EP 6: Postersitzung

Zeit: Mittwoch 16:45–18:45 Raum: Foyer Ebene G.10

EP 6.1 Mi 16:45 Foyer Ebene G.10

How to compare coronal magnetic field models and coronal images? — Ioanna-Amaryllis Patsou and •Thomas Wiegelmann — Max Planck Institute for Solar System Research, Justus-von-Liebig-Weg 3, 37077, Göttingen

The coronal magnetic field controls the structure and most physical processes in the solar corona. Up to date accurate measurements of the magnetic field vector are regularly available only in photospheric levels and the 3D coronal magnetic field is mainly modelled by extrapolation of the photospheric magnetic field vector into the corona. One has also to make assumptions for the coronal current density. In the low corona above Active Regions the average plasma beta parameter is about 10^{-4} to 10^{-2} and plasma forces can be neglected. Then the Lorentz-force vanishes and the electric currents flow parallel to the magnetic field, leading to $\nabla \times \mathbf{B} = \alpha \mathbf{B}$. In this work photospheric magnetic field measurements of ARs from SDO/HMI have been extrapolated using potential ($\alpha = 0$), linear force-free ($\alpha = constant$) and nonlinear force-free (α *varies in space*) models. A complementary approach to derive coronal magnetic loops (but only in 2D) is through coronal EUV-images, because the highly conductive coronal plasma outlines the magnetic field lines. We have combined high-resolution EUV coronal loop images from SDO/AIA with the 3D reconstructed magnetic field in order to obtain information about the magnetic field topology of coronal loops above ARs. We derived quantitative criteria to compare magnetic loops visible in AIA-images with field lines from 3D coronal magnetic field models.

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Expanding the Neutron Monitor database with data from real-time and historical stations — •Christian Steigies — Christian-Albrechts-Universität zu Kiel, Germany

The Neutron Monitor database NMDB, which has been funded by the FP7 program of European Commission, has been providing both real-time as well as historical data since its inception in 2008. In the beginning only the participants from a few European and Asian countries where providing their data to the database. However, the number of stations participating in NMDB is still increasing so that currently most American and Australian stations are also contributing to NMDB. Some stations are currently being upgraded, like Mt Washington, Leadville, which replaces the closed Climax station, or Calgary, which is receiving the new registration system from the University of Alcala, to ensure that they can contribute real-time data to NMDB. Meanwhile data from other historical stations (from Ahmedabad to Zugspitze) is being added to NMDB as a further step for one of our goals: making all Neutron Monitor data available in one format from one place for everybody. To facilitate the addition of new stations, a set of python scripts has been developed which can be used by all stations to easily transfer their data to NMDB in a tested way. By using a common software the data quality and the accessibility of the database is improved.

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Automatic classification of box and peanut shaped bulges using self organizing maps — Baris Özcan[1], •Rainer Lütticke[1], and Kai Lars Polsterer[2] — [1]Hochschule Bochum, Lennershofstr. 140 — [2]Heidelberger Institut für Theoretische Studien

There are several large studies to classify the morphology of bulges, e.g. peanut or box shaped (b/p) (Yoshino & Yamauchi, 2015, MNRAS 446, 3749; Lütticke, Dettmar, & Pohlen, 2000, A&AS 145, 405 [LDP]). Both referenced classifications are visual and very time consuming. An objective classification of bulge types would be useful. Therefore we developed software for an automatic classification of bulge types using unsupervised machine learning methods (self organizing maps, a kind of artificial neural network). This software is based on Polsterer, Gieseke, & Kramer (2012, ASPCS 461, 561). As input, our software gets preprocessed images (120x80 pixels). The preprocessing includes alignment with the major axis, scaling the galaxy image to the size of the bulge, and cutting out the region of the bulge. We give the image pixels in the region of the b/p structure a higher weighting in the classifying algorithm. Our sample includes 88 galaxies belonging to SDSS and fulfilling criteria for inclination, size, and Hubble type. With a set of 44 images the map (16 neurons = 16 classes) is trained and then the other set is classified using the trained map. However, the bulge types as defined in LDP are not well reproduced by these classes and automatically classified bulges are often wrong classified in comparison to LDP. We conclude that our approach has to be optimized or automatical classification for bulge types is not possible at all.

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Propagationszeiten von Jupiterelektronen — •Adrian Vogt, Phillip Dunzlaff, Bernd Heber, Andreas Kopp und Patrick Kühl — Christian-Albrechts-Universität Kiel

Seit 1977 ist bekannt, dass Jupiters Magnetosphäre Elektronen freisetzt. Da deren Energiespektrum bekannt ist und Jupiterelektronen im unteren MeV-Bereich gegenüber galaktischen Elektronen dominieren, lassen sich an ihnen exemplarisch die Transporteigenschaften geladener Teilchen in der inneren Heliosphäre untersuchen. In dieser Arbeit wurde mit Hilfe stochastischer Differentialgleichungen eine Parameterstudie durchgeführt, die mehrere Möglichkeiten die Propagationszeit über numerische Simulationen abzuschätzen, sowie deren Einfluss auf die gemessenen Zählraten zur Diskussion stellt.

EP 6.5 Mi 16:45 Foyer Ebene G.10

Angular Distribution of Charged Particles - Atmosphere Measurement (ADAM): Ein Teilchenteleskop zur Messung der Winkelverteilung geladener Teilchen in der Atmosphäre — •Stefan Wraase, Maximilian Brüdern, Finn Christiansen, Marlon Köberle, Sebastian Martensen, Dennis Trautwein, Bernd Heber, Robert Wimmer-Schweingruber, Stephan Böttcher und Sönke Burmeister — IEAP, Christian-Albrechts-Universität zu Kiel, Deutschland

Durch Wechselwirkung kosmischer Strahlung mit der Atmosphäre entstehen Teilchenschauer aus einer hohen Anzahl von Sekundärteilchen. Ziel des ADAM-Experiments ist es, die Winkelverteilung geladener Teilchen in der Atmosphäre zu bestimmen. Dazu wurde ein Sensorkopf, bestehend aus mehreren Halbleiter-Detektoren, entwickelt und gebaut. Dieser ermöglicht es, den Zenit-Winkelbereich auftreffender Teilchen über Koinzidenzmessung einzugrenzen. Das Experiment konnte im Oktober 2014 im Rahmen des REXUS/BEXUS-Programms für Studierende auf einem Stratosphärenballon geflogen werden und hat Messungen in bis zu 27 km Höhe vorgenommen. In diesem Beitrag sollen der wissenschaftliche Hintergrund, der Aufbau des Sensorkopfs, dessen Modellierung und Kalibrierung geschrieben werden. Darüberhinaus wird eine Methode zur Bestimmung der Winkelverteilungen aus den Daten beschrieben und anhand von Myonen-Messungen validiert.

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Simulation of radar observation of cometary dust particles — •Shraddha Dogra[1], Yevgen Grynko[1], Evgenij Zubko[2], and Jens Förstner[1] — [1]University of Paderborn, Warburger Str. 100, 33102 Paderborn, Germany — [2]V.N. Karazin Kharkov National University, Kharkov, Sumskaya Str. 35, Ukraine

In this work we numerically simulate the backscattering circular polarization response from dust around the nucleus of comet 103P/Hartley 2 [1]. We use the Discrete Dipole Approximation (DDA) method and a model of irregular Gaussian random field particle shapes [2]. The computation has been done for a wavelength of 12.6 cm and a set of icy particles in the size range 1 < d < 100 cm. Our results confirm detection of large ~10 cm grains [1]. [1] J. K. Harmon et al. 2011, ApJ, 734 L2. [2] Y. Grynko and Y. Shkuratov, 2003, JQSRT, 319.

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27-day solar rotational effect on auroral mesospheric nighttime OH and O3 observations induced by geomagnetic activity — •Tilo Fytterer[1], Michelle Santee[2], Miriam Sinnhuber[1], and Shuhui Wang[2] — [1]Institute for Meteorology and Climate Research, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany. — [2]Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, USA.

Precipitating particles (solar protons and electrons) lead to the formation of odd hydrogen (HOx = H + OH + HO2) in the mesosphere/lower thermosphere region (60 - 110 km) where HOx is locally responsible for catalytic O3 depletion. Measurements performed by the Earth Observing System Microwave Limb Sounder instrument onboard the Aura satellite from 2004 - 2009 (2004 - 2014) were used to investigate the 27-day solar rotational cycle in mesospheric OH (O3) and the physical connection to geomagnetic activity. Data analysis was focused on nighttime measurements at geomagnetic latitudes connected to the outer radiation belts (55° - 75°N/S). The applied superposed epoch analysis reveals a distinct 27-day solar rotational signal in OH and O3 during winter in both the Northern and the Southern Hemisphere at altitudes >70 km. The OH response is positive and in-phase with the respective geomagnetic activity signal, lasting for 1 - 2 days. In contrast the O3 feedback is negative, delayed by one day but lasts up to 4 days afterward. Largest OH (O3) peaks are found at 75 km, exceeding the 95% significance level and reaching variations of +14% (-7%) with respect to their corresponding background.

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Space weather case studies on disturbed VLF radio propagation in the lower ionosphere — •Michael Danielides[1] and Vladimir Skripachev[2] — [1]DSSC, 17129 Zemmin, Germany — [2]MSTU MIREA, Moscow, Russia

Since the early 20ies century the importance of the condition of Earth ionosphere for long range radio communication is known and presumable almost completely understood nowadays. However, the development and especially the distribution of low-cost software defined radio wave receivers (SDRs) is an on-going process and opens new opportunities for investigating Earths lower ionosphere, utilizing globally distributed VLF monitoring networks based on SDR technology. The aim of this presentation is to compare some of the existing VLF receiver types and networks and to present the InFlaMo network (www.inflamo.org) with its different SDR receivers. Results from case studies of combined VLF measurements are shown.