

Bochum

Ruhr-Universität Bochum
Institut für Theoretische Physik IV
Weltraum- und Astrophysik

Universitätsstraße 150, 44780 Bochum
Telefon: +49 (234) 32-22032, Telefax: +49 (234) 32-14177
E-Mail: rsch@tp4.ruhr-uni-bochum.de
WWW: <http://www.tp4.ruhr-uni-bochum.de>

1 Personal und Ausstattung

1.1 Personalstand

Professoren und Privatdozenten

Prof. Dr. Julia Becker [-23779] (seit 1.6.2009), PD. Dr. Horst Fichtner [-23786], Prof. Dr. em. Karl Schindler [-24728], Prof. Dr. Reinhard Schlickeiser [-22032], PD Dr. Andreas Shalchi, Prof. Dr. Dr. h.c. Padma Kant Shukla [-23759].

Wissenschaftliche Mitarbeiter:

Dr. Udo Arendt [-26709], Dipl.-Phys. Stefan Artmann [-26011], Dipl.-Phys. Katharina Anna Brodatzki [-27796], Dipl.-Phys. Giorgi Dalakishvili [-23457], Dr. Mark Eric Dieckmann [-23458], Dipl.-Phys. Alexander Dosch [-27869], Dipl.-Phys. Jens Dreyer [-23458], Dipl.-Phys. Frederic Effenberger [-23457], Dr. Bengt Eliasson [-23729], Dipl.-Phys. Dirk Gerbig [-26862], Dr. Fernando Haas [-23729], Dipl.-Math. Philipp Hoffmann [-26862], Dr. Jens Kleimann [-23676], Dr. Andreas Kopp [-23676], Dr. Marian Lazar [-23799], Dipl.-Phys. Michal Michno [-26011], M.Sc. Martino Olivo [-23458], Dipl.-Phys. Jenny Reimchen [-27796], Dipl.-Phys. Jens Ruppel [-22051], Dr. Christian Röken [-23771], Dr. Klaus Scherer [-23676], Dipl.-Phys. Tomislav Skoda [-23799], Dr. Anne Stockem [-22051], Dr. Robert Tautz [-27263], Dipl.-Phys. Bastian Weinhorst [-23771],

Doktoranden:

Dipl.-Phys. Stefan Artmann [-26011], Dipl.-Phys. Katharina Anna Brodatzki [-27796], Dipl.-Phys. Giorgi Dalakishvili [-23457], Dipl.-Phys. Alexander Dosch [-27869], Dipl.-Phys. Jens Dreyer [-23458], Dipl.-Phys. Frederic Effenberger [-23457], Dipl.-Phys. Dirk Gerbig [-26862], Dipl.-Math. Philipp Hoffmann [-26862], Dipl.-Phys. Michal Michno [-26011], M.Sc. Martino Olivo [-23458], Dipl.-Phys. Jenny Reimchen [-27796], Dipl.-Phys. Jens Ruppel [-22051], Dipl.-Phys. Tomislav Skoda [-23799], Dr. Anne Stockem [-22051], Dipl.-Phys. Bastian Weinhorst [-23771].

Diplomanden:

Stefan Artmann [-26011], Patrick Blies [-27752], Björn Eichmann [-23771], Michal Michno [-26011], Jenny Reimchen [-27796], Thomas Schablitzki [-23457], Tomislav Skoda [-23799].

Bachelor und Master:

Stephan Barra [-27263], Mustafa Caglar [-27752], Ulf Menzler, Matthias Temmen, Tobias Wiengarten, Michael Zacharias [-27869].

Sekretariat und Verwaltung:

Dipl.Soz. Wiss. Gisela Buhr [-26710].

Technisches Personal:

Kai Dietrich [-28878], Bernd Neubacher [-23798], Dominik Raulf [-28878], Patrick Tekath [-28878].

Studentische Mitarbeiter:

Stefan Artmann [-26011], Stephan Barra [-27263], Patrick Blies [-27752], Mustafa Caglar [-27752], Björn Eichmann [-23771], Michal Michno [-26011], Jenny Reimchen [-27796], Tomislav Skoda [-23799], Tobias Welz [-23676], Michael Zacharias [-27869].

1.2 Personelle Veränderungen*Ausgeschieden:*

Dr. Mark Eric Dieckmann [-23458], Dipl.-Phys. Björn Eichmann [-23771], Dr. Fernando Haas [-23729], Dr. Andreas Kopp [-23676], BSc Ulf Menzler [-23729], Dr. Christian Rösen [-23771], Dipl.-Phys. Thomas Schablitzki, Dr. Robert Tautz [-27263], BSc Matthias Temmen [-27752], BSc Tobias Wiengarten [-27752].

Neueinstellungen und Änderungen des Anstellungsverhältnisses:

Prof. Dr. Julia Becker [-23779], Dipl.-Phys. Stefan Artmann [-26011], cand.-phys. Stephan Barra [-27263], cand.-phys. Patrick Blies [-27752], cand.-phys. Mustafa Caglar [-27752], Dipl.-Phys. Giorgi Dalakishvili [-23457], Dipl.-Phys. Jens Dreyer [-23458], Dipl.-Phys. Frederic Effenberger [-23457], Dr. Bengt Eliasson [-23729], Dr. Jens Kleimann [-23676], Dr. Andreas Kopp [-23676], Dr. Marian Lazar [-23799], Dipl.-Phys. Michal Michno [-26011], Ulf Menzler [-23729], M.Sc. Martino Olivo [-23458], Dipl.-Phys. Jenny Reimchen [-27796], Dipl.-Phys. Thomas Schablitzki, Dipl.-Phys. Tomislav Skoda [-23799], Matthias Temmen [-27752], Tobias Wiengarten [-27752].

2 Gäste

Dr. A. Meli, 10-13.02.2009, Zusammenarbeit

Dr. T. Laitinen, University of Turku, Finnland, 9.-14.03.2009, Zusammenarbeit

M.Sc. M. Batterbee, University of Turku, Finnland, 9.-14.03.2009, Zusammenarbeit

M.Sc. G. Dalakishvili, University of Leuven, Belgien, 23.-26.06.2009, Vortrag und Zusammenarbeit

Dr. Federico Frascchetti, Univ. Paris, Juni - Juli 2009, Vortrag und Zusammenarbeit

Prof. A. A. Mamun, Pakistan, Alexander von Humboldt-Stiftung, Juli 2009, Zusammenarbeit

Dr. I. Büsching, North-West University, Potchefstroom, 17.07.2009, Südafrika, Zusammenarbeit

Dr. R. Kissmann, Universität Tübingen, 27.08.2009, Vortrag und Zusammenarbeit

Prof. R. Vainio, University of Helsinki, 30.09.-02.10.2009, Vortrag und Zusammenarbeit

Prof. Dusan Juvanovic, Stipendiat DAAD, 5.10.-31.01.2009, Zusammenarbeit

Dr. Mira Vukcevic, Universität Montenegro, 7.-12.12.2009, Zusammenarbeit

Prof. Dr. Yuri Litvinenko, University Waikato, Hamilton, Neuseeland, 01.12.2009-28.02.2010, Zusammenarbeit

3 Lehrtätigkeit, Prüfungen und Gremientätigkeit

3.1 Lehrtätigkeiten

U. Arendt: *Physik - Tutorium für Studienanfänger*, (2h), WS 08/09, SS 09, WS 09/10, *Quantenphysik auf dem Computer*, (2h), WS 08/09, *Repetitorium zu den Mathematischen Methoden der Physik*, (2h), SS 09, *Grundlagen der Mechanik und Elektrodynamik*, (4), SS 09, *Übungen zu 'Grundlagen der Mechanik und Elektrodynamik'*, (2h), SS 09, *Klassische Physik auf dem Computer*, (2h), SS 09, *Quantenphysik auf dem Computer*, (2h), WS 09/10.

J. Becker: *Einführung in die Kosmologie*, (3h), WS 09/10, *Seminar zur Theoretischen Weltraum- und Astrophysik: Cosmic Accelerators*, (2h), WS 09/10.

K. Brodatzki: *Übungen zu 'Grundlagen der Mechanik und Elektrodynamik'*, (2h), SS 09.

J. Dreyer: *Übungen zu Einführung in die Kosmologie*, (2h), WS 09/10.

F. Effenberger: *Übungen zu 'Grundlagen der Mechanik und Elektrodynamik'*, (2h), SS 09.

H. Fichtner: *Mathematische Methoden der Physik*, (4h), WS 08/09, WS 09/10, *Ergänzungen zu 'Mathematische Methoden der Physik'*, (2h), WS 08/09, WS 09/10, *Seminar zur theoretischen Weltraum- und Astrophysik*, (2h), WS 08/09, *Seminar zu laufenden wissenschaftlichen Arbeiten*, (2h), WS 08/09, SS 09, WS 09/10, *Physik - Tutorium für Studienanfänger*, (2h), WS 08/09, SS 09, WS 09/10, *Repetitorium zu den Mathematischen Methoden der Physik*, (2h), SS 09, *Grundlagen der Quantenmechanik und Statistik*, (2h), SS 09, *Theoretische Plasmaphysik*, (3h), WS 09/10, *Seminar zur Theoretischen Weltraum- und Astrophysik: Cosmic Accelerators*, (2h), WS 09/10.

D. Gerbig: *Übungen zu 'Grundlagen der Mechanik und Elektrodynamik'*, (2h), SS 09.

P. Hoffmann: *Übungen zu 'Theoretische Physik II: Elektrodynamik'*, (2h), SS 09.

C. Röken: *Übungen zu 'Theoretische Physik II: Elektrodynamik'*, (2h), SS 09.

R. Schlickeiser: *Seminar zur theoretischen Weltraum- und Astrophysik*, (2h), WS 08/09, *Seminar: Spezielle Probleme der Theoretischen Astrophysik*, (2h), WS 08/09, *Seminar zu laufenden wissenschaftlichen Arbeiten*, (2h), WS 08/09, *Theoretische Physik II: Elektrodynamik*, (4h), SS 09, *Übungen zu 'Theoretische Physik II: Elektrodynamik'*, (2h), SS 09, *Seminar zu laufenden wissenschaftlichen Arbeiten*, (2h), SS 09, *Seminar: Spezielle Probleme der Theoretischen Astrophysik*, (2h), SS 09, *Theoretische Physik I: Mechanik*, (2h), WS 09/10, *Seminar zur Theoretischen Weltraum- und Astrophysik: Cosmic Accelerators*, (2h), WS 09/10, *Seminar: Spezielle Probleme der Theoretischen Astrophysik*, (2h), WS 09/10, *Seminar zu laufenden wissenschaftlichen Arbeiten*, (2h), WS 09/10.

A. Shalchi: *Einführung in die Astroteilchenphysik*, (2h), WS 08/09, *Einführung in die Theoretische Astrophysik*, (2h), SS 09, *Spezielle Relativitätstheorie*, (2h), WS 09/10.

P.K. Shukla: *Nonlinear Plasma Waves*, (2h), SS 09.

A. Stockem: *Seminar: Spezielle Probleme der Theoretischen Astrophysik*, (2h), WS 09/10.

R.C. Tautz: *Seminar zu laufenden wissenschaftlichen Arbeiten*, (2h), WS 08/09, SS 09, *Übungen zu 'Theoretische Physik II: Elektrodynamik'*, (2h), SS 09, *Plasma-Astrophysik*, (2h), SS 09, *Seminar: Spezielle Probleme der Theoretischen Astrophysik*, (2h), SS 09.

B. Weinhorst: *Klassische Physik auf dem Computer*, (2h), SS 09.

3.2 Prüfungen

Von H. Fichtner abgenommene Prüfungen: 2 Diplomprüfungen, 7 Promotionsprüfungen, 1 Vordiplomsprüfung und 2 Erste Staatprüfungen.

Von R. Schlickeiser abgenommene Prüfungen: 18 Diplomprüfungen, 6 Promotionsprüfungen, 2 Vordiplomsprüfungen und 1 Master of Science Prüfung.

3.3 Gremientätigkeit

H. Fichtner: Mitglied der "Solar System Working Group" der ESA, Mitglied des Vorstandsrats der Deutschen Physikalischen Gesellschaft (DPG), Gastmitglied des DLR-Programmausschusses „Erforschung des Weltraums“, Bibliotheksbeauftragter der Fakultät für Physik und Astronomie, Mitglied des Beirats der Universitätsbibliothek der RUB

R. Schlickeiser: Advisory Board Member *Astrophysics and Space Science Transactions (ASTRA)*, Associate Editor of *Advanced Science Letter* (Topics: Astrophysics, Space Science, Plasma Theory), Associate Editor of *The Open Astronomy Journal*, Co-Editor *The Open Plasma Physics Journal*. Externer Gutachter beim Habilitationsverfahren von Dr. A. Bret an der Université Paris VI, LULU Palaiseau

Shukla, P. K.: Elected Corresponding Fellow of The Royal Society of Edinburgh, Elected Associate Fellow/Member (class for physics) of TWAS-The Academy of Sciences for the Developing World, Elected Foreign Member (class for physics) of The Royal Swedish Academy of Sciences; Chairman of the Science Council of the Emerging Nations Foundation, Elected Member and Chairman of IUPAP C16 Commission; Elected Associate Member IUPAP C17 Commission; Elected Fellow, Institute of Physics, UK; Elected Fellow, AIP, USA; Associate Member of the Max-Planck-Institut fuer Extraterrestrische Physik, Garching; Chairman of the International Advisory Committee of the International Conference on the Physics of Dusty Plasma (ICPDP); Member of the International Advisory Committee of the International Congress on Plasma Physics (ICPP); Member of the International Advisory Committee of the World Space Environment Forum; Chairman of the International Topical Conference on Plasma Physics (ITCPP); Editor-in-Chief *Journal of Plasma Physics*; Associate Editor of the *IEEE Trans Plasma Science*; Mitglied des Editorial Board *Plasma Physics and Controlled Fusion*, *New J. Physics*, and *International Review Electrical Engineering*; Co-Editor Topical Issue of *Physica Scripta*, The Royal Swedish Academy of Sciences; Co-Director Summer College on Plasma Physics, 29 July-24 August 2007, Abdus Salam ICTP, Trieste, Italien; Distinguished Guest (VIP) of the Abdus Salam ICTP, Trieste, Italien; Full Professor, Institut Superior Technica (IST), Universitat Technica de Lisboa, Portugal; Visiting Professor, University of Strathclyde, Glasgow, UK and Department of Physics at Umea University, Schweden; Fellow CCLRC Centre for Fundamental Physics, Rutherford Appleton Laboratory, Chilton, Didcot, UK; Honorary Professor, School of Physics, University of KwaZulu-Natal, Durban, South Africa; Distinguished Adjunct Professor, Department of Physics, COMSATS Institute of Information Technology, Islamabad, Pakistan; Adjunct Professor, National Physics Centre, Quaid-i-Azam University Campus, Islamabad, Pakistan.

4 Wissenschaftliche Arbeiten

Der am Institut für Theoretische Physik angesiedelte Lehrstuhl IV: Weltraum und Astrophysik übt eine Brückenfunktion aus zwischen den Theoretischen Lehrstühlen und den Lehrstühlen für Astronomie und Astrophysik an der Ruhr-Universität Bochum. Schwerpunkte des Lehr- und Forschungsprogramms des Lehrstuhls sind theoretische Fragestellungen aus der Weltraumphysik, der Astrophysik und der Physik kosmischer Plasmen mit Verzweigungen in die Gebiete der beobachtenden Astronomie, der Kosmologie, der Labor-Plasmaphysik, der Hochenergiephysik und der Teilchen-Astrophysik. Im Bereich der Astro-

nomie und Astrophysik beteiligt sich der Lehrstuhl an der bodengebundenen Gammaastronomie im Rahmen des H.E.S.S.-Projekts in Zusammenarbeit mit dem Max-Planck-Institut für Kernphysik in Heidelberg.

4.1 Weltraumphysik

Auswirkung der kosmischen Strahlung auf die terrestrische Atmosphäre und Umgebung (Fichtner, Scherer). Berechnung der Flüsse von energetischen Neutralatomen aus der äußeren Heliosphäre zur Vorbereitung der IBEX-Mission (Fichtner, Scherer, Sternal, Fahr). Zeitabhängigkeit des Transports von energetischen Elektronen in der Heliosphäre (Fichtner, Heber, Kopp, Scherer). Modellierung koronaler Massenauswürfe (Kleimann, Kopp, Fichtner, Grauer). Bestimmung der Elemente des räumlichen Diffusionstensors zum Transport heliosphärischer kosmischer Strahlung (Shalchi, Weinhorst, Fichtner). Bestimmung der Elemente des räumlichen Diffusionstensors zum Transport heliosphärischer kosmischer Strahlung (Schlickeiser, Shalchi).

4.2 Astrophysik

Quasilineare und nichtlineare Theorien des Transports und der Beschleunigung kosmischer Strahlung in magnetohydrodynamischer Turbulenz; (Dosch, Schlickeiser, Shalchi, Skoda, Tautz, Weinhorst). Nichtthermische Strahlungsprozesse in den Jets aktiver galaktischer Kerne und Gamma-ray bursts; Teilchenbeschleunigung in Supernova-Überresten; Heizung und Kühlung des Jetplasmas; Analytische Modellierung relativistischer Jets (Gerbig, Lerche, Röken, Ruppel, Schlickeiser, Stockem, Zacharias). Gamma-Astrophysik mit dem H.E.S.S.-Observatorium (Becker, Gerbig, Ruppel, Schlickeiser, Shalchi). Kollektive Instabilitäten in relativistischen Feuerbällen (Schlickeiser, Stockem, Tautz). Erzeugung kosmologischer Magnetfelder durch die Weibel-Instabilität (Lazar, Schlickeiser, Shukla, Stockem, Tautz). Beitrag anomaler kosmischer Strahlung zum interstellaren Protonenspektrum (Fichtner, Scherer, Büsching).

4.3 Plasmaphysik

Selbstgenerierte elektromagnetische Felder: Instabilitäten und energiereiche Teilchenstrahlung (Lazar, Schlickeiser, Skoda, Stockem, Tautz). Stochastische Magnetfelder mit Struktur – Universelles Verhalten beim chaotischen Transport: Selbstkonsistente Bestimmung der Energiespektren Kosmischer Strahlung durch stochastische Beschleunigung an Plasmaturbulenz (Hoffmann, Schlickeiser, Shalchi, Vukcevic). Kovariante Dispersionstheorie linearer Wellen für anisotrope Plasmaverteilungsfunktionen (Lazar, Lerche, Schlickeiser, Skoda, Tautz).

5 Diplomarbeiten, Dissertationen, Habilitationen

5.1 Diplomarbeiten

Abgeschlossen:

S. Artmann: Anisotropie-Zeit Profile solarer energetischer Teilchen. Bochum, TP IV, Diplomarbeit, 2009

M. Michno: On the magnetization of cosmic outflows. Bochum, TP IV, Diplomarbeit, 2009

T. Schablitzki: Suprathermische Ionen in der heliosphärischen Grenzschicht. Bochum, TP IV, Diplomarbeit, 2009

B. Eichmann: Synchrotron- und Röntgenvariabilitäten von Blazaren, TP IV, Diplomarbeit, 2009

J. Reimchen: Fokussierte Diffusion solarer kosmischer Strahlung, TP IV, Diplomarbeit, 2009

T. Skoda: Transport hochenergetischer kosmischer Strahlung im interstellaren Medium,

TP IV, Diplomarbeit, 2009

Laufend:

Patrick Blies: Einfluss von Klein-Nishina-Stufen in der Lösung der Diffusionsgleichung galaktischer kosmischer Elektronen, TP IV, Diplomarbeit, 2009

5.2 Bachelor und Masterarbeiten

Abgeschlossen:

S. Barra: Der anisotrope Diffusionstensor in symmetriefreien Magnetfeldern, TP IV, Master-of-Science Arbeit, 2009

C. Brock: Vergleich von exakten und genäherten Ladungsaustauschraten in heliosphärischen Plasmen mit thermischen und nicht-thermischen Verteilungsfunktionen, Master-of-Education-Arbeit, 2009

M. Temmen: Die Erzeugung energiereicher Wasserstoffatome von Protonenverteilungen in der Helioschicht. Bochum, TP IV, Bachelor-of-Science Arbeit, 2009

T. Wiengarten: Vergleich verschiedener Magnetfeldkonfigurationen im Bereich des heliosphärischen Terminationsschocks, Bochum, TP IV, Bachelor-of-Science Arbeit, 2009

U. Menzler: Kombinierte nichtlineare Synchrotron-Selbst-Compton Kühlung von relativistischen Elektronen, TP IV, Bachelor-of-Science Arbeit, 2009

Laufend:

Mustafa Caglar: Klein-Nishina-Stufen im Energiespektrum kosmischer Elektronen, Bachelor-of-Science Arbeit, 2010

M. Zacharias: Non-linear Synchrotron self-Compton Radiation of relativistic Electrons. Bochum, TP IV, Master-of-Science Arbeit, 2009

5.3 Dissertationen

Abgeschlossen:

A. Stockem: Plasmaintabilitäten in anisotropen Gegenstromverteilungen. Bochum, TP IV, Dissertation, 2009

Laufend:

S. Artmann: Untersuchungen zum fokussierten Transport kosmischer Strahlung, Dissertation, 2009

K. Brodatzki: High-energy photon interactions in active galactic nuclei, Dissertation, 2009

A. Dosch: Berechnung senkrechter Diffusionskoeffizienten geladener Teilchen aus der Newton - Lorentz - Gleichung, Bochum, TP IV, Dissertation

F. Effenberger: Anisotropic Cosmic Ray Diffusion in the Galaxy, Bochum, TP IV, Dissertation, 2009

D. Gerbig: Weiterentwicklung des relativistischen Pick-Up Modells. Bochum, TP IV, Dissertation, 2009

P. Hofmann: Calculation of Turbulence Power Spectra from Anisotropic Damping, Bochum, TP IV, Dissertation, 2009

M. Michno: Examination of kinetic and MHD-instabilities in anisotropic plasma distributions, Bochum, TP IV, Dissertation, 2009

M. Olivo: High-energy neutrinos from Gamma-Ray Bursts, Dissertation, Bochum, TPIV, Dissertation, 2009

J. Reimchen: Nichtlineare Transportparameter kosmischer Positronen, Bochum, TPIV,

Dissertation, 2009

J. Ruppel: Über die zeitlichen Skalen der Dynamik verschiedener Elektronenpopulationen, Bochum, TPIV, Dissertation, 2009

T. Skoda: Lineare Theorie von Fluktuationen im anisotropen Sonnenwindplasma, Bochum, TPIV, Dissertation, 2009

B. Weinhorst: Verallgemeinerte Turbulenzmodelle zur Beschreibung von FLRW und Teilchentransport, Bochum, TP IV, Dissertation, 2009

6 Tagungen, Projekte am Institut und Beobachtungszeiten

6.1 Projekte und Kooperationen mit anderen Instituten

Dr. H. Fichtner ist lokaler RUB-Koordinator für das EU Research Training Network "Solaire" Dr. H. Fichtner ist Leiter einer BMBF-geförderten Zusammenarbeit mit der North West University, Südafrika

7 Auswärtige Tätigkeiten

7.1 Nationale und internationale Tagungen

H. Fichtner: EU RTN Solaire-Network Meeting in Catania, Italien, 12.01.-16.01.2009

H. Fichtner: DFG CAWSES-Kolloquium, Bonn, 28.-30.01.2009

R. Schlickeiser: Vortrag "First-order distributed Fermi acceleration of relativistic particles in nonuniform magnetic fields" auf Workshop "UHECR and Magnetic Fields" auf Schloss Ringberg 11.2.-14.2.09

R. C. Tautz, J. Ruppel, A. Stockem, S. Artmann, H. Fichtner, D. Gerbig, M. Michno: Jahrestagung der Arbeitsgemeinschaft Extraterrestrische Forschung (AEF) und des DPG-Fachverbandes Extraterrestrische Forschung, Ernst-Moritz-Arndt-Universität Greifswald, 30.03.-03.04.2009

R. Schlickeiser: Hauptvortrag "Particle acceleration in astroparticle physics=Plasma physics of cosmic collisionless explosions" auf DFG Frühjahrstagung in Greifswald 31.3.-2.4.09

M. Michno: Workshop des Graduiertenkollegs 1147 Theoretische Astrophysik und Teilchenphysik, Julius-Maximilians-Universität Würzburg, 26.04.-29.04.2009

J. Ruppel, D. Gerbig: H.E.S.S. Collaboration Meeting, Eriwan, Armenien, 27.04.-04.05.2009

H. Fichtner, K. Scherer: NASA Review Panel, Washington, USA, 18.-22.05.2009

R. Schlickeiser: Teilnahme am CTA-Meeting des BMBF, DESY, Hamburg, 1.7.09

R. Schlickeiser: Eingeladener Vortrag "Plasma physics of cosmic collisionless explosions: The role of the relativistic filamentation and electrostatic instabilities", Summer College on Plasma Science, ICTP, Triest, Italien, 10.-14.8.09

H. Fichtner: IHY Africa Conference, Livingstone, Sambia, 05.-13.06.2009

J. Becker, International Cosmic Ray Conference, Lodz, Poland, July 2009

H. Fichtner: IBEX SWT-Meeting, Boston, USA, 18.-23.07.2009

J. Becker, M. Olivo, J. Dreyer: International IceCube Collaboration Meeting, Berlin, September 2009

S. Artmann: ISSI-Team Meeting on the "Transport of Energetic Particles in the Inner Heliosphere", Bern, Schweiz, 07.09.-11.09.2009

R. Schlickeiser: Vortrag "Linear theory of temperature anisotropy instabilities in magneti-

zed thermal plasmas”, ISSI-Team Meeting on “Transport of Energetic particles in the Inner Heliosphere”, Bern, Schweiz, 7.-11.9.09

R. Schlickeiser: Teilnahme am HESS-Team Meeting, Erlangen, 21.-25.9.09

R. C. Tautz, J. Ruppel, F. Effenberger: Annual Fall Meeting and 82nd General Assembly of the “Astronomische Gesellschaft”, Universität Potsdam, 21.09-25.09.2009

K. Brodatzki, Polish Astrophysics meeting, Krakau, October 2009

H. Fichtner, F. Effenberger: EU RTN Solaire-Network Meeting and Flux Emergence Workshop in Teneriffa, Spain, 02.11.-06.11.2009

7.2 Vorträge und Gastaufenthalte

H. Fichtner, Universität Düsseldorf, 03.02.2009

R. Schlickeiser: Vortrag “Von OSO-3 bis H.E.S.S.-2: Die Erfolgsgeschichte der Gammaastronomie”, Saturday Morning Physics, Ruhr-Universität Bochum, 07.02.09

J. Ruppel: Arbeitstreffen und Seminarvortrag, Universität Tübingen, 09.-13.02.2009

R. Schlickeiser: Vortrag “Cosmic ray acceleration and transport with weak adiabatic focusing”, Princeton Plasma Physics Laboratory, 19.02.09

R. Schlickeiser: Vortrag “Cosmic ray acceleration and transport with weak adiabatic focusing”, University of Chicago, 27.02.09

R. Schlickeiser: Vortrag „Cosmic ray acceleration and transport with weak adiabatic focusing“, University of Berkeley California, 04.03.09

R. C. Tautz: Deutsche Akademie der Naturforscher Leopoldina, Halle, 02.06.-03.06.2009

H. Fichtner, Universität Würzburg, 02.07.2009

A. Stockem: Vorstellungsgespräch, Lissabon, Portugal, 13.07.-15.07.2009

R. C. Tautz: Institut für Mathematik, Technische Universität Berlin, 30.07.-31.07.2009

J. Becker: Astroteilchenphysik Schule Bad Honnef, September 2009

J. Becker: TU Dortmund, Kolloquiumsvortrag, Oktober 2009

J. Kleimann: 3rd Solaire Network Meeting, Puerto de la Cruz/Teneriffa, Spanien, 05.11.2009

R. Schlickeiser: Vortrag “Von OSO-3 bis H.E.S.S.-2: Die Erfolgsgeschichte der Gammaastronomie” im Mathematisch-Technischem Kolloquium der Fachhochschule Koblenz/Rhein-Ahr Campus, Remagen, 12.11.09

R. Schlickeiser: Vortrag: “Die Erfolgsgeschichte der Gammaastronomie”, Volkssternwarte Recklinghausen, 16.12.09

J. Becker: Onsala Space Observatory, Sweden, Seminarvortrag, Dezember 2009

7.3 Kooperationen

IceCube Collaboration

HESS-Collaboration

Cherenkov Telescope Array

North-West University, Potchefstroom, Südafrika

University of Turku, Finnland

Friedrich-Wilhelms-Universität Bonn

Christian-Albrechts-Universität zu Kiel

EU Research Training Network Solaire

DFG Schwerpunktprogramm CAWSES

7.4 Sonstige Reisen

J. Becker, Universität Göteborg, Schweden, 01.-11.10.09, Zusammenarbeit mit Prof. Marek Abramowicz und Prof. John Black

M. Olivo, University of Wisconsin, Madison (USA), Zusammenarbeit mit Prof. F. Halzen, November - Dezember 2009

8 Veröffentlichungen

8.1 In Zeitschriften und Büchern

Abbasi, R., ..., Becker, J. K., ..., Dreyer, J., ..., Olivo, M. et al.: (IceCube Coll.), Extending the Search for Neutrino Point Sources with IceCube above the Horizon, *Phys. Rev. Lett.* **103**(22):221102 (2009)

Abramowicz, M.A., Becker, J. K. et al.: No observational constraints from hypothetical collisions of hypothetical dark halo primordial black holes with galactic objects, *Astroph. Journal* **705**:659 (2009)

Acciari, V. A., Aliu, E., Arlen, T., ... Gerbig, D., ... Ruppel, J., ... Schlickeiser, R., ... Schröder, R., ... Shalchi, A., et.al.: Radio Imaging of the Very-High-Energy γ -Ray Emission Region in the Central Engine of a Radio Galaxy, *Science* **325** (2009), 444

Acerro, F., Aharonian, F., Akhperjanian, A. G., ... Gerbig, D., ... Ruppel, J., ... Schlickeiser, R., ... Shalchi, A., et.al.: Detection of Gamma Rays from a Starburst Galaxy, *Science* **326** (2009), 1080

Acerro, F., Aharonian, F., ... Gerbig, D., ... Ruppel, J., ... Schlickeiser, R., ... Shalchi, A., et.al.: HESS upper limits on very high energy gamma-ray emission from the microquasar GRS 1915+105, *Astronomy and Astrophysics* **508** (2009), 1135

Aharonian, F., Akhperjanian, A. G., Anton, G., ... Ruppel, J., ... Schlickeiser R., ... Schröder, R., ... Shalchi, A., et.al.: Detection of very high energy radiation from HESS J1908+063 confirms the Milagro unidentified source MGRO J1908+06, *Astronomy and Astrophysics* **499** (2009), 723

Aharonian, F., Akhperjanian, A. G., Anton, G., ... Ruppel, J., ... Schlickeiser, R., ... Schröder R., ... Shalchi, A., et.al.: Simultaneous multiwavelength observations of the second exceptional γ -ray flare of PKS 2155-304 in July 2006, *Astronomy and Astrophysics* **502** (2009), 749

Aharonian, F., Akhperjanian, A. G., Anton, G., ... Gerbig, D., ... Ruppel, J., ... Schlickeiser R., ... Schröder, R., ... Shalchi, A., et.al.: Probing the ATIC peak in the cosmic-ray electron spectrum with H.E.S.S., *Astronomy and Astrophysics* **509** (2009), 561

Aharonian, F., Akhperjanian, A. G., Anton, G., ... Gerbig, D., ... Ruppel, J., ... Schlickeiser, R., ... Shalchi, A., et.al.: Very high energy γ -ray observations of the binary PSR B1259-63/SS2883 around the 2007 Periastron, *Astronomy and Astrophysics* **507** (2009), 389

Aharonian, F., Akhperjanian, A. G., Anton, G., ... Ruppel, J., ... Schlickeiser, R., ... Schröder, R., ... Shalchi, A., et.al.: HESS upper limit on the very high energy γ -ray emission from the globular cluster 47 Tucanae, *Astronomy and Astrophysics* **499** (2009), 273

Aharonian, F., Akhperjanian, A. G., Anton, G., ... Ruppel, J., ... Schlickeiser, R., ... Schröder, R., ... Shalchi, A., et.al.: Spectrum and variability of the Galactic center VHE γ -ray source HESS J1745-290, *Astronomy and Astrophysics* **503** (2009), 817

Aharonian, F., Akhperjanian, A. G., Anton, G., ... Ruppel, J., ... Schlickeiser, R., ... Schröder R., ... Shalchi, A., et.al.: Very high energy gamma-ray observations of the galaxy clusters Abell 496 and Abell 85 with HESS, *Astronomy and Astrophysics* **495** (2009),

27

- Aharonian, F., Akhperjanian, A. G., Anton, G., ... Ruppel, J., ... Schlickeiser, R., ... Schröder, R., ... Shalchi, A., et.al.: Constraints on the multi-TeV particle population in the Coma galaxy cluster with HESS observations, *Astronomy and Astrophysics* **502** (2009), 437
- Aharonian, F., Akhperjanian, A. G., Anton, G., ... Ruppel, J., ... Schlickeiser, R., ... Schröder, R., ... Shalchi, A., et.al.: Simultaneous Observations of PKS 2155-304 with HESS, Fermi, RXTE, and Atom: Spectral Energy Distributions and Variability in a Low State, *The Astrophysical Journal* **696** (2009), L150
- Aharonian, F., Akhperjanian, A. G., Anton, G., ... Ruppel, J., ... Schlickeiser, R., ... Schröder, R., ... Shalchi, A., et.al.: Discovery of Very High Energy γ -Ray Emission from Centaurus a with H.E.S.S., *The Astrophysical Journal* **695** (2009), L40
- Aharonian, F., Akhperjanian, A. G., Barres de Almeida, U., ... Ruppel, J., ... Schlickeiser, R., ... Schröder, R., ... Shalchi, A., et.al.: HESS observations of γ -ray bursts in 2003-2007, *Astronomy and Astrophysics* **495** (2009), 505
- Aharonian, F., Akhperjanian, A. G., Barres DeAlmeida, U., ... Ruppel, J., ... Schlickeiser R., ... Schröder, R., ... Shalchi, A., et.al.: HESS Observations of the Prompt and Afterglow Phases of GRB 060602B, *The Astrophysical Journal* **690** (2009), 1068
- Aharonian, F., Akhperjanian, A. G., de Almeida, U. B., ... Ruppel, J., ... Schlickeiser R., ... Schröder, R., ... Shalchi, A., et.al.: Discovery of Gamma-Ray Emission From the Shell-Type Supernova Remnant RCW 86 With Hess, *The Astrophysical Journal* **692** (2009), 1500
- Aharonian, F., Akhperjanian, A. G., de Almeida, U. B., ... Ruppel, J., ... Schlickeiser, R., ... Schröder R., ... Shalchi, A., et.al.: A Search for a Dark Matter Annihilation Signal Toward the Canis Major Overdensity with H.E.S.S., *The Astrophysical Journal* **691** (2009), 175
- Bergman, J., Eliasson, B.: Erratum: "Linear wave dispersion laws in unmagnetized relativistic plasma: Analytical and numerical results" [*Phys. Plasmas* 8, 1482 (2001)], *Physics of Plasmas* **16** (2009), 129902
- Biermann, P. L., Becker, J. K. et al.: Cosmic ray positrons and electrons from supernova explosions of massive stars, *Phys.Rev.Lett.* 103, 061101 (2009)
- Craig, I. J. D., Litvinenko, Y. E.: Anisotropic viscous dissipation in three-dimensional magnetic merging solutions, *Astronomy and Astrophysics* **501** (2009), 755
- Dalakishvili, G., Poedts, S., Fichtner, H., et.al.: Characteristics of magnetised plasma flow around stationary and expanding magnetic clouds, *Astronomy and Astrophysics* **507** (2009), 611
- Dieckmann, M. E., Shukla, P. K., Stenflo, L.: Simulation study of the filamentation of counter-streaming beams of the electrons and positrons in plasmas, *Plasma Physics and Controlled Fusion* **51** (2009), 065015
- Dosch, A., Shalchi, A.: Quasi-linear perpendicular diffusion coefficients of charged cosmic rays calculated directly from the Newton-Lorentz equation, *Monthly Notices of the Royal Astronomical Society* **394** (2009), 2089
- Dosch, A., Shalchi, A., Weinhorst, B.: Relation between different theories for cosmic ray cross field diffusion, *Advances in Space Research* **44** (2009), 1326
- El-Shamy, E. F., Moslem, W. M., Shukla, P. K.: Head-on collision of ion-acoustic solitary waves in a Thomas-Fermi plasma containing degenerate electrons and positrons, *Physics Letters A* **374** (2009), 290
- Eliasson, B., Shukla, P. K., Pavlenko, V. P.: Dynamics of nonlinearly interacting magnetic electron drift vortex modes in a nonuniform plasma, *Physics of Plasmas* **16** (2009),

042306

- Eliasson, B., Liu, C. S., Shao, X., ... Shukla P. K.: Laser acceleration of monoenergetic protons via a double layer emerging from an ultra-thin foil, *New Journal of Physics* **11** (2009), 073006
- Eliasson, B., Shukla, P. K.: Nonlinear Aspects of Quantum Plasma Physics: Nanoplasmonics and Nanostructures in Dense Plasmas, *Plasma and Fusion Research* **4** (2009), 32
- Eliasson, B., Shukla, P. K.: Nonlinear Aspects of Quantum Plasma Physics: Nanoplasmonics and Nanostructures in Dense Plasmas, *Plasma and Fusion Research* **4** (2009), 32
- Eliasson, B., Shukla, P. K.: Dispersion properties of electrostatic oscillations in quantum plasmas, *Journal of Plasma Physics* **76** (2009), 7
- Farokhi, B., Shahmansouri, M., Shukla, P. K.: Dust grain oscillations in two-dimensional hexagonal dusty plasma crystals in the presence of a magnetic field, *Physics of Plasmas* **16** (2009), 063703
- Haas, F., Bret, A., Shukla, P. K.: Physical interpretation of the quantum two-stream instability, *Physical Review E* **80** (2009), 066407
- Haas, F., Manfredi, G., Shukla, P. K., et.al.: Breather mode in the many-electron dynamics of semiconductor quantum wells, *Physical Review B* **80** (2009), 073301
- Haas, F., Shukla, P. K.: Translating oscillatory nonlinear structure in a plasma boundary, *Physics of Plasmas* **16** (2009), 092107
- Haas, F., Shukla, P. K.: Quantum and classical dynamics of Langmuir wave packets, *Physical Review E* **79** (2009), 066402
- Haas, F., Shukla, P. K., Eliasson, B.: Nonlinear saturation of the Weibel instability in a dense Fermi plasma, *Journal of Plasma Physics* **75** (2009), 251
- Heber, B., Kopp, A., Gieseler, J., ... Fichtner, H., Scherer, K., et.al.: Modulation of Galactic Cosmic Ray Protons and Electrons During an Unusual Solar Minimum, *The Astrophysical Journal* **699** (2009), 1956
- Homann, H., Bec, J., Fichtner, H., et.al.: Clustering of passive impurities in magnetohydrodynamic turbulence, *Physics of Plasmas* **16** (2009), 082308
- Hou, L. J., Mišković, Z. L., Piel, A., Shukla P. K.: Brownian dynamics of charged particles in a constant magnetic field, *Physics of Plasmas* **16** (2009), 053705
- Hou, L. J., Shukla, P. K., Piel, A.: Effect of overlapping Debye spheres on structures of 2D dusty plasmas, *Physics Letters A* **373** (2009), 458
- Hou, L.-J., Piel, A., Shukla, P. K.: Hou, Piel, and Shukla Reply:, *Physical Review Letters* **103** (2009), 099502
- Hou, L.-J., Piel, A., Shukla, P. K.: Self-Diffusion in 2D Dusty-Plasma Liquids: Numerical-Simulation Results, *Physical Review Letters* **102** (2009), 085002
- Hou, L.-J., Shukla, P. K., Piel, A., et.al.: Wave spectra of two-dimensional Yukawa solids and liquids in the presence of a magnetic field, *Physics of Plasmas* **16** (2009), 073704
- Jovanović, D., Shukla, P. K.: Nonlinear gyrokinetic theory for steady-state mirror mode magnetic structures, *Physics of Plasmas* **16** (2009), 082901
- Kleimann, J., Kopp, A., Fichtner, H., et.al.: A novel code for numerical 3-D MHD studies of CME expansion, *Annales Geophysicae* **27** (2009), 989
- Kourakis, I., Tautz, R. C., Shalchi, A.: Detailed analytical investigation of magnetic field line random walk in turbulent plasmas: II. Isotropic turbulence, *Journal of Plasma Physics* **75** (2009), 183

- Kourakis, I., Moslem, W. M., Abdelsalam, U. M., ... Shukla P. K.: Nonlinear Dynamics of Rotating Multi-Component Pair Plasmas and e-p-i Plasmas, *Plasma and Fusion Research* **4** (2009), 18
- Lazar, M., Dieckmann, M. E., Poedts, S.: Resonant Weibel instability in counterstreaming plasmas with temperature anisotropies, *Journal of Plasma Physics* **76** (2009), 49
- Lazar, M., Moslem, W. M., Smolyakov, A., Shukla, P. K.: Erratum: "Self-excited surface plasmon-polaritons at the interface of counterstreaming plasmas" [*Phys. Plasmas* **16**, 052102 (2009)], *Physics of Plasmas* **16** (2009), 079906
- Lazar, M., Moslem, W. M., Smolyakov, A., Shukla P. K.: Self-excited surface plasmon-polaritons at the interface of counterstreaming plasmas, *Physics of Plasmas* **16** (2009), 052102
- Lazar, M., Schlickeiser, R., Poedts, S.: On the existence of Weibel instability in a magnetized plasma. I. Parallel wave propagation, *Physics of Plasmas* **16** (2009), 012106
- Lazar, M., Schlickeiser, R., Wielebinski, R., et.al.: Cosmological Effects of Weibel-Type Instabilities, *The Astrophysical Journal* **693** (2009), 1133
- Lazar, M., Smolyakov, A., Schlickeiser, R., Shukla, P. K.: A comparative study of the filamentation and Weibel instabilities and their cumulative effect. I. Non-relativistic theory, *Journal of Plasma Physics* **75** (2009), 19
- Lerche, I., Tautz, R. C., Citrin, D. S.: Terahertz-sideband spectra involving Kapteyn series, *Journal of Physics A Mathematical General* **42** (2009), 5206
- Losseva, T. V., Popel, S. I., Golub', A. P., Shukla P. K.: Evolution of weakly dissipative hybrid dust ion-acoustic solitons in complex plasmas, *Physics of Plasmas* **16** (2009), 093704
- Mamun, A. A., Cairns, R. A., Shukla, P. K.: Dust negative ion acoustic shock waves in a dusty multi-ion plasma, *Physics Letters A* **373** (2009), 2355
- Mamun, A. A., Shukla, P. K.: Cylindrical and spherical dust-acoustic shock waves in a strongly coupled dusty plasma, *New Journal of Physics* **11** (2009), 103022
- Mamun, A. A., Shukla, P. K.: Arbitrary-amplitude dust-acoustic solitary waves in a strongly coupled dusty plasma, *Europhysics Letters* **87** (2009), 55001
- Mamun, A. A., Shukla, P. K.: Effects of nonthermal distribution of electrons and polarity of net dust-charge number density on nonplanar dust-ion-acoustic solitary waves, *Physical Review E* **80** (2009), 037401
- Mamun, A. A., Shukla, P. K.: Formation of dust-acoustic shock waves in a strongly coupled cryogenic dusty plasma, *Physics Letters A* **373** (2009), 3161
- Mamun, A. A., Shukla, P. K.: Cylindrical and spherical dust ion-acoustic shock waves in dusty plasmas, *Europhysics Letters* **87** (2009), 25001
- Mamun, A. A., Shukla, P. K., Eliasson, B.: Arbitrary amplitude dust ion-acoustic shock waves in a dusty plasma with positive and negative ions, *Physics of Plasmas* **16** (2009), 114503
- Mamun, A. A., Shukla, P. K., Eliasson, B.: Solitary waves and double layers in a dusty electronegative plasma, *Physical Review E* **80** (2009), 046406
- Maness, H. L., Kalas, P., Peek, K. M. G., ... Scherer, K., et.al.: Hubble Space Telescope Optical Imaging of the Eroding Debris Disk HD 61005, *The Astrophysical Journal* **707** (2009), 1098
- McComas, D. J., Allegrini, F., Bochsler, P., ... Fichtner, H., et.al.: Global Observations of the Interstellar Interaction from the Interstellar Boundary Explorer (IBEX), *Science* **326** (2009), 959
- McComas, D. J., Allegrini, F., Bochsler, P., ... Fichtner, H., et.al.: IBEX - Interstellar

- Boundary Explorer, *Space Science Reviews* **146** (2009), 11
- Mendonça, J. T., Shukla, N., Shukla, P. K.: Magnetization of Rydberg plasmas by electromagnetic waves, *Journal of Plasma Physics* **76** (2009), 19
- Mendonça, J. T., Shukla, P. K., Bingham, R.: Nonlinear excitation of zonal flows by Rossby wave turbulence, *New Journal of Physics* **11** (2009), 073038
- Misra, A. P., Bhowmik, C., Shukla, P. K.: Modulational instability and envelope excitation of ion-acoustic waves in quantum electron-positron-ion plasmas, *Physics of Plasmas* **16** (2009), 072116
- Misra, A. P., Ghosh, N. K., Shukla, P. K.: Evolution of Alfvénic wave envelopes in spin-1/2 quantum Hall-magnetohydrodynamic plasmas, *Physics of Plasmas* **16** (2009), 102309
- Misra, A. P., Ghosh, N. K., Shukla, P. K.: Surface waves in magnetized quantum electron-positron plasmas, *Journal of Plasma Physics* **76** (2009), 87
- Misra, A. P., Shukla, P. K.: Pattern dynamics and spatiotemporal chaos in the quantum Zakharov equations, *Physical Review E* **79** (2009), 056401
- Moslem, W. M., Lazar, M., Sabry, R., Shukla, P. K.: Self-excited plasmon polaritons in counterstreaming quantum plasmas, *Physics of Plasmas* **16** (2009), 122106
- Moslem, W. M., Sabry, R., Abdelsalam, U. M., ... Shukla P. K.: Solitary and blow-up electrostatic excitations in rotating magnetized electron-positron-ion plasmas, *New Journal of Physics* **11** (2009), 033028
- Qin, G., Shalchi, A.: Pitch-Angle Diffusion Coefficients of Charged Particles from Computer Simulations, *The Astrophysical Journal* **707** (2009), 61
- Röken, C., Schlickeiser, R.: Synchrotron self-Compton flaring of TeV blazars. II. Linear and nonlinear electron cooling, *Astronomy and Astrophysics* **503** (2009), 309
- Röken, C., Schlickeiser, R.: Linear and Nonlinear Radiative Cooling of Multiple Instantaneously Injected Monoenergetic Relativistic Particle Populations in Flaring Blazars, *The Astrophysical Journal* **700** (2009), 460
- Rios, L. A., Shukla, P. K., Serbeto, A.: Photon equivalent charge in a two-electron temperature Fermi plasma, *Journal of Plasma Physics* **75** (2009), 3
- Rosenberg, M., Shukla, P. K.: On the possibility of ion-acoustic instability in Titan's ionosphere, *Planetary and Space Science* **57** (2009), 2030
- Sabry, R., Moslem, W. M., Shukla, P. K.: Fully nonlinear ion-acoustic solitary waves in a plasma with positive-negative ions and nonthermal electrons, *Physics of Plasmas* **16** (2009), 032302
- Sabry, R., Moslem, W. M., Shukla, P. K.: Planar and nonplanar ion-acoustic envelope solitary waves in a very dense electron-positron-ion plasma, *European Physical Journal D* **51** (2009), 233
- Sabry, R., Moslem, W. M., Shukla, P. K., et.al.: Cylindrical and spherical ion-acoustic envelope solitons in multicomponent plasmas with positrons, *Physical Review E* **79** (2009), 056402
- Schaefer-Rolffs, U., Lerche, I., Tautz, R. C.: Particle radiation from relativistic plasmas contained by soliton waves, *Journal of Physics A Mathematical General* **42** (2009), 105501
- Scherer, K., Fahr, H.-J.: Spatial variation of the pickup-proton-injection rate into the ACR regime at the 3D-heliospheric termination shock, *Astronomy and Astrophysics* **495** (2009), 631
- Schlickeiser, R.: Non-linear synchrotron self-Compton cooling of relativistic electrons, *Monthly Notices of the Royal Astronomical Society* **398** (2009), 1483

- Schlickeiser, R.: First-Order Distributed Fermi Acceleration of Cosmic Ray Hadrons in Non-Uniform Magnetic Fields, *Modern Physics Letters A* **24** (2009), 1461
- Schlickeiser, R., Artmann, S., Droge, W.: Interplanetary Plasma Scattering Diagnostics from Anisotropy-time Profiles of Solar Energetic Particles, *The Open Plasma Physics Journal* **2** (2009), 1
- Schwadron, N. A., Bzowski, M., Crew, G. B., ... Fichtner, H., et.al.: Comparison of Interstellar Boundary Explorer Observations with 3D Global Heliospheric Models, *Science* **326** (2009), 966
- Shaikh, D., Shukla, P. K.: Spectral properties of electromagnetic turbulence in plasmas, *Nonlinear Processes in Geophysics* **16** (2009), 189
- Shaikh, D., Eliasson, B., Shukla, P. K.: Numerical study of the magnetic electron drift vortex mode turbulence in a nonuniform magnetoplasma, *Physical Review E* **79** (2009), 066404
- Shaikh, D., Shukla, P. K.: 3D Simulations of Fluctuation Spectra in the Hall-MHD Plasma, *Physical Review Letters* **102** (2009), 045004
- Shaikh, D., Shukla, P. K.: Simulations of two-dimensional magnetic electron drift vortex mode turbulence in plasmas, *Journal of Plasma Physics* **75** (2009), 133
- Shalchi, A.: Diffusive shock acceleration in supernova remnants: On the validity of the Bohm limit, *Astroparticle Physics* **31** (2009), 237
- Shalchi, A.: Analytical forms of the cosmic ray parallel mean free path with adiabatic focusing, *Journal of Physics G Nuclear Physics* **36** (2009), 025202
- Shalchi, A.: Nonlinear Cosmic Ray Diffusion Theories, *Nonlinear Cosmic Ray Diffusion Theories: , Astrophysics and Space Science Library*, Volume 362. ISBN 978-3-642-00308-0. Springer-Verlag Berlin Heidelberg, 2009 (2009),
- Shalchi, A., Dosch, A.: Plasma-particle interaction for strong stochastic magnetic fields: Isotropic and anisotropic scattering regimes, *Physical Review D* **79** (2009), 083001
- Shalchi, A., Le Roux, J. A., Webb, G. M., et.al.: Analytical description for field-line wandering in strong magnetic turbulence, *Physical Review E* **80** (2009), 066408
- Shalchi, A., Le Roux, J. A., Webb, G. M., et.al.: Nonlinear field line random walk for non-Gaussian statistics, *Journal of Physics A Mathematical General* **42** (2009), 5501
- Shalchi, A., Skoda, T., Tautz, R. C., Schlickeiser R.: Analytical description of nonlinear cosmic ray scattering: isotropic and quasilinear regimes of pitch-angle diffusion, *Astronomy and Astrophysics* **507** (2009), 589
- Shalchi, A., Škoda, T., Tautz, R. C., Schlickeiser R.: Nonlinear propagation, confinement, and anisotropy of ultrahigh-energy cosmic rays in the Galaxy, *Physical Review D* **80** (2009), 023012
- Shalchi, A., Webb, G. M., Le Roux, J. A., et.al.: Compound perpendicular transport of charged particles with drift, advection, wave propagation effects, and an arbitrary turbulence spectrum, *Astrophysics and Space Science* **321** (2009), 197
- Shalchi, A., Weinhorst, B.: Random walk of magnetic field lines: Subdiffusive, diffusive, and superdiffusive regimes, *Advances in Space Research* **43** (2009), 1429
- Shukla, N., Brodin, G., Marklund, M., Shukla, P. K., et.al.: Erratum: "Nonlinear electromagnetic wave equations for superdense magnetized plasmas" [*Phys. Plasmas* **16**, 072114 (2009)], *Physics of Plasmas* **16** (2009), 089904
- Shukla, N., Brodin, G., Marklund, M., Shukla, P. K., et.al.: Nonlinear electromagnetic wave equations for superdense magnetized plasmas, *Physics of Plasmas* **16** (2009), 072114

- Shukla, N., Shukla, P. K.: Proton-temperature-anisotropy-driven magnetic fields in plasmas with cold and relativistically hot electrons, *Journal of Plasma Physics* **76** (2009), 1
- Shukla, N., Shukla, P. K., Stenflo, L.: Magnetization of a warm plasma by the nonstationary ponderomotive force of an electromagnetic wave, *Physical Review E* **80** (2009), 027401
- Shukla, P. K.: Ion acceleration by the space charge electric force arising from the radiation pressure in a magnetized electron-positron plasma, *Physics Letters A* **373** (2009), 3547
- Shukla, P. K.: Instability of short wavelength electrostatic electron-cyclotron modes in the presence of an ion density ripple in plasmas, *Physica Scripta* **80** (2009), 038201
- Shukla, P. K.: Excitation of electrostatic ion-cyclotron-like modes by the electron density ripple in dusty magnetoplasmas, *Journal of Plasma Physics* **75** (2009), 433
- Shukla, P. K.: Excitation of the dust ion-acoustic and dust acoustic-like perturbations by plasma density ripples, *Physics Letters A* **373** (2009), 1768
- Shukla, P. K.: Generation of magnetic fields by the non-stationary ponderomotive force of electromagnetic waves in plasmas with streaming electrons, *Physics Letters A* **373** (2009), 1771
- Shukla, P. K.: Generation of wakefields by electromagnetic waves in a magnetized electron-positron-ion plasma, *Plasma Physics and Controlled Fusion* **51** (2009), 024013
- Shukla, P. K.: Dispersion properties of low-frequency electrostatic oscillations in metallic carbon nanotubes, *Physics Letters A* **373** (2009), 256
- Shukla, P. K.: Excitation of ion wakefields by electromagnetic pulses in dense plasmas, *Journal of Plasma Physics* **75** (2009), 15
- Shukla, P. K., Bingham, R., Phelps, A. D. R., et.al.: Dark and grey electromagnetic electron-cyclotron envelope solitons in an electron-positron magnetoplasma, *Journal of Plasma Physics* **75** (2009), 575
- Shukla, P. K., Brodin, G., Marklund, M., et.al.: Excitation of multiple wakefields by short laser pulses in quantum plasmas, *Physics Letters A* **373** (2009), 3165
- Shukla, P. K., Eliasson, B.: Colloquium: Fundamentals of dust-plasma interactions, *Reviews of Modern Physics* **81** (2009), 25
- Shukla, P. K., Morfill, G. E.: Low-frequency electrostatic wave in a metallic electron-hole-ion plasma with nanoparticles, *Journal of Plasma Physics* **75** (2009), 581
- Shukla, P. K., Rosenberg, M.: Drift wave excitation in a collisional dusty magnetoplasma with multi-ion species, *Journal of Plasma Physics* **75** (2009), 153
- Shukla, P. K., Shaikh, D.: Dynamics of fully nonlinear drift wave-zonal flow turbulence system in plasmas, *Physics Letters A* **374** (2009), 286
- Shukla, P. K., Shukla, N., Stenflo, L.: Generation of magnetic fields by the ponderomotive force of electromagnetic waves in dense plasmas, *Journal of Plasma Physics* **76** (2009), 25
- Shukla, P. K.: Plasma physics: A new spin on quantum plasmas, *Nature Physics* **5** (2009), 92
- Stenflo, L., Shukla, P. K.: Nonlinear acoustic-gravity waves, *Journal of Plasma Physics* **75** (2009), 841
- Stockem, A., Dieckmann, M. E., Schlickeiser, R.: PIC simulations of the thermal anisotropy-driven Weibel instability: field growth and phase space evolution upon saturation, *Plasma Physics and Controlled Fusion* **51** (2009), 075014
- Tautz, R. C.: A Note on Perpendicular Scattering Lengths, *The Astrophysical Journal* **703** (2009), 1294
- Trines, R. M. G. M., Bingham, R., Silva, L. O., ... Shukla, P. K., et.al.: Applications of

the wave kinetic approach: From laser wakefields to drift wave turbulence, *Physics of Plasmas* **16** (2009), 055904

- Webb, G. M., Kaghshvili, E. K., Le Roux, J. A., Shalchi, A., et.al.: Compound and perpendicular diffusion of cosmic rays and random walk of the field lines: II. Non-parallel particle transport and drifts, *Journal of Physics A Mathematical General* **42** (2009), 235502
- Zacharias, M., Schlickeiser, R.: Synchrotron fluence of nonlinearly cooled relativistic electrons with instantaneous flat power law injection, *Astronomy and Astrophysics* **498** (2009), 667
- ## 8.2 Konferenzbeiträge
- Besedina, Y. N., Popel, S. I., Shukla, P. K.: Vortex motions and dust particle transport in the ionosphere, *European Planetary Science Congress 2009*, held 14-18 September in Potsdam, Germany. <http://meetings.copernicus.org/epsc2009>, p.41 (2009), 41
- Bingham, R., Trines, R. M. G. M., Silva, L. O., ... Shukla, P. K.: Nonlinear Wave Driven Processes in Plasmas, *APS Meeting Abstracts* (2009), 8081P
- Dunzlaff, P., Kopp, A., Heber, B.: Time series analysis of the spectral modulation of MeV electrons in the Jovian magnetosphere, *European Planetary Science Congress 2009*, held 14-18 September in Potsdam, Germany. <http://meetings.copernicus.org/epsc2009>, p.405 (2009), 405
- Eliasson, B., Liu, C. S., Shao, X., ... Shukla, P. K., et.al.: Laser acceleration of monoenergetic protons via a double layer emerging from an ultra-thin foil, *APS Meeting Abstracts* (2009), 8068P
- Eliasson, B., Liu, C. S., Shao, X., ... Shukla P. K.: Laser Radiation Pressure Acceleration of Monoenergetic Protons in an Ultra-Thin Foil, *American Institute of Physics Conference Series* **1188** (2009), 35
- Haas, F., Shukla, P. K.: Nonlinear electrostatic oscillations in a sharp plasma interface, *American Institute of Physics Conference Series* **1188** (2009), 290
- Heber, B., Gieseler, J., Dunzlaff, P., ... Fichtner, H., Scherer, K., et.al.: Ulysses KET measurements of galactic cosmic ray protons and electrons during an unusual solar minimum, *AGU Fall Meeting Abstracts* (2009), A1489
- Shukla, P. K., Haas, F.: Variational approach for the fully three-dimensional quantum Zakharov system, *APS Meeting Abstracts* (2009), 8018P
- Shukla, P. K., Haas, F., Bret, A. C.: Negative energy modes and the quantum two-stream instability, *APS Meeting Abstracts* (2009), 8020P
- Shukla, P. K., Haas, F., Manfredi, G., et.al.: Self-consistent effects and breather mode in semiconductor quantum wells, *APS Meeting Abstracts* (2009), 8019P
- Kopp, A., Scherer, K., Fichtner, H., et.al.: The magnetic interaction between close-in extrasolar planets and their host stars, *European Planetary Science Congress 2009*, held 14-18 September in Potsdam, Germany. <http://meetings.copernicus.org/epsc2009>, p.436 (2009), 436
- Mamun, A. A., Eliasson, B., Shukla, P. K.: Theory of arbitrary amplitude dust ion-acoustic shock waves in a multi-ion dusty plasma, *APS Meeting Abstracts* (2009), 8092P
- Pogorelov, N. V., Frisch, P. C., Heerikhuisen, J., ... Fichtner, H., et.al.: Global Structure of the Heliosphere in the Interstellar Magnetic Field, *AGU Fall Meeting Abstracts* (2009), 1517
- Schwadron, N. A., Bzowski, M., Crew, G. B., ... Fichtner, H., et.al.: Comparison of Interstellar Boundary Explorer Observations with 3-D Global Heliospheric Models, *AGU Fall Meeting Abstracts* (2009), A1

- Shukla, P., Shaikh, D.: Electron Whistler Mode Turbulence in the Solar Wind Plasma, AGU Fall Meeting Abstracts (2009), A1208
- Shukla, P. K., Bingham, R., Phelps, A. D. R., et.al.: Dark and grey electromagnetic electron-cyclotron envelope solitons in an electron-positron magnetoplasma, APS Meeting Abstracts (2009), 8031P
- Shukla, P. K., Eliasson, B.: Nonlinear nanostructures in dense quantum plasmas, American Institute of Physics Conference Series **1177** (2009), 26
- Shukla, P. K., Eliasson, B., Shaikh, D.: Turbulence aspects of nonlinearly interacting ion waves in a nonuniform quantum plasma, APS Meeting Abstracts (2009), 6012
- Shukla, P. K., Shaikh, D., Eliasson, B.: Nonlinear Simulations of the inhomogeneous magnetic electron drift vortex mode turbulence, APS Meeting Abstracts (2009), 8030P
- Stenflo, L., Shukla, P. K.: Wave-wave interactions in plasmas, American Institute of Physics Conference Series **1177** (2009), 4
- Tercas, H., Shukla, N., Shukla, P. K., et.al.: Wave propagation and magnetic field generation in Rydberg plasmas, APS Meeting Abstracts (2009), 8105P
- Li, G., Webb, G., Shalchi, A., et.al.: Non-linear Guiding Center Theory and Acceleration of Cosmic Rays at Supernova Remnant Shocks, American Institute of Physics Conference Series **1183** (2009), 57
- Shaikh, D., Eliasson, B., Shukla, P. K.: Two Dimensional Inhomogeneous Magnetic Electron Drift Modes, American Institute of Physics Conference Series **1188** (2009), 168
- Eliasson, B., Shukla, P. K.: New Developments in nonlinear Plasma Physics: Proceedings of the 2009 ICTP Summer College on Plasma Physics and International Symposium on Cutting Edge Plasma Physics, American Institute of Physics Conference Series **1188** (2009),
- Fedele, R., Jovanović, D., de Nicola, S., Eliasson, B., Shukla P. K.: Analytical and numerical aspects in solving the controlled 3D Gross-Pitaevskii equation, American Institute of Physics Conference Series **1188** (2009), 356
- Fedele, R., de Nicola, S., Grecu, D., ... Shukla P. K.: Some mathematical aspects of the correspondence between the generalized nonlinear Schrödinger equation and the generalized Korteweg-de Vries equation, American Institute of Physics Conference Series **1188** (2009), 365
- Eliasson, B., Shukla, P. K., Pavlenko, V. P.: Turbulence and magnetic field generation by magnetic electron drift vortex modes in a nonuniform plasma, APS Meeting Abstracts (2009), 8012P
- Dunzlaff, P., Kopp, A., Heber, B., et.al.: Analysis of Jovian Jets Observed by Pioneer 10/11 and Ulysses, AGU Fall Meeting Abstracts (2009), A1488
- ### 8.3 Populärwissenschaftliche und sonstige Veröffentlichungen
- Eliasson, B., Shukla, P. K.: Numerical Investigation of the Stability of Ocean Waves Having Directional JONSWAP Spectra, ArXiv e-prints (2009), arXiv:0912.0474
- Fedele, R., Eliasson, B., Haas, F., et.al.: Soliton solutions of 3D Gross-Pitaevskii equation by a potential control method, ArXiv e-prints (2009), arXiv:0907.1595
- Hou, L. J., Piel, A., Shukla, P. K.: Hou et al. Reply to the comment [arXiv:0904.2989] on "Self-Diffusion in 2D Dusty-Plasma Liquids: Numerical-Simulation Results", ArXiv e-prints (2009), arXiv:0904.3765
- Hou, L. J., Shukla, P. K., Piel, A., et.al.: Wave spectra of 2D Yukawa solids and liquids in the presence of a magnetic field, ArXiv e-prints (2009), arXiv:0906.2041
- Misra, A. P., Marklund, M., Brodin, G., Shukla, P. K.: Stability of two-dimensional ion-acoustic wave packets in quantum plasmas, ArXiv e-prints (2009), arXiv:0912.4439

- Schlickeiser, R., Ruppel, J.: Klein-Nishina steps in the energy spectrum of galactic cosmic ray electrons, ArXiv e-prints (2009), arXiv:0908.2183
- Shukla, P. K., Eliasson, B.: Nonlinear aspects of quantum plasma physics, ArXiv e-prints (2009), arXiv:0906.4051
- Haas, F., Zamanian, J., Marklund, M., et.al.: Fluid moment hierarchy equations derived from gauge invariant quantum kinetic theory, ArXiv e-prints (2009), arXiv:0912.4718
- Fahr H. J., Fichtner H., Scherer K.: Rätselhaftes Band am Rand des Sonnensystems, *Sterne und Weltraum*, 12/2009, Seite 24

Prof. Dr. Reinhard Schlickeiser