Garching bei München

Max-Planck-Institut für extraterrestrische Physik

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0 Allgemeines

Die wissenschaftlichen Aktivitäten am MPE sind organisatorisch in vier große Arbeitsbereiche aufgeteilt, die jeweils von einem Direktor geleitet werden: (1) Infrarotund Submm/mm Astronomie (Prof. Dr. Reinhard Genzel), (2) Optische und Interpretative Astronomie (Prof. Dr. Ralf Bender), (3) Hochenergieastrophysik (Prof. Dr. Kirpal Nandra) und (4) Zentrum für Astrochemische Studien (Prof. Dr. Paola Caselli). Diese vier Arbeitsbereiche, sowie noch zusätzlich zwei unabhängige Forschungsgruppen, beschäftigen sich – oft bereichsübergreifend – mit unseren acht großen Forschungsthemen. 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, Satelliten und Raumsonden durchgeführt. In zunehmendem Maße setzen wir aber, vor allem im optischen, im Infrarotbereich und in der Astrochemie, auch Instrumente an erdgebundenen Teleskopen ein. Methodisch lassen sich die Forschungsaktivitäten des MPE in mehrere Bereiche einteilen. In der beobachtenden Astrophysik werden am MPE innovative Instrumente vollständig oder zum Teil gebaut. Damit wird die Strahlung entfernter Objekte in den Millimeter/Submillimeter-, Infrarot-, Optischen-, Röntgenund Gammaspektralbereichen gemessen. Der hierbei überdeckte Teil des elektromagnetischen Spektrums umfasst mehr als zwölf Dekaden. Die untersuchten Objekte reichen von nahen Kometen bis zu den fernsten Quasaren, von winzigen Neutronensternen bis zu Galaxienhaufen, den größten bekannten Formationen im Kosmos. Theoretische Arbeiten liefern die Grundlagen zum Verständnis und Interpretation der Beobachtungen und Messungen. Die direkte Wechselwirkung von Beobachtern, Experimentatoren und Theoretikern im Hause ist ein Merkmal unseres Arbeitsstils und führt oft im direkten Wechselspiel von Hypothesen und Beobachtungstatsachen zu einem frühen Erkennen von Zusammenhängen und damit zu einer frühzeitigen Identifikation vielversprechender neuer Forschungsrichtungen. Ergänzt werden unsere Forschungsaktivitäten durch Experimente im Labor, mit denen sowohl die aus Theorie und Beobachtungen gewonnenen Ergebnisse überprüft als auch Informationen und Erkenntnisse gewonnen werden, die wiederum in theoretische Modelle und die Dateninterpretation einfliessen. Eine externe technologische Einrichtung des MPE ist von besonderer Bedeutung: Die 130 m lange Vakuumanlage Panter zum Test von Röntgenteleskopen in Neuried bei München. Fast alle röntgenastronomischen Experimente oder Teile davon wurden in dieser Anlage getestet. Unter anderem durch diese Einrichtung findet ein Transfer von neuen Verfahren und Methoden in die industrielle Anwendung statt. Im Rahmen unserer Transferaktivitäten hielt das MPE 12 Patente am Ende von 2022. Neben

der Forschung nimmt unser Institut auch universitäre Ausbildungsaufgaben wahr. Mehr als zehn MPE-Wissenschaftler sind als Hochschullehrer an zahlreichen Universitäten tätig und betreuen studentische Forschungsarbeiten, wie z.B. Bachelor-, Masterund Doktorarbeiten. Die Mehrzahl davon an den beiden Münchner Universitäten, aber auch an anderen deutschen Hochschulen und im Ausland. Darüber hinaus veranstalten wir spezielle Seminare und Symposien zu den im Institut behandelten Forschungsgebieten, häufig in Zusammenarbeit mit Universitätsinstituten. Unsere sehr erfolgreiche „International MaxPlanck Research School (IMPRS) 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 und die Europäische Südsternwarte beteiligt. Mit typisch 80 Doktoranden in diesem Programm, wovon etwa 30 am MPE arbeiten, gehört die IMPRS on Astrophysics zu den größten Einrichtungen dieser Art weltweit. Das MPE präsentiert seine Arbeit und die Ergebnisse seiner Forschung auch einem breiten Publikum. Regelmäßige Meldungen über die Wissenschaft, Projekte und Menschen am Institut werden ergänzt durch eine Vielzahl an Veranstaltungen sowohl im Hause als auch außerhalb, wie Führungen für Gruppen (meist Schulklassen), Teilnahme am jährlichen „Girls' Day“, dem zweijährig stattfindenden „Tag der offenen Tür“ sowie der Anleitung von Schüler und Hochschulpraktikanten. Darüber hinaus halten MPE Wissenschaftler regelmäßig populär-wissenschaftliche Vorträge außer Haus.

1 Personal und Ausstattung

1.1 Personalstand

Direktoren und Professoren:

Prof. Dr. P. Caselli (Geschäftsführung), Zentrum für Astrochemische Studien

Prof. Dr. K. Nandra, Hochenergie-Astrophysik

Prof. Dr. R. Bender, Optische und Interpretative Astronomie

Prof. Dr. R. Genzel, Infrarotund Submillimeter-Astronomie

Prof. Dr. G. Haerendel (emeritiert)

Prof. Dr. G. Morfill (emeritiert)

Prof. Dr. J. Trümper (emeritiert).

Selbstständige Nachwuchsgruppen:

Dr. S. Spezzano

Minerva Fast Track

Dr. E. Redaelli

Direktionsassistent:

Dr. D. Lutz

Pressesprecherin:

Dr. H. Hämmerle

Auswärtige wissenschaftliche Mitglieder

Prof. Dr. E. van Dishoeck, Leiden Observatory (Niederlande)

Prof. Dr. J. Kormendy, Univ. of Texas at Austin (USA)

Prof. Dr. R. Z. Sagdeev, Univ. of Maryland (USA)

Prof. Dr. M. Schmidt †, CALTECH, Pasadena (USA)

Dr. K. Schuster, IRAM, Grenoble (Frankreich)

Prof. Dr. A. Sternberg, Tel Aviv University (Israel)

Fachbeirat:

Prof. Dr. J. Bland-Hawthorn, University of Sydney, Sydney Institute of Astronomy (Australia)

Prof. Dr. C. Canizares, MIT, Kavli Institute, Cambridge (USA)

Prof. Dr. A. Celotti, SISSA, Trieste (Italien)

Prof. Dr. R. Davies, University of Oxford, Department of Physics (UK)

Prof. Dr. N. Evans, The University of Texas at Austin, Austin (USA)

Prof. Dr. A. Goodman, Harvard-Smithsonian Center for Astrophysics, Cambridge (USA)

Prof. Dr. K. Kuijken, Universiteit Leiden, Leiden (Niederlande)

Prof. Dr. E. Sadler, University of Sydney, Sydney (Australia)

Prof. Dr. R. Sari, The Hebrew University of Jerusalem, Jerusalem (Israel)

Prof. Dr. B. Wilkes, Chandra X-Ray Center, Cambridge (USA)

Fachübergreifende Fachbeiräte:

Prof. Dr. C. Cesarsky, Commissariat á l'Energie Atomique, France, Sacley-Paris (Frankreich)

Prof. Dr. J. Peacock, Universität Edinburg (UK)

Kuratorium (gemeinsam mit dem MPI für Astrophysik):

Prof. Dr. A. Bode, Leibniz-Rechenzentrum der Bayerischen Akademie der Wissenschaften, Garching

MdB Dr. A. Christmann, Deutscher Bundestag, Berlin

MdL A. Franke, Bayerischer Landtag, München

MdB F. Hahn, Deutscher Bundestag, Berlin

Prof. Dr. B. Huber, Präsident der Ludwig-Maximilians-Universität, München

Prof. Dr. A. Kaysser-Pyzalla, Vorstandsvorsitze Deutsches Zentrum für Luft und Raumfahrt (DLR), Köln

Prof. Dr. D. Kranzlmüller, Direktoriumsvorsitzender Leibniz-Rechenzentrum, Garching

Dr. F. Merkle, ehemaliges Vorstandsmitglied OHB System AG, Eching

Dr. U. von Rauchhaupt, Frankfurter Allgemeine Zeitung, Frankfurt/Main

Prof. R. Rodenstock, Rodenstock Geschäftsführungs GmbH, München

Dr. J. Rubner, Vice President Global Communication and Public Engagement, Technische Universität München, München

B. Spiegel, Geschäftsführung Klaus Tschira Stiftung gGmbH, Heidelberg

Dr. M. Weiß, Ressortleiterin Wissen, Süddeutsche Zeitung, München MDirig

Dr. M. Wolter, Abteilungsleiter Bayer. Staatsministerium für Wirtschaft, Energie und Technologie, München

Wissenschaftliche Auszeichnungen, Berufungen:

Förster Schreiber, N. M.: ERC Advanced Grant, 2021 competition, European Research Council, Brussels, Belgium, 04/2022.

Eisenhauer, F.: Foreign Associate to the Académie des Sciences, Académie des Sciences Paris, Paris, France, 06/2022.

van Dishoeck, E. F.: Fritz Zwicky Award, European Astronomical Society, Valencia, Spain, 06/2022.

Eisenhauer, F.: Michelson Investigator Achievement Award 2020 for the groundbreaking results of VLTI-GRAVITY, Lowell Observatory and Observatoire de la Cote d'Azur, Montreal, Canada, 07/2022.

Eisenhauer, F.: Jackson-Gwilt Medal of the Royal Astronomical Society for the development of astronomical instrumentation, Royal Astronomical Society, Warwick, United Kingdom, 07/2022.

Correa, C.M.: Carlos Varsavsky Prize - Best PhD Thesis in Astronomy of Argentina, Asociación Argentina de Astronomía, Buenos Aires, Argentina, 08/2022.

Eisenhauer, F.: Gruber Cosmology Prize for designing instruments that collected evidence for a black hole at the center of our galaxy, Gruber Foundation, Busan, Korea, 08/2022.

Eisenhauer, F.: Stern-Gerlach Medal of the German Physical Society for the pioneering work in high-resolution infrared astronomy, DPG, Regensburg, Germany, 09/2022.

Grassi, T.: Astrophysical Software Award, German Astronomical Society (AG), Bremen, Germany, 09/2022.

van Dishoeck, E. F.: Niels Bohr International Gold Medal, Copenhagen, Denmark, 10/2022.

Shimizu, T.: Reinhard Genzel Nobel Prize Fellowship, Munich, Germany, 12/2022.

Wissenschaftliche Mitarbeiter:

A) Infrarot und Submillimeter-Astronomie

Sekretariat: Richter, A.

Teamassistentinnen: Dengler, S.; Hagedorn, I. (bis 30.09.); Kleiser, A.; Simonis, E. (seit 01.12.); Zanker-Smith, J.

Biondi, Dr. F.; Bourdarot, Dr. G.; Cao, Dr. Y.; Coogan, Dr. R. (bis 28.02.); Dallilar, Dr. Y. (bis 15.09.); Davies, Dr. R.; Eisenhauer, Dr. F.; Feuchtgruber, Dipl.-Phys. H.; Förster Schreiber, Dr. N.; Gillessen, Dr. S.; Jolly, Dr. J.-B. (seit 01.04.); Kravchenko, Dr. K.; Liu, Dr. D.; Lutz, Dr. D.; More, N.; Ott, Dr. T.; Price, Dr. S. (bis 31.07.); Pulsoni, Dr. C. (seit 01.06.); Rabien, Dr. S.; Shangguan, Dr, J.; Shimizu, Dr. T.; Sturm, Dr. E.; Tacconi, Dr. L.; Widmann, Dr. F.; Yazici, S.

Doktoranden (D.) / Master (M.)

Barféty, C. (seit 01.09., D., Förster Schreiber); Bettoni, G. (bis 31.12., D., van Dishoeck); Bordoni, M.S. (seit 01.09., D., Genzel/ Gillessen); Drescher, A. (D., Eisenhauer); Lee, L. Y.-L., (D., Tacconi, Förster-Schreiber); Mang, F. (M., D. seit 01.12., Eisenhauer); Pastras, S. (seit 01.09., D., Genzel/Förster Schreiber); Ribeiro, D. (seit 01.09., D., Genzel/ Gillessen); Santos, D. (D., Shimizu)

B) Hochenergie-Astrophysik

Sekretariat: Boller, B.

Teamassistentin: Frankenhuizen, W.

Altmann, A.; Andritschke, Dr. R.; Antonelli, V.; Arcodia, R. (bis 31.12.); Becker, Dr. W.; Behrens, Dr. A.; Beitler, C.; Boller, Prof. Dr. Th.; Bonholzer, M. (bis 31.12.); Brunner, Dr. H.; Buchner, Dr. J.; Bulbul, Dr. E.; Burgess, Dr. M.J.; Burkert, Dr. W.; Burwitz, Dr. V.; Chitham, I. J. (bis 30.06.); Comparat, Dr., J.; Dennerl, Dr. K.; Eder, Dipl.-Ing. J.; Emberger, V.; Frank, J.; Freyberg, Dr. M.; Friedrich, Dr. P.; Friedrich, Dr. S.; Gaida, R.; Gatuzz, Dr. E. (seit 01.09.); Ghirardini, Dr. V.; Gueguen, Dr. A.; Greiner, Dr. J.; Haberl, Dr. F.; Hartner, Dipl. Math. G.; Haase, Dr. J.; Hauser, G.; Keil, Dr. I.; Kienlin von, Dr. A;

Liu, Dr. A.; Laas, Dr. J.; Liu, Dr. T.; Liu, Dr. Z.; Locatelli, N. ; Maitra, Dr. Ch.; Malyali, A.; Meidinger, Dr. N.; Mayr, A.; Merloni, Dr. A.; Müller, T.; Müller-Seidlitz, Dr. J.; Ni, Dr. Q. (seit 08.10.); Oser, J. (bis 31.03.); Osterhage, Dr. S.; Pfeffermann, Dipl.-Phys. E. (bis 30.9.); Pietschner, D.; Predehl, Dr. P.; Ramos Ceja, Dr. M.; Rau, Dr. A.; Reiffers, Dr. J.; Rukdee, Dr. S.; Salvato, Dr. M.; Sanders, Dr. J.; Schmidt, T.; Schweingruber, A.; Siegert, T. (seit 01.11.); Stieglitz, V.; Stanke, Dr. Th. (seit 01.08.); Stewart, Dr. I.; Thi, Dr. W.-F.; Trümper, Prof. Dr. J.; Zhang, Dr. X. (seit 1.9.)

Doktoranden (D.) / Master (M.)

Aydar, C. (seit 01.09., D., Merloni); Bacelj, A. (seit 01.10., D., Greiner); Bahar, E. (D., Bulbul); Biltzinger, B. (D., Greiner); Bock, K. (seit 01.12., M. Greiner); Bogensberger, D. (bis 30.06., D., Nandra); Camilloni, F. (D., Becker); Fresco, A. (D., Merloni); Gauger, I. (seit 01.09., D., Buchner); Grotova, I. (seit 25.07., D., A. Rau); Hecker, Y. (M., Greiner); Hecker, C. (seit 01.05., M, Greiner); Kaltenberger, D. (D., Haberl); Khrokriakova, A. (seit 25.07., D., Becker); Igo, Z. (D., Merloni); Kuhn, M. (M., Greiner); Lopez, N. (bis 30.09., M., Buchner); Mayer, M. (D., Becker); Roster, W. (seit 01.10., D., Salvato); Scheck, D. (bis 30.09., M., Sanders); Schmidt, L. (M., Greiner); Shreeram, S., (D., Bulbul); Seppi, R. (D., Comparat); Schösser, E. (bis 31.11., M., Greiner); Waddell, S. (D., Nandra, Boller); Willer, R. (D., Greiner); Wolf, J. (D., Salvato); Yeung, H.F., (D., Becker); Zhang, Y., (D, Ponti); Zheng, X. (D. Ponti)

C) Optische und Interpretative Astronomie

Sekretariat: Ingram, C.

Bodendorf, Dr. C.; Bohnet, Dipl. Phys. A.; Clarke, Dr. J. (seit 01.08.); Correa, Dr. C. (seit 07.09.); DeNicola, Dr. S. (seit 01.12.); Escartin, Dr. J.; Fabricius, Dr. M.; Farrow, Dr. M. (bis 31.12.); Gracia Carpio, Dr. J.; Grupp, Dr. F.; Haase, J.(seit 01.04.); Hou, Dr. J. (seit 01.06.); Hopp, Dr. U.; Kluge, Dr. M.; Kruk, Dr. S.; Lippich, Dr. M. (bis 31.03.), Paech, Dr. K.; Parikh, Dr. T.; Pezzotta, Dr. A.; Pulsoni, Dr. C. (bis 31.03.); Raison, Dr. F.; Saglia, PD. Dr. R.; Sanchez, Dr. A.; Snigula, Dr. J.; Steinwagner, Dr. J.; Subramanian, Dr. S.; Thomas, Dr. J.; Weller, Prof. Dr. J.; Wetzstein, Dr. M.; Wylie, Dr. S. (seit 01.08.)

Doktoranden (D.) / Master (M.)

Balzer, F. (D., Saglia); Bolze, R. (M., Bender); Blumhof, M. (M., Bender); Clarke (bis 31.07., D., Gerhard); DeNicola, S. (bis 30.11., D., Saglia); Esposito, M. (D., Saglia); Fiorilli, A. (seit 01.09., D., Saglia) Finkbeiner, L. (M., Fabricius); Gong, L. (D., Bender); Ding, H. (M., Fabricius); Koc, A. (M., Saglia); Krecker, K. (bis 30.04., D., Fabricius); Lipka, M. (D., Saglia); Luis, T. (D., Saglia); Merghan, K. (D., Bender); Neureither B. (D., Thomas); Pandey, A. (D., Gerhard); Seminaite, A. (D., Sanchez); Smolla, M. (D., Bender); Steuer, J. (D., Grupp); Thikonenko, I. (D., Saglia); Wessely, P. (M.; Fabricius); Wylie, S. (bis 31.07., D., Gerhard)

D) Zentrum für astrochemische Studien

Sekretariat: Langer, A.

Almeida Ribeiro, Dr. F. (seit 01.09.); Araki, Dr. M. (seit 01.04.); Bunn, Dr. H. (seit 11.07.); de Oliveira Alves, Dr. F. (bis 30.11.); Endres, Dr. Ch.; Giuliano, Dr. B.M.; Gong, Dr. M.; Hsieh, Dr. T.-H.; Ivlev, Dr. A.; Jensen, Dr. S.; Jiménez Redondo, Dr. M.; Jusko, Dr. P.; Küffmeier, Dr. M.; Lattanzi, Dr. V.; Lin, Dr. Y.; Maureira Pinochet, Dr. M.J.; Nolan, Dr. Ch. (bis 31.05.); Pineda Fornerod, Dr. J.; Redaelli, Dr. E.; Schmiedeke Dr. A. (bis 10.04.); Silsbee, Dr. K. (bis 20.11.); Sipilä, Dr. O.; Spezzano, Dr. S.

Doktoranden (D.) / Master (M.)

Alberton, D. (D., Caselli); Choudhury, S. (bis 18.10., D., Caselli, Pineda Fornerod); Ferrada Chamorro, S., (seit 04.08., D., Caselli); Ferrer Asensio, J., (D., Caselli, Spezzano); Giers, K. (D., Caselli, Spezzano); Kakkenpara Suresh, S. (seit 20.05., D., Caselli); Kruczkiewicz, F. (bis 31.12., D., Caselli); Müller, B. (bis 31.03., D., Caselli, Giuliano); Obolentseva, M. (seit 22.06., D., Caselli, Ivlev); Riedel, W. (D., Caselli, Redaelli); Tabatabaei Mazraeh No,

F.S. (D., Caselli, Redaelli); Valdivia Mena, M. T. (D., Caselli, Pineda Fornerod); Zamponi Fuentealba, J. (D., Caselli, Maureira Pinochet)

E) Unabhängige Forschungsgruppen

E1) Forschungsgruppe Gerhard

Gerhard, Dr. O.

PhD Student: Pandey, A.

E2 Forschungsgruppe van Dishoeck

van Dishoeck, Prof. Dr. E.; Hu, Dr. C.-Y. (bis 01.09.); Grant, Dr. S.

PhD Student: Bettoni, G.

F) Ingenieurbereich und Werkstätten

F1) Elektronische Entwicklung

Albrecht, Dipl.-Ing. S. (Leitung)

Barl, Dipl.-Ing. (FH) L.; Bechteler, Dr. T.; Bornemann, Dipl.Ing. (FH) W.; Burghardt, Dipl.-Ing. (FH) T.; Dickfeld, M.Sc. (FH) F. (seit 01.08); Hälker, Dipl.-Ing. (FH) O.; Hans, O.; Hartmann, K.; Jilg, Dipl.-Ing. (FH) T. (seit 15.11.); Jung, M.Sc. F.; Kink, Dipl.-Ing. (FH) W.; Kshirsagar, M.Sc. T.; Mandla, M.Sc C.; Müller, Dipl.-Ing. (FH) S.; Neumeier, M.Sc. L.; Rau, M.Sc. C.; Reiffers, Dipl.-Ing. (FH) J.; Uysal, M.Sc. S.; Yaroshenko, V.; Zanker-Smith, J.; Ziegleder, Dipl.-Ing. (FH) J.

F2) Elektronische Werkstatt und Haustechnik

Oberauer, F. (Leitung)

Bachhuber, M.; Berger A.; Cibooglu, H.; Emslander, A. (bis 09.09.); Greßmann, R.; Kreibich, I.; Langer, P.; Özdemir, H.; Rupprecht, T. (bis 31.05.) Schneider R.

F3) Mechanik und Testlabor

Schubert, Dr. J. (bis 31.05.); Lang, Dipl-Phys. F. (Leitung) (seit 01.05.)

Antonelli, Dr.-Ing. V.; Beitler, M. Eng. C. (bis 31.05.); Deysenroth, C.; Deysenroth, M.; Dittrich, Dipl.- Ing. (FH) K.; Emslander, B. Eng. A.; Geis, Dr. N.; Gemperlein, Dipl.-Phys. H. (bis 30.06.); Hartl, Dr. M.; Haußmann, F.; Hörmann, M.Sc. V. (bis 31.03.); Huber, Dipl.-Ing. H.; Mican, Dipl.-Ing. B.; Möller, M. Eng. J.-P.; Paßlack, Dipl.-Ing. (FH) S.; Pflüger, Dipl.-Ing. (FH) A.; Pietschner, Dipl.-Ing. (FH) D.; Rohe, C.; Sönmez, M. Sc. A. (seit 01.07.); Strecker, R.; Frank, M.Sc. J. (seit 15.10.); Senol Dipl.-Phy. Y. (seit 01.07.)

F4) Mechanische Werkstatt

Czempiel, S. (Leitung)

Bayer, R.; Bergner, K.; Brara, A.; Budau, B. (bis 31.12.); Eibl, J.; Feldmeier, P.; Folek L.; Furchtsam, C.; Goldbrunner, A.; Hartwig, J.; Heckmair, S. (seit 16.2.); Honsberg, M.; Huber, D.; Huber, F.-X. (bis 31.07.); Kestler, H.-J.; Knapp, S.; Loichinger, L. (seit 16.2.); Sandmair, R.; Schunn, W.; Schuppe, D.; Soller, F.; Waldhör, F.

Auszubildende: Beck, A.; Fokken M. (seit 01.09.); Furchtsam, S.; Heckmair, S. (bis 15.02.); Lindenmüller, C.; Loichinger, L. (bis 15.02.) Schaefer, T.; Stadler, B.; Stübing, M.; Weber, G. (seit 01.09.)

G) Zentrale Bereiche

G1) Zentrale IT-Gruppe

Bohnet, Dipl. Phys. A. (Leitung)

Agudo Berbel, A.; Baumgartner, H.; Grassi, Dr. T.; Kleiser, A.; Klose, L.; Kollmer, C.; Oberauer, A.; Ott, Dr. T.; Piemonte, A.; Elsner, C.; Snigula, Dr. J.; Wieprecht, Dipl.-Ing. E.; Wiezorrek, Dipl.-Ing. (FH) E.

G2) Öffentlichkeitsarbeit

Hämmerle, Dr. H.; (Leitung)

Herrmann, T.; Niebisch, B.

G3) Bibliothek

Bartels, C. (Leitung)

Blank, E., Bolicevic, M.

G4) Verwaltung

Fischhaber, P. (seit 01.03.) (Leitung VAD); Wanger, H. (bis 31.05.)

Sekretariat: Hesseler, G.

Arturo, A.; Ayari, S.; Bauer, T.; Cziasto, U.; Eder, A. (bis 31.07.); Eicher, C.; Faust, T.; Gareva, L.; Goldbrunner, S.; Grohmann, M.; Hartung, I.; Hausmann, S.; Hidasi, R.; Jäkel, T.; Jirsch, Y.; Kaps, S.; Keil, M.; Kestler, L.; Krapivina, A.; Kuhwald, E.; Maier, E.; Mandl, E.; Nagy, A.; Neun, A. (BR); Paschou, J.; Preisler, C.; Rosenberger, S.; Sacher, A.; Schmidt, A.; Schwaiger, S.; Seyfarth, B.; Stock, C.; Stöckl, D.; Stricker, C.; Studier, S.; Thiess, F.; Thiess, L.; Üblacker, K. (bis 31.10.); Zubanova, E.

G5) IMPRS

Hilbert, A.

2 Lehrtätigkeit, Prüfungen und Gremientätigkeit

2.1 Lehrveranstaltungen/Seminare

Boller, T.: AGN Physics. Goethe-Universität, Frankfurt am Main, WS 22/23.

Boller, T.: Dynamik des Planetensystems. Goethe-Universität, Frankfurt am Main, SS 22.

Boller, T.: Radiation and Matter. Goethe-Universität, Frankfurt am Main, SS 22.

Caselli, P.: Introduction to Astrochemistry. Chalmers University of Technology, Gothenburg, Sweden, online lecture May 2022.

Caselli, P.: Astrochemistry 101: from atoms to seeds of life. (Heidelberg Summer School), Heidelberg University (Heidelberg, Germany), SS 22.

Caselli, P.: Astrochemistry 101: Molecules as diagnostics of stars and planet formation. (Heidelberg Summer School), Heidelberg University (Heidelberg, Germany), SS 22.

Caselli, P.: From atoms to seeds of life: the astrochemical journey. (Blaauw Lecture), University of Groningen (Groningen, The Netherlands), SS 22.

Caselli, P.: Dense Core Chemistry. (Astrochemistry Summer School), Pontificia Universidad Católica de Chile (Santiago, Chile), SS 22.

Caselli, P.: Protostellar disk chemistry. (Astrochemical Summer School), Pontificia Universidad Católica de Chile (Santiago, Chile), SS 22.

Caselli, P.: Planet formation and chemistry. (Astrochemistry Summer School), Pontificia Universidad Católica de Chile (Santiago, Chile), SS 22.

Eisenhauer, F.: High Angular Resolution Astronomy: Telescopes, Adaptive Optics, Interferometry, and more. Technische Universität München, SS 22.

Eisenhauer, F.: Introduction to Astrophysics. Technische Universität München, WS 22/23.

Gillessen, S.: The Black Hole in the Galactic Center. Bad Honnef Physics School (Bad Honnef, Germany) WS 22/23.

Lattanzi, V.: Molecular Spectroscopy for Astrochemistry: Part 1 - Context and Theory.

Universidad Autónoma de Chile (Santiago, Chile), November 2022.

Lattanzi, V.: Molecular Spectroscopy for Astrochemistry: Part 2 - From Theory to Lab to Space, Universidad Autónoma de Chile (Santiago, Chile), November 2022.

Salvato, M.: The problem of identification and characterisation of Xray sources in AGN evolutionary studies. Universidad Andres Bello in Chile (Santiago, Chile), WS 22/23.

Salvato, M.: eROSITA insights on the hot and energetic Universe. Observatorio National Rio de Janeiro (Rio de Janeiro, Brazil), Special Courses Cycle 2022.

2.2 Organisation von wissenschaftlichen Seminaren / Konferenzen

Users Meeting of Cavity Spectroscopy. zoom, 15.12.2022, Organisation: M. Araki, K. Tsukiyama, T. Oyama, K. Suma.

Galaxy Clusters 2022: Challenging Our Cosmological Perspectives. Baltimore, 25-29 April 2022, Organisation: E. Bulbul, M. Donahue, Y.-T. Lin, T. Marriage, M. Montes, P. Natarajan, M. Ntampaka, M. Postman.

Multi-phase, Multi-temperature and Complex: how AGN feedback shapes the nature of the circum-galactic and halo gas in galaxy groups. Garching, December 6-9, 2022, Organisation: P. Popesso (chair), V. Mainieri, M. Brusa, C. Peroux, A. Concas, E. Bulbul, A. Merloni, J. Comparat, D. Nelson, K. Dolag, P. Tozzi, S. Ettori, S. Borgani, P. Rosati, A. Liu, V. Ghirardini.

Friends of Friends Meeting. Córdoba / Argentina, 18.04. - 22.04.2022, Organisation: V. Bertazzi, R. Pignata, V. Cristiani, L. Ferrero, F. Stasyszyn, E. Díaz-Giménez, V. Daza, S. Gurovich, A. Rodríguez, D. Mast, C. Correa.

The Epoch of Galaxy Quenching. Cambridge, United Kingdom, 05.09. - 09.09.2022, Organisation: D. Sijacki, F. D'Eugenio, A. Bluck, M. Cappellari, A. Concas, E. CurLehrveranstaltungen, Seminare, Konferenzen 11 tis-Lake, S. Eales, S. Ellison, N. M. Förster Schreiber, J. Hlavacek-Larrondo, R. Maiolino, Y. Peng, A. Pillepich, J. Schaye, J. Scholtz.

Alvio@80 – Of Stars and Galaxies: Open Routes and Future Horizons Charted by a Curious Venetian Explorer. Chania, Crete, Greece, 09.09. - 10.09.2022, Organisation: M. Giavalisco, N. Arimoto, T. Brown, V. Charmandaris, A. Cimatti, E. Daddi, E. d'Onghia, N. M. Förster Schreiber, L. Hunt, T. Kodama, G. Magdis, C. Maraston, S. Mei, B. Poggianti, R. M. Rich, G. Rodighiero, J. Silverman, M. Zoccali.

In Situ View of Galaxy Formation 2. Ringberg, Germany, 25.07. - 29.07.2022, Organisation: N. M. Förster Schreiber, L. J. Tacconi, R. Genzel, D. Lutz, J. Bland-Hawthorn, R. Bouwens, F. Combes, T. de Zeeuw, T. Kodama, T. Naab, A. Renzini, A. Shapley, A. M. Swinbank, T. Treu.

Multi-phase, Multi-temperature and Complex: how AGN feedback shapes the nature of the circum-galactic and halo gas in galaxy groups. ESO, Garching, Germany, 7.129.12, Organisation: P. Popesso (chair), V. Mainieri, M. Brusa, C. Peroux, A. Concas, E. Bulbul, J. Comparat, D. Nelson, K. Dolag, P. Tozzi, S. Ettori, S. Borgani, P. Rosati, A. Liu, V. Ghirardini.

European Planetary Science Congress 2022: Small bodies from the active Main Belt to the Oort cloud and beyond. Granada, Spain, 18.09. - 23.09.2022, Organisation: J.-B. Vincent, T. Müller, X. Shi.

The Dynamic and Chemical Connection. Leiden, 04.07. - 08.07.2022, Organisation: Ch. Rab, Ch. Ginski, C. Hall, T. Grassi, J. Ilee.

EAS2022 - Symposium S5: Towards the next generation of X-ray surveys with Athena. Valencia, Spain, 30/06 - 01/07/2022, Organisation: A. Comastri, S. Ettori (coChair), M. Guainazzi (co-Chair), A. Hornschemeier, L. Lovisari (co-Chair), S. Martínez-Núñez, K. Nandra, L. Piro, E. Pointecouteau, A. Rau (Co-Chair), M. Salvato, T. Reiprich, M. Sasaki.

Observing the Universe in Motion: 5 Years of GRAVITY. Schloss Ringberg, Germany, 23.10. - 29.10.2022, Organisation: P. Caselli, V. Cardoso, F. Eisenhauer (co-chair), S. Hönig, L. Kreidberg, A. Lagrange, D. Lutz (co-chair), J. Monnier, G. Perrin, K. Perraut, T. Shimizu (co-chair), J. Woillez.

LyX Day (MPA). MPA, 05.10.2022, Organisation: E. Komatsu, F. Arrigoni Battaia, B. Ciardi, M. Gronke, M. Fabricius, C. Peroux, M. Walther.

OPINAS seminar (weekly seminar). MPE, 26.09.2022 - 12.12.2022, Organisation: A. Pezzotta, S. Kruk.

Multi-line Diagnostics of the Interstellar Medium. Nice, France, 04.04 - 06.04.2022, Organisation: C. Ceccarelli, J. Cernicharo, S. García-Burillo, M. Gérin, S. Guilloteau, F. Le Petit, R. Neri, N. Sakai, E. Schinnerer, K. Schuster, L. Tacconi, A. Weiss.

Galaxy evolution with the ESA Euclid mission and ESO telescopes. European Space Astronomy Centre (ESAC), Villanueva de la Cañada near Madrid, Spain, 24.10. - 27.10.2022, Organisation: J.-G. Cuby (co-chair), K. Kuijken (co-chair), C. Scarlata (co-chair), S. Toft (cochair), B. Altieri, R. Bowler, J. Brinchmann, K. Caputi, J.-C. Cuillandre, C. Conselice, C. De Breuck, P. Ferruit, G. Guzzo, R. Ivison, L. Koopmans, R. Laureijs, V. Mainieri, R. Pello, L. Tacconi.

A Holistic View of Stellar Feedback and Galaxy Evolution. Ascona, Switzerland, 11.07. - 15.07.2022, Organisation: A. McLeod (chair), D. Kruijssen, M. Krumholz, L. Tacconi.

Ringberg Colloquium in Honor of Reinhard Genzel's 70th Birthday. Schloss Ringberg, Germany, 26.06 - 02.07.2022, Organisation: L. Tacconi, F. Eiseinhauer, N. Foerster Schreiber, D. Lutz, E. Sturm.

In Situ View of Galaxy Formation 2. Schloss RIngberg, Germany, 24.07. - 29.07.2022, Organisation: N. M. Förster Schreiber (co-chair), L. J. Tacconi (co-chair), R. Genzel, D. Lutz, J. Bland-Hawthorn, R. Bouwens, F. Combes, T. de Zeeuw, T. Kodama, T. Naab, A. Renzini, A. Shapley, M. Swinbank, T. Treu.

44th COSPAR Scientific Assembly, COSPAR-22-F3.1, Chemical Complexity of Molecular Universe. Athens, Greece, 16.07-24.07.2022, Organisation: L. Bizzocchi, P. Caselli, A. Das, N. Mason, C. Puzzarini, V.M. Rivilla, T. Shimonishi, B. Sivaraman.

44th COSPAR Scientific Assembly, COSPAR-22-B1.3, Astrochemistry and Composition as Adriane's Threads for Planet Formation. Athens, Greece, 16.07-24.07.2022, Organisation: P. Caselli, M. Drozdovskaya, S. L. Ivanovski, D. Stamatellos, N. Turner, D. Turrini, S. Werner, K. Zhang.

EPoS 2022 - The Early Phases of Star Formation - Insights from Dynamics. Ringberg, Germany, 24.04-29.04.2022, Organisation: A. Bacmann, P. Caselli, J. Di Francesco, R. Friesen, A. Hacar, Th. Henning, J. Kainulainen, S.-P. Lai, S. Offner, P. Schilke, J. Steinacker, A. Sternberg.

EAS2022 - European Astronomical Society Annual Meeting. Valencia, Spain, 27.06- 01.07. 2022, Organisation: N. Aghanim, J. Brinchmann, P. Caselli, F. Figueras, J. Fynbo, D. Gabuzda, J.C. Guirado, L. Kaper, E. Khomenko, J. Knapen, Á. Labiano, L. Lara, S. Lucatello, G. Mellema, G. Meynet, D.F. Mota, B. Namumba, H. Rauer, N. Rea, J. Read, A. Różańska, J. Schaye, R. Szabo.

The astrochemical heritage: from molecular clouds to planetary surfaces. Valencia, Spain, 30.06-01.07.2022, Organisation: A. Belloche, P. Caselli, C. Puzzarini, V.M. Rivilla, S. Viti, C. Walsh.

GRAVITY - Observing the Universe in Motion: 5 Years of GRAVITY. Ringberg, Germany, 23.10-28.10.2022, Organisation: V. Cardoso, P. Caselli, F. Eisenhauer, S. Hoenig, L. Kreidberg, A.-M. Lagrange, D. Lutz, J. Monnier, K. Perraut, G. Perrin, T. Shimizu, J. Woillez.

Cosmic Rays: the salt of the star formation recipe. Florence, Italy, 08.11-10.11.2022, Or-

ganisation: P. Caselli, A. Marcowith, M. Padovani, M.E. Palumbo, V. Rivilla.

3 Akademische Abschlussarbeiten

3.1 Bachelorarbeiten

Abgeschlossen:

Becher, D.: The formation and evolution of early-type galaxies - Age determination of early-type galaxies as a function of redshift. LMU, 2022.

Huber, M.: Evolution of Early-Type galaxies - The Fundamental Plane. LMU, 2022.

Rijal, S.: The radius gap - Why there are (almost) no planets with radii between 1.5-2 earth radii. LMU, 2022.

Sabovic, A.: Measurement of spin-orbit alignments with the help of planetary transits. LMU, 2022.

Stanka, S.: Transit time variations - A powerful method for the determination and characterization of exoplanet systems and their properties. LMU, 2022.

Thurner, S.: Evolution of spiral galaxies - The Tully-Fisher relation. LMU, 2022.

3.2 Masterarbeiten

Abgeschlossen:

Almanstoetter, P.: Investigation of the dark matter distribution in barred Milky Way-like galaxies in the Illustris TNG50 simulation. Univ. Augsburg, 2022.

Balzer, F.: Quasar selection for 4Hi-Q using photometric redshifts. University Hamburg, 2022.

Baron Perez, Nicolas: Mass Prediction of eROSITA Galaxy Clusters Using Machine Learning. MPE, LMU, 2022.

Gonzales, Justo: Stacking the Spectra of eROSITA Galaxy Cluster Data for Searches of the 3.5keV line: Dark Matter Decay or Charge Exchange?. MPE, LMU, 2022.

Grünwald, G.: Spectral Analysis of Narrow-Line Seyfert 1 Galaxies in the First eROSITA All-Sky Survey Scan. MPE, 2022.

Jouili, A.: Dark matter in dwarf elliptical galaxies. TU, 2022.

Lopez, N.: Robust Estimation of Host Stellar Masses for Active Galactic Nuclei. MPE, 2022.

Makarov, S.: Finding Superclusters in the eRASS1. MPE, LMU, 2022.

Mang, M: Interferometrische Bildgebung und Mosaik des Galaktischen Zentrums mit GRAVITY / Interferometric Imaging and Mosaicing of the Galactic Center with GRAVITY. Max-Planck-Institut für extraterrestrische Physik, 2022.

Shankar, S.: Photometric redshift estimation for AGN detected by eROSITA. Tüebingen University, 2022.

3.3 Dissertationen

Abgeschlossen:

Choudhury, S.: Structure and dynamics of low-mass starforming cores. Ludwig Maximilian University, 2022.

Fahrenschon, V.: Stabilization of a high-resolution spectrograph and performance verification by measurements of the Rossiter-McLaughlin effect. LMU, 2022.

Müller, B.: Infrared spectroscopy of water-bearing interstellar ice analogues - from mole-

cular oxygen to the structure of ice mantles. Ludwig Maximilian University of Munich, 2022.

de Nicola, S.: Intrinsic shapes of massive elliptical galaxies. MPE/LMU, 2022.

4 Veröffentlichungen

4.1 In referierten Zeitschriften

Abbott T., M. Aguena, A. Alarcon, [...] T. Varga, [...], DES Collaboration: Dark Energy Survey Year 3 results: Cosmological constraints from galaxy clustering and weak lensing. Physical Review D 105, 2 (2022).

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4.3 Bücher / Beiträge in Büchern

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Dennerl, K.: Comets, Mars and Venus. In Book: Handbook of X-ray and Gamma-ray Astrophysics. (Eds.) C. Bambi, A. Santangelo, Springer Nature Singapore, Singapore (2022).

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Siegert, T., D. Horan, and G. Kanbach: Telescope concepts in gamma-ray astronomy. In Book: Handbook of X-ray and Gamma-ray Astrophysics. (Eds.) C. Bambi, A. Santangelo, Springer Nature Singapore, Singapore (2022).

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4.4 Artikel in der Öffentlichkeitsarbeit

Gillessen, S.: Gedanken jenseits der Physik. Rezension des Buches „Der Flug der Stare“ von Giorgio Parisi, Spektrum der Wissenschaft vom 28.09.2022.

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Gillessen, S.: Keine Einführung in die Gammaastronomie. Rezension des Buches „Rätselhafte Himmelsobjekte“ von Wilfried Domainko, Spektrum der Wissenschaft vom 8.12.2022.

5 Projekt-Gruppen

5.1 Infrarot- und Submillimeter-Astronomie

Stellvertreter des Gruppendirektors: Lutz, Tacconi.

ERIS: Dallilar, R. Davies, Dengler, M. Deysenroth, Eisenhauer, Feuchtgruber, Gemperlein, Hans, Hartl, Hartwig, D. Huber, Kleiser, Kravchenko, Pflüger, C. Rau, Sturm, Wiezorrek.

GRAVITY, GRAVITY+: Bourdarot, de Zeeuw, Dengler, Drescher, Eisenhauer, Feuchtgruber, Genzel, Gillessen, Hartl, Haußmann, Lutz, Mang, More, T. Ott, Pflüger, C. Rau, Ribeiro, Sadun Bordoni, Santos, Schubert, Shangguan, Shimizu, Sturm, Tacconi, Uysal, Widmann, Wieprecht, Wiezorrek, Yazici, ZankerSmith.

LBT Argos: Barl, R.Davies, M. Deysenroth, Gemperlein, Rabien, Zanker-Smith, Ziegleder.

MICADO: Barl, Biondi, Cao, R. Davies, Dengler, M. Deysenroth, J. Eder, Eisenhauer, A. Emslander, Förster Schreiber, Geis, Gemperlein, Genzel, Gillessen, Hartl, Haußmann, H. Huber, Jilg, Kleiser, Kravchenko, Lang, Neumeier, Pflüger, Rabien, Sönmez, Sturm, Ziegleder.

Galaktisches Zentrum: Bourdarot, Dallilar, Drescher, Eisenhauer, Genzel, Gillessen, Mang, T. Ott, Ribeiro, Sadun Bordoni, Widmann, de Zeeuw.

Galaxienkerne: Cao, R. Davies, Genzel, Lutz, Shangguan, Santos, Shimizu, Sturm, Tacconi, de Zeeuw.

Galaxien bei hoher Rotverschiebung: Barféty, Cao, Coogan, Förster Schreiber, Genzel, Jolly, L. Lee, D. Liu, Lutz, Pastras, Pulsoni, Price, Sturm, Tacconi

Sternentstehung: Bettoni, Grant, Hu, van Dishoeck.

5.2 Hochenergie-Astrophysik

ATHENA/Spiegel: Budau, Burwitz, Hartner, Langmeier, Müller, Passlack, Rukdee, Schmidt.

ATHENA/WFI: Albrecht, Andritschke, Antonelli, Bechteler, Behrens, Bonholzer, Bornemann, Eder, Emberger, Frank, Freyberg, Haberl, Hälker, Hartmann, Hauser, Kink, Lederhuber, Meidinger, Mican, Möller, Müller-Seidlitz, Nandra, Pietschner, A. Rau, Reiffers, Schubert, Strecker, v. Kienlin, Pflüger.

Chandra: Burwitz, Predehl.

Einstein Probe/Detektor: Keil, Meidinger, Nandra.

Einstein Probe/Spiegel: Budau, Burwitz, Eder, Friedrich, Gaida, Hartmann, Hartner, Langmeier, Z. Liu, Müller, Passlack, Pfeffermann, Rohe, Rukdee, Schmidt, Schuppe, Stieglitz.

eROSITA: Andritschke, Becker, Boller, Bornemann,, Brunner, Budau, Burghardt, Bulbul, Burwitz, Coutinho, Dennerl, Dittrich, Eder, Eibl, Emberger, Freyberg, P. Friedrich, S. Friedrich, Gaida, Goldbrunner, Gueguen, Haberl, Hälker, Hartmann, Hartner, F. Huber, Kink, Maitra, Meidinger, Merloni, Mican, S. Müller, Nandra, Ni, F. Oberauer, Pfeffermann, Pietschner, Predehl, Ramos-Ceja, Rau, Reiffers, Rohé, Salvato, Schuppe, Soller, Stewart, Trümper, v. Kienlin.

ROSAT: Boller, Freyberg, Haberl, Trümper.

Swift: Greiner.

XMM-Newton: Boller, Dennerl, Freyberg, Haberl, Meidinger, Trümper.

Fermi: Collmar, Diehl, Greiner, v. Kienlin.

GROND: A. Rau.

INTEGRAL: Diehl, Greiner, v. Kienlin.

MXT-SVOM: Budau, Burwitz, Hartner, Langmaier, Müller, Passlack, Meidinger, Nandra, Rukdee, Schmidt, A. Rau.

eXTP: Altmann, Bechteler, Meidinger, Nandra.

4MOST: Comparat, Laas, Merloni, Salvato, Thi.

Aktive Galaxien: Boller, Buchner, Collmar, Comparat, T. Liu, Merloni, Nandra, Salvato.

Clusters of Galaxies: Artis, Buchner, Bulbul, Comparat, Garrell, Gatuzz, Ghiradini, Kluge, A. Liu, Locatelli, Ramos-Ceja, Sanders.

eBOSS/SPIDERS: Comparat, Merloni, Nandra, Salvato.

5.3 Optische und Interpretative Astronomie

Large Scale Structure, eBoss, HETDEX: Bender, Correa, Farrow, Fabricius, Hopp, Pezzotta, Sanchez.

EUCLID: Bender, Bodendorf, Escartin, Fabricius, Garcia Carpio, Grupp, Kruk, Hartung, Raison, Saglia, Sanchez, Steinwagner, Wetzstein.

Galaxy Dynamics: Bender, Gerhard, Parikh, Saglia, Thomas.

INODE: Bender, Fabricius, Subramanian

GRAVITY+: Bender, Fabricius.

KMOS: Bender, Saglia.

MICADO: Bender, Fabricius, Grupp, Saglia, Thomas.

Prime Focus Spectropraph: Bender, Fabricius, Garcia Carpio, Sanchez.

Stellare Populationen und Galaxienentstehung: Bender, Hopp, Parikh, Saglia.

5.4 Zentrum für astrochemische Studien

Beobachtungen: De Oliveira Alves, Hsieh, Jensen, Lin, Maureira Pinochet, Pineda Fornerod, Redaelli, Schmiedeke, Segura-Cox, Spezzano.

Theorie: Gong, Grassi, Ivlev, Küffmeier, Nolan, Rab, Silsbee, Sipilä.

Labor: Dickfeld, Endres, Giuliano, Hans, Jiménez Redondo, Jusko, Kshirsagar, Lattanzi, Spezzano.

6 Projekte und Kooperationen

6.1 Wissenschaftliche Kooperationen

Belgien

Katholieke Universiteit Leuven, Leuven: GRAVITY+.

Department of Physics and Astronomy, Ghent University: EUCLID.

Brasilien

Instituto Federal de Educação, Ciência e Tecnologia do Rio de Janeiro, Nilópolis, Brazil: CAS-Laboratory.

IAG/Universidade de Sao Paulo: PFS.

Laboratório Nacional de Astrofísica: PFS.

Universidade Federal de Minas Gerais, Belo Horizonte: CAS-Observations.

Chile

ESO, Joint ALMA Observatory, Santiago de Chile: CASObservations; SBNAF.

NAQAF, Nucleo de astroquimica y astrofisica, Universidad Autónoma de Chile: CAS-Laboratory.

Universidad de Chile, Santiago de Chile: CAS-Observations.

Universidad de Concepcion: Max-Planck-Partnergruppe Baryonischer Zyklus in Galaxien; Röntgen-Doppelsternsysteme; CAS-Observations; Galaxienentwicklung.

Universidad Catolica Santiago, Santiago de Chile: Röntgen-Doppelsternsysteme; Max-Planck-Partnergruppe Galaktisches Zentrum.

Universidad Diego Portales, Santiago de Chile: CASObservations.

China

Donghua University, Shanghai: CAS-Theory.

Institute for High-Energy Physics (IHEP), Peking: Gammaquellen mit COMPTEL und INTEGRAL; Einstein Probe; eXTP.

Nanjing University, Nanjing: CAS-Observations.

National Astronomical Observatories of China, Peking: PFS; CAS-Observations, CAS-Theory.

Kavli Institute for Astronomy and Astrophysics at Peking University, Peking: PFS.

Shanghai Jiao Tong University, Shanghai: PFS. The University of Science and Technology of China, PFS. Tsinghua University, Peking: PFS. University of Hongkong, Hongkong: Strahlungsmechanismen von Pulsaren im Röntgen- und Gammabereich. University of Science and Technology of China, Hefei: PFS. Xiamen University, Xiamen: PFS. Xinji-

ang Astronomical Observatory, Ürümqi: CAS-Theory:

Dänemark

Dänemarks Technische Universität, Lyngby: ATHENA.

Niels Bohr Institute, University of Copenhagen: CAS-Theory.

DTU Space, Space Institute, Technical University of Denmark: EUCLID.

Deutschland

Astrophysikalisches Institut Potsdam, Potsdam: eROSITA; XMMNewton; OPTIMA; ARGOS; HETDEX; 4MOST.

Deutsches Elektronen-Synchrotron, Hamburg: CAS-Laboratory.

European Southern Observatory (ESO), Garching: GRAVITY; GRAVITY+; Galaxienentstehung; Nukleare Astrophysik; MICADO; ERIS; Black Hole Cam; Infrared Dark Clouds; CAS-Observations; CAS-Theory.

Fraunhofer Institut für Integrierte Schaltungen, Erlangen: Mikroelektronikentwicklungen; ATHENA.

Fraunhofer Institut for Computer Graphics Research IGD, Darmstadt: IODE.

Heinrich-Heine-Universität, Düsseldorf: Soft Matter Physics.

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

Institut für Astrophysik Göttingen, Göttingen: MICADO.

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

Institut für Materialphysik im Weltraum, Köln: Glasübergänge.

Landessternwarte Heidelberg-Königstuhl, Heidelberg: Galaxienentstehung; ARGOS.

Laser Zentrum Hannover, Hannover: Dichroics for ARGOS.

Ludwig-Maximilians-Universität, München: MICADO; HETDEX; eROSITA; CAS-Theory.

Max-Planck-Institut für Astronomie, Heidelberg: GRAVITY; GRAVITY+; SDSS; ARGOS; MICADO; EUCLID; CASTheory.

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

Max-Planck-Institut für Gravitationsphysik, Potsdam: Black Hole Cam.

Max-Planck-Institut für Physik, Werner Heisenberg Institut, München: MPG Halbleiterlabor; ATHENA.

Max-Planck-Institut für Radioastronomie, Bonn: ARGOS; Black Hole Cam; CAS-Observations; CAS-Theory.

Physikalisch-Technische Bundesanstalt Berlin, Berlin: eROSITA.

Technische Universität Berlin, Berlin: Interstellares Medium.

Technische Universität Darmstadt, Darmstadt: CAST.

Technische Universität München, München: Nukleare Astrophysik; ESBO-DS.

Thüringer Landessternwarte Tautenburg, Tautenburg: GROND; Gamma-Ray Bursts.

Universität Bonn, Bonn: ATHENA; eROSITA; EUCLID; CASObservations.

Universität der Bundeswehr, München: SBNAF.

Universität Düsseldorf, Düsseldorf: ERC Advanced Grant; CAS-Theory.

Universität Erlangen (ECAP), Erlangen: eROSITA; ATHENA.

Universität Hamburg, Hamburg: eROSITA; OPTIMA (Flarestars).

Universität Heidelberg, Heidelberg: ATHENA; XFEL; CASTheory.

Universität Jena, Jena: Isolierte Neutronensterne; Nukleare Astrophysik.

Universität Kassel, Kassel: CAS-Observations, CAS-Laboratory.

Universität Köln, Köln: Galaktisches Zentrum; GRAVITY; GRAVITY+; CAS-Observations; CAS-Theory; CAS-Laboratory.

Universität Mannheim, Mannheim: ATHENA; XFEL.

Universität Stuttgart, Stuttgart: ESBO-DS.

Universität Würzburg, Würzburg: AGADE.

Finnland

University of Helsinki, Helsinki: CAS-Theory; CAS-Observations.

University of Turku - Finnish Centre for Astronomy with ESO (FINCA), Turku: MICADO.

University of Helsinki, Department of Physics: EUCLID.

Frankreich

Aix-Marseille University, Marseille: CAS-Theory.

CEA, Saclay: INTEGRAL-Spektrometer SPI; EUCLID; SVOM; ATHENA.

Centre d'Etude Spatiale des Rayonnements (UPS), Toulouse: INTEGRAL-Spektrometer SPI; CAS-Observations.

Centre National de la Recherche Scientifique, Paris: INODE.

European Space Agency (ESA), Paris: EUCLID IAP, Paris: Nukleare Astrophysik.

Institut d'Astrophysique de Paris: EUCLID.

IPAG, Grenoble: GRAVITY; GRAVITY+; MICADO; CAS-Observations; CAS-Theory.

IRAM, Grenoble: CAS-Observations.

IRAM, Saint-Martin-d'Héres: CAS-Observations; Galaxienentstehung.

Laboratoire d'Astrophysique de Marseille (LAM), Marseille: EUCLID; Gamma-Ray Bursts; PFS; CAS-Observations.

Laboratoire Univers et Particules de Montpellier, Montpellier: Cosmic-ray propagation in molecular clouds.

Observatoire astronomique de Strasbourg, Strasbourg: ATHENA.

Observatoire de la Côte d'Azur Nice (OCA), Nizza: GRAVITY+.

Observatoire de Paris (GEPI), Paris: MICADO; GRAVITY.

Observatoire de Paris (LERMA), Paris: CAS-Theory.

Observatoire de Paris (LESIA), Paris: MICADO; GRAVITY.

Observatoire de Paris-Meudon, Paris: GRAVITY; GRAVITY+, Galaktisches Zentrum.

SOLEIL Synchrotron (AILES beamline), Saint-Aubin: CASLaboratory.

Université de Bordeaux, Bordeaux: CAS-Theory.

Université de Cergy-Pontoise, Cergy Pontoise Cedex: CAS-Observations.

Université de Franche-Comté (UTINAM), Besançon: MICADO.

Université de Lyon (CRAL), Lyon: GRAVITY+; CAS-Observations.

Université de Rennes, Rennes: CAS-Laboratory; CASObservations.

Université de Toulouse, Toulouse: CAS-Observations; CAS-Laboratory.

Universite Paris Diderot, Paris: CAS-Observations.

Université Paris-Saclay, Saclay: CAS-Laboratory; CASObservations.

Griechenland

ATHENA RC, Research and Innovation Centre in Information, Communication and Knowledge Technologies, Athen: INODE.

Infili Technologies, Athen: INODE.

University of Crete and Foundation for Research and Technology Hellas (FORTH), Heraklion: Röntgendoppelsternsysteme; OPTIMA Photometer; Röntgen-AGN.

National Observatory of Athens, Athen: Athena; eROSITA.

Großbritannien

Astrophysics Research Group University of Surrey: EUCLID.

John Moores University, Liverpool: Himmelsdurchmusterung Galaxienhaufen; Infrared Dark Clouds; CAS-Observations.

Open University, Milton Keynes: Kataklysmische Variablen; Novae; ATHENA.

Queen Mary University of London, London, UK: CAS-Observations; CAS-Theory.

Rutherford Appleton Laboratory, Council for the Central Laboratory of the Research Councils, Swindon: SIS-Junctions.

SKA Organisation, Jodrell Bank Observatory, Macclesfield: CAS-Observations.

United Kingdom Astronomy Technology Centre (UKATC), Edinburgh: EUCLID; ERIS.

University of Cambridge, Cambridge: DES; CAS-Theory.

University College London, London: High Energy Pulsars; EUCLID; DES; CAS-Observations.

University of Edinburgh, Edinburgh: DES.

University of Leeds, Leeds: CAS-Theory.

University of Leicester, Leicester: XMM-Newton; ATHENA; Swift; EUCLID.

University of Nottingham, Nottingham: DES.

University of Portsmouth, Portsmouth: DES.

University of Sussex, Brighton: DES.

University of Southampton, Southampton: GRAVITY+; Magellanic Clouds.

Indien

Tata Institute of Fundamental Research, Mumbai: CAS-Observations.

Irak

University of AL-Muthanna, AL-Muthanna: CAS-Observations.

Irland

National University of Ireland, Galway: High Time Resolution Astronomy; CAS-Theory.

University College Dublin, Dublin: Fermi/GBM.

Israel

School of Physics and Astronomy, Wise Observatory, Tel Aviv: Aktive Galaxien; Interstellares Medium; Galaxienentwicklung.

Italien

Free University of Bozen-Bolzano, Bozen: INODE.

IFCAI-CNR Palermo, Palermo: XMM-Newton Beobachtungen von Neutronensternen und Pulsaren.

INAF (Instituto Nationale di Astrofisica), Rom: ATHENA; EUCLID.

INAF Arcetri, Florenz: ARGOS; LBT; ERIS; CAS-Observations; CAS-Theory.

INAF Padua, Padua: LBT; MICADO; ERIS.

INAF Roma, Rom: LBT; Nukleare Astrophysik; EUCLID.

INAF Teramo, Teramo: ERIS. INAF Trieste, Triest: Gamma-Ray Bursts; Fermi/LAT.

INFN Frascati, Frascati: SIDDHARTA. Osservatorio Astronomico di Brera, Brera: Himmelsdurchmusterung Galaxienhaufen.

Osservatorio Astrofisico di Catania, Catania: CAS-Theory; CAS-Laboratory.

Scuola Normale Superiore, Pisa: CAS-Observations.

Università degli Studi di Firenze, Florenz: CAS-Observations; CAS-Theory.

Università degli Studi di Milano, Mailand: CAS-Observations.

Università degli Studi di Torino, Turin: CAS-Observations.

Università di Bologna, Bologna: EUCLID; CAS-Theory; CAS-Laboratory; CAS-Observations.

Università di Perugia, Perugia: CAS-Observations.

Japan

Academia Sinica, Nangang: PFS.

Chiba University: EUCLID.

Department of Chemistry, Tokyo University of Science, Japan: CAS-Observations.

Department of Physics, Nihon University, Japan: CASObservations.

Department of Materials and Life Sciences, Sophia University, Japan: CAS-Observations.

Kavli Institute for the Physics and Mathematics of the Universe, Kashiwa: PFS.

Kobe University, Kobe: CAS-Theory.

National Astronomical Observatory of Japan, Mitaka/ Tokio: CAS-Theory; CAS-Observations; Galaxienentwicklung; PFS.

Institute of Physical and Chemical Research, Saitama: CAS-Observations.

Japan Aerospace Exploration Agency, Sagamihara, Kanagawa: SBNAF.

The Institute of Physical and Chemical Research (RIKEN), Japan: CAS-Observations.

Tokio Institute of Technology (TITECH), Ookayama: ASCA/XMM-Newton Beobachtungen von AGN.

University of Osaka, Osaka: Astro-H.

University of Tokyo, Institutes for Advanced Study (UTIAS), Tokyo: PFS.

University of Tokyo, Tokyo: PFS; CAS-Observations.

Tohoku University, Sendai: Galaxienentwicklung.

Lettland

Ventspils University College, Ventspils: CAS-Theory.

Mexiko

Universidad Nacional Autonoma de México, Ensenada: CASObservations.

Niederlande

ESTEC, Noordwijk: XMM-Newton; INTEGRAL; EUCLID; ATHENA; eROSITA.

JIVE Dwingeloo, Dwingeloo: Black Hole Cam.

NOVA (Leiden, Groningen, ASTRON/Dwingeloo, Amsterdam): MICADO; ERIS.

Leiden University, Leiden: CAS-Observations; CAS-Theory; IR/ Submm Spectroscopy; EUCLID.

Radboud University, Nijmegen: Black Hole Cam; CAS-Laboratory.

SRON, Utrecht: Chandra-LETG.

University of Groningen, Kapteyn Institute, Groningen: Rekonstruktion der Dichteverteilung im Universum; EUCLID; Dynamical-Chemical Models; CAS-Theory; CAS-Observations.

Norwegen

Institute of Theoretical Astrophysics, University of Oslo: EUCLID.

Österreich

Institut für Ionenphysik und Angewandte Physik - Molekulare Systeme; Universität Innsbruck: CAS-Laboratory.

Institut für Weltraumforschung, Graz: ATHENA WFI.

Universität und TU Wien: MICADO; ATHENA.

Universität Innsbruck: MICADO.

Universität Linz: MICADO. RICAM Linz: MICADO.

Institute für Astronomy, Universität Wien: EUCLID.

Polen

Nicolaus Copernicus University, Torun: Pulsars Astronomical Centers; ATHENA.

Space Research Center (CBK), Warschau: ATHENA WFI.

Astronomical Observatory Institute, Poznań: SBNAF.

University Zielona Gora, Zielona Gora: OPTIMA.

Portugal

CENTRA Lissabon und Porto, Lissabon: GRAVITY; GRAVITY+.

Observatorio Astronomico de Lisboa, Lissabon: ATHENA.

Universidade de Coimbra, Coimbra: Departamento de Engenharia Química: CAS-Laboratory.

Russland

Institute of Astronomy, Moskau: CAS-Theory.

Lebedev Institute of Physics, Moskau: CAS-Theory.

Prokhorov General Physics Institute, Moskau: CAS-Laboratory.

Space Research Institute (IKI) of the Russian Academy of Science, Moskau: eROSITA/Spektrum Röntgen-Gamma.

Skobeltsyn Institute of Nuclear Physics, Moskau: Nukleare Astrophysik; Gamma-Ray Bursts; AGADE.

Ural Federal University, Jekaterinburg: CAS-Theory.

Schweden

Chalmers University of Technology, Onsala Space Observatory, Onsala: CAS-Observations.

University Lund/Observatory, Lund: OPTIMA.

Schweiz

CERN, Geneva: CAST.

ETH Zürich, Zürich: ERIS.

Observatoire de Genève Sauverny, Genf: ISDC/INTEGRAL; Nukleare Astrophysik; EUCLID.

Swiss Institute of Bioinformatics, Lausanne: INODE.

Universität Basel, Basel: Nukleare Astrophysik.

University of Geneva, Genf: ATHENA.

University of Zurich, Zürich: Infrared Dark Clouds.

Zürcher Hochschule für Angewandte Wissenschaften, Zürich: INODE.

Spanien

Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas, Madrid: DES.

Centro de Astrobiología (CSIC/INTA), Madrid: CAS-Laboratory.

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

Instituto de Astrofísica de Andalucía (IAA), Granada: SBNAF; ESBO-DS.

Institut d'Estudis Espacials de Catalunya: EUCLID.

Instituto de Astrofísica de Canarias, La Laguna: SBNAF; EUCLID.

Instituto de Ciencias del Espacio, Bellaterra: DES.

Instituto de Ciències de l'Espai, Cerdanyola del Vallès: CASObservations.

Institut de Fisica d'Altes Energies, Barcelona: DES; EUCLID.

Javalambre Physics of the Accelerating Universe Astrophysical Survey (J-PAS), Javalambre: eROSITA follow up.

SIRIS Academic SL, Barcelona:. INODE

Universitat Autònoma de Barcelona, Bellaterra: CAS-Observations.

Universidad de Valencia, Department de Astronomia, Valencia: INTEGRAL Spektrometer SPI.

Universidad de Zaragoza, Zaragoza: CAST.

Observatorio Astronómico de Mallorca, Costitx: Novae; Kometen.

Observatorio Astronómico Nacional, Madrid: CAS-Observations.

Südkorea

Seoul National University, Seoul: Hayabusa-2.

Taiwan

Academia Sinica Institute of Astronomy and Astrophysics (ASIAA), Taipei: CAS-Theory; CAS-Observations; PFS.

National Central University, Chungli; PanSTARRS.

Tschechien

Charles University, Prag: SBNAF; Hayabusa-2.

Dept. of Surface and Plasma Science, Faculty of Mathematics and Physics, Charles University, Prague: CAS-Laboratory.

Ungarn

Konkoly Observatory of the Hungarian Academy of Sciences, Budapest: SBNAF, CASObservations, CAS-Theory.

Institute for Nuclear Research (ATOMKI), Debrecen: CASLaboratory.

USA

Argonne National Laboratory, Lemont: DES.

Brookhaven National Laboratory, Upton: strahlenharte JFETElektronik; strahlenharte Detektoren.

Benedictine College, Atchison: CAS-Theory.

California Inst. of Technology, Pasadena: X-ray Survey; PFS.

CfA, Cambridge: ATHENA/WFI; XMM-Newton/Chandra Kalibration.

Clemson University, Clemson: Gamma-Ray Bursts; Nukleare Astrophysik.

Columbia University: PFS.

Department of Astronomy, The University of Texas at Austin, Austin: CAS-Observations.

Department of Astronomy, University of Michigan: CASObservations.

Fermilab, Batavia: DES.

Green Bank Observatory, Green Bank: CAS-Observations.

Harvard-Smithsonian Center for Astrophysics, Cambridge: CAS-Observations; CAS-Laboratory; CAS-Theory.

Johns Hopkins University, Baltimore: PFS.

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

MIT, Cambridge: ATHENA WFI.

NASA/Ames Research Center, Mofett Field (CA): MHD Shocks; SBNAF.

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

NASA/Jet Propulsion Laboratory, Pasadena: EUCLID; PFS; CAS-Observations.

National Radio Astronomy Observatory, Charlottesville: CAS-Theory; CAS-Observations.

National Radio Astronomy Observatory, Socorro, New Mexico: CAS-Observations.

National Science Foundation, Arlington: CAS-Observations.

NOAO, Tucson: DES.

Ohio State University, Columbus: DES; LBT.

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

Pennsylvania State University, State College: HETDEX; Swift; ATHENA, PFS.

Princeton University, Princeton: PFS; CAS-Theory.

Research Corporation, Tucson: LBT.

San Jose State University, San Jose: MHD shocks.

SLAC, Stanford: CAMP; DES; ATHENA.

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

Space Telescope Science Institute, Baltimore: Galaxienentstehung; Turbulence; SBNAF.

Stanford University, Stanford: DES; Fermi/LAT; Fermi/ GBM.

Texas A and M University, College Station: DES; SBNAF.

Texas State University, San Marcos: HETDEX.

University of Arizona, Tucson: Kosmische Strahlung; Planetenentstehung; LBT; ARGOS; CAS-Observations; CASTheory.

University of California, Berkeley: MPG/UCB-Kollaboration; FAST; INTEGRAL-Spektrometer SPI; Superbubbles.

University of California, Santa Cruz: DES.

University of Chicago, Chicago: CAS-Observations; DES.

University of Colorado, Boulder (Co): Superbubbles; CASObservations; Galaxienkerne.

University of Connecticut: PFS.

University of Florida, Gainesville: Infrared Dark Clouds.

University of Hawaii, Honolulu, Hawaii: CAS-Theory.

University of Illinois, Urbana-Champaign: DES; PFS.

University of Massachusetts, Amherst: CAS-Observations; PFS.

University of Michigan, Ann Arbor: DES.

University of Mississippi: CAS-Laboratory.

University of Nevada, Las Vegas: CAS-Observations.

University of Pennsylvania, State College: DES.

University of Pittsburgh, Pittsburgh: Galaxienentstehung; PFS.

University of Texas, Austin: Galaxienentstehung; CASTheory.

University of Texas Austin, McDonald Observatory: Hobby-Eberly-Telescope, HETDEX.

University of Texas at El Paso, CAS-Observations: CASTheory.

University of Texas, San Antonio: SBNAF.

University of Toledo, Toledo: Galaxienentstehung; CASObservations.

University of Virginia, Charlottesville: CAS-Theory; CASObservations.

University of Wisconsin-Madison, Madison: CAS-Theory.

Yale University, New Haven: CAS-Observations.

6.2 Multinationale Kooperationen

ARGOS - Laserleitstern für das LBT: Arcetri Observatory, Italy; AIP, 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.

ATHENA - Advanced Telescope for High Energy Astrophysics: Dänemarks Technische Universität, Dänemark; Nikolaus Kopernikus Astronomical Center, Polen; Universität Wien, Österreich; IWF, Graz; INAF Italy, Italy; CEA Frankreich, Frankreich; University of Leicester, Open University, UK; Institut für Astronomie und Astrophysik Tübingen, Erlangen Centre for Astroparticle Physics (ECAP), Germany; ESA; NOA, Greece; Universität Geneva, Schweiz; Institute for Astrophysics, Portugal; Stanford University, USA.

BOSS - Baryon Oscillation Spectroscopic Survey: SDSSIV Collaboration.

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.

COSMOS - Cosmological Evolution Survey: 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, Universita Padova, Dipartimento di Fisica, Universita degli Studi Roma Tre, Italy; Harvard-Smithsonian Centre for Astrophysics, Cambridge, Dept. of Physics, Carnegie Mellon University, Pittsburg, Institute for Astronomy, University of Hawaii, California Institute of Technology, Pasadena, Dept. of Astronomy, Yale University, USA; INTEGRAL Science Data Centre, Versoix, Switzerland; Laboratoire d'Astrophysique de Marseille, France.

DES - Dark Energy Survey: LMU München, Excellence Cluster Universe, Germany; The Fermi National Accelerator Laboratory (Fermilab), University of Chicago, NOAO, University of Michigan, University of Pennsylvania, University of Illinois at Urbana-Champaign, Ohio State University, Texas AM University, University of California Santa Cruz, Stanford University, SLAC National Accelerator Laboratory, The Lawrence Berkeley National Laboratory, Argonne National Laboratory, USA; University College London, University of Cambridge, University of Edinburgh, University of Portsmouth, University of Sussex, University of Nottingham, UK; Observatorio Nacional, Centro Brasileiro des Pesquisas Fisicas, Universidade Federal do Rio, Brasilien; Instituto de Ciencias dei Espacio, Institut de Fisica d'Altes Energies, Centro de Investigaciones Energeticas Medioambientales y Tecnologicas, Spain.

eBOSS - SDSS-IV Extended Baryon Oscillation Spectroscopic Survey: Carnegie Mellon University (CMU), University of Colorado Boulder, Harvard-Smithsonian Center for Astrophysics Participation Group, Johns Hopkins University, Kavli Institute for the Physics and Mathematics of the Universe, New Mexico State University, New York University, The Ohio State University, Penn State University, University of Utah, University of Wisconsin, Yale University, USA; Max-Planck-Institut fuer Astrophysik (MPA Garching), Max-Planck-Institut für extraterrestrische Physik (MPE), Max-Planck-Institut für Astronomie (MPIA Heidelberg), Germany; National Astronomical Observatories of China, Shanghai Astronomical Observatory, China; United Kingdom Participation Group, University of Portsmouth, UK.

ERIS - Enhanced Resolution Imager and Spectrograph for the VLT: ESO, Germany; ETH Zürich, Switzerland; INAF Arcetri (with OAA, OATe and OAPd), Italy; UKATC Edinburgh, Scotland; NOVA Leiden, The Netherlands.

EinsteinProbe: Chinese Acadamy of Science, Institute of High Energy Physics, National Astronomical Observatories, China, ESA.

eROSITA - extended Roentgen Survey with an Imaging Telescope Array: AIP

Potsdam, Universität Tübingen, Universität Bonn, Universität Erlangen, Universität Hamburg, Remeis-Sternwarte Bamberg, MPA Garching, LMU (USM) München, Germany; IKI Moskau, Russia.

ESBO-DS - European Stratospheric Balloon Observatory – Design Study, EU H2020 project; University of Stuttgart, University of Tübingen, Germany; Swedish Space Corporation, Sweden; Instituto de Astrofísica de Andalucía, Spain.

EUCLID - ESA Mission to map the Dark Energy: ESA; Institut d'Astrophysique de Paris, France; Institute fur Astronomy, Universitat Wien, Austria; Department of Physics and Astronomy, Ghent University, Belgium; Department of Physics and Astronomy, University of Waterloo, Canada; DTU Space, National Space Institute, Technical University of Denmark, Denmark; University of Helsinki, Department of Physics, Finland; Laboratoire d'Astrophysique de Marseille, Technopole de Marseille-Etoile, France; CEA/ DSM/Irfu/Service d'Astrophysique, CE Saclay, France; Max-Planck-Institute for Extraterrestrial Physics, Germany; Max Planck Institute for Astronomy, Germany; Dipartimento di Fisica e Astronomia, Universita di Bologna, Italy; INAF-Osservatorio di Roma, Italy; Chiba University, Japan; Leiden Observatory, Universiteit Leiden, Netherlands; Institute of Theoretical Astrophysics, University of Oslo, Norway; Departamento de Física da Faculdade de Ciências da Universidade de Lisboa, Portugal; Institut d'Estudis Espacials de Catalunya, Spain; Instituto de Astrofisica de Canarias, Spain; Institute for Space Science, Romania; Physique Théorique, Université de Genève, Switzerland; Physics Department, Lancaster University, UK; Astrophysics Research Group, University of Surrey, UK; NASA Jet Propulsion Laboratory, USA.

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

Fermi/LAT - Fermi Gamma-Ray Large Area Space 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, Instituto Nacionale di Fisica Nucleare Trieste, Italy; University of Tokyo, Japan; CEA Saclay, France.

GRAVITY - Instrument for VLT Interferometry: MPIA Heidelberg, Universität Köln, ESO Garching, Germany; CENTRA Lisbon and Porto, Portugal; IPAG Grenoble, Observatoire de Paris / Meudon (LESIA) France.

GRAVITY+ - VLT Interferometry upgrade project: MPIA Heidelberg, Universität Köln, ESO Garching, Germany; CENTRA Lisbon and Porto, Portugal; IPAG Grenoble, Observatoire de Paris / Meudon (LESIA), OCA Nice, CRAL Lyon, France; University of Southampton, UK; KU Leuven, Belgium.

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

INODE - Intelligent Open Data Exploration: Zürcher Hochschule für Angewandte Wissenschaften, ATHENA RC, Research and Innovation Center in Information, Communication and Knowledge Technologies, Fraunhofer Institute for Computer Graphics Research IGD, Infili Technologies Private Company, Center National de la Recherche Scientifique, SIRIS Academic SL, Swiss Institute of Bioinformatics, Free University of Bozen-Bolzano.

INTAS - Cooperation of Western and Eastern European Scientists: France, Germany, Norway, Russia.

ISDC - INTEGRAL Science Data Centre: Observatoire de Geneva Sauverny, Swit-

zerland; 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, Instituto 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 Spatial des Rayonnements (CESR) Toulouse, CEA Saclay Gif-surYvette, France; University de Valencia Burjassot, Spain.

LBT - Large Binocular Telescope Project: MPIA Heidelberg, MPIfR Bonn, Landessternwarte Heidelberg Königstuhl, AIP, Germany; University of Arizona, Tucson, Ohio State University, Columbus, Research Corporation, USA; INAF, Italy.

MICADO - Multi-Adaptive Optics Imaging Camera for Deep Observations: ESO, LMU (USM), MPIA Heidelberg, IAG Göttingen, Germany; INAF-OAPD Padova, INAF-OAR Roma, Italy; A* (an Austrian partnership comprising the University of Vienna, the University of Innsbruck, the University of Graz, and the University of Linz [with RICAM Linz]; specific contributions to MICADO come from Vienna/Innsbruck/Linz), Austria; NOVA (a federation several astronomical institutes; specific contributions to MICADO come from the University of Groningen, the University of Leiden, and the NOVA optical/infrared instrumentation group based at ASTRON in Dwingeloo), The Netherlands; CNRS/INSU (representing LESIA and GEPI, Paris, IPAG, Grenoble and UTINAM, Besançon), France; FINCA (University of Turku) Turku, Finland.

MXT - Microchannel X-Ray Telescope for Gamma-Ray Bursts: CEA, Saclay, France; University of Leicester, UK.

OPTIMA: AIP, MPI für Astrophysik, Universität Hamburg, Germany; University of Crete, Greece; University Zielona Gora, Poland; University Lund/ Observatory, Schweden.

PanSTARRS - Panoramic Survey Telescope and Rapid Response System: MPIA Heidelberg, Germany, University of Hawaii, Harvard University, Johns Hopkins Univ. Baltimore, MD, USA; Universities of Durham, Edinburgh, Belfast, UK.

PFS - The Subaru Prime Focus Spectrograph Collaboration: Kavli Institute for the Physics and Mathematics of the Universe, Japan; The University of Tokyo Institutes for Advanced Study (UTIAS), University of Tokyo, Japan; National Astronomical Observatory of Japan; Academia Sinica, Institute of Astronomy and Astrophysics, Taiwan; California Institute of Technology, USA; NASA Jet Propulsion Laboratory, USA; Laboratoire d'Astrophysique de Marseille, France; Princeton University, USA; Johns Hopkins University, USA; IAG/Universidade de Sao Paulo, Brazil; Laboratório Nacional de Astrofísica, Brazil; MaxPlanck-Institut für Astrophysik, Garching; Shanghai Jiao Tong University, China; National Astronomical Observatories of China; Tsinghua University, China; The University of Science and Technology of China; Xiamen University, China; Peking University, China; Columbia University, USA; Tufts University, USA; University of Connecticut, USA; University of Illinois at Urbana-Champaign, USA; University of Pittsburgh, USA; University of Massachusetts Amherst, USA; Pennsylvania State University, USA.

SBNAF - Small Bodies Near and Far, EU H2020 project; Poznań, Poland; Instituto de Astrofísica de Andalucía, Granada, Instituto de Astrofísica de Canarias (IAC), Spain; Konkoly Observatory, Budapest, Hungary; Institute of Space and Astronautical Science (ISAS, JAXA), Kanagawa, Japan.

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

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

XMM-Newton/SSC Survey Science Center: AIP, Germany; SAP Saclay, CDS Strasbourg, CESR Toulouse, France; University of Leicester, Institute of Astronomy Cambridge, MSSL London, UK.

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

6.3 Industrielle Kollaborationen

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

ABN GmbH, Neuried: Ongoing servicing of the MPE test facility PANTER.

ACM GmbH, Naumburg - Acktar Ltd., Kiryat-Gat, Israel: Schwärzen für EUCLID.

af inventions, Braunschweig: FPGA Programmierung für eROSITA.

AHC Oberflächentechnik GmbH / Aalberts Surface Technologies GmbH: coating for MICADO.

ALPAO, Montbonnot-Saint-Martin, France: GRAVITY+ deformable mirrors.

Alwin Müller GmbH Co. KG, Nürnberg: Oberflächenbeschichtung vieler Projekte.

Ariane Group GmbH, Munich: EUCLID design study, eROSITA, ATHENA, Oberflächenbeschichtung und cleanliness control EinsteinProbe.

Array Electronics, Egmating: DAQ development OPTIMA.

BASF Coatings AG, Münster: Investigations on the scattering properties of micro particles.

Bräuninger Konstruktionen, Neuried: Construction and manufacturing of laboratory equipment.

Buchberger GmbH, Tuchenbach: Manufacturing of parts for PANTER manipulators.

Carl Zeiss QEC GmbH, Garching b. München, Deutschland: Messdienstleistungen, EinsteinProbe.

Christian Rehm - ISKON, Isen: Design and mechanical engineering for MICADO, GRAVITY+.

CryoVac GmbH, Troisdorf: MICADO Cryostat.

DHL Special services, Flughafen München: EinsteinProbe.

Dico-Solutions, München: eROSITA Betrieb.

DoKaSch TEMPERATURE SOLUTIONS GmbH, Kelsterbach, Deutschland: klimatisierte Frachtcontainer, EinsteinProbe.

ECM Engineered Ceramic Materials GmbH, Moosinning: Hersteller von CESIC.

EATON Powering Business Worldwide, Camarillo, CA, USA: Actuators separationnuts for eROSITA.

First Light Imaging, Meyreuil, France: GRAVITY+ wavefront sensor cameras.

Fraunhofer IOF, Jena: Mirror development for MICADO.

Freyer GmbH, Tuningen: PANTER.

Frühschütz Lohngalvanik GmbH, Penzberg: Oberflächenbeschichtung vieler Projekte.

Gräfe Spezialoptik GmbH, Camburg: Zerodur-Materialbearbeitung und -Lieferant.

Hans Englert GmbH, Berlin: Manufacturing of front panels and metering devices.

HERMLE AG, Gosheim: Milling Machines, MPE Workshop.

HOC Optik Dr. Christoph Horneber, Lauf: GRAVITY+.

Hochschule München, Laserlabor, Prof. Heinz Huber, München: Materialbearbeitung mit Ultrakurzpulsarlaser.

Industrieanlagen – Betriebsgesellschaft mbH (IABG), Ottobrunn: Testanlagen, Luftfahrtsicherheit, EinsteinProbe.

Industrieberatung Reinhard Katterloher, München: Specifications for MICADO Test Cryostat.

Ingenieurbüro Josef Eder, Hilgertshausen: System engineering for eROSITA, ATHENA, Einstein Probe.

Ingenieurbüro Weisz, München: Design and mechanical engineering for MICADO and GRAVITY+.

Ingenieurbüro Michael Kautz, Regensburg: Design and mechanical engineering for CAS.

Kampf Telescope Optics (KTO), München: Design and System Engineering for MICADO.

LaserJob GmbH, Fürstenfeldbruck, Deutschland: Präzisions-Laserzuschnitt und Schweißen EinsteinProbe.

LEX GmbH, Miesbach, Deutschland: Mechanische Fertigung, ATHENA, EinsteinProbe.

LT Ultra, Herdwangen-Schönach: Spiegelhersteller.

Feinmechanische Werkstätte Thomas Markl GmbH, Deisenhofen; eROSITA.

GEWO Feinmechanik GmbH, Hörlkofen: EinsteinProbe, MICADO.

Media Lario Srl, Bosisio Parini, Italien: eROSITA, EinsteinProbe.

OHB System AG, München: EUCLID design study.

Peter Blank GmbH, Aschaffenburg: Mechanische Fertigung MICADO, GRAVITY+.

Peter Feckl Maschinenbau GmbH, Forstern: Spiegelmodule EinsteinProbe.

Physik Instrumente (PI): Präzisions-Positionier-Systeme.

Plappert Industrieanlagen GmbH, Schorndorf: Design and mechanical engineering for MICADO Handling Tools.

Qioptic GmbH, Feldkirchen: Oberflächenbeschichtung vieler Projekte.

Steinmeyer Mechatronik, Dresden: GRAVITY+ translational stages.

Tafelmaier Dünnschicht-Technik, Rosenheim: Optical Coatings, GRAVITY+.

Tesat-Spacecom GmbH Co. KG, Backnang: FMECA und Zuverlässigkeitsanalyse für ATHENA WFI.

Steinmeyer Mechatronik, Dresden: GRAVITY+ translational stages.

Unholtz-Dickie Corp., Wallingford, USA: Shaker System, MPE Test Facility.

7 Öffentlichkeitsarbeit

Das MPE engagierte sich 2022 durch folgende Aktivitäten in der Öffentlichkeitsarbeit: 35, zum Teil online gehaltene populär-wissenschaftliche Vorträge durch Wissenschaftler, so-

wie 19 Pressemitteilungen über wissenschaftliche Ergebnisse und allgemeine Nachrichten (wissenschaftliche Preise, Auszeichnungen). Nachdem die Aktivitäten am Institut aufgrund der Covid19-Pandemie in den vergangenen zwei Jahren fast vollständig zum Erliegen kamen, waren im Laufe des Jahres wieder vereinzelte Besuche und Events möglich. Insgesamt wurden 2022 am MPE sechs Besuchsgruppen empfangen, darunter eine Delegation des designierten Präsidenten der Max-Planck-Gesellschaft, Patrick Cramer. Der Girlsday 2022 wurde online abgehalten und bestand aus mehreren Vorträgen sowie einem Livestream aus der Werkstatt. Insgesamt nahmen 50 Schülerinnen teil. Auch in 2022 wurden die Aktivitäten auf Social Media fortgeführt bzw. intensiviert. Der Twitteraccount des MPE (@MPE-Garching) wies zum Stichtag 31.12.2022 1276 Follower auf und setzte seit der Aktivierung im Juni 2021 insgesamt 623 Tweets bzw. Re-Tweets ab. Der Account auf LinkedIn (MPE-Garching) wies zum Endes des Jahres 3806 Follower auf, womit die Followerzahl innerhalb eines Jahres mehr als verdoppelt wurde. Zusätzlich wurde im Dezember 2022 noch ein Account auf Mastodon (@MPE-Garching) angelegt. Weitere Informationen zur Öffentlichkeitsarbeit sind unter: http://www.mpe.mpg.de zu finden.

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