EP 4: Poster Session

Zeit: Dienstag 11:15–12:45 Raum: Poster OG

EP 4.1 Di 11:15 Poster OG

Hydrodynamical Simulations of the Young Supernova Remnant CTB 109 — •Jan Bolte[1], Manami Sasaki[2], and Dieter Breitschwerdt[1] — [1]Zentrum für Astronomie und Astrophysik, TU Berlin — [2]Institut für Astronomie & Astrophysik, Universität Tübingen

Based on the assumption that the background medium has not changed significantly during the evolution of the SNR, we use the present ambient medium, given by the CO emission, as the initial condition of a 3D hydrodynamical simulation. By adding an additional small dense cloud to this realistic inhomogeneous medium, not only the observed morphology of the remnant can be reproduced very well, but also the prominent X-ray lobe of CTB 109 can be explained as the result of a shocked dense cloud. With further constraints from X-ray observations we can derive various important physical parameters from the parameter studies and get a picture of the preshock medium.

EP 4.2 Di 11:15 Poster OG

Arecibo message: Fatigue due to diffraction effects ? — •Erhard K. Schweizer — D-97980 Bad Mergentheim, Neunkircher Str. 46

In 1974 the Arecibo message was sent toward M13, 25'000 light years away with a radiated power of 1 MW. Taking diffraction effects into account, the signal from the 305m-Arecibo-antenna is shaped to a conical, modified Bessel lobe showing a cone angle of 0,017°. This minute divergence results in a circular spread of 18.3AU after 1 year of travel. The 1MW starting power is diluted to a power strength of less than 5E-20 W/m*, 1 light year away. Further propagation weakens the signal quadratically with distance, so ET needs sophisticated devices to detect the MW-Arecibo message at all. Acchievable signal strength for our extraterrestrial neighbours are discussed as a function of antenna size, radiated power, frequency and sender-recipient distance.

EP 4.3 Di 11:15 Poster OG

Monte Carlo studies for ground state configurations of atoms and ions in strong magnetic fields — •Sebastian Boblest, Christoph Schimeczek, Dirk Meyer, and Günter Wunner — 1. Institut für Theoretische Physik, Universität Stuttgart, 70550 Stuttgart

Accurate data of atoms and ions in magnetic fields as they occur on magnetic white dwarfs (MWD) and neutron stars (NS) are an essential requirement for better understanding these extreme objects. We present precise computations of the electronic ground state configurations and energies of atoms and ions in a wide range of magnetic field strengths using the Fixed Phase Diffusion Quantum Monte Carlo Method. We utilize trial functions obtained from Hartree Fock calculations performed using an expansion in a basis of Landau levels. The results from such computations may ultimately be used to uncover the origin of absorption features in the thermal emission spectra of MWD and NS.

EP 4.4 Di 11:15 Poster OG

HD 42659: the first spectroscopic binary around a rapidly oscillating Ap star — •Michael Hartmann and Artie Hatzes — Thüringer Landessternwarte Tautenburg, Sternwarte 5, 07778 Tautenburg, Germany

Chemically peculiar Ap stars are main-sequence stars of spectral type B8 – F0 which show large overabundances of some chemical elements (e.g., Si, Sr, Cr, and Eu), especially of rare earth elements, compared to normal A-type stars. Furthermore, they have strong, global magnetic fields and low rotational velocities. Spectra of these stars contain plenty of narrow absorption lines, thus making precise radial velocity (RV) measurements possible. Some Ap stars exhibit high-overtone, low-degree, non-radial p-mode pulsations with periods of 6 – 21 min and are called rapidly oscillating Ap (roAp) stars. Interestingly, no roAp star is known to be a spectroscopic binary (SB), while many non-oscillating Ap (noAp) stars are found in SB systems. One hypothesis to explain this difference is that the pulsations in Ap stars might be inhibited due to tidal interaction in binaries. To find a SB around a roAp star would thus disprove this hypothesis. We observed a sample of noAp and roAp stars with the HARPS spectrograph at the 3.6-m telescope at the European Southern Observatory (La Silla, Chile). We find significant variability with a period of 93 days in the RVs of the roAp star HD 42659 which is caused by a stellar companion with a minimum mass of 0.5 solar masses in a slightly eccentric ($e = 0.15$) orbit. This detection makes HD 42659 the first confirmed SB around a roAp star in a relatively close orbit ($a = 0.55$ AU).

EP 4.5 Di 11:15 Poster OG

Supernova remnants in a dense gas environment and the problem of the cosmic ray origin — •Tatyana Liseykina[1], Mikhail Malkov[2], and Galina Dudnikova[3] — [1]Institut für Physik, Universität Rostock, Germany — [2]University of California at San Diego, USA — [3]University of Maryland, USA

Although cosmic rays (CR) have been discovered a century ago, their origin is still not precisely known. The latest direct observations [1] of galactic supernova remnants (SNR) strongly support a hypothesis that those are the objects where most of the galactic CR originate from. Turning to the possible mechanisms of CR generation, observations favour the diffusive shock acceleration (DSA) scenario [2]. The limited understanding of the phenomena critical to the DSA, i.e., the confinement of energetic particles in partially ionized molecular clouds (MC) in front of SNR shocks, the modification of MC by cosmic rays, the escape of CRs and their propagation into the interstellar medium, precludes the interpretation of recent, significantly improved SNR observations. We review some important shortcomings of the theory, propose ways to overcome them, and present preliminary results on the identification of the most significant CR driven instabilities.

[1] A. A. Abdo et al., Science 327(2010); Astrophys. J. 734(2011); F. Aharonian et al., A& A 449(2006); R. Enomoto et al., Nature 416(2002); V.A. Acciari et al., Astrophys. J. 714(2010).
[2] L.O. Drury, Rep. Prog. Phys. **46** (1983); R. Blandford, D. Eichler, Phys. Rep. **154** (1987); M.A. Malkov, L.O. Drury, Rep. Prog. Phys. **64** (2001).

EP 4.6 Di 11:15 Poster OG

A high precision experimental benchmark of Fe M-shell unresolved-transition-array (UTA) inter-shell absorption lines — C. Beilmann[1], M. Leutenegger[2], R. Steinbrügge[1], J. Rudolph[1,3], S. Eberle[1], M.C. Simon[1], S.W. Epp[1], A. Graf[4], G.V. Brown[4], P. Beiersdorfer[4], T.M. Baumann[1], F.R. Brunner[1], S. Bernitt[1], Z. Harman[1,5], N.S. Oreshkina[1], C.H. Keitel[1], R. Follath[6], G. Reichardt[6], J. Ullrich[1], and •J.R. Crespo López-Urrutia[1] — [1]Max-Planck-Institut für Kernphysik, Heidelberg, Germany — [2]NASA/GSFC, Greenbelt MD, USA — [3]Universität Gießen, Germany — [4]LLNL, Livermore CA, USA — [5]EMMI, Darmnstadt, Germany — [6]HZB/BESSY, Berlin, Germany

Measurements of inner-shell absorption lines in highly charged ions have been performed with the portable electron beam ion trap FLASH-EBIT. It was coupled to a high-resolution monochromator at the synchrotron X-ray source BESSY II [1] to measure the resonant excitation energies of states decaying by autoionization or photon emission, which are measured by counting photoions and fluorescence photons in dependence of the X-ray energy. We compared the results with those of our own state-of-the-art relativistic configuration-interaction and multiconfiguration Dirac-Fock calculations, as well as with other recent calculations. The experimentally determined resonance energies typically have absolute precisions of about 70 meV, stringently benchmarking theory.

[1] M.C. Simon et al., Phys. Rev. Lett. **105**, 183001 (2010)

EP 4.7 Di 11:15 Poster OG

High resolution X-ray spectroscopy of young Neutron Stars — •Markus Hohle — AIU Jena, Germany

High resolution X-ray spectroscopy of young Neutron Stars using XMM RGS and Chandra HRC data unveiled previously unknown narrow absorption features. In some cases these features are likely not caused by the ISM, but may have their origins in the Neutron Star atmosphere (NSA). With these spectra we can probe current, highly magnetized NSA models. Although still challenging, a properly fitting model can yield the compactness of the Neutron Star, hence delivers precious constrains on the Equation of State.

EP 4.8 Di 11:15 Poster OG

Moving neutral helium in neutron star magnetic fields — •Thorsten Kersting and Günter Wunner — Institut für Theoretische Physik 1, Universität Stuttgart

In the past years, significant improvements in numerical calculations of atoms in neutron star magnetic fields have led to the possibility of producing a huge amount of atomic data, which can serve as a basis for modeling neutron star atmospheres. To calculate the quantity of interest, i.e. the opacity, from cross sections and dipole strengths, it is necessary to consider broadening effects due to influences of the hot plasma in the neutron star atmosphere. The largest broadening effect for atoms in neutron star magnetic fields is likely to be the influence of the motional Stark effect induced by the magnetic field. We will primarily focus on helium and work in center of mass and relative coordinates. The wave function is described by configuration interaction and the single-particle orbitals are expanded in B-Splines. This approach requires sophisticated numerical algorithms.

EP 4.9 Di 11:15 Poster OG

Bounds on the compactness of the isolated neutron stars via X-ray phase-resolved spectroscopy. — •Valeri Hambaryan — AIU Jena

We try to constrain compactness, thereby the nuclear Equation-of-State, of the isolated neutron stars in our galactic neighborhood. There are seven thermally emitting isolated neutron stars known from X-ray and optical observations, radio-quiet with blackbody-like X-ray spectra. Among them two (RBS1223 and RXJ0720) are very well suited to perform rotational phase-resolved X-ray spectroscopy, thanks to the observed large pulsed fractions and multi-epoch pointed observations, conducted by XMM and/or Chandra X-ray observatories. With number of models of magnetized atmosphere we fitted simultaneously the observed general spectral shape and the broad absorption feature in different spin-phases of the isolated neutron star, allowing to derive bounds of the gravitational redshift.

EP 4.10 Di 11:15 Poster OG

Giant radio pulses from the Crab pulsar — •Natalia Lewandowska and MAGIC Collaboration — Lehrstuhl für Astronomie, Universität Würzburg, Deutschland

Since its discovery in 1969 the Crab pulsar has been regarded as a special source of pulsar radio emission. Apart from its regular pulsed emission discovered to be emitted over the entire electromagnetic spectrum, it is one of the few pulsars in which giant radio pulses have been observed.

Giant radio pulses are characterized by much higher flux densities, an apparently non-periodical occurrence, short durations ranging from the microseconds to the nanoseconds range and their power-law energy statistics. These properties distinguish them clearly from regular pulses.

Neither the region of origin in the magnetosphere nor the emission mechanisms of giant pulses are understood. Within the framework of this talk we present an overview of our study of Crab radio giant pulses resulting from a multi-frequency campaign between radio and gamma-ray telescopes.

EP 4.11 Di 11:15 Poster OG

Beobachtung und Modellierung des Staubes in gut aufgelösten "Trümmerscheiben" um nahe Sterne — •Torsten Löhne und Alexander Krivov — Astrophysikalisches Institut und Universitätssternwarte Jena

Um zahlreiche Sterne findet man, meist am Rande der Systeme, größere Ansammlungen von Staub, den man in der Regel über seine thermische Emission im fernen Infraroten nachweist. Diese sogenannten Trümmerscheiben gelten als Überreste der Planetenentstehung, in denen Kleinkörper von höchstens Plutogröße in Kollisionskaskaden ebendiesen beobachteten Staub nachproduzieren.

Für ein besseres Verständnis dieser Systeme und ihrer Geschichte wurden im Rahmen der Mission des Herschel-Weltraumteleskops zahlreiche Trümmerscheiben bei Wellenlängen von 70 bis 500 Mikrometern beobachtet. Dabei sind es besonders die nahen und gut aufgelösten Scheiben, die detailiertere Untersuchungen zulassen.

Wir präsentieren hier einen Abriss der Beobachtungs- und Modellierungsergebnisse für zwei Objekte mit hervorragender Datenlage. Dabei wird gezeigt, welche Rückschlüsse die räumliche Verteilung und die spektrale Energieverteilung des Staubs auf die Dynamik der nicht sichtbaren größeren Objekte im Speziellen und die Entwicklung von Planetensystemen im Allgemeinen zulassen.

EP 4.12 Di 11:15 Poster OG

A high precision experimental benchmark of Fe M-shell unresolved-transition-array (UTA) inter-shell absorption lines — C. Beilmann[1], M. Leutenegger[2], R. Steinbrügge[1], J. Rudolph[1,3], S. Eberle[1], M.C. Simon[1], S.W. Epp[1], A. Graf[4], G.V. Brown[4], P. Beiersdorfer[4], T.M. Baumann[1], F.R. Brunner[1], S. Bernitt[1], Z. Harman[1,5], N.S. Oreshkina[1], C.H. Keitel[1], R. Follath[6], G. Reichardt[6], J. Ullrich[1], and •J.R. Crespo López-Urrutia[1] — [1]Max-Planck-Institut für Kernphysik, Heidelberg, Germany — [2]NASA/GSFC, Greenbelt MD, USA — [3]Universität Gießen, Germany — [4]LLNL, Livermore CA, USA — [5]EMMI, Darmnstadt, Germany — [6]HZB/BESSY, Berlin, Germany

Measurements of inner-shell absorption lines in highly charged ions have been performed with the portable electron beam ion trap FLASH-EBIT. It was coupled to a high-resolution monochromator at the synchrotron X-ray source BESSY II [1] to measure the resonant excitation energies of states decaying by autoionization or photon emission, which are measured by counting photoions and fluorescence photons in dependence of the X-ray energy. We compared the results with those of our own state-of-the-art relativistic configuration-interaction and multiconfiguration Dirac-Fock calculations, as well as with other recent calculations. The experimentally determined resonance energies typically have absolute precisions of about 70 meV, stringently benchmarking theory.

[1] M.C. Simon et al., Phys. Rev. Lett. **105**, 183001 (2010)

EP 4.13 Di 11:15 Poster OG

YETI - search for young transiting planets — •Ronny Errmann[1], Ralph Neuhäuser[1], Stefanie Rätz[1], Gracjan Maciejewski[2], Manfred Kitze[1], and YETI Team[3] — [1]Astrophysikal Institute und University Observatory, University Jena — [2]Centre for Astronomy of the Nicolaus Copernicus University, Torun — [3]all over the world

The transit method is the only method to determine the radius of a planet and inclination of the orbit directly. Radial velocity follow up results the true mass. So far, only transiting exoplanets older than several hundred Myr are known. To close the gap at young ages, the YETI network (Young Exoplanet Transit Initiative) was established. The network consists of ground based telescopes with mirror sizes of 0.4 to 2 m, located at different longitudes all over the world. With the telescopes it is possible to observe continuously for 24h a day without gaps in the light curves and therefor not missing a transit.

The targets are young clusters, which provide a large number of young stars with similar properties. The cluster is observed with YETI in three runs per year with length of one to two weeks each and over three years. The first target was Trumpler 37 with an age of 4 Myr. The monitoring started 2009. We reach a precision better than 30 milli-mag for 5500 out of the 17,000 field stars. Data processing of 50,000 images from 12 telescopes is still in progress, but we found already 2 transiting candidates, for which follow up is partly done.

EP 4.14 Di 11:15 Poster OG

TTV@YETI: Analysing Transit-Timing-Variations using ground-based observations — •Martin Seeliger[1], Gracjan Maciejewski[2], and Ralph Neuhäuser[1] — [1]Astrophysical Institute and University Observatory Jena — [2]Torun Centre for Astronomy, Poland

The transit timing variation (TTV) method, that was already successfully applied to space-based (i.e. Kepler) data, is sensitive to small perturbing masses in orbits near the low-order mean-motion resonances. However, deriving the orbital elements and mass of the perturber from TTV is a difficult inverse problem that requires many observations to at least partially remove degeneracies and point out the most probable configuration.

So far, we have observed transits of selected known transiting planets with known or suspected non-zero eccentricities and/or scatter in the radil-velocity orbit solution (which may indicate additional planets in the system). We could show that the achievable precision using ground-based data allows us to find planets as described above. Since single-site ground-based observations are not sufficient, we use the YETI-network, a consortium of small- to medium-size telescopes around the world to be able to cover all longitudes, allowing us to observe transits at certain phases and to probe certain frequencies in the periodogram, even though they would not be observable from single-site monitoring. Hence we are now able to compensate the disadvantages of ground-based observations.

EP 4.15 Di 11:15 Poster OG

The Next Generation Transit Search — •Philipp Eigmüller — Institut für Planetenforschung, Deutsches Zentrum für Luft- und Raumfahrt, Rutherfordstrasse 2, 12489 Berlin

The 'Next Generation Transit Search' project (ngts) is a new ground-based transit survey aimed at detecting sub-Neptune sized exoplanets around bright stars. It will consist of twelve robotic telescopes with an aperture of 200mm, each equipped with a 2kx2k NIR sensitive detector. NGTS builds upon the experience of past and current surveys. The instrument will be installed at the ESO Paranal observatory in order to benefit from the excellent observing conditions and follow-up synergy with the VLT and E-ELT.

EP 4.16 Di 11:15 Poster OG

Orbital motion of the binary brown dwarf companions HD130948BC around their host star — •Christian Ginski, Ralph Neuhäuser, Markus Mugrauer, Tobias O. B. Schmidt, and Christian Adam — Astrophysikalisches Institut und Universitäts-Sternwarte Jena, Jena 07745, Germany

Evolutionary models and mass estimates for brown dwarfs remain uncertain, hence determining the masses of brown dwarfs by model-independent methods is important to test and constrain such theories. Following the orbital motion of brown dwarf companions around their primaries gives us the opportunity to dynamically calculate the masses of these systems. In addition, detecting curvature (acceleration or deceleration) in the orbit would confirm that the companion is physically associated with its primary, thus eliminating the possibility of a by-chance alignment of the primary's and the companion's proper motions and positions. Furthermore, the orbit parameters can be important indicators for the formation process of such wide, massive sub-stellar companions.

The binary brown dwarf companions to HD 130948 were discovered by Potter et al. 2002. We present various observations of this triple system over the course of seven years. With these data points we can infer that HD 130948 BC show orbital motion around A.

EP 4.17 Di 11:15 Poster OG

High contrast imaging search for (sub)stellar companions to young stars in the Lupus star forming region — •Markus Mugrauer — AIU Jena, Jena, Germany

We give an introduction to our high contrast imaging search for (sub)stellar companions of pre-main sequence stars in the Lupus star forming region, carried out with NACO at ESO-VLT. The survey started 2010 with the 1st epoch AO observations of 63 targets taken at the Paranal Observatory. Recently in June 2012, the follow-up imaging of all our targets could be completed successfully. Here, we will present some first results of our multiplicity study.

EP 4.18 Di 11:15 Poster OG

High contrast AO imaging observations of PZ Tel and its sub-stellar companion — •Markus Mugrauer — AIU Jena, Jena, Germany

We will present new high contrast AO imaging observations of the PZ Tel system, taken with NACO at the Paranal Observatory. Our new NACO astrometry confirms the companionship of PZ Tel B on a very high significance level. The orbital motion of the companion relative to its primary is clearly detected between all observing epochs with evidence for deceleration. Our new NACO astrometry, together with the previously taken one, allows a characterization of the orbit elements of the PZ Tel system.

EP 4.19 Di 11:15 Poster OG

Messungen mit einem Phoswich-Detektor auf einem Stratosphärenballon — •Johannes Marquardt, Enno Scharrenberg, Esther M. Dönsdorf, Patrick Kühl, Henning Lohf und Henning Winterfeld — Christian-Albrechts-Universität zu Kiel

Die Galaktische Kosmische Strahlung (GCR) wird durch die Heliosphäre, die Magnetosphäre und die Atmosphäre moduliert. Durch die Ablenkung durch das Erdmagnetfeld erreichen nur Teilchen mit einem gewissen Impuls pro Ladung, genannt Steifigkeit, die Erdatmosphäre. Bei Wechselwirkungen wie Spallation von primären Teilchen der GCR mit Atomen der Atmosphäre entsteht ein höhenabhängiges, komplexes Strahlungsfeld sekundärer Teilchen, von denen Neutronen einen erheblichen Anteil an der Umgebungsäquivalentdosis liefern. Zudem wird der Teilchenfluss der GCR durch den solaren Zyklus beeinflusst; er ist antikorreliert zur Sonnenaktivität. Der höhenabhängige Neutronenfluss sollte während eines solaren Maximums an einem Ort mit geringer geomagnetischer Abschneidesteifigkeit bestimmt werden. Dazu wurde ein Teilchendetektor auf einem BEXUS-Ballon in der Stratosphäre geflogen. BEXUS ist ein Studentenprojekt des Deutschen Zentrums für Luft- und Raumfahrt und bietet die Möglichkeit, im Rahmen des Programms Experimente auf einem Ballon durchzuführen. Das Instrument für das Experiment ist ein Phoswich-Detektor, welcher aus zwei verschiedenen optisch miteinander gekoppelten Szintillatoren, angeschlossen an einen gemeinsamen Photomultiplier, besteht. Der Ballonflug fand Ende Septmeber 2012 in Kiruna (Schweden) erfolgreich statt und es wurden bereits grundlegende Datenanalysen durchgeführt.

EP 4.20 Di 11:15 Poster OG

The First Ground Level Event of Solar Cycle 24 and its longitudinal distribution in the inner heliosphere — •Bernd Heber[1], Nina Dresing[1], Wolfgang Dröge[2], Raúl Goméz-Herrero[3], Klaudia Herbst[1], Yulia Kartavikh[2], Andreas Klassen[1], Johannes Labrenz[1], and Olga Malandraki[4] — [1]Christian-Albrechts-Universität zu Kiel — [2]University of Würzburg, Würzburg, Germany — [3]SRG, University of Alcalá, Alcalá de Henares, Spain. — [4]Institute of Astronomy, Astrophysics, Space Applications and Remote Sensing, National Observatory of Athens, Athens, Greece

Ground level events (GLEs) are solar energetic particle (SEP) events that are recorded by ground-based instrumentation. The energy of the particles is so high that they produce secondary particles, i.e. protons and neutrons, which are detected as sudden increases in cosmic ray intensities measured by e.g. neutron monitors. On May 17 at 1:25 UT a M5.1 X-ray flare from the active region 11476 (N11W76) was detected accompanied by type II and III radio bursts and a coronal mass ejection heading towards STEREO A. The corresponding shock wave passed STEREO A on May 18 at 12:43 UT but missed the Earth and STEREO B. The event onset of near relativistic electrons was at SOHO (250 -700 keV),at STEREO A and B (125-335 keV)at 1:51 UT,6:05 UT and 3:38 UT, respectively. In contrast to observations close to the Earth no strong anisotropies have been observed at both STEREO A and B. The neutron monitor network recorded the first GLE for solar cycle 24.The Electron Proton Helium INstrument on board SOHO measured protons with energies of more than 600 MeV (rigidities of more than 1.2 GV). The interplanetary field direction was such that neutron monitor stations with asymptotic direction in the 1 to 2 GV range over Australia were connected best and recorded the biggest increase of 17

EP 4.21 Di 11:15 Poster OG

The Current Status of Development of the Electron and Proton Telescope for Solar Orbiter — •Jan Steinhagen, Shri Kulkarni, Sebastian Boden, Cesar Martin-Garcia, Stephan Böttcher, Björn Schuster, Lars Seimetz, and Robert Wimmer-Schweingruber — IEAP, Christian-Albrechts-Universität zu Kiel

ESA's Solar Orbiter mission, scheduled for launch in January 2017, will study how the sun creates the inner heliosphere. Therefore, the spacecraft will perform in situ and remote sensing measurements of the sun on a high inclination orbit with a perihelion of about 60 solar radii, making it possible to observe the poles of the sun from nearby. The Energetic Particle Detector suite on-board of Solar Orbiter will measure particles of a wide energy range and from multiple directions. One of the important sensors of the EPD suite is the Electron and Proton Telescope. It consists of two antiparallel telescopes with two silicon detectors respectively and is designed to detect electrons between 20 - 400 keV and protons from 20 keV to 7 MeV. EPT relies on a magnet/foil technique to discriminate between electrons and protons. Its design is driven by mass allocation, the thermal environment, power consumption and electronic noise; especially the magnet system must guarantee stray fields low enough to be compliant with the Solar Orbiter EMC requirements. Here, we present the current status of the Structural/Thermal Model and Engineering Model assembly as well as the integration and testing of the prototype.

EP 4.22 Di 11:15 Poster OG

Characterisation of a LSO scintillation crystal for space applications — •Robert Elftmann, Jan Grunau, Shrinivasrao Kulkarni, César Martin, and Robert Wimmer-Schweingruber — IEAP Christian-Albrechts-Universität, Kiel, Deutschland

Inorganic scintillation crystals coupled with semiconductor detectors are often used in space applications as gamma ray detectors or high energy particle calorimeters. Currently BGO ($Bi_4Ge_3O_{12}$) is widely used for this purpose because of its high stopping power, the non hygroscopy

and its ruggedness, which is favorable in space applications. Cerium doped LSO (Lu_2SiO_5) offers the same benefits with higher light output capabilites and a shorter decay time. In this work a cerium doped LSO scintillation crystal coupled with a photo diode is investigated. The light yield and resolution studies for two different radioactive sources, ^{207}Bi and ^{60}Co, are presented. To increase the light collection and consequently the energy resolution, scintillation crystals are wrapped in highly reflective material. The increase in light collection depending on the amount of layers for the LSO crystal along with investigations of quenching effects with alpha particles and the background spectrum, which arises from radioactive cerium isotopes, are also included in this work.

EP 4.23 Di 11:15 Poster OG

MHD simulations: Corotating Interaction Regions — •Tobias Wiengarten, Horst Fichtner, and Jens Kleimann — Theoretische Physik IV, Ruhr-Universität Bochum, Germany

Corotating Interaction Regions (CIRs) form in the solar wind when, due to the rotation of the Sun, parcels of fast-speed wind interact with slow-speed wind. The resulting build-up of pressure generates waves that with increasing time (or distance from the Sun) may evolve into a so-called forward-reverse shock-pair. During solar-quiet times CIRs can be the dominant drivers for shaping large-scale structures in the heliosphere. Studying CIRs is also important because the associated shocks are capable of (re-)accelerating energetic particles or deflect cosmic rays. The global, three-dimensional structure of CIRs is modeled with an MHD approach that gives the plasma quantities needed to model the transport and acceleration of particles in the heliosphere (with, e.g., stochastic differential equations (SDEs), see the talk by *Effenberger*).
Here, we show results from 3D-MHD simulations made with our code CRONOS for a) analytic boundary conditions where results can be compared with those obtained with a different code and b) boundary conditions derived from observational data that are compared to spacecraft observations.

EP 4.24 Di 11:15 Poster OG

Laboratory Experiments on the Expansion of Magnetically Confined Plasma Loops — •Jan Tenfelde[1], Felix Mackel[1], Sascha Ridder[1], Henning Soltwisch[1], Jürgen Dreher[2], Thomas Tacke[2], and Philipp Kempkes[3,4] — [1]Institut für Experimentalphysik V, Ruhr-Universität Bochum — [2]Institut für theoretische Physik I, Ruhr-Universität Bochum — [3]Ernst-Moritz-Arndt-Universität, Greifswald — [4]MPI für Plasmaphysik, EURATOM Association, Greifswald

Plasma loops reminiscent of Solar flares are generated in a pulsed-power laboratory experiment. A constant apex expansion velocity as well as constant current channel diameter are observed over a wide range of experimental parameters. Commonly, the evolution of current-carrying plasma loops is interpreted as being driven by the hoop force. We compare modifications of this hoop expansion that include the effect of mass loading with the expansion velocites obtained from the experiment. In addition, the effect of boundary conditions of the electric field is investigated in 3D time-dependent MHD simulations and compared with experimental results. Both mechanisms are discussed with respect to measurements of the plasma magnetic field and plasma currents.

MHD pumping driven by the axial plasma current has been proposed as possible cause of the uniform diameter along the plasma loop. However, it is found that this mechanism does not play a significant role in our device.

EP 4.25 Di 11:15 Poster OG

The Local Interstellar Spectrum Beyond the Heliopause: What can we Learn from Voyager in the Inner Heliosheath? — •Klaudia Herbst[1], Bernd Heber[1], Andreas Kopp[1], Oliver Sternal[2], and Friedhelm Steinhilber[3] — [1]Christian-Albrechts-Universität zu Kiel, Germany — [2]MINT-Kolleg, University of Stuttgart, Germany — [3]Swiss Federal Institute of Aquatic Science and Technology, EAWAG, Dübendorf, Switzerland

The local interstellar spectrum (LIS) is one of the most important but unknown parameters in all model efforts to describe the modulation of Galactic Cosmic Rays on their way from the galaxy through a possible bow shock, heliosheath and heliosphere towards the Earth. Because it could not be measured so far, several LIS models derived from numerical simulations or data at Earth were developed. A new perspective to determine the LIS was opened when the Voyager spacecraft crossed the termination shock and entered the heliosheath. Webber & Higbie (2009) derived a new LIS, which is lower than all previous LIS models over the entire energy range, on the base of these measurements. Numerical simulations by Scherer et al. (2011) showed that already particles in the outer heliosheath are modulated, suggesting that the LIS by Webber & Higbie (2009) is a heliopause spectrum rather than the "true" LIS. By using the same simplified simulation model we estimate the diffusion coefficient in the OHS by mapping the LIS models to this HPS and conclude that the Voyager measurements will not be able to determine the LIS in the next future.

EP 4.26 Di 11:15 Poster OG

Investigation of Pickup Ions with SOHO/CELIAS/CTOF — •Andreas Taut[1], Nils Janitzek[1], Lars Berger[1], Peter Bochsler[2], Christian Drews[1], Berndt Klecker[3], and Robert F. Wimmer-Schweingruber[1] — [1]Institute for Experimental and Applied Physics, Christian-Albrechts-University Kiel, Germany — [2]Physikalisches Institut, University of Bern, Switzerland — [3]Max Planck Institute for Extraterrestrial Physics, Garching, Germany

The Charge Time Of Flight (CTOF) sensor of the Charge, ELement, and Isotope Analysis System (CELIAS) experiment on SOHO is a time-of-flight mass spectrometer designed to measure the ionic composition of the solar wind. CTOF determines an ion's mass, mass-per-charge and velocity by the combined measurement of energy-per-charge (0.3 keV/e to 35 keV/e), time-of-flight and residual energy. Due to failure of detector components in August 1996, CTOF ceased to operate nominally after 150 days, but partially compensates the relatively small operation time by a signifcantly higher collection power with respect to other time-of-flight mass spectrometers. Thus, CTOF is able to study rare solar wind heavy ions with exceptional statistics. CTOF is especially well suited for the investigation of interstellar and inner-source pickup ions, because of its excellent time-of-flight resolution. Pickup ions are ionized neutral atoms coming from the interstellar medium or a source close to the sun, respectively. We report on first results of our investigation of the abundance and velocity spectra of inner-source and interstellar C+ and O+ pickup ions. Furthermore the in-flight calibration of the instrument is shown.

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Particle simulation of an Alfvénic turbulence cascade in the solar chromosphere — •LiHui Chai[1,2], Jörg Büchner[2], and KuangWu Lee[2] — [1]University of Science and Technology of China, Hefei, China — [2]Max-Planck-Institut für Sonnensystemforschung, Katlenburg-Lindau, Germany

Inertial Alfvén waves has been proposed to accelerate electrons in the chromosphere where they might cause hard X ray radiation during solar flare [Fletcher & Hudson 2008, ApJ, 675, 1645]. Due to their short transverse wave length inertial Alfvén waves carry a longitudinal electric field parallel to the background magnetic field. This longitudinal field can accelerate particles and dissipate wave energy to the plasma particles that move at the wave speed, i.e. via Landau damping effect [Landau 1946, J. Phys. USSR, 10, 25].

For this study an electromagnetic two-dimensional particle-in-cell simulation (2D EM PIC) is used to study the proposed acceleration mechanism in chromospheric plasmas. To generate an incoming Alfvén wave, an antenna that generates sinusoidal oscillating perpendicular electric fields is placed at one boundary. While the waves propagates into chromospheric plasmas a parallel electric field is obtained. The response of the particle distribution to this parallel electric field as well as the acceleration due to Landau damping are discussed in this work.

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High Time Resolution Measurements of Solar Wind Heavy Ions with SOHO/CELIAS/CTOF — •Nils Janitzek[1], Andreas Taut[1], Lars Berger[1], Peter Bochsler[2], Christian Drews[1], Berndt Klecker[3], and Robert F. Wimmer-Schweingruber[1] — [1]Christian-Albrechts-Universität Kiel — [2]Universität Bern — [3]MPE Garching

The Charge Time-Of-Flight (CTOF) mass spectrometer as one of the three main sensors of the Charge, ELement and Isotope Analysis System (CELIAS) onboard the SOlar and Heliospheric Observatory (SOHO) is designed to measure the kinetic properties and elemental/ionic composition of solar wind ions heavier than H^+, which we refer to as heavy ions. This is achieved by measuring the E/q-ratio, the time-of-flight and the energy deposit of incident ions. While CTOF was able to measure data only for a short time period from DOY 80 1996 until DOY 230 1996 due to an instrument failure, the measured

data shows a remarkable time-of-flight resolution compared to similar instruments such as SWICS on ACE. In addition the CTOF measurement cycle of about 5 minutes allows the investigation of short-time variations of the solar wind composition. We performed an in-flight calibration of the CTOF sensor which includes the determination of both time-of-flight range and energy deposit range of the measured ion species at fixed E/q-ratios. The results of our calibration will allow us to infer the composition and spectra of solar wind heavy ions with high time resolution.

EP 4.29 Di 11:15 Poster OG

Simulation results of the Electron-Proton Telescope for Solar Orbiter — •Sebastian Boden, Jan Steinhagen, Shrinivasrao Kulkarni, Jan Grunau, Rolf Paspirgilis, César Martin, Stephan Böttcher, Lars Seimetz, Björn Schuster, Alexander Kulemzin, and Robert Wimmer-Schweingruber — Christian-Albrechts-Universität Kiel

The Electron Proton Telescope (EPT) is one of five instruments in the Energetic Particle Detector suite for Solar Orbiter. It investigates low energy electrons and protons of solar events. EPT covers an energy range from 20 - 400 keV for electrons and 20 keV - 7 MeV for protons and distinguishes electrons from protons using a magnet/foil technique with silicon detectors.

There will be two EPT units, each with double-barreled telescopes, one looking sunwards/antisunwards and the other north/south.

EPT is designed using the GEometry ANd Tracking (GEANT) simulation toolkit developed by CERN for Monte Carlo calculations. Here we present the details of our simulations and the simulation results with respect to energy coverage and the geometrical factor of the EPT instrument. We will also look at the far-field of the EPT magnets, which is important for electo-magnetic cleanliness considerations.

EP 4.30 Di 11:15 Poster OG

Particle acceleration in the solar corona above active regions — •Xiaowei Zhou[1,2], Jan Skala[2], Joerg Buechner[2], Siming Liu[1], and Weiqun Gan[1] — [1]PMO, Nanjing, China — [2]MPS, Lindau, Germany

Recent solar observations gave important clues about the particle acceleration in solar flares. Many models have been investigated, but the many questions still remain. In our contribution we present relativistic test particle approach to study the acceleration mechanisms by magnetic reconnection.

We choose a relativistic guiding center approach, because particles are adiabatic along the magnetic field and the details of the particle trajectories is not important for our study.

The magnetic and electric fields are obtained from resistive MHD numerical simulations. The particles can be effectively accelerated by the parallel component of electric field Ejj. Our MHD simulations are based on the observations. The initial magnetic field is extrapolated from magnetogram of active region.

We investigate various models of anomalous resistivity dependent on the current carrier velocity. We compared the particle acceleration in different models. We studied the dependence of acceleration times and energy gains for ions and as well as their energy distribution needed to calculate the Hard X-ray spectrum to be compared with the observations of RHESSI.

EP 4.31 Di 11:15 Poster OG

Radiation Measurement on a Stratospheric Balloon — •Thomas Möller[1], Thomas Berger[2], Sönke Burmeister[1], Bent Ehresmann[1], Bernd Heber[1], Johannes Labrenz[1], Lauri Panitzsch[1], and Robert F. Wimmer-schweingruber[1] — [1]IEAP, Christian-Albrechts-University Kiel, Kiel, Germany — [2]German Aerospace Center (DLR), Cologne, Germany

The Earth is permanently exposed to energetic particle radiation from cosmic rays. This energetic particle radiation yields, together with its secondary particles produced in the Earth's atmosphere, a natural radiation field inside the atmosphere. The radiation exposure is dependent on altitude and geomagnetic latitude. In the future, it is planned to use supersonic aircraft, with operation altitudes between 20 and 25 km which is significantly higher than common aircraft altitudes. At these altitudes the radiation level is higher and reaches a maximum due to production of secondary particles. Therefore it is important to know which kind of radiation level will be expected in these altitudes. For this investigation a particle telescope consisting of four segmented silicon semiconductor detectors was developed. Due to the arrangement of the detectors, it is possible to separate neutral and charged particles. Therefore the dose rates induced by charged and neutral particles can be determined seperately. The Flight Radiation Environment Detector (FRED) conducted measurements onboard a stratospheric balloon in altitudes up to 25 km as part of the BEXUS programme. The results of the measurements will be presented.

EP 4.32 Di 11:15 Poster OG

Space Weather monitoring with Neutron Monitor measurements — •Christian Steigies — Christian-Albrechts-Universität zu Kiel

Space Weather affects many areas of the modern society, advance knowledge about space weather events is important to protect personnel and infrastructure. Cosmic Rays (CR) measurements by ground-based Neutron Monitors are influenced by Coronal Mass Ejections (CME), the intensity of the ever present Cosmic Rays is reduced in a Forbush decrease (Fd). In the case of very energetic CMEs, the measured intensity can be significantly increased in a Ground Level Enhancement (GLE). By detecting the anisotropy of the CR environment, a CME can be detected hours before it arrives at Earth. During a GLE the high-energy particles from the Sun can be detected before the more abundant lower energy particles arrive at Earth, thus allowing to take protective measures. Since the beginning of the Neutron Monitor Database (NMDB) project, which has been started in 2008 with funding from the European Commission, real-time data from Neutron Monitors around the world has been made available through one web-portal. We have more than doubled the number of stations providing data since the start of the project to now over 30 stations. The effectiveness of the ALERT applications which are based on NMDB data has been shown by the recent GLE71. We will present different applications through which the measurements and different data products are accessible.

EP 4.33 Di 11:15 Poster OG

Modernes Solares Röntgen Flare Monitoring im VLF Bereich — •Michael Danielides[1] und Thomas Bayer[2] — [1]E.-M. Arndt-Strasse 11, 17129 Bentzin — [2]Hungerstorf 40, 17139 Faulenrost

Das Indirekte Solare Röntgen Flare Monitor- Netzwerk (InFlaMo- Net) besteht aus neu entwickelten Detektoren für das VLF- Band, deren Daten auf einem sich noch im Aufbau befindlichen Internet-Portal gesammelt werden. Da die Detektoren fast autark arbeiten können, ist ein weit gestreutes und globales Netzwerk möglich.

Die so gewonnen und archivierten Daten geben indirekt Aufschluss über Weltraumwetterereignisse und eignen sich für eine Verbesserung der HF- Ausbreitungsvorhersage oder z.B. der Funkfernsteuerungsverfahren.

EP 4.34 Di 11:15 Poster OG

Ionization rates in the heliosheath and in astrosheaths — •Klaus Scherer[1], Horst Fichtner[1], Hans-Joerg Fahr[2], Maciej Bzowski[3], and Stefan Ferreira[4] — [1]Institut für Theoretische Physik IV, Ruhr-Universität Bochum, 44780 Bochum — [2]Argelander Institut, Universität Bonn, 53121 Bonn — [3]Polish Space Science Center, Warsaw — [4]Centre for Space Research, North-West University, 2520 Potchefstroom, South Africa

In the heliosphere, especially in the inner heliosheath, mass-, momentum-, and energy loading induced by the ionization of neutral interstellar species plays an important and underestimated role. We discuss the importance of the charge exchange and electron impact processes for interstellar neutral hydrogen and helium and its implications for further modeling. We will show, that electron impact can in some regions of the heliosphere, particularly in the heliotail, more effective than charge exchange, and the ionization of neutral interstellar helium contributes about 20% to the mass- and momentum loading in the inner heliosheath.

EP 4.35 Di 11:15 Poster OG

Energetic Neutral Atoms (ENAs) produced along the Voyager trajectories and implications for modeling of the inner heliosheath — •Mark Siewert and Hans-Jörg Fahr — Argelander-Institut f. Astronomie, Univ. Bonn, Auf dem Hügel 71, 53121 Bonn

Over the past years, we have developed our model for the production of Energetic Neutral Atoms (ENAs) produced in the inner heliosheath, and how they relate to the skymaps obtained by the IBEX mission. We now present first results of a study aiming to improve our initial model for the outer heliosphere with independent observational data.

The main contribution to this is derived from the two Voyager spacecrafts, which offer the only directly observed data on plasma properties of the heliospheric boundary layer. As it turns out, no existing model is able to describe, globally and self-consistently, all observations by the Voyagers, so a new and improved description is clearly required. We present first results on how strong a more realistic description would impact observed ENA fluxes.

EP 4.36 Di 11:15 Poster OG

Teilchenidentifikation von Neutronen und Gammas — •Dennis Sie, Sönke Burmeister, Stephan Böttcher und Bernd Heber — Institut für Experimentelle und Angewandte Physik, Christian-Albrechts-Universität zu Kiel

Die Messung energiereicher neutraler Teilchen mittels Silizium Halbleiterdetektoren beruht auf der spezifischen Wechselwirkung der Teilchen mit dem Absorber-Material. Während Neutronen mit Kerne des Materials wechselwirken, reagieren Photonen im Wesentlichen mit der Atomhülle. Letztere erzeugen durch Compton- oder Paarerzeugung Elektronen bzw. Positronen. Bei einem elastischen Stoß von Neutronen mit dem Absorber-Material werden die Stoßkerne beschleunigt. Zusätzlich können Neutronen durch in-elastische Wechselwirkungen mit dem Absorber energiereiche Teilchen erzeugen. Bei gleichem Energieverlust in dem Material besitzen Ionen gegenüber Elektronen ein wesentlich höheres Ionisationsvermögen. Aus diesem Grunde werden beim Messprozess unterschiedliche Pulsformen erwartet. Deshalb sollten die Impulse, die auf einer Wechselwirkung von Neutronen mit dem Material basieren. Die sehr kleinen Ladungsimpulse der Silizium PIN-Fotodiode werden mittels einem ladungsempfindlichen Verstärkers verstärkt und in Spannungsimpulse leicht messbarer Amplitude umgewandelt. Mittels einer zusätzlichen Digitalelektronik werden die Signale für die Auswertung digitalisiert und gespeichert. Mit der entwickelten Elektronik und der Pulse-Shape-Analysis können über die verschiedenen Pulsformen, Neutronen und Gammas getrennt werden. Der Aufbau und das Verfahren sollen hier vorgestellt werden.

EP 4.37 Di 11:15 Poster OG

On the gravitational redshift — •Klaus Wilhelm[1] and Bhola N. Dwivedi[2] — [1]Max-Planck-Institut für Sonnensystemforschung (MPS), 37191 Katlenburg-Lindau, Germany — [2]Dept. of Applied Physics, Indian Institute of Technology (Banaras Hindu University), Varanasi-221005, India

The study of the gravitational redshift — a relative wavelength increase of $\approx 2 \times 10^{-6}$ was predicted for solar radiation by Einstein in 1908 — is still an important subject in modern physics. Two research teams have recently disagreed on the physical cause of the shift. We argue that both teams miss the important point that the ratio of the gravitational force acting on an electron in a hydrogen atom situated in the Sun's photosphere to the electrostatic force between the proton and the electron is very small, namely, 3×10^{-21} and, of course, it is much smaller on Earth. A comparison of this ratio with the predicted and observed solar redshift indicates a discrepancy of many orders of magnitude. With Einstein's early assumption that the frequency of a spectral line depends only on the generating ion itself, a solution is found based on a two-step process in analogy with Fermi's treatment of the Doppler effect. A sequence of physical processes in line with the conservation of energy and momentum results in the observed shift. We suggest that the gravitational field affects the release of the photon and not the atomic transition. The atomic emission is then compared with the gravitational redshift of matter-antimatter annihilation events.

EP 4.38 Di 11:15 Poster OG

Modellierung des Einflusses von CIRs auf niedrig energetische Elektronen — •Adrian Vogt[1], Bernd Heber[1], Horst Fichtner[2], Jens Kleimann[2], Frederic Effenberger[2] und Oliver Sternal[3,1] — [1]Institut für Experimentelle und Angewandte Physik, Christian Albrechts Universität zu Kiel, 24118 Kiel, Germany — [2]Lehrstuhl für Theoretische Physik IV, Ruhr Universität Bochum, 44780 Bochum, Germany — [3]MINT-Kolleg Baden-Württemberg, Universität Stuttgart, Germany

In diesem Beitrag unterersuchen wir den Einfluss korotierender Wechselwirkungsregionen auf die Modulation niederenergetischer Elektronen mithilfe von Computersimulationen durch den VLUGR3-Code. Dazu werden zwei verschiedene analytische Modelle der Sonnenwindgeschwindigkeit und des Diffusionskoeffizienten bzw. der Magnetfeldstärke weiterentwickelt und ihre Parameterkonfiguration anhand der Zählratenmessungen von IMP-8 überprüft.

EP 4.39 Di 11:15 Poster OG

Calculating particle spectra from the Solar Electron and Proton Telescope onboard STEREO — •Jan Gieseler, Stephan Böttcher, Bernd Heber, and Jan Köhler — IEAP, CAU Kiel, Kiel, Germany

STEREO (Solar TErrestrial RElations Observatory) was launched on October 26, 2006. It consists of two spacecraft on heliocentric orbits, one preceding the Earth, the other following it. The Solar Electron and Proton Telescope (SEPT) onboard each of the two spacecraft is made up of two dual double-ended magnetic/foil particle telescopes which separate and measure electrons (from 30 to 400 keV) and ions, mainly protons and α-particles (from 70 keV to 2.2 MeV). Low energy ions are stopped by the thin foil which electrons can pass with an essentially unaltered spectrum. The magnet on the other side deflects electrons while ions still reach the detector. Up to now, SEPT energy spectra were obtained using defined energy channels from accelerator calibration measurements and geometric factors derived from Monte Carlo simulations. We try a different approach, applying inversion methods to calculate the energy spectra from the measurements, expecting higher accuracy and better separation of the different particle populations.

EP 4.40 Di 11:15 Poster OG

Particle scattering at amplified wavemodes within the heliosphere — •Sebastian Lange[1], Felix Spanier[1], and Rami Vainio[2] — [1]Lehrstuhl für Astronomie, Universität Würzburg, Emil-Fischer-Straße 31, D-97074 Würzburg — [2]Department of Physics, P.O.Box 64, 00014 University of Helsinki, Finland

Coronal mass ejections and flares are most likely the accelerators of high-energy particles. Streaming particles up to GeV energy causing plasma instabilities within the heliosphere. This leads to amplified wavemodes which influence the turbulent evolution and hence the particle scattering significantly. To investigate these effects, we use a hybrid simulation code called Gismo, which treats the heliospheric turbulence by an incompressible magnetohydrodynamic appoach separately from a kinetic particle description. In this talk, we present results of particle scattering within turbulence by using conditions observed at three solar radii. Furthermore, simulations of particle scattering at amplified wavemodes will be shown. These numerical results are compared to a semi-analytical approach using quasilinear theory. Differences and problems in these models will be discussed to achieve a fundamental understanding of wave-particle interactions.

EP 4.41 Di 11:15 Poster OG

Reconstruction of the Solar Modulation Parameter during the Holocene — •Klaudia Herbst[1], Bernd Herber[1], and Jürg Beer[2] — [1]Christian-Albrechts-Universität zu Kiel, D-24118 Kiel, Kiel — [2]Swiss Federal Institute of Aquatic Science and Technology, EAWAG, Dübendorf, Switzerland

On their way through the interplanetary space the intensity of galactic cosmic rays is modulated by the solar activity. In the Earth's atmosphere, however, the intensities of these primary cosmic rays but also of secondary particles produced in the atmosphere are anti-correlated to the solar activity. Cosmogenic radionuclides produced by spallation reactions of primary and secondary hadrons with atmospheric nuclei are mixed and transported into natural archives like ice sheets, tree rings or sediments. We compute the local and global production rates of ^{10}Be, ^{7}Be, ^{3}H, ^{36}Cl, ^{26}Al and ^{14}C on shorter time-scales, showing a clear anti-correlation to the solar activity. For ^{14}C we present, moreover, production rates for the entire Holocene and investigate their correlation to the solar modulation parameter.

EP 4.42 Di 11:15 Poster OG

Scintillation quenching in BGO crystal of the Solar Orbiter HET — •J. Grunau, S.R. Kulkarni, C. Martin, S. Boettcher, L. Seimetz, B. Schuster, A. Kulemzin, and R.F. Wimmer-Schweingruber — IEAP, Christian-Albrechts-Universität zu Kiel, Germany

The High-Energy Telescope (HET) on ESA's Solar Orbiter mission will measure electrons from 300 keV up to about 30 MeV, protons from 10 to 100 MeV and heavy ions from approximately 20 to 200 MeV/nuc. These measurement capabilities are reached by a combination of solid-state tracking detectors and a scintillator calorimeter. This setup can perform particle identification via the dE/dx vs total E technique. The scintillator approach provides a good resolution over the complete energy range but the total energy deposition has to be corrected for the

scintillation quenching. The quenching lowers light output depending on the type and energy of the incident particle. We measured the crystal response for different heavy ions and energies and compared them to simulated values. Simulations were carried out using the GEANT4 toolkit provided by CERN. From comparison of simulated and measured data we were able to calculate quenching factors for the BGO crystals for ions up to iron. The results are of great interest for later data analysis with the HET telescope.

EP 4.43 Di 11:15 Poster OG

Magnetic Field Fluctuations in Saturn's Magnetosphere — •Michael von Papen[1], Joachim Saur[1], and Olga Alexandrova[2] — [1]Institut für Geophysik & Meteorologie, Universität zu Köln — [2]Observatoire de Paris, LESIA, Meudon, France

In the framework of turbulence, we analyze the statistical properties of magnetic field fluctuations measured by the Cassini spacecraft inside Saturn's plasma sheet. In the power spectra of the fluctuations we identify two power-law spectral ranges seperated by a spectral break around ion gyro-frequencies of O^+ and H^+. The spectral indices of the low frequency power-law are found to be between 5/3 (for fully developed cascades) and 1 (during energy input on the corresponding scales). Above the spectral break there is a constant power-law with mean spectral index $\sim$2.5 indicating a permament turbulent cascade in the kinetic range. An increasing non-gaussian probability density with frequency indicates the build-up of intermittency. Correlations of plasma parameters with the spectral indices are examined and it is found that the power-law slope depends strongly on background magnetic field strength and plasma beta.