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Enrico Marchetti
Laird M. Close
Jean-Pierre Véran
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Y. Clénet, T. Buey, G. Rousset, LESIA, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); M. Cohen, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); P. Feautrier, IPAG, Univ. Joseph Fourier, CNRS (France); E. Gendron, Z. Hubert, LESIA, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); F. Chemla, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); D. Gratadour, P. Baudoz, S. Lacour, A. Boccaletti, A. Sevin, F. Vidal, R. Galicher, D. Perret, B. Le Ruyet, F. Chapron, LESIA, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); E. Stadler, P. Rabou, L. Jocou, S. Rochat, G. Chauvin, IPAG, Univ. Joseph Fourier, CNRS (France); R. Davies, Max-Planck-Institut für extraterrestrische Physik (Germany)

9148 10 **NFIRAOS: first facility AO system for the Thirty Meter Telescope** [9148-35]

G. Herriot, D. Andersen, J. Atwood, National Research Council Canada (Canada); C. Boyer, Thirty Meter Telescope Observatory Corp. (United States); P. Byrnes, K. Caputa, National Research Council Canada (Canada); B. Ellerbroek, L. Gilles, Thirty Meter Telescope Observatory Corp. (United States); A. Hill, Z. Ljusic, J. Pazder, M. Rosensterner, M. Smith, P. Spano, K. Szeto, J.-P. Véran, I. Wevers, National Research Council Canada (Canada); L. Wang, Thirty Meter Telescope Observatory Corp. (United States); R. Wooff, National Research Council Canada (Canada)

SESSION 9 NEW PROPOSED AO SYSTEMS AND CONCEPTS FOR LARGE TELESCOPES AND ELTS

9148 11 **Pushing the limits of NGSs solely AO: GMCAO and beyond (Invited Paper)** [9148-36]

R. Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy)

9148 12 **Second generation Robo-AO instruments and systems** [9148-37]

C. Baranec, Institute for Astronomy, Univ. of Hawai'i (United States); R. Riddle, California Institute of Technology (United States); N. M. Law, The Univ. of North Carolina at Chapel Hill (United States); M. R. Chun, J. R. Lu, M. S. Connelley, D. Hall, D. Atkinson, S. Jacobson, Institute for Astronomy, Univ. of Hawai'i (United States)

9148 13 **Wide field adaptive optics correction for the GMT using natural guide stars** [9148-38]

M. A. van Dam, Flat Wavefronts (New Zealand); A. H. Bouchez, Giant Magellan Telescope Corp. (United States); B. A. McLeod, Smithsonian Astrophysical Observatory (United States)

9148 14 **TMT-AGE: wide field of regard multi-object adaptive optics for TMT** [9148-39]

M. Akiyama, Tohoku Univ. (Japan); S. Oya, Subaru Telescope, National Astronomical Observatory of Japan (United States); Y. H. Ono, Tohoku Univ. (Japan) and Subaru Telescope, National Astronomical Observatory of Japan (United States); H. Takami, S. Ozaki, National Astronomical Observatory of Japan (Japan); Y. Hayano, I. Iwata, Subaru Telescope, National Astronomical Observatory of Japan (United States); K. Hane, T. Wu, Tohoku Univ. (Japan); T. Yamamuro, OptCraft (Japan); Y. Ikeda, Photocoding, Inc. (Japan)

- 9148 16 **Review of the latest developments in fast low noise detectors for wavefront sensing in the visible (Invited Paper)** [9148-41]
S. M. Adkins, W. M. Keck Observatory (United States)
- 9148 17 **SAPHIRA detector for infrared wavefront sensing (Invited Paper)** [9148-42]
G. Finger, European Southern Observatory (Germany); I. Baker, SELEX ES Ltd. (United Kingdom); D. Alvarez, D. Ives, L. Mehrgan, M. Meyer, J. Stegmeier, European Southern Observatory (Germany); H. J. Weller, SELEX ES Ltd. (United Kingdom)
- 9148 18 **Revolutionary visible and infrared sensor detectors for the most advanced astronomical AO systems** [9148-43]
P. Feautrier, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS, Univ. Grenoble Alpes (France) and First Light Imaging S.A.S. (France); J.-L. Gach, First Light Imaging SAS (France) and Lab. d'Astrophysique de Marseille (France); S. Guieu, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS, Univ. Grenoble Alpes (France); M. Downing, European Southern Observatory (Germany); P. Jorden, e2v technologies Ltd. (United Kingdom); J. Rothman, E. de Borniol, CEA-Leti (France); P. Balard, First Light Imaging S.A.S. (France) and Lab. d'Astrophysique de Marseille, CNRS, Technopôle de Château-Gombert (France); E. Stadler, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS, Univ. Grenoble Alpes (France) and First Light Imaging S.A.S. (France); C. Guillaume, Observatoire de Haute-Provence, CNRS (France); D. Boutolleau, First Light Imaging S.A.S. (France); J. Coussement, SOFRADIR (France); J. Kolb, N. Hubin, European Southern Observatory (Germany); S. Derelle, C. Robert, ONERA (France); J. Tanchon, T. Trollier, A. Ravex, Absolut Systems S.A.S. (France); G. Zins, P. Kern, T. Moulin, S. Rochat, A. Delpoulbé, J.-B. Lebouquin, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS, Univ. Grenoble Alpes (France)
- 9148 19 **OCAM2S: an integral shutter ultrafast and low noise wavefront sensor camera for laser guide stars adaptive optics systems** [9148-44]
J.-L. Gach, Lab. d'Astrophysique de Marseille, CNRS, Aix Marseille Univ. (France) and First Light Imaging S.A.S. (France); P. Feautrier, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS (France) and First Light Imaging S.A.S. (France); P. Balard, Lab. d'Astrophysique de Marseille, CNRS, Aix Marseille Univ. (France) and First Light Imaging S.A.S. (France); C. Guillaume, Observatoire de Haute-Provence, CNRS (France) and First Light Imaging S.A.S. (France); E. Stadler, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS (France) and First Light Imaging S.A.S. (France)
- 9148 1A **Very low noise Shack-Hartmann wavefront sensor for adaptive optics in the near-IR** [9148-45]
S. Gousset, C. Robert, ONERA (France); T. Fusco, ONERA (France) and Lab. d'Astrophysique de Marseille, CNRS, Univ. d'Aix-Marseille (France); V. Michau, C. Petit, S. Derelle, J. Deschamps, ONERA (France); P. Feautrier, E. Stadler, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS (France); E. D. de Borniol, J. Rothman, MINATEC (France); J. Coussement, SOFRADIR (France)

SESSION 11 LASER GUIDE STAR SYSTEMS II

- 9148 1B **Status of the ARGOS project (Invited Paper) [9148-46]**
S. Rabien, L. Barl, Max-Planck-Institut für extraterrestrische Physik (Germany); U. Beckmann, Max-Planck-Institut für Radioastronomie (Germany); M. Bonaglia, INAF - Osservatorio Astrofisico di Arcetri (Italy); J. L. Borelli, Max-Planck-Institut für Astronomie (Germany); J. Brynnel, Large Binocular Telescope Observatory (United States); P. Buschkamp, Max-Planck-Institut für extraterrestrische Physik (Germany); L. Busoni, INAF - Osservatorio Astrofisico di Arcetri (Italy); J. Christou, Large Binocular Telescope Observatory (United States); C. Connot, Max-Planck-Institut für Radioastronomie (Germany); R. Davies, M. Deysenroth, Max-Planck-Institut für extraterrestrische Physik (Germany); S. Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); W. Gässler, Max-Planck-Institut für Astronomie (Germany); H. Gemperlein, Max-Planck-Institut für extraterrestrische Physik (Germany); M. Hart, The Univ. of Arizona (United States); M. Kulas, Max-Planck-Institut für Astronomie (Germany); M. Lefebvre, Large Binocular Telescope Observatory (United States); M. Lehmitz, Max-Planck-Institut für Astronomie (Germany); T. Mazzone, INAF - Osservatorio Astrofisico di Arcetri (Italy); E. Nussbaum, Max-Planck-Institut für Radioastronomie (Germany); G. Orban de Xivry, Max-Planck-Institut für extraterrestrische Physik (Germany); D. Peter, Max-Planck-Institut für Astronomie (Germany); A. Quirrenbach, Landessternwarte Heidelberg (Germany); W. Raab, Max-Planck-Institut für extraterrestrische Physik (Germany); G. Rahmer, Large Binocular Telescope Observatory (United States); J. Storm, Leibniz-Institut für Astrophysik Potsdam (Germany); J. Ziegler, Max-Planck-Institut für extraterrestrische Physik (Germany)
- 9148 1C **Laser guidestar uplink correction using a MEMS deformable mirror: on-sky test results and implications for future AO systems [9148-47]**
A. P. Norton, D. T. Gavel, UC Observatory Lab. For Adaptive Optics (United States); M. Helmbrecht, C. Kempf, Iris AO, Inc. (United States); E. Gates, K. Chloros, D. Redel, Lick Observatory (United States); R. Kupke, D. Dillon, UC Observatory Lab. For Adaptive Optics (United States)
- 9148 1D **PULSE: The Palomar Ultraviolet Laser for the Study of Exoplanets [9148-126]**
C. Baranec, Institute for Astronomy, Univ. of Hawai'i (United States); R. G. Dekany, California Institute of Technology (United States); R. S. Burruss, Jet Propulsion Lab. (United States); B. P. Bowler, California Institute of Technology (United States); M. van Dam, Flat Wavefronts (New Zealand); R. Riddle, California Institute of Technology (United States); J. C. Shelton, T. Truong, J. Roberts, Jet Propulsion Lab. (United States); J. Milburn, California Institute of Technology (United States); J. Tesch, Jet Propulsion Lab. (United States)

SESSION 12 PATHFINDERS TO ENABLE AO ON ELTS AND NEW AO CONCEPTS I

- 9148 1F **Adaptive optics for space debris tracking (Invited Paper) [9148-51]**
F. Bennet, C. D'Orgeville, The Australian National Univ. (Australia); Y. Gao, EOS Space Systems Pty. Ltd. (Australia); W. Gardhouse, N. Paulin, I. Price, F. Rigaut, The Australian National Univ. (Australia); I. Ritchie, C. Smith, EOS Space Systems Pty. Ltd. (Australia); K. Uhlendorf, The Australian National Univ. (Australia); Y. Wang, EOS Space Systems Pty. Ltd. (Australia)

- 9148 1G **Multi-object adaptive optics on-sky results with RAVEN (Invited Paper)** [9148-50]
O. Lardire, Univ. of Victoria (Canada); D. Andersen, NRC - Herzburg Institute of Astrophysics (Canada); C. Blain, C. Bradley, D. Gamroth, K. Jackson, P. Lach, R. Nash, K. Venn, Univ. of Victoria (Canada); J.-P. Vran, National Research Council Canada (Canada); C. Correia, Univ. do Porto (Portugal); S. Oya, Y. Hayano, H. Terada, Subaru Telescope, National Astronomical Observatory of Japan (United States); Y. Ono, Subaru Telescope, National Astronomical Observatory of Japan (United States) and Tohoku Univ. (Japan); M. Akiyama, Tohoku Univ. (Japan)

SESSION 13 PATHFINDERS TO ENABLE AO ON ELTS AND NEW AO CONCEPTS II

- 9148 1I **CANARY phase B: on-sky open-loop tomographic LGS AO results** [9148-52]
T. Morris, Durham Univ. (United Kingdom); E. Gendron, LESIA, CNRS, Observatoire de Paris (France); A. Basden, Durham Univ. (United Kingdom); O. Martin, LESIA, CNRS, Observatoire de Paris (France); J. Osborn, Durham Univ. (United Kingdom); D. Henry, UK Astronomy Technology Ctr. (United Kingdom); Z. Hubert, LESIA, CNRS, Observatoire de Paris (France); G. Sivo, Lab. Charles Fabry, CNRS, Institut d'Optique Graduate School (France) and ONERA (France); D. Gratadour, F. Chemla, A. Sevin, M. Cohen, LESIA, CNRS, Observatoire de Paris (France); E. Younger, Durham Univ. (United Kingdom); F. Vidal, LESIA, CNRS, Observatoire de Paris (France); R. Wilson, T. Butterley, U. Bitenc, A. Reeves, N. Bharmal, Durham Univ. (United Kingdom); H.-F. Raynaud, C. Kulcsar, Lab. Charles Fabry, CNRS, Institut d'Optique Graduate School (France); J.-M. Conan, ONERA (France); J.-M. Huet, D. Perret, LESIA, CNRS, Observatoire de Paris (France); C. Dickson, D. Atkinson, T. Bailie, A. Longmore, S. Todd, UK Astronomy Technology Ctr. (United Kingdom); G. Talbot, S. Morris, Durham Univ. (United Kingdom); G. Rousset, LESIA, CNRS, Observatoire de Paris (France); R. Myers, Durham Univ. (United Kingdom)
- 9148 1J **A measurement of the systematic astrometric error in GeMS and the short-term astrometric precision in ShaneAO** [9148-53]
S. M. Ammons, Lawrence Livermore National Lab. (United States); B. Neichel, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France) and Gemini Observatory (Chile); J. Lu, Institute for Astronomy, Univ. of Hawai'i (United States); D. T. Gavel, S. Srinath, R. McGurk, A. Rudy, C. Rockosi, Univ. of California, Santa Cruz (United States); C. Marois, National Research Council Canada (Canada); B. Macintosh, Stanford Univ. (United States); D. Savransky, Cornell Univ. (United States); R. Galicher, LESIA, CNRS, Observatoire de Paris (France); E. Bendek, NASA Ames Research Ctr. (United States); O. Guyon, The Univ. of Arizona (United States); E. Marin, V. Garrel, G. Sivo, Gemini Observatory (Chile)
- 9148 1K **`imaka: a path-finder ground-layer adaptive optics system for the University of Hawaii 2.2-meter telescope on Maunakea** [9148-54]
M. R. Chun, Institute for Astronomy, Univ. of Hawai'i (United States); O. Lai, Gemini Observatory (United States) and Subaru Telescope, National Astronomical Observatory of Japan (United States); D. Toomey, Mauna Kea Infrared LLC (United States); J. R. Lu, C. Baranec, Institute for Astronomy, Univ. of Hawai'i (United States); S. Thibault, D. Brousseau, Univ. Laval (Canada); H. Zhang, ImmerVision (Canada); Y. Hayano, S. Oya, Gemini Observatory (United States)

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- 9148 1L **Circumstellar disk and planet imaging with AO (Invited Paper)** [9148-55]
M. Janson, Queen's Univ. Belfast (United Kingdom)
- 9148 1M **Into the blue: AO science with MagAO in the visible (Invited Paper)** [9148-56]
L. M. Close, J. R. Males, K. B. Follette, P. Hinz, K. Morzinski, Y.-L. Wu, Steward Observatory, The Univ. of Arizona (United States); D. Kopon, Max-Planck-Institut für Astronomie (Germany); A. Riccardi, S. Esposito, A. Puglisi, E. Pinna, M. Xompero, R. Briguglio, F. Quiros-Pacheco, INAF - Osservatorio Astrofisico di Arcetri (Italy)
- 9148 1O **Results from the Gemini NICI Planet-Finding Campaign (Invited Paper)** [9148-58]
B. A. Biller, The Univ. of Edinburgh (United Kingdom); M. C. Liu, Institute for Astronomy, Univ. of Hawai'i (United States); Z. Wahhaj, European Southern Observatory (Chile); E. L. Nielsen, Institute for Astronomy, Univ. of Hawai'i (United States); T. L. Hayward, Gemini Observatory (Chile); M. R. Chun, Institute for Astronomy, Univ. of Hawai'i (United States); L. M. Close, Steward Observatory, The Univ. of Arizona (United States); C. Ftaclas, Institute for Astronomy, Univ. of Hawai'i (United States); J. R. Males, Steward Observatory, The Univ. of Arizona (United States); M. Hartung, Gemini Observatory (Chile); I. N. Reid, Space Telescope Science Institute (United States); E. Shkolnik, Lowell Observatory (United States); A. J. Skemer, Steward Observatory, The Univ. of Arizona (United States); M. Tecza, N. A. Thatte, F. Clarke, Univ. of Oxford (United Kingdom); D. Toomey, Mauna Kea Infrared LLC (United States)

SESSION 15 STATUS OF CURRENT AO INSTRUMENT PROJECTS II

- 9148 1R **Adaptive optics at the Subaru telescope: current capabilities and development (Invited Paper)** [9148-60]
O. Guyon, Y. Hayano, Subaru Telescope, National Astronomical Observatory of Japan (United States); M. Tamura, National Astronomical Observatory of Japan (Japan); T. Kudo, S. Oya, Y. Minowa, O. Lai, N. Jovanovic, N. Takato, Subaru Telescope, National Astronomical Observatory of Japan (United States); J. Kasdin, T. Groff, Princeton Univ. (United States); M. Hayashi, National Astronomical Observatory of Japan (Japan); N. Arimoto, Subaru Telescope, National Astronomical Observatory of Japan (United States); H. Takami, National Astronomical Observatory of Japan (Japan); C. Bradley, Univ. of Victoria (Canada); H. Sugai, Kavli Institute for the Physics and Mathematics of the Universe, The Univ. of Tokyo (Japan); G. Perrin, LESIA, CNRS, Observatoire de Paris (France); P. Tuthill, The Univ. of Sydney (Australia); B. Mazin, Univ. of California, Santa Barbara (United States)
- 9148 1S **Solar adaptive optics with the DKIST: status report** [9148-61]
L. C. Johnson, K. Cummings, M. Drobilek, S. Gregory, S. Hegwer, E. Johansson, J. Marino, K. Richards, T. Rimmele, P. Sekulic, F. Wöger, National Solar Observatory (United States)
- 9148 1T **GREGOR MCAO looking at the Sun** [9148-62]
D. Schmidt, National Solar Observatory (United States); T. Berkefeld, F. Heidecke, A. Fischer, O. von der Lühe, D. Soltau, Kiepenheuer-Institut für Sonnenphysik (Germany)

- 9148 1U **Final performance and lesson-learned of SAXO, the VLT-SPHERE extreme AO: from early design to on-sky results** [9148-63]
T. Fusco, J.-F. Sauvage, ONERA (France) and Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France); C. Petit, ONERA (France); A. Costille, K. Dohlen, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France); D. Mouillet, J.-L. Beuzit, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS (France); M. Kasper, M. Suarez, C. Soenke, European Southern Observatory (Germany); E. Fedrigo, LESIA, CNRS, Observatoire de Paris (France); M. Downing, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS (France); P. Baudoz, A. Sevin, D. Perret, LESIA, CNRS, Observatoire de Paris (France); A. Barrufolo, B. Salasnich, INAF - Osservatorio Astronomico di Bologna (Italy); P. Puget, F. Feautrier, S. Rochat, T. Moulin, A. Deboulb, Institut de Plantologie et d'Astrophysique de Grenoble, CNRS (France); E. Hugot, A. Vigan, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille, Univ. (France); D. Mawet, J. Girard, N. Hubin, European Southern Observatory (Germany)
- 9148 1V **Gender equity issues in astronomy: facts, fiction, and what the adaptive optics community can do to close the gap (Invited Paper)** [9148-64]
C. D'Orgeville, F. Rigaut, The Australian National Univ. (Australia); S. Maddison, Swinburne Univ. of Technology (Australia); E. Masciadri, INAF - Osservatorio Astrofisico di Arcetri (Italy)

SESSION 16 CHARACTERIZATION, MEASUREMENT AND MODELING OF THE DISTURBANCES FACED BY AO

- 9148 1W **Review on atmospheric turbulence monitoring (Invited Paper)** [9148-65]
G. Lombardi, J. Navarrete, European Southern Observatory (Chile); M. Sarazin, European Southern Observatory (Germany)
- 9148 1X **Turbulence profiling methods applied to ESO's adaptive optics facility** [9148-66]
J. Valenzuela, Pontificia Univ. Catlica de Chile (Chile) and European Southern Observatory (Germany); C. Bchet, Pontificia Univ. Catlica de Chile (Chile); A. Garcia-Rissmann, F. Gont, J. Kolb, M. Le Louarn, European Southern Observatory (Germany); B. Neichel, Lab. d'Astrophysique de Marseille, CNRS, Aix Marseille Univ. (France); P.-Y. Madec, European Southern Observatory (Germany); A. Guesalaga, Pontificia Univ. Catlica de Chile (Chile)
- 9148 1Z **Progress towards wind predictive control on ShaneAO: test bench results** [9148-68]
A. R. Rudy, S. Srinath, Univ. of California, Santa Cruz (United States); L. Poyneer, S. M. Ammons, Lawrence Livermore National Lab. (United States); D. Gavel, R. Kupke, D. Dillon, C. Rockosi, Univ. of California Observatories (United States)

SESSION 17 EXTREME AO II

- 9148 20 **Direct imaging of exoplanets in the habitable zone with adaptive optics (Invited Paper)** [9148-69]
J. R. Males, L. M. Close, O. Guyon, K. Morzinski, Steward Observatory, The Univ. of Arizona (United States); A. Puglisi, INAF - Osservatorio Astrofisico di Arcetri (Italy); P. Hinz, K. B. Follette, Steward Observatory, The Univ. of Arizona (United States); J. D. Monnier, Univ. of Michigan (United States); V. Tolls, Harvard-Smithsonian Ctr. for Astrophysics (United States); T. J. Rodigas, A. Weinberger, A. Boss, Carnegie Institution of Washington

(United States); D. Kopon, Max-Planck-Institut für Astronomie (Germany); Y. Wu, Steward Observatory, The Univ. of Arizona (United States); S. Esposito, A. Riccardi, M. Xompero, R. Briguglio, E. Pinna, INAF - Osservatorio Astrofisico di Arcetri (Italy)

- 9148 21 **On-sky speckle nulling with the Subaru Coronagraphic Extreme AO (SCEXAO) instrument** [9148-70]
F. Martinache, Lab. J.L. Lagrange, CNRS, Observatoire de la Côte d'Azur (France) and Subaru Telescope, National Astronomical Observatory of Japan (United States); O. Guyon, Subaru Telescope, National Astronomical Observatory of Japan (United States) and The Univ. of Arizona (United States); N. Jovanovic, C. Clergeon, G. Singh, T. Kudo, Subaru Telescope, National Astronomical Observatory of Japan (United States)
- 9148 22 **Real-time speckle sensing and suppression with project 1640 at Palomar** [9148-71]
G. Vasisht, E. Cady, C. Zhai, T. Lockhart, Jet Propulsion Lab. (United States); B. Oppenheimer, American Museum of Natural History (United States)

Part Two

SESSION 18 WAVEFRONT CORRECTION II

- 9148 24 **On the way to build the M4 Unit for the E-ELT** [9148-73]
E. Vernet, M. Cayrel, N. Hubin, European Southern Observatory (Germany); R. Biasi, Microgate S.r.l. (Italy); D. Gallieni, M. Tintori, A.D.S. International S.r.l. (Italy)
- 9148 25 **Recent improvements of high density magnetic deformable mirrors: faster, larger and stronger** [9148-74]
J. Charton, ALPAO S.A.S. (France); U. Bitenc, Durham Univ. (United Kingdom); J.-F. Curis, S. Camet, R. Di Chiaro, R. Bougeard, ALPAO S.A.S. (France)

SESSION 19 STATUS OF CURRENT AO INSTRUMENT PROJECTS III

- 9148 26 **The ERIS adaptive optics system** [9148-75]
E. Marchetti, E. Fedrigo, M. Le Louarn, P.-Y. Madec, C. Soenke, R. Brast, R. Conzelmann, B. Delabre, M. Duchateau, C. Frank, B. Klein, P. Amico, N. Hubin, European Southern Observatory (Germany); S. Esposito, J. Antichi, L. Carbonaro, A. Puglisi, F. Quirós-Pacheco, A. Riccardi, M. Xompero, INAF - Osservatorio Astrofisico di Arcetri (Italy)
- 9148 27 **Status of the PALM-3000 high order adaptive optics instrument** [9148-4]
R. S. Burruss, Jet Propulsion Lab. (United States); R. G. Dekany, Caltech Optical Observatories (United States); J. E. Roberts, J. C. Shelton, J. K. Wallace, J. A. Tesch, D. L. Palmer, Jet Propulsion Lab. (United States); D. Hale, Caltech Optical Observatories (United States); R. Bartos, Jet Propulsion Lab. (United States); K. M. Rykoski, C. M. Heffner, Palomar Observatory, California Institute of Technology (United States); J. E. Eriksen, Jet Propulsion Lab. (United States); F. Vescelus, California Institute of Technology (United States)

- 9148 28 **Pathfinder first light: alignment, calibration, and commissioning of the LINC-NIRVANA ground-layer adaptive optics subsystem** [9148-77]
D. Kopon, A. Conrad, Max-Planck-Institut für Astronomie (Germany); C. Arcidiacono, INAF - Osservatorio Astrofisico di Bologna (Italy); T. Herbst, Max-Planck-Institut für Astronomie (Germany); V. Viotto, J. Farinato, M. Bergomi, R. Ragazzoni, L. Marafatto, INAF - Osservatorio Astronomico di Padova (Italy); H. Baumeister, T. Bertram, J. Berwein, F. Briegel, R. Hofferbert, F. Kittmann, M. Kürster, L. Mohr, K. Radhakrishnan, Max-Planck-Institut für Astronomie (Germany)

SESSION 20 WAVEFRONT SENSING II

- 9148 2A **Strategies to cope with sodium layer profile variations in laser guide star AO systems (Invited Paper)** [9148-79]
B. L. Ellerbroek, Thirty Meter Telescope Observatory Corp. (United States)
- 9148 2B **A near-infrared tip-tilt sensor for the Keck I laser guide star adaptive optics system** [9148-80]
P. Wizinowich, W. M. Keck Observatory (United States); R. Smith, California Institute of Technology (United States); R. Biasi, Microgate S.r.l. (Italy); S. Cetre, W. M. Keck Observatory (United States); R. Dekany, California Institute of Technology (United States); B. Femenia-Castella, W. M. Keck Observatory (United States); J. Fucik, D. Hale, California Institute of Technology (United States); C. Neyman, W. M. Keck Observatory (United States); D. Pescoller, Microgate S.r.l. (Italy); S. Ragland, P. Stomski, W. M. Keck Observatory (United States); M. Andrichettoni, Microgate S.r.l. (Italy); R. Bartos, K. Bui, California Institute of Technology (United States); A. Cooper, W. M. Keck Observatory (United States); J. Cromer, California Institute of Technology (United States); M. van Dam, Flat Wavefronts (New Zealand); M. Hess, E. James, J. Lyke, W. M. Keck Observatory (United States); H. Rodriguez, California Institute of Technology (United States); T. Stalcup, W. M. Keck Observatory (United States)
- 9148 2E **A miniature curvature wavefront sensor with coherent fiber image bundle** [9148-83]
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J.-P. Véran, National Research Council Canada (Canada); C. Boyer, B. L. Ellerbroek, L. Gilles, Thirty Meter Telescope Observatory Corp. (United States); G. Herriot, D. A. Kerley, Z. Ljusic, National Research Council Canada (Canada); E. A. McVeigh, R. Prior, Univ. of Victoria (Canada); M. Smith, National Research Council Canada (Canada); L. Wang, Thirty Meter Telescope Observatory Corp. (United States)
- 9148 2G **Enabling technologies for GPU driven adaptive optics real-time control** [9148-85]
A. Sevin, D. Perret, D. Gratadour, M. Lainé, J. Brulé, B. Le Ruyet, LESIA, CNRS, Univ. Paris Diderot (France)

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- 9148 2J **Physical optics modeling of sky coverage for TMT NFIRAOS with advanced LQG controller** [9148-88]
L. Wang, L. Gilles, B. Ellerbroek, Thirty Meter Telescope Observatory Corp. (United States);
C. Correia, Univ. do Porto (Portugal)
- 9148 2K **Tomography and calibration for Raven: from simulations to laboratory results** [9148-89]
K. Jackson, Univ. of Victoria (Canada); C. Correia, Univ. do Porto (Portugal); O. Lardire,
Univ. of Victoria (Canada); D. Andersen, NRC - Herzburg Institute of Astrophysics (Canada);
C. Bradley, L. Pham, C. Blain, R. Nash, D. Gamroth, Univ. of Victoria (Canada); J.-P. Vran,
NRC - Herzburg Institute of Astrophysics (Canada)
- 9148 2L **Thirty Meter Telescope astrometry error budget** [9148-90]
M. Schck, Thirty Meter Telescope Observatory Corp. (United States); T. Do, Univ. of Toronto
(Canada); B. Ellerbroek, L. Gilles, Thirty Meter Telescope Observatory Corp. (United States);
G. Herriot, National Research Council Canada (Canada); L. Meyer, Univ. of California, Los
Angeles (United States); R. Suzuki, National Astronomical Observatory of Japan (Japan);
L. Wang, Thirty Meter Telescope Observatory Corp. (United States); S. Yelda, National
Astronomical Observatory of Japan (Japan)
- 9148 2M **Design and numerical simulations of the GMT Natural Guide star WFS** [9148-91]
E. Pinna, G. Agapito, F. Quirs-Pacheco, J. Antichi, L. Carbonaro, R. Briguglio, M. Bonaglia,
A. Riccardi, A. Puglisi, V. Biliotti, INAF - Osservatorio Astrofisico di Arcetri (Italy);
C. Arcidiacono, INAF - Osservatorio Astrofisico di Arcetri (Italy) and INAF - Osservatorio
Astronomico di Bologna (Italy); M. Xompero, INAF - Osservatorio Astrofisico di Arcetri (Italy);
G. Di Rico, A. Valentini, INAF - Osservatorio Astronomico di Teramo (Italy); A. Bouchez,
F. Santoro, G. Trancho, Giant Magellan Telescope Corp. (United States); S. Esposito, INAF -
Osservatorio Astrofisico di Arcetri (Italy)

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- 9148 2N **Detailed analysis of the Canary on-sky results at the WHT using Rayleigh laser guide stars** [9148-92]
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Durham Univ. (United Kingdom); Z. Hubert, D. Gratadour, LESIA, CNRS, Univ. Paris Diderot
(France); J. Osborn, Durham Univ. (United Kingdom); F. Vidal, LESIA, CNRS, Univ. Paris
Diderot (France); F. Chemla, GEPI, CNRS, Univ. Paris Diderot (France); G. Rousset, LESIA,
CNRS, Univ. Paris Diderot (France); R. Myers, Durham Univ. (United Kingdom)
- 9148 2O **Image restoration with spatially variable PSF** [9148-182]
P. Ciliegi, INAF - Osservatorio Astronomico di Bologna (Italy); A. La Camera, Univ. degli
Studi di Genova (Italy); L. Schreiber, M. Bellazzini, INAF - Osservatorio Astronomico di
Bologna (Italy); M. Bertero, P. Boccacci, Univ. degli Studi di Genova (Italy); E. Diolaiti,
I. Foppiani, M. Lombini, INAF - Osservatorio Astronomico di Bologna (Italy); D. Massari, Univ.
degli Studi di Bologna (Italy); P. Montegriffo, INAF - Osservatorio Astronomico di Bologna
(Italy); M. Talia, Univ. degli Studi di Bologna (Italy)
- 9148 2P **Perspectives on phase retrieval and phase diversity in astronomy** [9148-94]
R. A. Gonsalves, Tufts Univ. (United States)

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K. K. Radhakrishnan Santhakumari, Max-Planck-Institut für Astronomie (Germany); L. Marafatto, INAF - Osservatorio Astronomico di Padova (Italy) and Univ. degli Studi di Padova (Italy); M. Bergomi, V. Viotto, J. Farinato, R. Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); T. Herbst, T. Bertram, Max-Planck-Institut für Astronomie (Germany); M. Dima, INAF - Osservatorio Astronomico di Padova (Italy); P. Bizenberger, F. Briegel, F. Kittmann, L. Mohr, Max-Planck-Institut für Astronomie (Germany); D. Magrin, INAF - Osservatorio Astronomico di Padova (Italy)
- 9148 2S **ULTIMATE-SUBARU: project status** [9148-98]
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- 9148 2T **Integration and bench testing for the GRAVITY Coudé IR adaptive optics (CIAO) wavefront sensor** [9148-99]
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- 9148 2U **The multi-conjugate adaptive optics system of the New Solar Telescope at Big Bear Solar Observatory** [9148-100]
D. Schmidt, National Solar Observatory (United States); N. Gorceix, X. Zhang, Big Bear Solar Observatory (United States); J. Marino, National Solar Observatory (United States); R. Coulter, S. Shumko, P. Goode, Big Bear Solar Observatory (United States); T. Rimmele, National Solar Observatory (United States); T. Berkefeld, Kiepenheuer-Institut für Sonnenphysik (Germany)
- 9148 2V **GALACSI integration and functional tests** [9148-101]
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J. L. Lizon, P.-Y. Madec, A. Manescau, L. Mehrgan, B. Sedghi, M. Suárez Valles, C. Soenke, S. Tordo, J. Vernet, S. Zampieri, European Southern Observatory (Germany)

- 9148 2W **The first portable solar and stellar adaptive optics** [9148-102]
D. Ren, California State Univ., Northridge (United States) and Nanjing Institute of Astronomical Optics & Technology (China); R. Li, Nanjing Institute of Astronomical Optics & Technology (China) and Univ. of Chinese Academy of Sciences (China); X. Zhang, J. Dou, Y. Zhu, G. Zhao, Z. Wu, R. Chen, Nanjing Institute of Astronomical Optics & Technology (China); C. Liu, Nanjing Institute of Astronomical Optics & Technology (China) and Univ. of Chinese Academy of Sciences (Central African Republic); F. Yang, C. Yang, Nanjing Institute of Astronomical Optics & Technology (China) and Univ. of Chinese Academy of Sciences (China)
- 9148 2Y **First light of the LINC-NIRVANA Pathfinder experiment** [9148-106]
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- 9148 2Z **Swimming with ShARCS: comparison of on-sky sensitivity with model predictions for ShaneAO on the Lick Observatory 3-meter telescope** [9148-107]
S. Srinath, R. McGurk, C. Rockosi, Univ. of California, Santa Cruz (United States); R. Kupke, D. Gavel, G. Cabak, D. Cowley, M. Peck, C. Ratliff, E. Gates, D. Dillon, A. Norton, M. Reining, Univ. of California Observatories (United States)
- 9148 30 **The CHARA array adaptive optics I: common-path optical and mechanical design, and preliminary on-sky results** [9148-108]
X. Che, Univ. of Michigan (United States); L. Sturmann, The CHARA Array, Mountain Wilson Observatory (United States); J. D. Monnier, Univ. of Michigan (United States); T. A. ten Brummelaar, J. Sturmann, The CHARA Array, Mountain Wilson Observatory (United States); S. T. Ridgway, National Optical Astronomy Observatory (United States); M. J. Ireland, Macquaire Univ. (Australia); N. H. Turner, The CHARA Array, Mountain Wilson Observatory (United States); H. A. McAlister, Georgia State Univ. (United States)
- 9148 31 **Development of a new solar adaptive optics system at the Hida Observatory** [9148-109]
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- 9148 33 **Optical design of the relay optics for the MICADO SCAO system** [9148-111]
M. Cohen, F. Chemla, T. Buey, E. Gendron, Z. Hubert, LESIA, CNRS, GEPI Observatoire de Paris (France); M. Hartl, Max-Planck-Institut für extraterrestrische Physik (Germany); Y. Clénet, LESIA, CNRS, GEPI Observatoire de Paris (France); R. Davies, Max-Planck-Institut für extraterrestrische Physik (Germany)

- 9148 34 **ARGOS wavefront sensing: from detection to correction** [9148-112]
G. Orban de Xivry, Max-Planck-Institut für extraterrestrische Physik (Germany); M. Bonaglia, INAF - Osservatorio Astrofisico di Arcetri (Italy); J. Borelli, Max-Planck-Institut für Astronomie (Germany); L. Busoni, INAF - Osservatorio Astrofisico di Arcetri (Italy); C. Connot, Max-Planck-Institut für Radioastronomie (Germany); S. Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); W. Gaessler, M. Kulas, Max-Planck-Institut für Astronomie (Germany); T. Mazzone, A. Puglisi, INAF - Osservatorio Astrofisico di Arcetri (Italy); S. Rabien, Max-Planck-Institut für extraterrestrische Physik (Germany); J. Storm, Leibniz-Institut für Astrophysik Potsdam (Germany); J. Ziegler, Max-Planck-Institut für extraterrestrische Physik (Germany)
- 9148 35 **AO-308: the high-order adaptive optics system at Big Bear Solar Observatory** [9148-113]
S. Shumko, N. Gorceix, Big Bear Solar Observatory (United States); S. Choi, Big Bear Solar Observatory (United States) and Korea Astronomy and Space Science Institute (Korea, Republic of); A. Kellerer, Big Bear Solar Observatory (United States); W. Cao, Big Bear Solar Observatory (United States) and New Jersey Institute of Technology (United States); P. R. Goode, New Jersey Institute of Technology (United States); V. Abramenko, Big Bear Solar Observatory (United States); K. Richards, T. R. Rimmele, J. Marino, National Solar Observatory (United States)
- 9148 37 **Present opto-mechanical design status of NFIRAOS** [9148-115]
P. W. G. Byrnes, J. Atwood, National Research Council Canada (Canada); M.-A. Boucher, Institut National d'Optique (Canada); J. Fitzsimmons, A. Hill, G. Herriot, P. Spanò, K. Szeto, I. Wevers, National Research Council Canada (Canada)
- 9148 38 **Altair performance and upgrades** [9148-116]
O. Lai, Gemini Observatory (United States) and Subaru Telescope, National Astronomical Observatory of Japan (United States); J.-P. Véran, G. Herriot, NRC - Herzberg Institute of Astrophysics (Canada); J. White, J. Ball, C. Trujillo, Gemini Observatory (United States)
- 9148 39 **KAPAO first light: the design, construction and operation of a low-cost natural guide star adaptive optics system** [9148-117]
S. A. Severson, Sonoma State Univ. (United States); P. I. Choi, Pomona College (United States); K. E. Badham, Sonoma State Univ. (United States); D. Bolger, D. S. Contreras, Pomona College (United States); B. N. Gilbreth, Sonoma State Univ. (United States); C. Guerrero, Harvey Mudd College (United States); E. Littleton, J. Long, L. P. McGonigle, W. A. Morrison, F. Ortega, A. R. Rudy, J. R. Wong, Pomona College (United States); E. Spjut, Harvey Mudd College (United States); C. Baranec, Institute for Astronomy, Univ. of Hawai'i (United States); R. Riddle, California Institute of Technology (United States)
- 9148 3A **Commissioning ShARCS: the Shane adaptive optics infrared camera-spectrograph for the Lick Observatory Shane 3-m telescope** [9148-118]
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- 9148 3B **Opto-mechanical design of ShaneAO: the adaptive optics system for the 3-meter Shane Telescope** [9148-119]
C. Ratliff, J. Cabak, D. Gavel, R. Kupke, D. Dillon, E. Gates, W. Deich, J. Ward, D. Cowley, T. Pfister, M. Saylor, Lick Observatory, Univ. of California, Santa Cruz (United States)

- 9148 3D **The NGS Pyramid wavefront sensor for ERS** [9148-122]
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- 9148 3E **A sodium laser guide star facility for the ANU/EOS space debris tracking adaptive optics demonstrator** [9148-124]
C. D'Orgeville, F. Bennet, The Australian National Univ. (Australia); M. Blundell, R. Brister, A. Chan, M. Dawson, Y. Gao, EOS Space Systems Pty. Ltd. (Australia); N. Paulin, I. Price, F. Rigaut, The Australian National Univ. (Australia); I. Ritchie, EOS Space Systems Pty. Ltd. (Australia); M. Sellars, The Australian National Univ. (Australia); C. Smith, EOS Space Systems Pty. Ltd. (Australia); K. Uhlendorf, Jenoptik Optical Systems GmbH (Germany); Y. Wang, EOS Space Systems Pty. Ltd. (Australia)
- 9148 3G **Pulsed laser architecture for enhancing backscatter from sodium** [9148-127]
T. J. Kane, P. D. Hillman, C. A. Denman, FASORtronics LLC (United States)
- 9148 3H **ARGOS laser system mechanical design** [9148-128]
M. Deysenroth, M. Honsberg, H. Gemperlein, J. Ziegler, W. Raab, S. Rabien, L. Barl, Max-Planck-Institut für extraterrestrische Physik (Germany); W. Gässler, J. L. Borelli, Max-Planck-Institut für Astronomie (Germany)
- 9148 3I **Laboratory validation of a laser shaping system before guide star projection** [9148-129]
S. Zúñiga, Univ. Técnica Federico Santa María (Chile); C. Béchet, H. González-Núñez, Pontificia Univ. Católica de Chile (Chile); B. Neichel, Lab. d'Astrophysique de Marseille, CNRS, Aix Marseille Univ. (France) and Gemini Observatory Southern Operations Ctr. (Chile); V. Fesquet, V. Garrel, Gemini Observatory Southern Operations Ctr. (Chile); P. Escárate, M. Castro, Univ. Técnica Federico Santa María (Chile); D. Guzmán, A. Guesalaga, Pontificia Univ. Católica de Chile (Chile)
- 9148 3J **Polarization control optimization of the Gemini South beam transfer optics** [9148-130]
C. Araujo, C. Moreno, V. Fesquet, V. Garrel, C. Marchant, Gemini Observatory (Chile)
- 9148 3K **The ARGOS laser system: green light for ground layer adaptive optics at the LBT** [9148-131]
W. Raab, S. Rabien, Max-Planck-Institut für extraterrestrische Physik (Germany); W. Gässler, Max-Planck-Institut für Astronomie (Germany); S. Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); L. Barl, Max-Planck-Institut für extraterrestrische Physik (Germany); J. Borelli, Max-Planck-Institut für Astronomie (Germany); M. Daysenroth, H. Gemperlein, Max-Planck-Institut für extraterrestrische Physik (Germany); M. Kulas, Max-Planck-Institut für Astronomie (Germany); J. Ziegler, Max-Planck-Institut für extraterrestrische Physik (Germany)
- 9148 3L **Coupling efficiency measurements for long-pulsed solid sodium laser based on measured sodium profile data** [9148-133]
K. Jin, Institute of Optics and Electronics (China) and The Key Lab. on Adaptive Optics (China) and Univ. of Chinese Academy of Sciences (China); K. Wei, Institute of Optics and Electronics (China) and The Key Lab. on Adaptive Optics (China); S. Xie, Y. Bo, J. Zuo,

Technical Institute of Physics and Chemistry (China); P. Wang, Univ. of Chinese Academy of Sciences (China) and Technical Institute of Physics and Chemistry (China); L. Feng, National Observatory of China (China); X. Xue, Univ. of Science and Technology of China (China); M. Li, Institute of Optics and Electronics (China) and The Key Lab. on Adaptive Optics (China); X. Cheng, Wuhan Institute of Physics and Mathematics (China); C. Cui, Anhui Institute of Optics and Fine Mechanics (China); Y. Shen, Q. Bian, J. Yao, Technical Institute of Physics and Chemistry (China); A. Otárola, Thirty Meter Telescope Observatory Corp. (United States); X. Dai, Institute of Optics and Electronics (China) and The Key Lab. on Adaptive Optics (China) and Univ. of Chinese Academy of Sciences (China); Q. Peng, Technical Institute of Physics and Chemistry (China); C. Rao, Institute of Optics and Electronics (China) and The Key Lab. on Adaptive Optics (China); Z. Xu, Technical Institute of Physics and Chemistry (China); Y. Zhang, Institute of Optics and Electronics (China) and The Key Lab. on Adaptive Optics (China)

9148 3M **Proposal for a field experiment of elongated Na LGS wave-front sensing in the perspective of the E-ELT** [9148-134]

G. Rousset, D. Gratadour, E. Gendron, T. Buey, LESIA, CNRS, Observatoire de Paris, Univ. Paris Diderot (France); R. Myers, T. Morris, A. Basden, G. Talbot, Durham Univ. (United Kingdom); D. Bonaccini Calia, E. Marchetti, T. Pfrommer, European Southern Observatory (Germany)

9148 3N **Using a deformable mirror to generate custom laser guide star asterisms: simulation and laboratory results** [9148-135]

A. P. Norton, S. Srinath, D. Gavel, R. Kupke, D. Dillon, UC Observatory Lab. for Adaptive Optics (United States)

9148 3O **Assembly and test results of the AOF laser guide star units at ESO** [9148-136]

W. Hackenberg, D. Bonaccini Calia, B. Buzzoni, M. Comin, C. Dupuy, F. Gago, I. M. Guidolin, R. Guzman, R. Holzloehner, L. Kern, J. P. Kirchbauer, S. Lewis, J.-L. Lizon, S. McLay, T. Pfrommer, M. Quattri, J. Quentin, R. Ridings, European Southern Observatory (Germany)

9148 3P **Laser guide star pointing camera for ESO LGS Facilities** [9148-137]

D. Bonaccini Calia, European Southern Observatory (Germany); M. Centrone, F. Pedichini, INAF - Osservatorio Astronomico di Roma (Italy); A. Ricciardi, A. Cerruto, Astrel Instruments (Italy); F. Ambrosino, INAF - Osservatorio Astronomico di Roma (Italy)

9148 3Q **Evaluating the compliance of Keck's LGS AO automated aircraft protection system with FAA adopted criteria** [9148-138]

P. J. Stomski Jr., R. Campbell, W. M. Keck Observatory (United States); T. W. Murphy Jr., Univ. of California, San Diego (United States)

POSTER SESSION: ASTRONOMY WITH AO

9148 3T **Experimental demonstration of brighter sodium resonant scattering with 1.7 GHz sideband repumping for long pulse laser** [9148-132]

L. Li, S. Zhang, W. Hua, H. Wang, Y. Ning, X. Xu, National Univ. of Defense Technology (China)

- 9148 3U **On the use of asymmetric PSF on NIR images of crowded stellar fields** [9148-142]
G. Fiorentino, INAF - Osservatorio Astronomico di Bologna (Italy); I. Ferraro, G. Iannicola, INAF - Osservatorio Astronomico di Roma (Italy); G. Bono, INAF - Osservatorio Astronomico di Roma (Italy) and Univ. degli Studi di Roma Tor Vergata (Italy); M. Monelli, Instituto de Astrofísica de Canarias (Spain) and Univ. de la Laguna (Spain); V. Testa, INAF - Osservatorio Astronomico di Roma (Italy); C. Arcidiacono, INAF - Osservatorio Astronomico di Bologna (Italy); M. Faccini, INAF - Osservatorio Astronomico di Roma (Italy); R. Gilmozzi, European Southern Observatory (Germany); M. Xompero, R. Briguglio, INAF - Osservatorio Astronomico di Arcetri (Italy)
- 9148 3V **Photometric performance of LGS MCAO with science-based metrics: first results from Gemini/GeMS observations of Galactic globular clusters** [9148-143]
P. Turri, Univ. of Victoria (Canada) and NRC - Herzberg Institute of Astrophysics (Canada); A. W. McConnachie, P. B. Stetson, NRC - Herzberg Institute of Astrophysics (Canada); G. Fiorentino, INAF - Osservatorio Astronomico di Bologna (Italy); D. R. Andersen, NRC - Herzberg Institute of Astrophysics (Canada); G. Bono, INAF - Osservatorio Astronomico di Bologna (Italy); J.-P. Véran, NRC - Herzberg Institute of Astrophysics (Canada)
- 9148 3X **L'-band AGPM vector vortex coronagraph's first light on LBT/LMIRCam** [9148-145]
D. Defrère, Steward Observatory, The Univ. of Arizona (United States); O. Absil, Univ. de Liège (Belgium); P. Hinz, Steward Observatory, The Univ. of Arizona (United States); J. Kuhn, Jet Propulsion Lab. (United States); D. Mawet, European Southern Observatory (Chile); B. Mennesson, Jet Propulsion Lab. (United States); A. Skemer, Steward Observatory, The Univ. of Arizona (United States); K. Wallace, Jet Propulsion Lab. (United States); V. Bailey, E. Downey, Steward Observatory, The Univ. of Arizona (United States); C. Delacroix, Univ. de Liège (Belgium); O. Durney, Steward Observatory, The Univ. of Arizona (United States); P. Forsberg, Uppsala Univ. (Sweden); C. Gomez, S. Habraken, Univ. de Liège (Belgium); W. F. Hoffmann, Steward Observatory, The Univ. of Arizona (United States); M. Karlsson, Uppsala Univ. (Sweden); M. Kenworthy, Leiden Observatory (Netherlands); J. Leisenring, M. Montoya, Steward Observatory, The Univ. of Arizona (United States); L. Pueyo, Space Telescope Science Institute (United States); M. Skrutskie, Univ. of Virginia (United States); J. Surdej, Univ. de Liège (Belgium)

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- 9148 3Y **Double drive modes unimorph deformable mirror with high actuator count for astronomical application** [9148-146]
Y. Liu, Univ. of Science and Technology of China (China); J. Ma, Ningbo Univ. (China); J. Chen, B. Li, J. Chu, Univ. of Science and Technology of China (China)
- 9148 3Z **Payload characterization for CubeSat demonstration of MEMS deformable mirrors** [9148-147]
A. Marinan, K. Cahoy, M. Webber, Massachusetts Institute of Technology (United States); R. Belikov, E. Bendek, NASA Ames Research Ctr. (United States)
- 9148 40 **Analysis of the static deformation matching between numerical and experimental data on the voice-coil actuated deformable mirrors** [9148-148]
C. Del Vecchio, R. Briguglio, A. Riccardi, M. Xompero, INAF - Osservatorio Astrofisico di Arcetri (Italy)

- 9148 42 **A compact adaptive optics system with 3mm narrow-interval deformable mirror** [9148-150]
M. Li, L. Xue, H. Xian, X. Rao, K. Wei, X. Zhang, S. Chen, A. Zhang, D. Chen, C. Rao,
Y. Zhang, Institute of Optics and Electronics (China) and The Key Lab. On Adaptive Optics
(China)
- 9148 43 **Optimization of electrode configuration in surface-parallel actuated deformable mirrors**
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M. Laslandes, S. Pellegrino, J. Steeves, California Institute of Technology (United States);
K. Patterson, Jet Propulsion Lab. (United States)
- 9148 44 **The 384-channel prototype of DM Electronics for ELT AO systems** [9148-152]
K. Caputa, J. Atwood, G. Herriot, J.-P. Véran, P. Spanò, National Research Council
Canada (Canada); A. Zielinski, Univ. of Victoria (Canada)
- 9148 45 **The deformable secondary mirror of VLT: final electro-mechanical and optical acceptance
test results** [9148-153]
R. Briguglio, INAF - Osservatorio Astrofisico di Arcetri (Italy); R. Biasi, Microgate S.r.l. (Italy);
M. Xompero, A. Riccardi, INAF - Osservatorio Astrofisico di Arcetri (Italy); M. Andrichetoni,
D. Pescoller, G. Angerer, Microgate S.r.l. (Italy); D. Gallieni, A.D.S. International S.r.l. (Italy);
E. Vernet, J. Kolb, R. Arsenault, P.-Y. Madec, European Southern Observatory (Germany)
- 9148 46 **Deformable mirror interferometric analysis for the direct imagery of exoplanets** [9148-154]
J. Mazoyer, R. Galicher, P. Baudoz, LESIA, CNRS, Observatoire de Paris (France); P. Lanzoni,
F. Zamkotsian, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France);
G. Rousset, LESIA, CNRS, Observatoire de Paris (France)

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- 9148 48 **Lyot-based low order wavefront sensor: implementation on the Subaru Coronagraphic
Extreme Adaptive Optics System and its laboratory performance** [9148-157]
G. Singh, Subaru Telescope, National Astronomical Observatory of Japan (United States)
and LESIA, CNRS, Observatoire de Paris (France); O. Guyon, Subaru Telescope, National
Astronomical Observatory of Japan (United States) and Jet Propulsion Lab. (United States);
P. Baudoz, LESIA, CNRS, Observatoire de Paris (France); N. Jovanovich, Subaru Telescope,
National Astronomical Observatory of Japan (United States); F. Martinache, Observatoire
de la Cote d'Azur, CNRS, Univ. de Nice Sophia-Antipolis (France); T. Kudo, Subaru
Telescope, National Astronomical Observatory of Japan (United States); E. Serabyn,
J. G. Kuhn, Jet Propulsion Lab. (United States)
- 9148 49 **CHARIS science: performance simulations for the Subaru Telescope's third-generation of
exoplanet imaging instrumentation** [9148-158]
T. D. Brandt, Institute for Advanced Study (United States); M. W. McElwain, NASA Goddard
Space Flight Ctr. (United States); M. Janson, Queen's Univ. Belfast (United Kingdom);
G. R. Knapp, Princeton Univ. (United States); K. Mede, The Univ. of Tokyo (Japan);
M. A. Limbach, T. Groff, A. Burrows, J. E. Gunn, Princeton Univ. (United States); O. Guyon,
Subaru Telescope, National Astronomical Observatory of Japan (United States) and The
Univ. of Arizona (United States); J. Hashimoto, The Univ. of Oklahoma (United States);
M. Hayashi, National Astronomical Observatory of Japan (Japan); N. Jovanovic, Subaru
Telescope, National Astronomical Observatory of Japan (United States); N. J. Kasdin,
Princeton Univ. (United States); M. Kuzuhara, National Astronomical Observatory of Japan
(Japan) and Tokyo Institute of Technology (Japan); R. H. Lupton, Princeton Univ. (United

States); F. Martinache, Subaru Telescope, National Astronomical Observatory of Japan (United States) and Laboratoire Lagrange, CNRS, Observatoire de la Côte d'Azur (France); S. Sorahana, Nagoya Univ. (Japan); D. S. Spiegel, Institute for Advanced Study (United States); N. Takato, Subaru Telescope, National Astronomical Observatory of Japan (United States); M. Tamura, National Astronomical Observatory of Japan (Japan) and Univ. of Tokyo (Japan); E. L. Turner, Princeton Univ. (United States) and The Univ. of Tokyo (Japan); R. Vanderbei, Princeton Univ. (United States); J. Wisniewski, Univ. of Oklahoma (United States)

Part Three

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- 9148 4A **A software based de-rotation algorithm concept for the new adaptive optics module (NAOMI) for the auxiliary telescopes of the VLTI** [9148-159]
E. Aller-Carpentier, E. Marchetti, R. Dorn, F. Delplancke-Stroebele, E. Fedrigo, M. Le Louarn, N. Hubin, J. Paufique, J. Woillez, European Southern Observatory (Germany)
- 9148 4B **Evaluation of the Xeon phi processor as a technology for the acceleration of real-time control in high-order adaptive optics systems** [9148-160]
D. Barr, UK Astronomy Technology Ctr. (United Kingdom) and Heriot-Watt Univ. (United Kingdom); A. Basden, N. Dipper, Durham Univ. (United Kingdom); N. Schwartz, A. Vick, H. Schnetler, UK Astronomy Technology Ctr. (United Kingdom)
- 9148 4C **Preliminary evaluation and comparison of atmospheric turbulence rejection performance for infinite and receding horizon control in adaptive optics systems** [9148-161]
M. V. Konnik, J. De Dona, The Univ. of Newcastle (Australia)
- 9148 4E **Multi-input multi-output identification for control of adaptive optics systems** [9148-165]
R. Muradore, Univ. degli Studi di Verona (Italy); J. Kolb, L. Pettazzi, E. Marchetti, European Southern Observatory (Germany)
- 9148 4F **Real-time control for the high order, wide field DRAGON AO test bench** [9148-168]
A. Basden, N. A. Bharmal, U. Bitenc, N. Dipper, T. Morris, R. Myers, A. Reeves, E. Younger, Durham Univ. (United Kingdom)
- 9148 4G **VLT DSM, the control system of the largest deformable secondary mirror ever manufactured** [9148-169]
M. Manetti, Microgate S.r.l. (Italy); M. Morandini, P. Mantegazza, Politecnico di Milano (Italy); R. Biasi, M. Andrighettoni, Microgate S.r.l. (Italy); D. Gallieni, A.D.S. International S.r.l. (Italy)
- 9148 4H **Anti-windup control of tip-tilt mirror** [9148-172]
J.-P. Folcher, Lab. Lagrange, CNRS, Univ. de Nice Sophia Antipolis (France)
- 9148 4J **Woofers-tweeters deformable mirror control for closed-loop adaptive optics: theory and practice** [9148-174]
D. Gavel, Univ. of California Observatories (United States); A. Norton, Lockheed Martin Space Systems (United States)

- 9148 4K **Benchmarking hardware architecture candidates for the NFIRAOS real-time controller** [9148-176]
M. Smith, D. Kerley, G. Herriot, J.-P. Véran, NRC - Dominion Astrophysical Observatory (Canada)
- 9148 4L **Kalman filter design for atmospheric tip/tilt, tip/tilt anisoplanatism and focus filtering on extremely large telescopes** [9148-177]
L. Gilles, Thirty Meter Telescope Observatory Corp. (United States); H. F. Raynaud, Lab. Charles Fabry de l'Institut d'Optique, CNRS, Univ. Paris-Sud (France); C. Correia, Univ. do Porto (Portugal); L. Wang, B. Ellerbroek, C. Boyer, Thirty Meter Telescope Observatory Corp. (United States); C. Kulcsár, Lab. Charles Fabry de l'Institut d'Optique, CNRS, Univ. Paris-Sud (France)
- 9148 4M **First on-sky results of a neural network based tomographic reconstructor: Carmen on Canary** [9148-178]
J. Osborn, Durham Univ. (United Kingdom); D. Guzman, Pontificia Univ. Católica de Chile (Chile); F. J. de Cos Juez, Univ. de Oviedo (Spain); A. G. Basden, T. J. Morris, Durham Univ. (United Kingdom); É. Gendron, LESIA, CNRS, Observatoire de Paris (France); T. Butterley, R. M. Myers, Durham Univ. (United Kingdom); A. Guesalaga, Pontificia Univ. Católica de Chile (Chile); F. Sanchez Lasheras, M. Gomez Victoria, M. L. Sánchez Rodríguez, Univ. de Oviedo (Spain); D. Gratadour, G. Rousset, LESIA, CNRS, Observatoire de Paris (France)
- 9148 4N **Robustness of tomographic reconstructors versus real atmospheric profiles in the ELT perspective** [9148-179]
E. Gendron, C. Morel, LESIA, CNRS, Observatoire de Paris (France); J. Osborn, Durham Univ. (United Kingdom); O. Martin, D. Gratadour, F. Vidal, LESIA, CNRS, Observatoire de Paris (France); M. Le Louarn, European Southern Observatory (Germany); G. Rousset, LESIA, CNRS, Observatoire de Paris (France)

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- 9148 4O **Morphology of distant galaxies with MCAO** [9148-180]
B. Neichel, Lab. d'Astrophysique de Marseille, CNRS, Aix Marseille Univ. (France); M. Huertas-Company, T. Huellou, GEPI, CNRS, Observatoire de Paris à Meudon (France); B. Epinat, Lab. d'Astrophysique de Marseille, CNRS, Aix Marseille Univ. (France); M. Puech, GEPI, CNRS, Observatoire de Paris à Meudon (France); D. Gratadour, LESIA, CNRS, Observatoire de Paris (France)
- 9148 4P **Maximum likelihood approach for the adaptive optics point spread function reconstruction** [9148-181]
J. Exposito, D. Gratadour, G. Rousset, Y. Clénet, LESIA, CNRS, Observatoire de Paris, Univ. Paris-Diderot (France); L. Mugnier, ONERA (France); É. Gendron, LESIA, CNRS, Observatoire de Paris, Univ. Paris-Diderot (France)

- 9148 4Q **CHARA array adaptive optics II: non-common-path correction and downstream optics** [9148-183]
T. ten Brummelaar, The CHARA Array (United States); X. Che, Univ. of Michigan (United States); H. McAlister, CHARA, Georgia State Univ. (United States); M. Ireland, The Australian National Univ. (Australia); J. Monnier, Univ. of Michigan (United States); D. Mourard, Univ. de Nice (France); S. Ridgway, National Optical Astronomy Observatory (United States); J. Sturmann, L. Sturmann, N. Turner, The CHARA Array (United States); P. Tuthill, The Univ. of Sydney (Australia)
- 9148 4S **Laser guide star adaptive optics point spread function reconstruction project at W. M. Keck Observatory: preliminary on-sky results** [9148-185]
L. Jollissaint, Univ. of Applied Sciences Western Switzerland (Switzerland); S. Ragland, P. Wizinowich, W. M. Keck Observatory (United States); A. Bouxin, Univ. of Applied Sciences Western Switzerland (Switzerland)
- 9148 4T **Real-time Strehl and image quality performance estimator at Paranal Observatory** [9148-186]
D. Mawet, A. Smette, European Southern Observatory (Chile); M. S. Sarazin, H. Kuntschner, European Southern Observatory (Germany); J. H. Girard, European Southern Observatory (Chile)
- 9148 4U **Strehl-constrained reconstruction of post-adaptive optics data and the Software Package AIRY, v. 6.1** [9148-187]
M. Carbillet, Observatoire de la Cote d'Azur, CNRS, Univ. de Nice Sophia-Antipolis (France); A. La Camera, Univ. degli Studi di Genova (Italy); J. Deguignet, Observatoire de la Cote d'Azur, CNRS, Univ. de Nice Sophia-Antipolis (France); M. Prato, Univ. degli Studi di Modena e Reggio Emilia (Italy); M. Bertero, Univ. degli Studi di Genova (Italy); É. Aristidi, Observatoire de la Cote d'Azur, CNRS, Univ. de Nice Sophia-Antipolis (France); P. Boccacci, Univ. degli Studi di Genova (Italy)
- 9148 4V **On-sky PSF reconstruction with APeTy** [9148-188]
R. Olguin, Pontificia Univ. Católica de Chile (Chile); M. Hartung, T. Hayward, Gemini Observatory (Chile); D. Gratadour, LESIA, CNRS, Observatoire de Paris (France); A. Guesalaga, Pontificia Univ. Católica de Chile (Chile)
- 9148 4W **Analysis of turbulent atmospheric anisoplanatism influence on adaptive optics system over horizontal path** [9148-253]
Q. Sun, Y. Ning, B. Shu, S. Du, National Univ. of Defense Technology (China)

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- 9148 4X **Meaningful options for a dichroic unit within the natural & laser guide star AO systems at the Giant Magellan Telescope** [9148-189]
J. Antichi, E. Pinna, S. Esposito, M. Bonaglia, L. Busoni, INAF - Osservatorio Astrofisico di Arcetri (Italy); F. Santoro, A. Bouchez, Giant Magellan Telescope Corp. (United States)
- 9148 4Z **Design of adaptive optics calibration source for the Giant Magellan Telescope** [9148-192]
P. Zhou, J. H. Burge, C. Zhao, S. Benjamin, B. Cuerden, College of Optical Sciences, The Univ. of Arizona (United States); A. Bouchez, Giant Magellan Telescope Corp. (United States)

- 9148 50 **Optical design of the Big Bear Solar Observatory's multi-conjugate adaptive optics system** [9148-193]
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- 9148 51 **1500Hz adaptive optics system using commercially available components** [9148-194]
A. Schimpf, M. Micallef, J. Charton, ALPAO S.A.S. (France)
- 9148 53 **Testing the analytical model of the pyramid wavefront sensor with high-order aberrations on the optical bench** [9148-196]
M. Rosensteiner, J.-P. Véran, NRC - Herzberg Institute of Astrophysics (Canada)

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- 9148 55 **A composite tracking sensor with high accuracy and large dynamic range** [9148-199]
X. Ma, K. Wei, W. Zheng, C. Rao, Institute of Optics and Electronics (China) and The Key Lab. Of Adaptive Optics (China)
- 9148 56 **Theoretical analyses for the relationship between the performance of quadrant photodetector and the size of incident light spot** [9148-201]
Z. Zheng, Nanjing Institute of Astronomical Optics & Technology (China) and Univ. of Chinese Academy of Sciences (China); C. Li, S. Zhang, Nanjing Institute of Astronomical Optics & Technology (China)
- 9148 57 **Non-common path aberration corrections for current and future AO systems** [9148-202]
M. Lamb, Univ. of Victoria (Canada) and NRC - Herzberg Institute of Astrophysics (Canada); D. R. Andersen, J.-P. Véran, NRC - Herzberg Institute of Astrophysics (Canada); C. Correia, Univ. do Porto (Portugal); G. Herriot, M. Rosensteiner, NRC - Herzberg Institute of Astrophysics (Canada); J. Fiege, Univ. of Manitoba (Canada)
- 9148 58 **Cross-scale inference and wavefront reconstruction** [9148-203]
S. K. Maji, INRIA (France); T. Fusco, ONERA (France); H. Yahia, INRIA (France)
- 9148 59 **Wavefront sensing from the image domain with the Oxford-SWIFT integral field spectrograph** [9148-204]
B. Pope, N. Thatte, Univ. of Oxford (United Kingdom); R. Burruss, Jet Propulsion Lab. (United States); M. Tecza, F. Clarke, G. Cotter, Univ. of Oxford (United Kingdom)
- 9148 5B **Near-infrared aberration tracking using a correlation algorithm on the Galactic Center** [9148-207]
N. Anugu, P. Garcia, Univ. do Porto (Portugal); A. Amorim, P. Gordo, Univ. de Lisboa (Portugal); F. Eisenhauer, Max-Planck-Institut für extraterrestrische Physik (Germany); G. Perrin, Observatoire de Paris à Meudon, CNRS (France); W. Brandner, Max-Planck-Institut für Astronomie (Germany); C. Straubmeier, Univ. zu Köln (Germany); K. Perraut, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS (France)

- 9148 5C **High speed and high precision pyramid wavefront sensor: In labs validation and preparation to on sky demonstration** [9148-208]
K. El Hadi, Lab. d'Astrophysique de Marseille, CNRS, Aix Marseille Univ. (France); T. Fusco, J.-F. Sauvage, ONERA (France) and Lab. d'Astrophysique de Marseille, CNRS, Aix Marseille Univ. (France); B. Neichel, Lab. d'Astrophysique de Marseille, CNRS, Aix Marseille Univ. (France)
- 9148 5D **Focal-plane wavefront sensing with high-order adaptive optics systems** [9148-209]
V. Korkiakoski, Delft Ctr. for Systems and Control (Netherlands) and Leiden Observatory (Netherlands); C. U. Keller, Leiden Observatory (Netherlands); N. Doelman, TNO Science and Industry (Netherlands) and Leiden Observatory (Netherlands); M. Kenworthy, G. Otten, Leiden Observatory (Netherlands); M. Verhaegen, Delft Ctr. for Systems and Control (Netherlands)
- 9148 5E **A novel means of measuring non-common path errors in an adaptive optics system** [9148-210]
E. E. Bloemhof, National Science Foundation (United States)
- 9148 5G **Pre-shipment test of the ARGOS laser guide star wavefront sensor** [9148-212]
M. Bonaglia, L. Busoni, T. Mazzoni, A. Puglisi, J. Antichi, S. Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); G. Orban de Xivry, S. Rabien, Max-Planck-Institut für extraterrestrische Physik (Germany)
- 9148 5H **Design optimization and lab demonstration of ZELDA: a Zernike sensor for near-coronagraph quasi-static measurements** [9148-213]
M. N'Diaye, Space Telescope Science Institute (United States); K. Dohlen, A. Caillat, A. Costille, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France); T. Fusco, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France) and ONERA (France); A. Jolivet, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France) and Institut d'Astrophysique et de Géophysique (Belgium); F. Madec, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France); L. Mugnier, ONERA (France); B. Paul, J.-F. Sauvage, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France) and ONERA (France); R. Soummer, Space Telescope Science Institute (United States); A. Vigan, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France); J. K. Wallace, Jet Propulsion Lab. (United States)
- 9148 5I **Understanding and correcting low order residual static aberrations in adaptive optics corrected images** [9148-214]
R. Rampy, S. Ragland, P. Wizinowich, R. Campbell, W. M. Keck Observatory (United States)
- 9148 5J **Applications of variable focus liquid lenses for curvature wave-front sensors in astronomy** [9148-215]
J. Fuentes-Fernández, S. Cuevas, L. C. Alvarez-Núñez, A. M. Watson, Univ. Nacional Autónoma de México (Mexico)
- 9148 5K **Comparing the performance of open loop centroiding techniques in the Raven MOAO system** [9148-216]
D. R. Andersen, NRC - Herzberg Institute of Astrophysics (Canada); C. Bradley, D. Gamroth, Univ. of Victoria (Canada); D. Kerley, NRC - Herzberg Institute of Astrophysics (Canada); O. Lardière, Univ. of Victoria (Canada); J.-P. Véran, NRC - Herzberg Institute of Astrophysics (Canada)

- 9148 5L **Effects of differential wavefront sensor bias drifts on high contrast imaging** [9148-217]
N. Sadakuni, Gemini Observatory (United States); B. A. Macintosh, Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States) and Lawrence Livermore National Lab. (United States); D. W. Palmer, L. A. Poyneer, Lawrence Livermore National Lab. (United States); C. E. Max, Univ. of California, Santa Cruz (United States); D. Savransky, Cornell Univ. (United States); S. J. Thomas, NASA Ames Research Ctr. (United States); A. Cardwell, S. Goodsell, M. Hartung, P. Hibon, F. Rantakyro, A. Serio, Gemini Observatory (Chile)
- 9148 5M **Wavefront sensing in a partially illuminated, rotating pupil** [9148-218]
T. Bertram, K. Kumar Radhakrishnan Santhakumari, Max-Planck-Institut für Astronomie (Germany); L. Marafatto, INAF - Osservatorio Astronomico di Padova (Italy) and Univ. delgi Studi di Padova (Italy); C. Arcidiacono, INAF - Osservatorio Astronomico di Bologna (Italy); J. Berwein, Max-Planck-Institut für Astronomie (Germany); R. Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); T. M. Herbst, Max-Planck-Institut für Astronomie (Germany)
- 9148 5N **A new phase retrieval algorithm based on multi-layered intensity distribution** [9148-220]
S. Du, X. Zhang, B. Shu, National Univ. of Defense Technology (China)
- 9148 5O **New CCD imagers for adaptive optics wavefront sensors** [9148-221]
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- 9148 5P **Discretized aperture mapping with a micro-lenses array for interferometric direct imaging** [9148-222]
F. Patru, J. Antichi, Osservatorio Astrofisico di Arcetri (Italy); D. Mawet, European Southern Observatory (Chile); L. Jolissaint, Haute Ecole d'Ingenierie et de Gestion du Canton de Vaud (Switzerland); M. Carbillet, Observatoire de la Côte d'Azur, CNRS (France); J. Milli, J. Girard, European Southern Observatory (Chile); P. Rabou, Institut de Planetologie et d'Astrophysique, CNRS (France); E. Giro, Osservatorio Astronomico di Padova (Italy); D. Mourard, Observatoire de la Cote d'Azur, CNRS (France)
- 9148 5Q **On-sky low order non-common path correction of the GPI calibration unit** [9148-224]
M. Hartung, Gemini Observatory (Chile); B. Macintosh, Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States); P. Langlois, N. Sadakuni, Gemini Observatory (Chile); D. Gavel, Lick Observatory, Univ. of California, Santa Cruz (United States); J. K. Wallace, Jet Propulsion Lab. (United States); D. Palmer, L. Poyneer, Lawrence Livermore National Lab. (United States); D. Savransky, Cornell Univ. (United States); S. Thomas, NASA Ames Research Ctr. (United States); D. Dillon, Lick Observatory, Univ. of California, Santa Cruz (United States); J. Dunn, NRC - Herzburg Institute of Astrophysics (Canada); P. Hibon, F. Rantakyro, S. Goodsell, Gemini Observatory (Chile)

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- 9148 5S **HALOS: fast, autonomous, holographic adaptive optics** [9148-226]
G. P. Andersen, P. Gelsinger-Austin, R. Gaddipati, P. Gaddipati, F. Ghebremichael, U.S. Air Force Academy (United States)
- 9148 5T **A laser tomography test bed for extremely large telescopes** [9148-227]
R. Conan, P. Piatrou, F. Rigaut, The Australian National Univ. (Australia); K. Uhlendorf, The Australian National Univ. (Germany)

- 9148 5U **DRAGON, the Durham real-time, tomographic adaptive optics test bench: progress and results** [9148-228]
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- 9148 5V **CHOUGH, the Canary Hosted-Upgrade for High-Order Adaptive Optics** [9148-229]
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- 9148 5W **CRAO: a compact and refractive adaptive-optics** [9148-230]
N. Fujishiro, E. Kitao, Kyoto Sangyo Univ. (Japan); T. Shimizu, Nishimura Co., Ltd. (Japan); T. Matsui, Kyoto Sangyo Univ. (Japan); Y. Ikeda, Kyoto Sangyo Univ. (Japan) and Photocoding (Japan); H. Kawakita, Kyoto Sangyo Univ. (Japan); S. Oya, Subaru Telescope, National Astronomical Observatory of Japan (United States)
- 9148 5X **Pyramidal Wavefront Sensor Demonstrator at INO** [9148-231]
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