of them were taken from the WIND list which ends in early 2006. We have completed the survey up to mid 2007 and als o present the new MCs. The MCs were investigated for spatial heterogeneity with the aim to find trends for distinct compositional features.

EP 4.11 Mo 17:30 Vorraum KGI-Aula

Suprathermal particles in CIRs at 1 AU — •Lars Berger[1], Muharrem Köten[1], Roland Rodde[1], George Gloeckler[2], Robert F. Wimmer-Schweingruber[1], Raul Gomez-Herrero[1], Bernd Heber[1], Reinhold Müller-Mellin[1], and Andreas Klassen[1] — [1]Institut fur Experimentelle und Angewandte Physik, University of Kiel, D-24098 Kiel, Germany — [2]Institute for Physical Science and Technology, University of Maryland, College Park, MD 20742, USA

Because of their already high energy, suprathermal particles likely serve as the source population for further acceleration at interplanetary shocks. The very low solar activity in 2007 and the recurrent corotating particle events make 2007 an ideal time period to study the abundance of non-flare associated, i.e. quiet-time, suprathermal particles. Using a maximum-likelihood method based on Poissonian statistics which is well adapted to deriving fluxes from small count numbers, we determine the fluxes of suprathermal particles in 2007. We will present results for CIRs, high-speed streams, slow wind, and solar wind dwells.

EP 4.12 Mo 17:30 Vorraum KGI-Aula

An improved ACE/SWICS efficiency model including uncertainty estimates — •Muharrem Köten[1], Lars Berger[1], Roland Rodde[1], Jim Raines[2], and Robert F. Wimmer-Schweingruber[1] — [1]Institut fur Experimentelle und Angewandte Physik, University of Kiel, D-24098 Kiel, Germany — [2]University of Michigan, Atmospheric, Oceanic, and Space Sciences, 2455 Hayward St., Ann Arbor, MI 48109, USA

SWICS (Solar Wind Ion Composition Spectrometer) is a linear time-of-flight mass spectrometer on ACE (Advanced Composition Explorer), launched 1997, and now at L1. SWICS determines the ion composition of the solar wind and of suprathermal particles in interplanetary space. For the purpose of an improved data analysis technique we have developed an advanced mathematical model of SWICS that calculates the detection probabilities as a function of ion species, energy, and flight trajectory. Based on careful analysis of calibration data and detailed comparison with flight data, we have included several effects in the model: Energy loss in the carbon foil was simulated with SRIM and adapted to flight and calibration results. Pulse height defects were derived from calibration data. Scattering in the foil has been improved by using results from dedicated scattering experiments performed at the University of Bern, Switzerland. Finally, we use the full 3-d information of the instrument to obtain accurate active areas. We present the operational breakdown of the efficiency model and the data products the program provides, and present uncertainty estimates for them.

EP 4.13 Mo 17:30 Vorraum KGI-Aula

Phasenraum-Transport von Pick-up Ionen unter CGL Invarianzen — •Hans-Jörg Fahr — Argelander Institut fuer Astronomie, Universität Bonn,Auf dem Huegel 71, 53121 Bonn

Der Phasenraumtransport von suprathermischen Ionen im Bereich des supersonischen Sonnenwindes wird unter Verwendung von CGL-Invarianten neu untersucht. Es wird gezeigt, daß der gewöhnlich angesetzte Prozess der adiabatischen Dezeleration für Ionenenergien im Bereich um einige KeV nicht operabel ist. Es kann vielmehr gezeigt werden, daß es für KeV-Ionen im supersonischen Sonnenwindbereich zu nicht-isentropen Entwicklungen der Verteilungsfunktion kommt. Eine angemessene Beschreibung der Dezeleration im expandierenden Sonnenwind ergibt sich dagegen unter Berücksichtigung von Invarianten der Ionen-Bewegung im divergierenden Magnetfeld. Dies liefert neue Aussagen über den resultierenden Power-Index der Pick-up Ionen Verteilungsfunktion und neue Einsichten in den mit solchen Verteilungen verbundenen Pick-up Ionendruck. Der Gradient dieses Druckes wirkt auf die Sonnenwinddynamik ein und kompensiert zum Teil die durch Impulsbeladung des Sonnenwindes mit neuen Ionen resultierende Sonnenwindverlangsamung.

EP 4.14 Mo 17:30 Vorraum KGI-Aula

Produktion energetischer Neutralatome im Heliosheath: die Pick-Up Ionen-Komponente — •Horst Fichtner[1] und Ian Lerche[2] — [1]Institut für Theoretische Physik IV, Ruhr-Univrsität Bochum — [2]Institut für Geophysik und Geologie, Universität Leipzig

Die Raumsonde IBEX, deren Start für Juni diesen Jahres vorgesehen ist, wird den Fluss von in der äußeren Heliosphäre durch Ladungsaustausch entstehenden energetischen Wasserstoffatomen messen, um so Rückschlüsse auf die Beschaffenheit der Produktionsregion ziehen zu können. Die hauptsäschlich in der heliosphärischen Grenzschicht erfolgende Umladung von Protonen zu energetischen Neutralatomen (ENA) hat dort im von IBEX abgedeckten Energieintervall von 0.01 bis 10 keV zwei 'Kanäle': zum einen eine Umladung von Sonnenwindprotonen und zum anderen die von Pick-Up Ionen. Im Vortrag wird über die Ergebnisse einer Studie des Beitrags letzterer zum ENA-Gesamtfluss berichtet.

EP 4.15 Mo 17:30 Vorraum KGI-Aula

Are "Anomalous" Cosmic Rays the Main Contribution to the Low-Energy "Galactic" Cosmic Ray Spectrum? — •Klaus Scherer[1], Horst Fichtner[1], Stefan Ferreira[2], Ingo Büsching[2], and Marius Potgieter[2] — [1]Institut für Theoretische Physik, Lehrstuhl IV: Weltraum- und Astrophysik, Ruhr-Universität Bochum, D-44780, Bochum, Germany — [2]Unit for Space Physics, North-West University, 2520 Potchefstroom, South Africa

While the high-energy part of the galactic cosmic ray spectrum is well observed, its nature at energies below about 1 GeV/nucleon is still not known well. Recent in-situ measurements made with the Voyager 1 spacecraft in the heliosheath between the solar wind termination shock and the heliopause have not only added further constraints to the local interstellar spectrum of galactic cosmic rays at low energies, but also suggest how the proton part is formed in the Galaxy. It appears that the acceleration of heliospheric anomalous cosmic rays does not only take place at the solar wind termination shock but to an even larger extent within the heliosheath leading to a significantly higher source strength than expected. Combining this finding with recent model results for astrospheres immersed in different interstellar environments shows that the astrospheric anomalous cosmic ray fluxes of solar-type stars can be a hundred times higher than thought earlier and, consequently, their total contribution to the lower end of the interstellar spectrum can be significant.

EP 4.16 Mo 17:30 Vorraum KGI-Aula

Ulysses observations of recurrent cosmic ray decreases during solar cycle 22 and 23 — •Phillip Dunzlaff, Bernd Heber, Oliver Rother, Reinhold Müller-Mellin, Andreas Klassen, Raul Gomez-Herrero, and Robert Wimmer-Schweingruber — IEAP, Christian-Albrechts-Universität Kiel, Germany

During the first south polar pass of the Ulysses spacecraft from mid-1992 to mid-1994 (solar cylce 22), the counting rates of several hundred MeV galatic cosmic rays were modulated by transient and recurrent decreases at all latitudes. In solar cycle 23, from late 2004 to 2007 the Ulysses spacecraft repeated this trajectory segment during a similar phase of the solar cycle but with the opposite heliospheric magnetic field polarity. In this contribution we determine the amplitude and latitude distribution of recurrent cosmic ray decreases in solar cycle 22 and 23: 1. While recurrent cosmic ray decreases were present up to highest latitudes in the 1990's, we find that recurrent cosmic ray decreases vanish above 40° S in 2006. 2. A spectral analysis on the solar wind speed and the magnetic field strength leads to a 26 and 24.5-day periodicity in cycle 22 and 23, respectively. While the 26-day variation continues to highest latitudes the 24.5 days vanishes in the fast solar wind regime. Thus we suggest tentatively that the difference between solar cycle 22 and 23 is caused by a different coronal structure, as observed in coronal maps. While the 1990's recurrent decreases are caused by the large extension of the southern polar coronal hole towards low latitudes the decreases in the 2000's are due to relatively stable, "small" equatorial coronal holes.

EP 4.17 Mo 17:30 Vorraum KGI-Aula

Are there Kronian electrons in the inner heliosphere? — Dennie Lange and •Horst Fichtner — Theoretische Physik IV, Weltraum- und Astrophysik, Ruhr-Universität Bochum

So far the Jovian magnetosphere as the largest in our solar system is treated in the literature as the dominant source of a few MeV electrons. On the basis of a time-dependent three-dimensional modulation model the transport of MeV electrons in the heliosphere is simulated. For this purpose the cosmic rays, the Jovian and the Saturnian electron source are considered together in the simulation of electron fluxes. The simulated electron intensities are discussed along the Ulysses and Cassini trajectories. The strength of the electron source at Jupiter is relatively well known and modelled. To determine the source strength of Saturn in comparison to that of Jupiter, we compare all available spacecraft measurements at Jupiter/Saturn in the overlaping energy range. Especially the study of the particle diffusion is of great relevance, because the really unknown function in the used transport equation is the diffusion tensor. The Jovian and/or Kronian electrons are in doing so very suitable to study the transport of energetic particles. All results effect clearly the intensities along the Ulysses and the Cassini trajectories. Our results reveal that the electrons from the Kronian magnetosphere, as the second largest, can not be neglected in the low MeV energy range.

EP 4.18 Mo 17:30 Vorraum KGI-Aula

Numerical simulations of the energetic particles accelerated by reconnection electric field — •Jingnan Guo[1,2], Jörg Büchner[1], Eckart Marsch[1], Pengfei Chen[3], Cheng Fang[3], and Weiqun Gan[2] — [1]Max Planck Institute for Solar System Research — [2]Purple Mountain Observatory, Chinese Academy of Sciences — [3]Nanjing University, China

Particle acceleration by direct current electric field in a reconnecting current sheet is considered as one of the popular mechanisms of generation of energetic particles during solar flares. We investigate the energy spectra using test particle approach in the framework of 2.5-dimensional magnetohydrodynamical numerical simulations of magnetic reconnection. The result indicates that both electrons and protons escaping from the acceleration region have a power-law spectrum and that those most energetic particles are accelerated from area nearest to the X-point. The influences of the electromagnetic configuration and plasma parameters on the final energy spectrum and the comparison between proton acceleration and electron acceleration are also studied.

EP 4.19 Mo 17:30 Vorraum KGI-Aula

Perpendicular Transport in the Inner Heliosphere: A Quick and Dirty Approach — •Florian Lampa, Katrin Jahns, and May-Britt Kallenrode — Department of Physics, University of Osnabrueck, Barbarastraße 7, D-49076 Osnabrueck

In previous studies, particle transport in the inner heliosphere is regarded as one dimensional along the archimedian spiral; any perpendicular transport is neglected. We extend Roelof's equation of focused transport to accommodate perpendicular transport in the plane of ecliptic. For typical ratios $\kappa_\perp/\kappa_\parallel$ between 0.02 and 0.1 we find that cross-field transport is extremely efficient in smearing out any azimuthal gradients within a few hours – much faster than suggested by observations. We employ different scenarios to reduce perpendicular transport to maintain gradients, namely a diffusive shell around the Sun and an ad-hoc scaling of azimuthal transport with spiral angle Ψ. For the latter case we find that (a) azimuthal spread over some ten degrees occurs within a few hours, (b) the variation of maximum intensities with longitude is comparable to the ones inferred from multi-spacecraft observations, and (c) on a given field line intensity- and anisotropy-time profiles are modified such that fits with the 2D transport model give different combinations of injection profiles and mean free paths. Thus although the consideration of perpendicular transport in the inner heliosphere can account for quite a wide range for observations, this is not possible with currently assumed fixed ratios $\kappa_\perp/\kappa_\parallel$ derived from random walk of field lines and non-linear guiding center theory.

EP 4.20 Mo 17:30 Vorraum KGI-Aula

The Interstellar Heliopause Probe / Heliospheric Explorer: IHP/HEX — •Robert F. Wimmer-Schweingruber[1], Bernd Heber[1], Ralph McNutt[2], Horst Fichtner[3], Klaus Scherer[3], Manfred Leipold[4], and The IHP HEX Team[5] — [1]Institute for Experimental and Applied Physics, Christian-Albrechts-University Kiel, Kiel, Germany — [2]Applied Physics Laboratory, John Hopkins University, Laurel, MD, USA — [3]Institut für Theoretische Physik IV, Weltraum- und Astrophysik, Ruhr-Universität Bochum, D-44780 Bochum, Germany — [4]Kayser-Threde GmbH, Wolfratshauser Str. 48, D-81379 München, Germany — [5]spread across the world, Earth, Solar System

The Sun, driving a supersonic solar wind, cuts out of the local interstellar medium a giant plasma bubble, the heliosphere. Dedicated deep-space missions have greatly enhanced our understanding of our immediate neighborhood.

The next logical step is to leave the heliosphere and to thereby map out in unprecedented detail the structure of the outer heliosphere and its boundaries, the termination shock, the heliosheath, the heliopause, and, after leaving the heliosphere, to discover the true nature of the hydrogen wall, the bow shock, and the local interstellar medium beyond. This will greatly advance our understanding of the heliosphere that is the best-known example for astrospheres as found around other stars. Thus, IHP/HEX will allow us to discover, explore, and understand fundamental astrophysical processes in the largest accessible plasma laboratory, the heliosphere.

EP 4.21 Mo 17:30 Vorraum KGI-Aula

Development of a position-sensitive Faraday cup array beam diagnostic for the solar wind laboratory at the University of Kiel — •Lauri Panitzsch, Michael Stalder, Robert Wimmer-Schweingruber, Christiane Helmke, Christian Steigies, Onno

Kortmann, Stephan Böttcher, Oliver Rother, Stefan Kolbe, Lars Seimetz, and Horst Schlüter — IEAP, University of Kiel, Germany

The department of extraterrestrial physics of the university of Kiel is establishing a solar wind laboratory which will be used mainly for three purposes: calibration of space instruments interacting with the solar wind, research on space weathering of dust particles, and for fundamental plasma physics. The laboratory will be able to generate a well defined highly-charged ion flux, similar to the solar wind, at energies from 1- 450keV/q. To generate this flux, ions of different charge states are produced in a 10-14GHz Electron-Cyclotron-Resonance Ion Source (ECRIS).

Both, calibration and dust particle bombardment, need accurate values for the main beam parameters such as current, position and profile. While the current will be measured by a single Faraday Cup (FC), position and profile of the ion beam will be acquired with a Faraday Cup Array (FCA) which can be moved through the beam. This array will allow high resolution, accuracy and durability even for the expected current range (pA → mA) and a beam power up to 40W.

Here, we report on the design, assembly, implementation, and testing of the FCA.

EP 4.22 Mo 17:30 Vorraum KGI-Aula

RAD/MSL calibration results — •Onno Kortmann, Eckart Böhm, Stephan Böttcher, Sönke Burmeister, César Martin, and Robert F. Wimmer-Schweingruber — Institut für Experimentelle und Angewandte Physik, University of Kiel, Leibnizstraße 11, D-24098 Kiel, Germany

RAD, the radiation assessment detector on NASA´s Mars Science Laboratory rover mission is designed to detect a wide range of different particle species at energies up to 100 MeV/nuc.

Validation of the instrument design as well as calibration has been done with a prototype unit of the RAD sensor head. We present calibration results as well as comparisons with first data taken with flight units during laboratory testing.

EP 4.23 Mo 17:30 Vorraum KGI-Aula

Real-time database for high resolution Neutron Monitor measurements — •Christian T. Steigies, Oliver M. Rother, Robert F. Wimmer-Schweingruber, and Bernd Heber — IEAP, Christian-Albrechts-Universität zu Kiel

The worldwide network of standardised neutron monitors is, after 50 years, still the state-of-the-art instrumentation to measure spectral variations of the primary cosmic ray component. These measurements are an ideal complement to space based cosmic ray measurements. Data from the approximately 50 IGY and NM64 neutron monitors is stored locally but also available through data collections sites like the World Data Center (WDC) or the IZMIRAN ftp server. The data from the WDC is in a standard format, but only hourly values are available. IZMIRAN collects the data in the best available time resolution, but the data arrives on the ftp server only hours, sometimes days, after the measurements. Also, the high time-resolution measurements of the different stations do not have a common format, a conversion routine for each station is needed before they can be used for scientific analysis. Supported by the 7th framework program of the European Commission, we are setting up a real-time database where high resolution cosmic ray measurements will be stored and accessible immediately after the measurement. Stations that do not have 1-minute resolution measurements will be upgraded to 1-minute or better resolution with an affordable standard registration system, that will submit the measurements to the database via the internet in real-time.