

## Garching

### Max-Planck-Institut für extraterrestrische Physik

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#### 0 Allgemeines

Das Max-Planck-Institut für extraterrestrische Physik (MPE) befaßt sich mit Themen der Astrophysik und Plasmaphysik, die sich sechs großen Bereichen zuordnen lassen: (i) *Großräumige Struktur und Kosmologie*, (ii) *Galaxien und Galaxienentwicklung*, (iii) *Massive Schwarze Löcher und Aktive Galaxien*, (iv) *Sternentwicklung und Interstellares Medium*, (v) *Physik des Sonnensystems* und (vi) *Komplexe Plasmen*. Dabei werden überwiegend experimentelle Methoden angewandt, aber auch theoretische Untersuchungen durchgeführt. Der Name des Instituts bezieht sich einerseits auf den Gegenstand der Forschung: die Physik des Weltraums, andererseits auf die Forschungsmethoden: viele unserer Experimente werden notwendigerweise oberhalb der dichten, absorbierenden Erdatmosphäre mit Flugzeugen, Raketen, Satelliten und Raumsonden durchgeführt. In zunehmendem Maße setzen wir aber, vor allem im optischen und Infrarotbereich, auch Instrumente an erdgebundenen Teleskopen ein. Ergänzt werden unsere Untersuchungen durch Experimente im Labor.

Methodisch lassen sich die Forschungsaktivitäten des MPE in mehrere Bereiche einteilen. In den astrophysikalischen Forschungsbereichen wird die Strahlung entfernter Objekte mit Teleskopen in den Millimeter/Sub-millimeter-, Infrarot-, Optischen-, Röntgen- und Gammabereich gemessen. Der hierbei überdeckte Teil des elektromagnetischen Spektrums umfasst mehr als zwölf Dekaden. Die untersuchten Objekte reichen von Kometen bis zu den fernsten Quasaren, von den winzigen Neutronensternen bis zu Galaxienhaufen, den größten bekannten Formationen im Kosmos. Ein weiterer Bereich beschäftigt sich mit Teilchen und elektromagnetischen Feldern, sowie ihren Wechselwirkungen im Sonnensystem, d.h. in der Ionosphäre und Magnetosphäre der Erde und im Sonnenwind. Dabei werden diagnostische "in-situ"-Messungen durchgeführt. Seit der Entdeckung eines neuen Plasmazustandes ("Plasmakristall") hat sich noch das Forschungsfeld "Komplexe Plasmen" aufgetan, das hauptsächlich in Laborexperimenten betrieben wird. Um die Gravitation "auszuschalten" werden inzwischen auch Experimente auf Parabelflügen und auf der Internationalen Raumstation durchgeführt. Die Theoriegruppe des Instituts beteiligt sich Gruppen-übergreifend an der Interpretation der Beobachtungen und Messungen. Die direkte Wechselwirkung von Beobachtern, Experimentatoren und Theoretikern im Hause ist ein Markenzeichen unseres Arbeitsstils und führt oft im direkten Wechselspiel von Hypothesen und neuen Beobachtungen zu einer frühen Erkennung vielversprechender neuer Forschungsrichtungen.

Zwei technologische Einrichtungen des MPE sind von besonderer Bedeutung: Die 130 m lange Vakuumanlage *Panzer* zum Test von Röntgenteleskopen in Neuried bei München

und das zusammen mit dem Max-Planck-Institut für Physik betriebene Halbleiterlabor in München-Neuperlach, in dem Strahlungsdetektoren für unsere Raumfahrtexperimente entwickelt werden. Auch durch diese Einrichtungen gewinnt der Transfer von neuen Verfahren und Methoden in die industrielle Anwendung immer mehr an Bedeutung. Besonders hervorzuheben sind dabei ein weiter Bereich von Anwendungen für die von uns entwickelten Strahlungsdetektoren, die erfolgreiche Verwendung mathematischer Methoden der nichtlinearen Dynamik in der Medizin, sowie die Anwendungen der Plasmaphysik auf die Medizin.

Neben der Forschung nimmt unser Institut auch universitäre Ausbildungsaufgaben wahr. MPE-Wissenschaftler sind als Hochschullehrer an mehreren Universitäten tätig und betreuen studentische Forschungsprojekte (Diplom- und Doktorarbeiten). Die Mehrzahl davon an den beiden Münchner Universitäten, aber auch an anderen deutschen Hochschulen und sogar im Ausland. Darüber hinaus veranstalten wir spezielle Seminare und Symposien zu unseren und angrenzenden Forschungsgebieten, häufig in Zusammenarbeit mit Universitätsinstituten. Unsere sehr erfolgreiche "International Max-Planck Research School on Astrophysics" an der Ludwig-Maximilians-Universität (LMU) München brachte eine wesentliche Intensivierung der Doktorandenausbildung im Raum Garching/München. An dieser im Jahre 2000 gegründeten Graduate School sind neben unserem Institut und dem Max-Planck-Institut für Astrophysik (MPA) noch das Institut für Astronomie und Astrophysik der LMU, die Europäische Südsternwarte, sowie Forschergruppen aus der TU München beteiligt.

## 1 Personal und Ausstattung

### 1.1 Personalstand

#### *Direktoren und Professoren:*

Prof. Dr. R. Genzel (Geschäftsführung), Infrarot- und Submillimeter-Astronomie; Prof. Dr. R. Bender, Optische und Interpretative Astronomie; Prof. Dr. G. Morfill, Theorie, komplexe Plasmen; Prof. Dr. G. Haerendel (emeritiert); Prof. Dr. R. Lüst (emeritiert); Prof. Dr. J. Trümper (emeritiert).

#### *Auswärtige wissenschaftliche Mitglieder:*

Prof. Dr. E. van Dishoeck (Universität Leiden, Niederlande); Prof. Dr. V. Fortov (IHED, Moskau, Russland); Prof. Dr. R. Z. Sagdeev (University of Maryland, College Park, USA); Prof. Dr. M. Schmidt (CALTECH, Pasadena, USA); Prof. Dr. Y. Tanaka (JSPS, Bonn; MPE, Deutschland); Prof. Dr. C. H. Townes (UC Berkeley, USA).

#### *Kuratorium:*

Dr. L. Baumgarten, Vorstandsmitglied DLR; Prof. Dr. A. Bode, Vizepräsident TU München; J. Breitkopf, Kayser-Threde GmbH; H.-J. Dürrmeier, Süddeutscher Verlag; Prof. Dr. W. Glatthaar, ehemaliger Präsident der Universität Witten/Herdecke (Vorsitzender des Kuratoriums); Dr. G. Gruppe, Bayerisches Staatsministerium für Wirtschaft, Verkehr und Technologie; Prof. Dr. B. Huber, Rektor der LMU München; Min.Dir. L. Mayer, Bundesministerium für Wirtschaft und Technologie; Dr. M. Mayer, ehem. Mitglied des Bundestages; Prof. Dr. E. Rohkamm, Blohm & Voss GmbH, Hamburg.

#### *Fachbeirat:*

Prof. Dr. R. Davies, Oxford University (UK); Prof. Dr. A. Ellis, CALTECH (USA); Dr. N. Gehrels, NASA GSFC (USA); Prof. Dr. F. Harrison, CALTECH (USA); Prof. Dr. O. Havnes, Trømsø University (Norwegen); Prof. Dr. P. Léna, Université Paris VII (Frankreich); Prof. Dr. R. McCray, University of Colorado (USA); Prof. Dr. M. Salvati, Osservatorio Astrofisico di Arcetri (Italien).

*Sonderfachbeirat (CIPS):*

Prof. Dr. H. Gleiter, Forschungszentrum Karlsruhe (Deutschland); Prof. Dr. R. Sauerbrey, Forschungszentrum Rossendorf, Dresden (Deutschland).

*Wissenschaftliche Mitarbeiter und Angestellte**A. Infrarot-und Sub-mm-Astronomie*

Dr. N. Ageorges A. Agudo Berbel, Dr. H. Bartko, Dipl.-Phys. O. Bauer, Dr. S. Berta, Dr. N. Bouché, Dr. J. Brown, Dr. A. Contursi, Dr. G. Cresci, Dr. R. Davies, Dr. V. Doublier Pritchard, Dr. F. Eisenhauer, Dipl.-Phys. H. Feuchtgruber, Dr. N. Förster Schreiber, Dr. N. Geis, H. Gemperlein, Dr. S. Gillessen, Dr. J. Grácia Carpio, A. Gräter, A. Gueguen, S. Harai-Ströbl, Dr. C. Hartinger, Dr. G. Herczeg, Dr. E. Hicks, Dr. R. Hofmann, Dr. R. Katterloher, A. Kleiser, H. Krombach, Dr. J. Kurk, S. Lüst, Dr. D. Lutz, Dr. B. Magnelli, Dr. T. Müller, Dr. R. Nordon, S. Osterhage, Dr. A. Poglitsch, Dr. P. Popesso, Dr. W. Raab, Dr. S. Rabien, Dr. A. Saintonage, Dr. E. Sturm, Dr. L. Tacconi, Dr. S. Trippe, Dr. E. Vilenius, Dr. M. Wetzstein, J. Zanker-Smith.

*Doktoranden/Diplomanden:*

P. Buschkamp, K. Dodds-Eden, H. Engel, K. Exter, T. Fritz, S. Genel, A. Karska, B. Lo Faro, L. Mascetti, P. Mayer, G. Orban di Xivry, O. Pfuhl, L. Shao.

*B. Hochenergieastrophysik*

Dr. R. Andritschke, F. Aschauer, Dr. B. Aschenbach, Dr. I. Balestra, Prof. Dr. W. Becker, B. Boller, Prof. Dr. T. Boller, Dr. A. Bongiorno, Dr. E. Bottacini, Dr. H. Bräuninger, B. Bribian-Sanchez, Dr. U.G. Briel, Dr. H. Brunner, Dr. M. Brusa, Dr. W. Burkert, Dr. V. Burwitz, Dr. N. Cappelluti, Dr. W. Collmar, Dr. K. Dennerl, Dr. R. Diehl, S. Dittmar, Dr. J. Elbs, Dipl.-Ing. J. Eder, Dr. A. Finoguenov, W. Frankenhuisen, A. Freyberg, Dr. M. Freyberg, Dr. P. Friedrich, R. Gaida, Dr. J. Greiner, Dr. F. Haberl, Dipl.-Math. G. Hartner, S. Hasinger, M. Hirschinger, F. Hofmann, J. Hölzl, A. Irlbeck, Dr. G. Kanbach, Dr. A. von Kienlin, Dr. N. Kimmel, L. Kocelch, Dr. S. Komossa, Dr. G. Lemson, C. Loose, N. Lützgendorf, Dr. P. Martin, Dr. S. McBreen, Dr. N. Meidinger, B. Menz, A. Meuris, Dr. K. Misaki, Dr. F. Mokler, A. Müller, M. Nöbauer, I. Ordavo, Dipl.-Phys. E. Pfeffermann, Dr. W. Pietsch, P. Podigachoski, Dr. M. Porro, Dr. P. Predehl, Dr. A. Rau, D. Rehm, Dr. M. Rovilos, R. Salamon, Dr. S. Savaglio, Dr. P. Schady, Dr. A. Schael, G. Schaller, Dr. F. Schopper, Dr. I. Strateva, Dr. A. Strong, Prof. Dr. L. Strüder, Dr. J. Treis, Dr. W. Voges, M. Vongehr, Dr. R. Voss, A. Yoldas, Dr. X.-L. Zhang, A. Zöller.

*Doktoranden/Diplomanden:*

P. Afonso, A. Bähr, M.G. Bernhardt, E. Bissaldi, D. Burlon, P. Chaudhary, C. Clemens, S. Ebermayer, V. Fedl, R. Filgas, M. Fürmetz, D. Gruber, B. Grünecker, M. Henze, H.-H. Huang, B. Huber, C. Jocham, K. Kretschmer, T. Kruehler, M. Lang, T. Lauf, A. Mikova, M. Mühlegger, H. Ohlendorf, F. Olivares, G. Saez-Cano, J. Rabe, C. Sädler, G. Schächner, A. Stefanescu, H. Stiehle, R. Sturm, V. Sudilovsky.

*C. Theorie und Komplexe Plasmen*

U. Ackermann, Dr. T. Antonova, Dr. T. Aschenbrenner, Dr. P. Badyopadhyay, Dr. H. Böhringer, Dr. W. Bunk, Dr. M. Chaudhuri, E. Collmar, Dr. L. Couédel, Dr. R. Fassbender, Dipl.-Phys. H. Höfner, F. Honecker, Dr. L. Hou, Dr. A. Ivlev, Dr. S. Khrapak, Dr. B. Klumov, Dr. U. Konopka, Dr. M. Kretschmer, A. Langer, Dr. Y. Li, Dr. R. Monetti, Dr. T. Nosenko, Dr. V. Nosenko, Dr. D. Pierini, Dr. R. Pompl, Dr. G. Pratt, Dr. M. Pustyl'nik, Dr. Ch. Räth, Dr. H. Rothermel, Dr. M. Rubin-Zuzic, Dr. H. Scheingraber, K. Schmid, Dr. S. Shimizu, Dr. T. Shimizu, Dr. I. Sidorenko, Dr. M. Thoma, Dr. H. Thomas, Dr. M. Verdugo, Dr. V. Yaroschenko, Dr. S. Zhdanov, Dr. J. Zimmermann.

*Doktoranden/Diplomanden:*

F. Braglia, P. Brandt, C. Du, M. Fink, S. Giodini, R. Heidemann P. Huber, J. Jeon, K.

Jiang, C. Knapek, V. Lachner, H. Meyer, S. Mitic, S. Mihatsch, A. Mois, G. Rossmannith, J. Santos, M. Schwabe, A. Simionescu, R. Suhada, R. Sütterlin, L. Wörner, Y-Y. Zhang.

#### *D. Optische und Interpretative Astronomie*

Prof. Dr. A. Burkert, Dr. L. Coccatto, Dr. C. Dalla Vecchia, Dr. F. De Lorenzi, Dr. C. Dobbs, Dr. N. Drory, Dr. F. Durier, Dr. V. Gaibler, Prof. Dr. O. Gerhard, Dr. C. Grillo, Dr. F. Grupp, Dr. U. Hopp, Dr. S.M. Hu, Dr. J. Johnson, Dr. R. Katterloher, Dr. S. Khochfar, Dr. M. Krause, Dr. U. Maio, Dr. M. Montalto, Dr. B. Muschielok, Dr. E. Noyola y Loya, Dr. S. Phleps, Dr. H. Relke, M. Rieperding, Dr. R. Saglia, Dr. A. Sanchez, Dr. M. Schartmann, Dr. M. Schweitzer, Dr. R. Senger, Prof. J. Weller, Dr. D. Wilman, Dr. H. Ziaeeepour.

#### Doktoranden/Diplomanden:

A. Balaguera-Antolinez, M. Cappetta, J. Connelly, P. Das, M. Fabricius, M. Hilz, M. Hirschmann, R. Kelzenberg, H. Kotarba, K. Markovic, F. Montasano, L. Morganti, E. Ntormousi, L.G. Oser, S. Pekruhl, S. Prianto Rusli, S. Pu, H. Schlagenhauser, R. Schoenrich, J. Sundquist, A. Ulubay Siddiki, G. Ventimiglia, J. Zendejas Dominguez.

#### *E. Physik des Erdnahen Weltraums*

Dr. B. Klecker.

#### *F. Ingenieurbereiche und Werkstätten*

##### a) Elektrotechnik

Dipl.-Ing. S. Albrecht, Dipl.-Ing. (FH) L. Barl, Dipl.-Ing. (FH) W. Bornemann, Dipl.-Ing. (FH) T. Burghardt, H. Ciboglu, M. Deuter, A. Emslander, Dr. F. Fumi, M. Geithner, R. Gressmann, Dipl.-Ing. (FH) T. Hagl, Dipl.-Ing. (FH) O. Hälker, O. Hans, M. Hengmith, Dipl.-Ing. (FH) S.-C. Herrmann, Dipl.-Ing. (FH) F. Huber, Dipl.-Ing. S. Kellner, Dipl.-Ing. (FH) W. Kink, P. Langer, R. Lederer, D. Mießner, M. Müller, S. Müller, Dipl.-Ing. (FH) S. Müller, F. Oberauer, Dipl.-Ing. (FH) C. Rau, P. Reiss, J. Reiffers, T. Rupprecht, M. Schneider, F. Schrey, Dipl.-Ing. K. Tarantik, K. Tomic, Dipl.-Ing. G. Wildgruber, V. Yaroshenko, J. Zanker-Smith, Dipl.-Ing. (FH) J. Ziegleder.

##### b) Mechanik

R. Bayer, T. Blasi, M. Bibracher, J. Brandstetter, A. Brara, B. Budau, S. Czempiel, C. Deysenroth, M. Deysenroth, G. Dietrich, Dipl.-Ing. (FH) K. Dittrich, J. Eibl, P. Feldmeier, J. Gahl, A. Goldbrunner, J. Hartwig, Dipl.-Ing. (FH) M. Haug, M. Honsberg, F.-X. Huber, Dipl.-Ing. H. Huber, S. Huber, H.J. Kestler, J. Liebhardt, R. Mayr, R. Mayr-Ihbe, Dipl.-Ing. (FH) B. Mican, E. Niemetz, Dipl.-Ing. (FH) D. Pietschner, M. Plangger, C. Rohe, R. Sandmair, M. Schindlmeier, A. Schneider, P. Schnell, C. Schreib, W. Schunn, F. Soller, G. Stadler, P. Straube, R. Strecker, Dipl.-Ing. M. Thiel, Dipl.-Ing. L. Tiedemann, S. Wick.

##### c) Auszubildende

M. Bibracher, D. Cziasto, M. Greil, J. Hartwig, S. Hasinger, D. Huber, F. Mihé, E. Niemetz, M. Schindelmeier, A. Schneider, S. Senftleben, T. Urban, M. Wachendorf.

#### *G. Zentrale DV-Gruppe*

Dipl.-Phys. O.H. Bauer, H. Baumgartner, Dipl.-Phys. A. Bohnet, B. Bribian-Sanchez, A. Kleiser, L. Klose, C. Kollmer, A. Oberauer, Dr. T. Ott, J. Paul, Dipl.-Ing. (FH) R. Sigl, Dr. J. Snigula, Dr. H. Steinle, Dipl.-Ing. E. Wieprecht, Dipl.-Ing. E. Wiezorrek.

#### *H. Öffentlichkeitsarbeit*

Dr. M. Clerico, Dr. W. Collmar, Dr. H. Hämmerle.

#### *I. Publikationsunterstützung*

R. Hauner, R. Mayr-Ihbe, B. Mory.

*J. Bibliothek*

E. Chmielewski, E. Blank, C. Hardt.

*K. Verwaltung und Allgemeine Dienste*

G. Apold, A. Arturo, M. Bauernfeind, U. Bitzer, M. Blaschek, J. Christof, U. Cziasto, E. Doll, C. Eicher, M. Ertl, S. Goldbrunner, M. Grasemann, M. Grohmann, H.-P. Gschnell, R. Hübner, M. Ihle, E. Ingram, I. Inhofer, T. Jäkel, J. Jirsch, W. Karing, M. Keil, L. Kestler, V. Kliem, T. Kürzinger, E. Kuhwald, A. Nagy, A. Neun, M. Peischl, C. Preisler, A. Reither, R. Rochner, E. Rossa, P. Sandtner, E. Sarsilmaz, B. Scheiner, B. Schrötter, S. Schwaiger, G. Sedlmaier, Dipl.-Ökonom G. Seeger, R. Steinle, R. Strecker, L. Thies, J. Vogt.

## 1.2 Preise, Auszeichnungen, Berufungen

Volker Gaibler: “Golden Spike Award“, High Performance Computing Center Stuttgart (HLRS).

Reinhard Genzel: Premio Galileo, Fondazione Premio Galileo 2000, Florenz, Italien.

Ortwin Gerhard: Präsident der IAU Division VII (Galactic Structure) und der IAU Kommission 33 (Structure and Dynamics of the Galactic System).

**2 Lehrtätigkeiten**

Becker, W.: Weiße Zwerge, Neutronensterne und Schwarze Löcher, LMU München WS 08/09 und 09/10; Astrophysikalisches Doktorandenseminar mit den Studenten der *International Max-Planck Research School on Astrophysics*, LMU München WS 08/09, SS 09 und WS 09/10; Gravitationswellen und ihr Nachweis, LMU München SS 09

Bender, R.: Astronomisches Hauptseminar zur Astrophysik, LMU München SS 09 und WS 09/10; Astrophysikalisches Praktikum “A“ und Übungen, LMU München WS 08/09, SS 09 und WS 09/10; Astrophysikalisches Praktikum “B“ und Übungen, LMU München WS 08/09, SS 09 und WS 09/10; Astronomisches Kolloquium, LMU München WS 08/09, SS 09 und WS 09/10; Extragalactic Journal Club, LMU München WS 08/09, SS 09 und WS 09/10; Extragalactic Group Seminar, LMU München WS 08/09, SS 09 und WS 09/10; Introduction into Astronomy and Astrophysics and Exercises, LMU München WS 08/09

Böhringer, H.: Cosmology and Large-Scale Structure of the Universe, LMU München SS 09

Böhringer, H. / Fassbender, R. / Phleps, S.: Galaxien und Galaxienhaufen im Universum, LMU München WS 08/09, SS 09; Einführung in die beobachtungsorientierte Kosmologie, LMU München SS 09, WS 09/10

Boller, Th.: Einführung in die Astronomie II, J.-W. von Goethe Univ. Frankfurt WS 08/09; Kernregionen aktiver Galaxien, J.-W. von Goethe Univ. Frankfurt WS 09/10; Distribution Functions in Astrophysics/Active Galactic Nuclei, IMPRS for Astrophysics, Garching (WS 08/09)

Diehl, R.: Seminar on “Nuclei in the Cosmos“, TU München WS 08/09, WS 09/10; Observational High-Energy Astrophysics, TU München SS 09

Eisenhauer, F.: Einführung in die Astrophysik, TU München WS 08/09, WS 09/10

Gerhard, O.: IMPRS Advanced Course II Galaxies and the Galaxy: Structure and Dynamics in the Milky Way, IMPRS Garching WS 09/10

Gillessen, S.: Seminar “Tools in Modern Astrophysics“, LMU München WS 08/09, SS 09, WS 09/10

Khochfar, S.: Structure Formation in the Universe, Uni. Heidelberg WS 09/10

Saglia, R. / Bender, R.: IMPRS introductory course, IMPRS Garching WS 08/09, SS 09  
 Thoma, M.: Theoretische Plasmaphysik, Univ. Gießen SS 09; Einführung in die Eichtheorie, Univ. Gießen WS 08/09; Physik in der Schwerelosigkeit, Univ. Gießen WS 09/10  
 Thoma, M. (mit Kretschmer, M. und Schwabe, M.): Fortgeschrittenenpraktikum III und IV - Versuch 03: Plasmakristall, TU München WS 08/09, SS 09, WS 09/10

### 3 Wissenschaftliche Arbeiten

Die wissenschaftlichen Aktivitäten am MPE sind organisatorisch in vier große Arbeitsbereiche aufgeteilt, die jeweils von einem Direktor geleitet werden: (1) Infrarot- und Submm/mm Astronomie, (2) Optische und Interpretative Astronomie (3) Hochenergieastrophysik, und (4) Theorie und komplexe Plasmen. Dazu untersucht noch eine kleinere Gruppen die Plasmaphysik des erdnahen Weltraums. Diese Arbeitsbereiche beschäftigen sich – oft bereichsübergreifend – mit unseren sechs großen Forschungsthemen (siehe “Allgemeines“). Unsere Wissenschaft ist ausführlich auf unseren Internetseiten (<http://www.mpe.mpg.de>) unter dem Punkt “Forschungsbereiche“ dargestellt. Wichtige Einzelergebnisse sind unter “Aktuelles Thema“ und “MPE Meilensteine“ in zeitlicher Reihenfolge beschrieben.

### 4 Diplomarbeiten, Dissertationen, Habilitationen

#### 4.1 Diplomarbeiten

Fritz, T.K.: Astrometrie von IRS13E. LMU München 2009.  
 Heftrich, T.: AGN X-ray photoionized plasma diagnostics with IXO. Goethe-Universität Frankfurt am Main 2009.  
 Jankowsky, F.: (Bachelor Thesis) Beobachtungsmethoden und die physikalischen Eigenschaften von extrasolaren Planeten. LMU München 2009.  
 Mayer, P.: Charakterisierung und Integration eines Wellenfrontensorddetektors für ein Laserleitsternsystem (Master Thesis). LMU München 2009.  
 Ohlendorf, H.:  $^{26}\text{Al}$  Gamma-Ray Emission from the Scorpius-Centaurus Association. Universität Würzburg 2009.  
 Saez-Cano, G.:  $^{26}\text{Al}$  gamma-ray emission and star formation in the Gould Belt. TU München 2009.

#### 4.2 Dissertationen

Kimmel, N.: Analysis of the charge collection process in solid state X-ray detectors. Universität Siegen 2009.  
 Koppenhoefer, J.: Searching for extra-solar planets with the transit method. LMU München 2009.  
 Krühler, T.: Advanced Photometric Studies of Gamma-Ray Burst Afterglows. TU München 2009.  
 Nowak, N.A.N.: Exploring the relations between bulges and central black holes in unusual galaxies. LMU München 2009.  
 Schwabe, M.: Dynamical effects in fluid complex plasmas. LMU München 2009.

### 5 Tagungen und Veranstaltungen

**The local volume: constraints on galaxy formation and evolution**, Jenam 2009, Hatfield, UK, 21.-22.4.2009, Organisation: R.P. Saglia.

**Massive Black Hole Binaries and their Coalescence in Galactic Nuclei**, Kavli Institute for Astronomy and Astrophysics, Beijing, China, 20.-25.7.2009, Organisation: S. Komossa, F. Liu, D. Lin, D. Merritt, L. Rezzolla, R. Spurzem, X.-B. Wu, Q. Yu.

**IAU-Symposium 267: Evolution of Galaxies and Central Black Holes - Feeding and Feedback**, Rio de Janeiro, Brazil, 5.-10.8.2009, Organisation: B. Peterson, M. Elvis, L. Ferrarese, T. Heckman, S. Komossa, G. Kauffmann, P. Lira, A. Marconi, H. Netzer, E. Sadler, R. Somerville, T. Storchi-Bergmann, K. Wada, M. Ward.

**Supersoft X-ray Sources - New Developments**, Villafranca del Castillo, Madrid, Spain, 18.-20.5.2009, Organisation: F. Haberl, N. Schartel, R. Gonzalez, J. Greiner, M. Hernanz, M. Orio, R. Di Stefano, J. Osborne, M. Kato, J.-P. Lasota, K. Mukai.

**AO for ELT**, Paris, France, 22.-26.6.2009, Organisation: T. Fusco, Y. Clenet, J.-L. Beuzet, B.R. Brandl, J.-M. Conan, E. Diolaiti, F. Eisenhauer, B. Ellerbroek, M. Ferrari, W. Gaessler, N. Hubin, M. Kasper, R. Myers, G. Rousset, J.-P. Veran.

**DLR-MPE Workshop - Soft Matter and Materials Physics in Space**, Ringberg/Tegernsee, Germany, 14.-16.9.2009, Organisation: M. Thoma, H.M. Thomas.

**PK-3 Plus Symposium 2009**, Garching, Germany, 27.- 28.10.2009, Organisation: H.M. Thomas, A. Langer.

**Annual Meeting of the German Long Wavelength Consortium (GLOW)**, MPA, Garching, Germany, 2.-3.7.2009, Organisation: A. Merloni, B. Ciardi, J. Weller.

**From circumstellar disks to planetary systems: annual MPE-ESO-MPA-USM workshop**, Garching, Germany, 3.- 6.11.2009, Organisation: E.F. van Dishoeck, L. Testi, J. Brown, G. Herczeg, A. Burkert, P. Klaassen, L. Ricci, P. Teixeira, J. Zanker-Smith, C. Stoffer.

**From cores to disks: Spitzer IRS and VLT-CRIFES studies**, Garching, Germany, 30.10.-2.11.2009, Organisation: E.F. van Dishoeck, G. Herczeg, J. Brown.

**Galaxy Metabolism: Galaxy Evolution Near and Far**, Sydney, Australia, 22.-26.6.2009, Organisation: J. Bland-Hawthorn, R. Braun, J. Dickey, A. Hopkins, G. Kauffmann, L. Kewley, M. Shull, L.J.Tacconi.

**To the Edge of the Universe: 30 Years IRAM Anniversary Celebration**, Grenoble, France, 28.-30.9.2009, Organisation: J. Alcolea, P. Andre, F. Boulanger, P. Cox, P. Goldsmith, S. Guilleaume, D. Muters, L.J. Tacconi, P. De Vicente, F. Wyrowski.

**Physics of Galactic Nuclei**, Ringberg, Germany, 15.- 19.6.2009, Organisation: A. Burkert, M. Krause, M. Schartmann, M. Hirschmann, C. Alig, S. Khochfar.

**Joint Discussion 1: Dark matter in early-type galaxies**, General Assembly of the IAU, Rio de Janeiro, Brazil, 3.- 5.8.2009, Organisation: L. Koopmans, T. Treu, L. Ciotti, W. Evans, O. Gerhard, D. Maoz, P. Natarajan, T. Ohashi, S. Pellegrini.

**Joint Discussion 2: Diffuse light in galaxy clusters**, General Assembly of the IAU, Rio de Janeiro, Brazil, 6.-7.8.2009, Organisation: M. Arnaboldi, O. Gerhard, C. Adami, R. Ciardullo, K.C. Freeman, L. Mayer, C.L. Mendes de Oliveira, S. Okamura, S.D.M. White, A. Zabludoff.

**Modelling the Milky Way in the era of Gaia**, General Assembly of the IAU, Rio de Janeiro, Brazil, 6.-7.8.2009, Organisation: J.J. Binney, L.A.C. Aguilar, H.B. Dejonghe, K.C. Freeman, O. Gerhard, N. Gouda, A. Helmi, J.R.D. Lepine, A.C. Quillen, A.C.R. Robin, N.Y. Sotnikova.

**The Origins of  $^{44}\text{Ti}$** , Garching, Germany, 15.1.2009, Organisation: R. Diehl, R. Kruecken, H.T. Janka.

**Detectors for Astronomy 2009**, Garching, Germany, 12.- 16.10.2009, Organisation: D. Baade, J. Beletic, R. Campbell, D. Figer, G. Finger, J.-L. Gach, S. Miyazaki, P. Moore, G. Tarlé, S. Tulloch, A. Short, I. Bronnert, M. Fabricius, L. Feng, N. Neumayer, U. Seaman,

C. Stoffer.

**MPE Workshop on Medical Physics**, Ringberg, Germany, 21.-23.10.2009, Organisation: W. Bunk, E. Collmar, G. Morfill, J. Zimmermann.

**Directional discontinuities in the interplanetary magnetic field**, International Space Science Institute, Bern, Switzerland, 19.-23.10.2009. Organisation: G. Paschmann.

**The future of magnetospheric research**, ISSI Forum, 24.- 25.3 2009. Organisation: G. Paschmann.

## 6 Projekte am Institut

### 6.1 Kooperationen mit anderen Instituten

#### Argentinien

Observatorio Astronomico Felix Aguilar (OAFA), Universität San Juan, and Instituto de Astronomia y Fisica del Espacio (IAFE), CONICET, Buenos Aires: H-alpha Solar Telescope for Argentina (HASTA).

#### Australien

Australian National University: Galaxienentstehung.

Melbourne University: Astro-Plasmaphysik.

Swinburne University of Technology, Victoria: Millisecond Pulsars.

University of Western Sydney: Magellanic Clouds.

#### Belgien

CSL Liège, Katholieke Universiteit Leuven: Herschel-PACS, INTEGRAL-Spectrometer SPI.

Europäische Kommission, Joint Research Centre (JRC-IRMM), Geel: Entwicklung von großflächigen Röntgenfiltern für eROSITA.

#### Brasilien

Universidade de Sao Paulo: Galaxienentstehung.

#### Chile

Universidad de Concepcion: Röntgen-Doppelsternsysteme.

Universidad Catolica Santiago: Röntgen-Doppelsternsysteme.

#### China

Institute for High-Energy Physics (IHEP), Peking: AGN und unidentifizierte Gammaquellen von COMPTEL und INTEGRAL.

Institute for Plasma Physics, Hefei: Komplexe Plasmen, Staubdetektion in Fusionsreaktoren.

University of Hongkong: Strahlungsmechanismen von Pulsaren vom Röntgen bis zum Gammabereich.

#### Deutschland

Astrophysikalisches Institut Potsdam: eROSITA; XMM-Newton; GAVO; OPTIMA; ARGOS; HETDEX.

Christian-Albrechts-Universität, Kiel: Komplexe Plasmen; STEREO.

DLR-Köln Porz: Plasmakristall Experiment; Rosetta Lander (ROLAND); PKE-Nefedov.

European Southern Observatory (ESO), Garching: KMOS Multiobjekt-Spectrograph für



VLT; GRAVITY; Galaxienentstehung; ASTRO-WISE; OmegaCAM; MICADO, Nukleare Astrophysik.

Fraunhofer Institut für Festkörpertechnologie, München: IXO; eROSITA.

Fraunhofer Institut für Mikroelektronische Schaltungen und Systeme, Duisburg: Mikroelektronikentwicklungen; CAMEX 64B; JFET-CMOS Prozessor; IXO; eROSITA.

IAP Berlin: HETDEX.

International University Bremen: Astro-Plasmaphysik, CLUSTER.

Institut für Festkörperphysik und Werkstoff-Forschung, Dresden: Entwicklung weichmagnetischer Werkstoffe.

Institut für Astronomie und Astrophysik Tübingen (IAAT): XMM-Newton; eROSITA.

Klinik für Dermatologie, Allergologie und Umweltmedizin, Krankenhaus München Schwabing: Plasmamedizin.

Landessternwarte Heidelberg-Königstuhl: Nahinfrarotspektrograph LUCIFER für LBT; Galaxienentstehung; ARGOS.

Laser Zentrum Hannover: Development of advanced Filters for MICADO.

Leibniz Rechenzentrum der Bayerischen Akademie der Wissenschaften, Garching: Label free imaging and Pattern Recognition.

Ludwig-Maximilians-Universität, München: OmegaCAM; ASTRO-WISE; KMOS; MICADO; HETDEX; Raman Spektroskopie; Plasmamedizin.

Max-Planck-Institut für Sonnensystemforschung, Katlenburg-Lindau: Experiment CELIAS auf SOHO; Experiment CIS auf CLUSTER; Rosetta Lander (ROLAND); Multi-Ionen Plasmatheorie; MIXS auf BepiColombo.

Max-Planck-Institut für Astronomie, Heidelberg: GRAVITY; LUCIFER; Herschel-PACS; PanSTARRS; SDSS; ARGOS; MICADO; EUCLID.

Max-Planck-Institut für Astrophysik, Garching: GAVO; SDSS; OPTIMA; eROSITA.

Max-Planck-Institut für Physik, Werner Heisenberg Institut, München: MPI Halbleiterlabor, Entwicklung von CCDs; Active Pixeldetektoren (APS); JFET-Elektronik und Drift-detektoren für den Röntgenbereich; CAST.

Max-Planck-Institut für Kernphysik: CFEL.

Max-Planck-Institut für Biomedizinische Forschung: CFEL.

Max-Planck-Institut für Komplexe System, Fritz-Haber Institut: CFEL.

Max-Planck-Institut für Biophysische Chemie: CFEL.

Max-Planck-Institut für Radioastronomie, Bonn: ARGOS.

Physikalisch-Technische Bundesanstalt Berlin: eROSITA; TES Bolometer SQUID-Ausleseschaltung.

Thüringer Landessternwarte Tautenberg: GROND; Gamma-Ray Bursts.

Technische Universität Berlin: Interstellares Medium.

Technische Universität Darmstadt: CAST.

Technische Universität München: Nukleare Astrophysik.

Technische Universität Braunschweig, Institut für Geophysik und Meteorologie: Hybridcode-Simulationen; Mirror-Moden.

Technische Universität Darmstadt: CAST.

Technische Universität München: Plasmamedizin.

Universität Bochum: Komplexe Plasmen; LUCIFER.

Universität Bonn: Test von Pixeldetektoren für IXO; OmegaCAM; ASTRO-WISE; eROSITA.

Universität der Bundeswehr München: Venus Express.

Universität Düsseldorf: Komplexe Plasmen.

Universität Erlangen: eROSITA.

Universität Greifswald: Komplexe Plasmen.

Universität Hamburg: eROSITA; OPTIMA.

Universität Heidelberg: IXO: XFEL.

Universität Jena: Isolierte Neutronensterne; Nukleare Astrophysik.

Universität Köln: Galaktisches Zentrum; GRAVITY.

Universität Mannheim: IXO XFEL.

Universität Regensburg, Department für Dermatology, Uni.-Klinik Regensburg: Plasmamedizin.

Universitätssternwarte Göttingen: OmegaCAM.

Universität Siegen: Compton Kamera.

Universität Würzburg: ACE; STEREO; AGADE.

### *Frankreich*

CEA, Saclay: INTEGRAL-Spektrometer SPI; Herschel-PACS; CAST; SIMBOL-X; EUCLID: SPICA.

Centre d'Etude Spatiale des Rayonnements (UPS), Toulouse: INTEGRAL-Spektrometer SPI; CIS/Cluster; Double Star.

Centre d'Etudes des Environnements Terrestres et Planétaires (CNRS), St Maur des Fossés: FAST - Auroraphysik.

GREMI-Lab, Orleans: Komplexe Plasmen; Plasmakristall Experiment auf der ISS.

IAP Paris: Nukleare Astrophysik.

IGRP Marseille: Herschel-PACS.

LAM: EUCLID.

LAOG Grenoble: Gravity.

OAMP Marseille: Herschel-PACS.

Observatoire de Meudon: ASTRO-WISE.

Observatoire de Paris / LESIA: GRAVITY; MICADO.

### *Großbritannien*

Belfast Queen's University: PanSTARRS.

BRUNEL University: IXO.

John Moores University, Liverpool: Himmelsdurchmusterung Galaxienhaufen.

Open University, Milton Keynes: Kataklysmische Variable, Novae.

Rutherford Appleton Laboratory, Council for the Central Laboratory of the Research Councils: SIS-Junctions; Komplexe Plasmen; Rosetta Lander (ROLAND); JSOC für CLUSTER.

University of Birmingham: INTEGRAL-Spektrometer SPI; XMM-Newton.

University of Cambridge: RoPacs.

University College London, MSSL: High Energy Pulsars; EUCLID.

University of Durham: KMOS, PanSTARRS.  
University of Edinburgh: KMOS, PanSTARRS.  
University of Hertfordshire: RoPACS.  
University of Leeds: Komplexe Plasmen.  
University of Leicester: XMM-Newton Datenanalyse; XEUS; Swift.  
University of Liverpool: Komplexe Plasmen.  
University of Southampton: Magellanic Clouds.  
University of Wales, Cardiff: Filter für Herschel-PACS.  
University Oxford: Komplexe Plasmen; KMOS.  
University of Sheffield: Astro-Plasmaphysik.  
UKATC: EUCLID.

#### Griechenland

University of Crete and Foundation for Research and Technology Hellas (FORTH), Heraklion: Ausbau und Betrieb der Skinakas Sternwarte; Untersuchung von windakkretierenden Röntgendoppelsternsystemen; Entwicklung und Einsatz des OPTIMA Photometers; Optische Identifikation und Monitoring von Röntgen-AGN, Novae.

#### Israel

Ber Sheva University: Astro-Plasmaphysik.  
School of Physics and Astronomy, Wise Observatory, Tel Aviv: Aktive Galaxien; Galaxienentwicklung; Interstellares Medium.  
Weizmann Institut, Rehovot: Komplexe Plasmen; Galaktisches Zentrum.

#### Italien

Brera Astronomical Observatory: Himmelsdurchmusterung Galaxienhaufen; XEUS.  
IFCAI-CNR Palermo: XMM-Newton Beobachtungen von Neutronensternen und Pulsaren.  
INAF: Arcetri: ARGOS.  
INFR Frascati: SIDDHARTA.  
INAF Padua: Herschel-PACS; OmegaCam; MICADO.  
INAF Roma: Nukleare Astrophysik.  
INAF Trieste: Gamma-Ray Bursts: Fermi/LAT.  
Istituto di Fisica Cosmica e Tecnologia, Mailand: INTEGRAL-Spektrometer SPI.  
Istituto di Fisica dello Spazio Interplanetario (CNR), Frascati: Herschel-PACS; CLUSTER/CIS; Double Star.  
Osservatorio di Capodimonte, Napoli: OmegaCAM; ASTRO-WISE.  
Osservatorio di Padova: OmegaCAM.  
Politecnico di Milano: Rauscharme Elektronik; Röntgendetektorenentwicklung.  
University Bologna: EUCLID.  
Universität Neapel: Komplexe Plasmen.

#### Japan

Tokio Institute of Technology (TITECH), Ookayama: ASCA/XMM-Newton Beobachtungen von AGN.  
Institute of Space and Astronautical Science, Yoshinodai: Suzaku; Astro-F Solar System

Observations; Astro-Plasmaphysik.

JAXA: Pk-3 Plus; PK-4; Plasmalab.

Kyoto Institute for Technology: Komplexe Plasmen, PK-3 Plus; Plasmalab.

Tohoku University: Komplexe Plasmen; IMPF.

University of Osaka: Astro H, IXO CCDs.

University of Tokyo: Astro-F Solar System Observations; Astro-Plasmaphysik.

Yokohama National University: Komplexe Plasmen.

#### Kroatien

Ministry of Science and Technology, Zagreb: CAST.

#### Niederlande

ESTEC, Noordwijk: XMM-Newton-TS-Spiegelkalibration; CCD Entwicklung; Radiation Performance Instrument; INTEGRAL; EUCLID.

FOM Institute for Plasma Physics, Rijhuizen: Komplexe Plasmen.

NOVA Leiden: MICADO.

SRON, Utrecht: Chandra-LETG; TES für SPICA/IXO.

Sterrewacht Leiden: ASTRO-WISE; OmegaCAM.

TU Delft: Reflexions Messungen an schwarzen Farben.

University Eindhoven: Komplexe Plasmen; PlasmaLab.

University of Groningen, Kapteyn Institute: Rekonstruktion der Dichteverteilung im Universum; OmegaCAM; ASTRO-WISE.

#### Norwegen

Universität Trømsø: Komplexe Plasmen.

#### Österreich

Institut für Weltraumforschung der Österreichischen Akademie der Wissenschaften, Graz: CIS; EDI auf CLUSTER; Geomagnetischer Schweif. Universität und TU Wien: Herschel-PACS.

#### Polen

Nicolaus Copernicus (ZAMK), Torun: Pulsars Astronomical Centers.

#### Portugal

Sim Lissabon: Gravity.

Universität Lissabon: Komplexe Plasmen.

#### Rumänien

Institute for Space Sciences, Bukarest: Plasmaphysik; FAST; CLUSTER.

#### Russland

Joint Institute for High Temperatures (JFHT) of the Russian Academy of Science, Moscow: Plasmakristall Experiment (PKE); PKE-Nefedov; PK-3 Plus; PK-4; Plasmalab; Plasma-medizin.

Institute Physics of Earth, Moscow: Plasmaphysik; Astro-Plasmaphysik.

Institute for Biomedical Problems of the Russian Academy of Sciences, Moscow: Plasma Medicine.

Institute for Epidemiology and Microbiology Problems of the Russian Academy of Medical

Sciences, Moscow: Plasma Medicine.

Institute for Theoretical and Experimental Biophysics of the Russian Academy of Sciences, Moscow: Plasma Medicine.

Institute for Problems of Chemical Physics of the Russian Academy of Sciences, Moscow: Plasma Medicine.

Institute for Physical Chemical Medicine of the Russian Academy of Medical Sciences, Moscow: Plasma Medicine.

Space Research Institute (IKI) of the Russian Academy of Science, Moscow: eROSITA.

Skobeltsyn Institute of Nuclear Physics, Moscow: Nukleare Astrophysik und Gamma-Ray Bursts.

#### Schweden

University Lund/Observatory: OPTIMA.

University Stockholm: Komplexe Plasmen; Staubdetektion in Fusionsreaktoren.

#### Schweiz

CERN, Geneva: CAST.

International Space Science Institute, Bern: Plasmaphysik; Astro-Plasmaphysik.

Observatoire de Genève Sauverny, Geneva: ISDC; Nukleare Astrophysik.

Universität Basel: Nukleare Astrophysik.

Universität Bern: SOHO/CELIAS; STEREO/PLASTIC.

#### Spanien

ESAC, Madrid: XMM-Newton Science Operations Center; INTEGRAL Science Operations Center.

Instituto de Astrofísica de Canarias (IAC), Laguna: Herschel-PACS; RoPACS.

LAEFF, Madrid: RoPACS.

Universität Valencia, Department de Astronomia, Valencia: INTEGRAL-Spektrometer SPI.

Universidad de Zaragoza: CAST.

Observatorio Astronomico de Mallorca: Novae; Kometen.

#### Taiwan

National Central University, Chungli: PanSTARRS.

#### Türkei

Bogazici University, Istanbul: CAST.

#### Ukraine

Main National Observatory, Kiev: RoPACS.

#### USA

Brookhaven National Laboratory: Strahlenharte JFET-Elektronik; Strahlenharte Detektoren.

California Inst. of Technology, Pasadena: SAMPEX; ACE; X-ray survey; STEREO.

CfA, Cambridge: IXO WFI.

Clemson University: Gamma-Ray Bursts; Nukleare Astrophysik.

Dartmouth College, Hanover, NH: Weltraum-Plasmaphysik, CLUSTER.

Harvard University: PanSTARRS.

Institute for Astronomy, Hawaii, Honolulu: Galaxienentstehung; PanSTARRS; NIR Kamera für Wendelstein.

Jet Propulsion Laboratory, Pasadena: EUCLID.

Johns Hopkins University: PanSTARRS.

Lawrence Berkeley National Laboratory, Berkeley: Herstellung der Ge:Ga Detektorelemente für Herschel-PACS und SOFIA; Charakterisierung von GaAs-Detektorenmaterial.

Marshall Space Flight Center, Huntsville: GLAST Gamma-Ray Burst Monitor; XMM-Newton und Chandra Beobachtungen von Neutronensternen, Pulsaren und Supernova-Überresten.

MIT, Cambridge: IXI WFI.

NASA/Goddard Space Flight Center, Greenbelt, MD: INTEGRAL-Spektrometer SPI; ACE; STEREO; Swift.

Naval Research Laboratory: Komplexe Plasmen.

Naval Postgraduate School, Monterey: Modellierung der Halbleitereigenschaften von Galliumarsenidmaterial für Infrarotdetektoren.

Pacific Northwest National Laboratory (PNNL), Richland: CAST.

Pennsylvania State University: HETDEX; IXO WFI; Swift.

Smithsonian Astrophysical Observatory, Cambridge: Chandra-LETGS; Röntgendoppelsterne in M31.

Space Telescope Science Institute, Baltimore: Galaxienentstehung.

STC: EUCLID.

Stanford University: Fermi/LAT; Fermi/GBM.

SLAC: CAMP.

Texas State University: HETDEX.

University of Arizona, Tucson: Kosmische Strahlung; SOHO/CELIAS; Planetenentstehung; LBT; ARGOS.

University of California, Berkeley: MPG/UCB-Kollaboration; Fern-Infrarot-Detektoren; Polarlichtbeobachtungen; FAST; CLUSTER/CIS; STEREO.

University of California, San Diego: CLUSTER/EDI; Komplexe Plasmen.

University of Colorado, Boulder: SAMPEX; Komplexe Plasmen.

University of Iowa, Iowa City: Komplexe Plasmen; CLUSTER/EDI; IMPF; PKE-Nefedov; PK-3 Plus.

University of Illinois at Urbana-Champaign: FIFI-LS.

University of Maryland, College Park, MD: SOHO; ACE.

University of New Hampshire, Durham: SEPICA/ACE; CLUSTER; SOHO; FAST; STEREO.

University of Pittsburgh: Galaxienentstehung.

University of Southern California, Los Angeles: SEM/CELIAS Experiment auf SOHO.

University of Texas, Austin: Galaxienentstehung; HETDEX.

University of Toledo: Galaxienentstehung.

University of Washington, Seattle: CLUSTER/CIS.

University Space Research Association, Moffett Field: SOFIA.

## 6.2 Multinationale Projekte

ARGOS – Laserleitstern für das LBT: API, LSW Heidelberg, MPIA, MPIfR, Germany; University of Arizona, USA.

ASPI, The International Wave Consortium: CNR-IFSI Frascati, Italy; LPCE/CNRS Orleans, France; Dept. of Automatic Control and Systems University of Sheffield, UK.

ASTRO-WISE: LMU München, Universität Bonn, Germany; Sterrewacht Leiden, University of Groningen, The Netherlands; Osservatorio di Capodimonte, Napoli, Italy; Observatoire de Meudon, Paris, France.

Bepi Colombo: ESA; MPS Katlenburg-Lindau, University of Leicester, UK; University of Helsinki, Finland; CAB in Madrid, Spain

BOSS: SDSS-III Collaboration.

CAST – CERN Solar Axion Telescope: CERN Geneva Switzerland; TU Darmstadt, MPI für Physik (WHI) München, Germany; Universidad de Zaragoza, Spain; Bogazici University Istanbul, Turkey; Ministry of Science and Technology Zagreb, Croatia; CEA/Saclay DAPNIA/-SED, France; Pacific Northwest National Laboratory, Richland, USA.

CDFS – The Chandra Deep Field South: ESO Garching, Astrophysikalisches Institut Potsdam, Germany; IAP Paris, France; Osservatorio Astronomico Trieste; Istituto Nazionale di Fisica Nucleare Trieste, Italy; Associated Universities Washington, Johns Hopkins University Baltimore, Space Telescope Science Institute Baltimore, USA; Center for Astrophysics Hefei, China.

CDS – Coronal Diagnostic Spectrometer for the Solar and Heliospheric Observatory: Rutherford Appleton Laboratory Chilton, Mullard Space Science Laboratory London, University College London, Oxford University, UK; LPSP Verrieres-le-Buisson, Nice Observatory, France; Oslo University, Norway; ETH Zürich, Switzerland; GSFC Greenbelt, NRL Washington, HCO Cambridge, Stanford University, USA; Padova University, Turin University, Italy; MPS Katlenburg-Lindau, Germany.

CELIAS – Experiment for SOHO: MPS Katlenburg-Lindau, TU Braunschweig, Germany; Universität Bern, Switzerland; IKI Moscow, Russia; University of Maryland College Park, University of New Hampshire Durham, University of Southern California Los Angeles, USA.

Chandra: Marshall Space Flight Center Huntsville, Massachusetts Institute of Technology Cambridge, Smithsonian Astrophysical Observatory Cambridge, USA; Space Research Institute Utrecht, The Netherlands; Universität Hamburg, Germany.

CIS-Experiment for CLUSTER: MPS Katlenburg-Lindau Germany; Universität Bern, Switzerland; CESR Toulouse, France; IFSI-CRR Frascati, Italy; Universität Heraklion, Greece; Lockheed Palo Alto Res. Lab., Space Science Lab., Univ. of California Berkeley, Univ. of New Hampshire Durham, Univ. of Washington Seattle, USA.

COSMOS: INAF-Osservatorio Astronomico di Bologna, INAF-Osservatorio Astronomico di Roma, INAF-Osservatorio Astrofisico di Arcetri, INAF/IASF-CNR, Sezione di Milano, IRA-INAf, Bologna, Dipartimento di Astronomia, Università Padova, Dipartimento di Fisica, Università degli Studi Roma Tre, Italy; Harvard-Smithsonian Centre for Astrophysics, Cambridge, Department of Physics, Carnegie Mellon University, Pittsburg, Institute for Astronomy, University of Hawaii, California Institute of Technology, Pasadena, Department of Astronomy, Yale University, USA; INTEGRAL Science Data Centre, Versoix, Switzerland; Laboratoire d'Astrophysique de Marseille, France.

DOUBLE STAR: MPS Katlenburg-Lindau, Germany; IFSI-CRR Frascati, Italy; CESR Toulouse, France; Space Science Lab., University of California, Berkeley, University of New Hampshire, Durham NH, USA.

EDI-Experiment for CLUSTER: University of New Hampshire Durham, University of California San Diego, USA.

eROSITA: Universität Tübingen, AIP Potsdam, Universität Hamburg, Remeis-Sternwarte Bamberg, MPA Garching, Germany; IKI Moskau, Russia.

EUCLID - ESA Mission to map the Dark Energy: ESA; CEA Saclay, LAM, France; University Bologna, INAF, Italy; MSSL, Durham University, UKATC, UK; STScI, USA.

FAST – Fast Auroral Snapshot Explorer: SSL-UCB Berkeley, USA; CETP St.Maur, France.

Fermi/GBM – Gamma-Ray Burst Monitor: Marshall Space Flight Center Huntsville, University of Huntsville, USA.

Fermi/LAT – Fermi Large Area Telescope: Stanford University Palo Alto, Naval Research Laboratory Washington DC, Sonoma State University Rohnert Park, Lockheed Martin Corporation Palo Alto, University of California Santa Cruz, University of Chicago, University of Maryland Greenbelt, NASA Ames Research Center Moffett Field, NASA Goddard Space Flight Center for High Energy Astrophysics Greenbelt, Boston University, University of Utah Salt Lake City, University of Washington Seattle, SLAC Particle Astrophysics Group Palo Alto, USA; ICTP and INFN Trieste, Istituto Nazionale di Fisica Nucleare Trieste, Italy; University of Tokyo, Japan; CEA Saclay, France.

FP7 Opticon JRA1 -Adaptive Optics: INAF Padova, INAF Arcetri, Italy; LAM Marseille, LAOG Grenoble; LESIA Paris, ONERA Paris, France; KIS Freiburg, MPIA Heidelberg, Germany; NOVA Leiden, The Netherlands; UKATC Edinburgh; University Durham, UK.

GRAVITY – Instrument for VLT Interferometry: MPIA Heidelberg, Germany; Observatoire de Paris /LESIA, France; Universität zu Köln, Germany; European Southern Observatory, Garching, Germany.

GROND – Gamma-Ray Burst Optical Near-IR Detector: Landessternwarte Tautenburg, Germany; ESO Garching, Germany.

Herschel – PACS (Photodetector Array Camera and Spectrometer): CSL Liège, Katholieke Universiteit Leuven, Belgium; MPIA Heidelberg, Universität Jena, Germany; OAA/LENS Firenze, IFSI Roma, OAP Padova, Italy; IAC La Laguna, Spain; Universität und TU Wien, Austria; IGRAP Marseilles, CEA Saclay, France.

HETDEX – Hobby-Eberly Telescope Dark Energy Experiment: University of Texas, Austin, Pennsylvania State University, Texas A&M University, USA; AIP Potsdam, LMU, USM, Germany.

INTAS – Cooperation of Western and Eastern European Scientist: France, Germany, Norway, Russia.

ISDC – INTEGRAL Science Data Centre: Observatoire de Geneva Sauverny, Switzerland; Service d'Astrophysique Centre d'Etudes de Saclay, France; Rutherford Appleton Laboratory Oxon Dept. of Physics University Southampton, UK; Institut für Astronomie und Astrophysik Tübingen, Germany; Danish Space Research Institute Lyngby, Denmark; University College Dublin, Ireland; Istituto di Fisica Milano, Istituto die Astrofisica Spatiale Frascati, Italy; N. Copernikus Astronomical Center Warsaw, Poland; Space Research Institute of the Russian Academy of Sciences Moscow, Russia; Laboratory for High Energy Astrophysics GSFC Greenbelt, USA.

INTEGRAL-Spectrometer SPI: Centre d'Etude Spatiale des Rayonnements (CESR) Toulouse, CEA Saclay Gif-sur-Yvette, France; Institute de Physique Nucleaire Université de Louvain, Belgium; Istituto di Fisica Cosmica e Tecnologia del CNR Milano, Italy; University de Valencia Burjassot, Spain; University of Birmingham, UK; NASA/GSFC Greenbelt, University of California Berkeley.

IXO – International X-ray Observatory: University of Leicester, UK; SRON Utrecht, The Netherlands; Institut für Astronomie und Astrophysik Tübingen, Germany; CESR Toulouse, France; Institute of Space and Astronautical Science (ISAS), Japan.

KMOS – A VLT multi-IFU near-infrared spectrograph: Universitätssternwarte München, Germany; University of Durham, ATC Edinburgh, University of Oxford, Bristol University,



UK.

LBT – Large Binocular Telescope Project: MPIA Heidelberg, MPIfR Bonn, Landessternwarte Heidelberg Königstuhl, Astrophysikalisches Institut Potsdam, Germany; University of Arizona Tucson, USA; Osservatorio Astrofisico di Arcetri Firenze, Italy.

Lockman Hole, optical/NIR identifications: Astrophysikalisches Institut Potsdam, ESO Garching, Germany; Istituto di Radioastronomia del CNR Bologna, Italien; Associated Universities Washington, California Institute of Technology Pasadena, Institute for Astronomy Honolulu, Princeton University Observatory, Pennsylvania State University Park, USA; Subaru Telescope NAO Hilo, Japan.

MICADO – MCAO Imaging Camera for Deep Observations: LMU, USM, MPIA, Germany; INAF Padova, Italy; NOVA, Federation of Dutch University Astronomy Departments, The Netherlands; GIS-Phase Paris, France.

OmegaCAM – Wide Field Imager of the VST: ESO Garching, LMU München, Universität Bonn, Universitätssternwarte Göttingen, Germany; Sterrewacht Leiden, University of Groningen, The Netherlands; Osservatorio di Capodimonte, Napoli, OAP Padua, Italy.

PanSTARRS: MPIA Heidelberg, Germany, University of Hawaii, Harvard University, USA, Johns Hopkins Univ. Baltimore, MD, USA, Universities of Durham, Edinburgh, Belfast, UK.

PK-3 Plus (Plasma-crystal experiment): JIHT Moscow, Russia; University of Iowa City, USA; DLR-Köln, Germany; Université d'Orléans CNRS, France.

PK-4 (Plasma-crystal experiment): JIHT Moscow, Russia; Université d'Orléans CNRS, France; Universität Düsseldorf, Germany; FOM Rijnhuizen, The Netherlands; Kyoto Institute for technology, Japan; University Stockholm, Sweden.

PlasmaLab: JIHT Moscow, Russia; GREMI-Orleans, France; Tohoku University Sendai, Japan.

Plasma Physics, Astro-Plasmaphysics: International Space Science Institute Bern, Switzerland; Institute Physics of Earth Moscow, Russia; University of Sheffield, UK.

PLASTIC experiment for STEREO: University of New Hampshire Durham, NASA/GSFC Greenbelt, USA; Universität Bern, Switzerland; Universität Kiel, Germany.

RoPACS – Marie Curie Initial Training Network to study Rocky Planets around Cool Stars: University of Hertfordshire, Institute of Astronomy, Cambridge, UK; Instituto de Astrofísica de Canarias, Laboratorio de Astrofísica Espacial y Física Fundamental, Madrid, Spain; Main Astronomical Observatory, Kiev, Ukraine.

SDSS (Sloan Digital Sky Survey): MPA Garching, MPIA Heidelberg, Germany; Univ. of Washington, Seattle, Fermi National Accelerator Laboratory, Batavia, Univ. of Michigan, Ann Arbor, Carnegie Mellon Univ., Pittsburgh, Penn State Univ., University Park, Princeton Univ. Observatory, Princeton, The Institute of Advanced Study Princeton, Space Telescope Science Institute, Baltimore, Johns Hopkins Univ. Baltimore, USA.

SIMBOL-X – Formation flying for a next-generation X-ray telescope: Osservatorio Astronomico di Brera, Italy; CEA Saclay, France; Universität Tübingen, Universität Erlangen, Germany.

SIMBOL-X: Osservatorio Astronomico di Brera, Italy; CEA Saclay, France.

Swift: NASA/GSFC Greenbelt, Penn State University, USA; University of Leicester, Mullard Space Science Laboratory London, UK; Osservatorio Astronomico Brera, Italy.

Topical Team – Critical Point in Complex Plasmas: ESA, Paris, France; JAXA, Tokyo, Japan; JIHT, Moscow, Russia.

XMM-Newton/SSC: Astrophysikalisches Institut Potsdam, Germany; SAP Saclay, CDS Strasbourg, CESR Toulouse, France; University of Leicester, Institute of Astronomy Cam-

bridge, MSSL London, UK.

XMM-Newton/TS: ESTEC Noordwijk, The Netherlands.

XMM-Newton/EPIC: SAP Saclay, IAS Orsay, CESR Toulouse, France; University of Leicester, University Birmingham, UK; CNR Mailand-Palermo-Bologna-Frascati, Osservatorio Astronomico Mailand, Italy; Institut für Astronomie und Astrophysik Tübingen, Germany.

### 6.3 Projekte mit der Industrie

3d shape GmbH, Erlangen: metrology for slumped glass mirror study.

ABN GmbH, Neuried: Betreuung der Testanlage PANTER.

ADTEC Plasma Technology Co. Ltd., Hiroshima: Entwicklung eines Niedertemperatur-Plasma-Gerätes zur in-vivo Sterilisation für Medizinanwendungen.

Albedo GmbH, München: Soft- and Hardware Entwicklung für PK-3 Plus; Elektronik für SDD-Auslese.

Array Electronics, Engmanting: DAQ development OPTIMA.

ASTEQ GmbH, Kelkheim: Fertigung von Detektorarrays aus gedrücktem Ge:Ga und Bearbeitung von Detektorproben aus Galliumarsenid; SAFARI.

Bach Research corp, Boulder, USA: Gratings for Lucifer.

BARR, USA: Manufacturing of filters for Omega Cam.

BASF Coatings AG, Münster: Untersuchung der Streueigenschaften von Mikropartikeln.

Berner & Mattner Systemtechnik GmbH, München: PK-4 documents, construction of plasma diagnostics system.

Bonerz engineering, Weiler-Simmerberg: Platinenentwicklung, Elektronikentwicklung.

Buchberger GmbH, Tuchenbach: Fertigung Strukturteile für PANTER-Manipulatoren und OPTIMA; Strukturteile CAST und GROND, Lucifer.

Carl Zeiss, Jena: eROSITA Spiegel und Mandrels.

Drollinger, Birkenfeld: Vergoldung von Detektorteilen für FIFI-LS.

EADS Atrium Munich: Euclid design study.

ESS, Landsberg: Wartung der Elektroinstallation; Ergänzung der Ansteuerungseinheit für das Vakuumpumpensystem; Fertigung von elektrischen Ansteuerungen für die Testanlagen PANTER, CALIFA und PUMA.

ESL GmbH, Berlin: Fertigung von Leiterplatten.

Euro Hect Pipes, Nivelles, Belgien: Cooling System for eROSITA.

Frank Optic Products GmbH, Berlin: VIRUS-W Faserbündel.

Freyer GmbH, Tübingen: PANTER.

Guido Lex Werkzeugbau GmbH, Miesbach: Strukturteile für FIFI-LS.

Hans Englett OHG, Berlin: Fertigung von Frontplatten und Meßvorrichtungen.

Harold Johnson, Gardena, USA: Spiegel und Normalisierungslinsen.

IMEC, Leuven, Belgium: Herstellung von kryogenen Ausleseelektronik-Schaltkreisen in neuer CMOS Technologie für IR-Detektoren auf Herschel-PACS; FIFI-LS; SAFARI.

Ingenieurbüro Buttler, Essen: Front-End Elektronikentwicklung für XEUS und eROSITA.

Ingenieurbüro pfma, Haar-Salmdorf: SAFARI.

Ingenieurbüro Weisz, München: Design und Konstruktion für LUCIFER; PACS Testoptik;

## SAFARI.

Invent GmbH, Braunschweig: CFRP-Telescopestructure for eROSITA.

JDS Uniphase Corporation, Milpitas, USA: VIRUS-W Schmalbandfilter.

Kaiser Optical Systems Inc., Ann Arbor, USA: VIRUS-W VPH grating.

Kayser-Threde GmbH, München: Hauptkontraktor für Herschel-PACS; Halbleiter-Detektoren Gamma-Astronomie; Plasmakristall-Experiment auf der Internationalen Raumstation; PKE; PK-3 Plus; PK-4; eROSITA-Spiegelsystem.

Kugler GmbH, Salem: Spiegel für OPTIMA, FIFI-LS.

Laserjob GmbH, Grafrath, Entwicklung Röntgenbaffle für eROSITA. Media Lavio Technologies, Borisio Parini, Italy: eROSITA mirror system.

PFMA Munich: Mechanical Design for Gravity.

PNSensor, München: Entwicklung und Fertigung von Halbleiterdetektoren; Montage von Halbleiterdetektorsystemen; ARGOS.

POG Präzisionsoptik, Gera: Camera objektive VIRUS-W, Prism for VIRUS-W GRISM, Beamsplitter for 3-channel camera.

Pribil D., Unterhaching: LUCIFER.

Physik Instrumente Karlsruhe: Cryogenic Piezo Actuators for Gravity.

Sagem, Paris: Fertigung von Filtern für OmegaCAM.

Siegert Electronics GmbH, Cadolzburg: Ausleseelektronik-Platinen für FIFI-LS; SAFARI.

Technotron, Lindau: Entwicklung und Fertigung der Platinen Layouts für eROSITA.

von Hoerner & Sulger, Schwetzingen: Manufacturing for PK-4.

## 7 Veröffentlichungen

### 7.1 In Zeitschriften und Büchern

Abazajian, K.N., J.K. Adelman-McCarthy, M.A. Agüeros, ..., W. Voges, et al.: The Seventh Data Release of the Sloan Digital Sky Survey. *Ap. J. Supp. Ser.* 182, 543-558 (2009).

Abdo, A.A., M. Ackermann, M. Ajello, ..., E. Orlando, et al.: Detection of 16 gamma-ray pulsars through blind frequency searches using the Fermi LAT. In: *Science* 325, 5942, 840-844 (2009).

Abdo, A.A., M. Ackermann, M. Ajello, ..., E. Orlando, ..., A.W. Strong, et al.: Measurement of the cosmic ray  $e^+ + e^-$  spectrum from 20 GeV to 1 TeV with the Fermi large area telescope. *Phys. Rev. Lett.* 102, 18, Seq. No.: 181101 (2009).

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## 7.6 Vorträge, Astronomische Telegramme und Zirkulare, Poster

Von Mitarbeitern des MPE wurden im Jahre 2009 insgesamt 494 Vorträge auf Konferenzen, bei Seminaren und Kolloquien und in der Öffentlichkeitsarbeit im In- und Ausland gehalten.

Zusätzlich haben sie an insgesamt 194 astronomischen Telegrammen und Zirkularen mitgewirkt und 68 Poster als Erstautoren auf Konferenzen präsentiert.

Die Zahlen, verteilt auf die einzelnen Arbeitsbereiche, sind in Tabelle 1 gelistet. Die Zahlen in Klammern geben die eingeladenen Vorträge (bei Konferenzen und zu Kolloquien) an, sowie die Zahl der Erstautorschaften bei Telegrammen und Zirkularen.

Tabelle 1: Vorträge, Telegramme/Zirkulare und Poster

Arbeitsgruppe	Vorträge	Telegramme, Zirkulare	Poster
Infrarot-/Submillimeter-Astronomie	151 (108)	1 (0)	11
Optische & Interpretative Astronomie	72 (37)	1 (0)	12
Hochenergieastrophysik	164 (91)	192 (126)	25
Theorie / Komplexe Plasmen	87 (35)	0 (0)	17
Weltraumplasmaphysik	20 (9)	0 (0)	3

Die vollständige Liste der Vorträge, der astronomischen Telegramme und Zirkulare sowie der Poster kann auf der MPE Internetseite (<http://www.mpe.mpg.de>) unter dem Punkt "Veröffentlichungen" eingesehen werden.

#### Öffentlichkeitsarbeit

Das MPE engagiert sich auch in der Öffentlichkeitsarbeit. Im Jahre 2009 hielten MPE-Wissenschaftler 39 Vorträge vor einem Laien-Publikum (z.B. an Schulen, Planetarien, bei Astronomischen Vereinigungen). In Institutsführungen wurde 21 Gruppen von bis zu 30 Personen, hauptsächlich Schüler und Lehrer von naturwissenschaftlich orientierten Schulen, das Institut und seine Arbeit erläutert. Am "Girl's Day" informierten sich 40 Mädchen über das MPE und 17 Schüler/innen erhielten in ein- oder zweiwöchigen Praktika einen Einblick in die Arbeitswelt von Plasma- und Astrophysikern.

Im Rahmen des "Internationalen Jahres der Astronomie 2009" war das MPE zusätzlich aktiv: beim "Tag der offenen Tür" mit Kinderprogramm im Oktober 2009 besichtigten etwa 3000 Besucher das Institut, am Kinderprogramm nahmen dabei etwa 600 Kinder teil. Gemeinsam mit vier astronomisch tätigen Instituten aus der Region München erstellte das MPE eine Ausstellung im Deutschen Museum in München zur "Entwicklung des Universums", die im Dezember 2009 für die Allgemeinheit eröffnet wurde. Darüber hinaus hat das Institut eine Reihe von "Vodcasts" aufgenommen, die wissenschaftliche Themen des MPEs allgemein verständlich im Internet präsentieren.

Reinhard Genzel