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Ground-based and Airborne Instrumentation for Astronomy V

**Suzanne K. Ramsay
Ian S. McLean
Hideki Takami**
Editors

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MEGARA: a new generation optical spectrograph for GTC [9147-23]

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SESSION 4 HIGH MULTIPLEX AND SURVEY INSTRUMENTS II

- 9147 OP **The WIYN one degree imager 2014: performance of the partially populated focal plane and instrument upgrade path** [9147-24]
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- 9147 OQ **VIRUS: production and deployment of a massively replicated fiber integral field spectrograph for the upgraded Hobby-Eberly Telescope** [9147-25]
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9147 OR **The construction, alignment, and installation of the VIRUS spectrograph** [9147-26]
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9147 OS **The Dark Energy Spectroscopic Instrument (DESI)** [9147-27]
B. Flaugher, Fermi National Accelerator Lab. (United States); C. Bebek, Lawrence Berkeley National Lab. (United States)

9147 OT **Progress with the Prime Focus Spectrograph for the Subaru Telescope: a massively multiplexed optical and near-infrared fiber spectrograph** [9147-28]
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9147 OU **Results of the verification of the NIR MOS EMIR [9147-29]**

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9147 OV **DOTIFS: a new multi-IFU optical spectrograph for the 3.6-m Devasthal optical telescope [9147-270]**

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9147 OW **Performance of the K-band multi-object spectrograph (KMOS) on the ESO VLT [9147-31]**

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9147 OX **Demonstration of high-performance cryogenic probe arms for deployable IFUs [9147-32]**

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9147 OY **First light results from the Hermes spectrograph at the AAT [9147-33]**

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SESSION 5 HIGH MULTIPLEX AND SURVEY INSTRUMENTS III

9147 OZ **KOSMOS and COSMOS: new facility instruments for the NOAO 4-meter telescopes [9147-34]**

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9147 10 **TAIPAN: optical spectroscopy with StarBugs** [9147-35]

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9147 12 **mxSPEC: a massively multiplexed full-disk spectroheliograph for solar physics research** [9147-37]

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9147 13 **BATMAN: a DMD-based multi-object spectrograph on Galileo telescope** [9147-38]

F. Zamkotsian, Lab. d'Astrophysique de Marseille, CNRS (France); P. Spano, INAF - Osservatorio Astronomico di Brera (Italy); P. Lanzoni, H. Ramarijaona, Lab. d'Astrophysique de Marseille, CNRS (France); M. Moschetti, M. Riva, INAF - Osservatorio Astronomico di Brera (Italy); W. Bon, Lab. d'Astrophysique de Marseille, CNRS (France); L. Nicastro, INAF - IASF Bologna (Italy); E. Molinari, R. Cosentino, A. Ghedina, M. Gonzalez, INAF - Telescopio Nazionale Galileo (Spain); P. Di Marcantonio, I. Coretti, R. Cirami, INAF - Osservatorio Astronomico di Trieste (Italy); F. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); L. Valenziano, INAF - IASF Bologna (Italy)

SESSION 6 HIGH SPECTRAL RESOLUTION INSTRUMENTS I

9147 14 **Infrared Doppler instrument (IRD) for the Subaru telescope to search for Earth-like planets around nearby M-dwarfs** [9147-39]

T. Kotani, National Astronomical Observatory of Japan (Japan); M. Tamura, National Astronomical Observatory of Japan (Japan) and The Univ. of Tokyo (Japan); H. Suto, National Astronomical Observatory of Japan (Japan); J. Nishikawa, National Astronomical Observatory of Japan (Japan) and The Graduate Univ. for Advanced Studies (Japan); B. Sato, Tokyo Institute of Technology (Japan); W. Aoki, T. Usuda, National Astronomical Observatory of Japan (Japan) and The Graduate Univ. for Advanced Studies (Japan); T. Kurokawa, National Astronomical Observatory of Japan (Japan) and Tokyo Univ. of Agriculture and Technology (Japan); K. Kashiwagi, Tokyo Univ. of Agriculture and Technology (Japan); S. Nishiyama, Miyagi Univ. of Education (Japan); Y. Ikeda, Photocoding (Japan); D. B. Hall, K. W. Hodapp, Institute for Astronomy, Univ. of Hawai'i (United States); J. Hashimoto, The Univ. of Oklahoma (United States); J. Morino, National Astronomical Observatory of Japan (Japan); Y. Okuyama, Y. Tanaka, S. Suzuki, S. Inoue, Tokyo Univ. of Agriculture and Technology (Japan); J. Kwon, The Univ. of Tokyo (Japan); T. Suenaga, National Astronomical Observatory of Japan (Japan); D. Oh, The Graduate Univ. for Advanced Studies (Japan); H. Baba, National Astronomical Observatory of Japan

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SPIRou: the near-infrared spectropolarimeter/high-precision velocimeter for the Canada-France-Hawaii telescope [9147-40]

É. Artigau, Univ. de Montréal (Canada); D. Kouach, J.-F. Donati, Institut de Recherche en Astrophysique et Planétologie, CNR, Univ. de Toulouse (France); R. Doyon, Univ. de Montréal (Canada); X. Delfosse, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS, Univ. Joseph Fourier (France); S. Baratchart, M. Lacombe, Institut de Recherche en Astrophysique et Planétologie, CNR, Univ. de Toulouse (France); C. Moutou, Canada-France-Hawaii Telescope (United States); P. Rabou, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS, Univ. Joseph Fourier (France); L. P. Parès, Y. Mischeau, Institut de Recherche en Astrophysique et Planétologie, CNR, Univ. de Toulouse (France); S. Thibault, Univ. Laval (Canada); V. A. Reshetov, NRC - Herzberg Institute of Astrophysics (Canada); B. Dubois, Institut de Recherche en Astrophysique et Planétologie, CNR, Univ. de Toulouse (France); O. Hernandez, P. Vallée, Univ. de Montréal (Canada); S.-Y. Wang, Institute of Astronomy and Astrophysics, Academia Sinica (Taiwan); F. Dolon, Institut de Recherche en Astrophysique et Planétologie, CNR, Univ. de Toulouse (France); F. A. Pepe, Observatoire Astronomique de l'Univ. de Genève (Switzerland); F. Bouchy, Aix Marseille Univ., CNRS, Lab. d'Astrophysique de Marseille (Switzerland); N. Striebig, Institut de Recherche en Astrophysique et Planétologie, CNR, Univ. de Toulouse (France); F. Hénault, Institut de Planétologie et d'Astrophysique de Grenoble, CNRS, Univ. Joseph Fourier (France); D. Loop, L. Sadelmyer, NRC - Herzberg Institute of Astrophysics (Canada); G. Barrick, T. Vermeulen, Canada-France-Hawaii Telescope (United States); M. Dupieux, Institut de Recherche en Astrophysique et Planétologie, CNR, Univ. de Toulouse (France); G. Hébrard, Institut d'Astrophysique de Paris, CNRS, Univ. Pierre et Marie Curie (France); I. Boisse, Univ. do Porto (Portugal); E. Martoli, Lab. Nacional de Astrofísica (Brazil); S. H. P. Alencar, Univ. Federal de Minas Gerais (Brazil); J.-D. do Nascimento, Univ. Federal do Rio Grande do Norte (Brazil); P. Figueira, Univ. do Porto (Portugal)

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NRES: the network of robotic Echelle spectrographs [9147-41]

J. D. Eastman, Las Cumbres Observatory Global Telescope (United States) and Univ. of California, Santa Barbara (United States); T. M. Brown, Las Cumbres Observatory Global Telescope (United States) and Univ. of Colorado Boulder (United States); J. Hygelund, Las Cumbres Observatory Global Telescope (United States); J. van Eyken, Las Cumbres

Observatory Global Telescope (United States) and Univ. of California, Santa Barbara (United States); J. R. Tufts, Las Cumbres Observatory Global Telescope (United States); S. Barnes, Stuart Barnes Optical Design (Netherlands)

- 9147 17 **High resolution broad-band spectroscopy in the NIR using the Triplespec externally dispersed interferometer at the Hale telescope** [9147-42]
D. J. Erskine, Lawrence Livermore National Lab. (United States); J. Edelstein, M. Sirk, E. Wishnow, Y. Ishikawa, E. McDonald, W. V. Shourt, Space Sciences Lab., Univ. of California, Berkeley (United States)
- 9147 18 **A design for high-resolution spectroscopy with adaptive optics at the Large Binocular Telescope** [9147-43]
R. O. Reynolds, L. Dettmann, J. C. Guerra, Large Binocular Telescope Observatory (United States)
- 9147 19 **CRIRES+: a cross-dispersed high-resolution infrared spectrograph for the ESO VLT** [9147-44]
R. Follert, Thüringer Landessternwarte Tautenburg (Germany); R. J. Dorn, European Southern Observatory (Germany); E. Oliva, INAF - Osservatorio Astrofisico di Arcetri (Italy); J. L. Lizon, European Southern Observatory (Germany); A. Hatzes, Thüringer Landessternwarte Tautenburg (Germany); N. Piskunov, Uppsala Univ. (Sweden); A. Reiners, U. Seemann, Georg-August-Univ. Göttingen (Germany); E. Stempels, U. Heiter, T. Marquart, M. Lockhart, Uppsala Univ. (Sweden); G. Anglada-Escude, Georg-August-Univ. Göttingen (Germany); T. Löwinger, Thüringer Landessternwarte Tautenburg (Germany); D. Baade, J. Grunhut, P. Bristow, B. Klein, Y. Jung, D. J. Ives, F. Kerber, E. Pozna, J. Paufigue, H. U. Kaeufl, European Southern Observatory (Germany); L. Origlia, INAF - Osservatorio Astronomico di Bologna (Italy); E. Valenti, D. Gojak, M. Hilker, L. Pasquini, A. Smette, J. Smoker, European Southern Observatory (Germany)
- 9147 1A **On-sky performance of a high resolution silicon immersion grating spectrometer** [9147-45]
J. Ge, S. Powell, B. Zhao, S. Schofield, F. Varosi, C. Warner, J. Liu, S. Sithajan, L. Avner, H. Jakeman, J. A. Gittelmacher, W. A. Yoder, Univ. of Florida (United States); M. Muterspaugh, M. Williamson, J. E. Maxwell, Tennessee State Univ. (United States)
- 9147 1C **A laser frequency comb featuring sub-cm/s precision for routine operation on HARPS** [9147-47]
R. A. Probst, Max-Planck-Institut für Quantenoptik (Germany); G. Lo Curto, G. Avila, European Southern Observatory (Germany); B. L. Canto Martins, J. R. de Medeiros, Univ. Federal do Rio Grande do Norte (Brazil); M. Esposito, J. I. González Hernández, Instituto de Astrofísica de Canarias (Spain); T. W. Hänsch, Max-Planck-Institut für Quantenoptik (Germany); R. Holzwarth, Max-Planck-Institut für Quantenoptik (Germany) and Menlo Systems GmbH (Germany); F. Kerber, European Southern Observatory (Germany); I. C. Leão, Univ. Federal do Rio Grande do Norte (Brazil); A. Manescau, L. Pasquini, European Southern Observatory (Germany); R. Rebolo-López, Instituto de Astrofísica de Canarias (Spain); T. Steinmetz, Max-Planck-Institut für Quantenoptik (Germany) and Menlo Systems GmbH (Germany); T. Udem, Max-Planck-Institut für Quantenoptik (Germany); Y. Wu, Max-Planck-Institut für Quantenoptik (Germany) and Menlo Systems GmbH (Germany)

- 9147 1D **Design and early performance of IGRINS (Immersion Grating Infrared Spectrometer)** [9147-48]
 C. Park, Korea Astronomy and Space Science Institute (Korea, Republic of); D. T. Jaffe, The Univ. of Texas at Austin (United States); I.-S. Yuk, M.-Y. Chun, Korea Astronomy and Space Science Institute (Korea, Republic of); S. Pak, Kyung Hee Univ. (Korea, Republic of); K.-M. Kim, Korea Astronomy and Space Science Institute (Korea, Republic of); M. Pavel, H. Lee, The Univ. of Texas at Austin (United States); H. Oh, Korea Astronomy and Space Science Institute (Korea, Republic of) and Univ. of Science and Technology (Korea, Republic of); U. Jeong, Korea Astronomy and Space Science Institute (Korea, Republic of); C. K. Sim, H.-I. Lee, H. A. Nguyen Le, Kyung Hee Univ. (Korea, Republic of); J. Strubhar, M. Gully-Santiago, The Univ. of Texas at Austin (United States); J. S. Oh, S.-M. Cha, B. Moon, K. Park, Korea Astronomy and Space Science Institute (Korea, Republic of); C. Brooks, The Univ. of Texas at Austin (United States); K. Ko, J.-Y. Han, J. Nah, Korea Astronomy and Space Science Institute (Korea, Republic of); P. C. Hill, The Univ. of Texas at Austin (United States); S. Lee, Space Environment Lab. (Korea, Republic of); S. Barnes, Stuart Barnes Optical Design (Netherlands); Y. S. Yu, Korea Astronomy and Space Science Institute (Korea, Republic of); K. Kaplan, G. Mace, The Univ. of Texas at Austin (United States); H. Kim, J.-J. Lee, N. Hwang, Korea Astronomy and Space Science Institute (Korea, Republic of); B.-G. Park, Korea Astronomy and Space Science Institute (Korea, Republic of) and Univ. of Science and Technology (Korea, Republic of)
- 9147 1E **High resolution near IR spectroscopy with GIANO-TNG** [9147-49]
 L. Origlia, INAF - Osservatorio Astronomico di Bologna (Italy); E. Oliva, C. Baffa, G. Falcini, E. Giani, F. Massi, INAF - Osservatorio Astrofisico di Arcetri (Italy); P. Montegriffo, INAF - Osservatorio Astronomico di Bologna (Italy); N. Sanna, INAF - Osservatorio Astrofisico di Arcetri (Italy); S. Scuderi, INAF - Osservatorio Astrofisico di Catania (Italy); M. Sozzi, A. Tozzi, INAF - Osservatorio Astrofisico di Arcetri (Italy); I. Carleo, Bologna Univ. (Italy) and INAF - Osservatorio Astrofisico di Padova (Italy); R. Gratton, INAF - Osservatorio Astrofisico di Padova (Italy); F. Ghinassi, M. Lodi, Telescopio Nazionale Galileo (Spain)

SESSION 7 HIGH SPECTRAL RESOLUTION INSTRUMENTS II

- 9147 1F **CARMENES instrument overview** [9147-50]
 A. Quirrenbach, Landessternwarte Heidelberg (Germany); P. J. Amado, Instituto de Astrofísica de Andalucía (Spain); J. A. Caballero, Ctr. de Astrobiología (Spain); R. Mundt, Max-Planck-Institut für Astronomie (Germany); A. Reiners, Institut für Astrophysik Göttingen (Germany); I. Ribas, Institut de Ciències de l'Espai (Spain); W. Seifert, Landessternwarte Heidelberg (Germany); M. Abril, Instituto de Astrofísica de Andalucía (Spain); J. Aceituno, Calar Alto Observatory (Spain); F. J. Alonso-Floriano, Univ. Complutense de Madrid (Spain); M. Ammler-von Eiff, Thüringer Landessternwarte Tautenburg (Germany); R. Antona Jiménez, Instituto de Astrofísica de Andalucía (Spain); H. Anwand-Heerwart, Institut für Astrophysik Göttingen (Germany); M. Azzaro, Calar Alto Observatory (Spain); F. Bauer, Institut für Astrophysik Göttingen (Germany); D. Barrado, Calar Alto Observatory (Spain); S. Becerril, Instituto de Astrofísica de Andalucía (Spain); V. J. S. Béjar, Instituto de Astrofísica de Canarias (Spain); D. Benítez, Calar Alto Observatory (Spain); Z. M. Berdiñas, M. C. Cárdenas, E. Casal, A. Claret, Instituto de Astrofísica de Andalucía (Spain); J. Colomé, Institut de Ciències de l'Espai (Spain); M. Cortés-Contreras, Univ. Complutense de Madrid (Spain); S. Czesla, Hamburger Sternwarte (Germany); M. Doellinger, Thüringer Landessternwarte Tautenburg (Germany); S. Dreizler, Institut für Astrophysik Göttingen (Germany); C. Feiz, Landessternwarte Heidelberg (Germany); M. Fernández, Instituto de Astrofísica de Andalucía (Spain); D. Galadí, Calar Alto Observatory (Spain);

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9147 1G **The Habitable-zone Planet Finder: A status update on the development of a stabilized fiber-fed near-infrared spectrograph for the for the Hobby-Eberly telescope** [9147-51]

S. Mahadevan, L. W. Ramsey, R. Terrien, S. Halverson, A. Roy, F. Hearty, E. Levi, G. K. Stefansson, P. Robertson, C. Bender, C. Schwab, The Pennsylvania State Univ. (United States); M. Nelson, Univ. of Virginia (United States)

9147 1H **ESPRESSO: the radial velocity machine for the VLT** [9147-52]

D. Mégevand, Observatoire de l'Univ. de Genève (Switzerland); F. M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); P. Di Marcantonio, INAF - Osservatorio Astronomico di Trieste (Italy); A. Cabral, Univ. de Lisboa (Portugal); M. Riva, INAF - Osservatorio Astronomico di Brera (Italy); M. Abreu, Univ. de Lisboa (Portugal); F. Pepe, Observatoire de l'Univ. de Genève (Switzerland); S. Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy); R. Rebolo Lopez, Instituto de Astrofísica de Canarias (Spain); N. C. Santos, Univ. do Porto (Portugal); H. Dekker, European Southern Observatory (Germany); M. Aliverti, INAF - Osservatorio Astronomico di Brera (Italy); C. Allende, M. Amate, Instituto de Astrofísica de Canarias (Spain); G. Avila, European Southern Observatory (Germany); V. Baldini, INAF - Osservatorio Astronomico di Trieste (Italy); T. Bandy, Univ. Bern (Switzerland); P. Bristow, European Southern Observatory (Germany); C. Broeg, Univ. Bern (Switzerland); R. Cirami, INAF - Osservatorio Astronomico di Trieste (Italy); J. Coelho, Univ. de Lisboa (Portugal); P. Conconi, INAF - Osservatorio Astronomico di Brera (Italy); I. Coretti, G. Cupani, V. D'Odorico, INAF - Osservatorio Astronomico di Trieste (Italy); V. De Caprio, INAF - Osservatorio Astronomico di Brera (Italy); B. Delabre, R. Dorn, European Southern Observatory (Germany); P. Figueira, Univ. do Porto (Portugal); A. Fragoso, Instituto de Astrofísica de Canarias (Spain); S. Galeotta, INAF - Osservatorio Astronomico di Trieste (Italy); L. Genolet, Observatoire de l'Univ. de Genève (Switzerland); R. Gomes, Univ. de Lisboa (Portugal); J. González Hernández, Instituto de Astrofísica de Canarias (Spain); I. Hughes, Observatoire de l'Univ. de Genève (Switzerland); O. Iwert, F. Kerber, European Southern Observatory (Germany); M. Landoni, INAF - Osservatorio Astronomico di Brera (Italy); J.-L. Lizon, European Southern Observatory (Germany); C. Lovis, C. Maire, Observatoire de l'Univ. de Genève (Switzerland); M. Masetta, INAF - Osservatorio Astronomico di Trieste (Italy); C. C. J. A. P. Martins, Univ. do Porto (Portugal); P. Molaro, INAF - Osservatorio Astronomico di Trieste (Italy); M. A. S. Monteiro, Univ. do Porto (Portugal); M. Moschetti, INAF - Osservatorio Astronomico di Brera (Italy); A. Oliveira, Univ. de Lisboa (Portugal); M. R. Zapatero Osorio, Ctr. de Astrobiología (Spain); E. Poretti, INAF - Osservatorio Astronomico di Brera (Italy); J. L. Rasilla, S. Santana Tschudi, Instituto de Astrofísica de Canarias (Spain); P. Santos, Univ. de Lisboa (Portugal); D. Sosnowska, Observatoire de l'Univ. de Genève (Switzerland); S. Sousa, Univ. do Porto (Portugal); F. Tenegi, Instituto de Astrofísica de Canarias (Spain); G. Toso, INAF - Osservatorio Astronomico di Brera (Italy); E. Vanzella, M. Viel, INAF - Osservatorio Astronomico di Trieste (Italy)

- 9147 1I **PIMMS échelle: the next generation of compact diffraction limited spectrographs for arbitrary input beams** [9147-53]
C. H. Betters, S. G. Leon-Saval, J. Bland-Hawthorn, S. N. Richards, The Univ. of Sydney (Australia); T. A. Birks, I. Gris-Sánchez, Univ. of Bath (United Kingdom)
- 9147 1J **Progress on the Gemini High-Resolution Optical Spectrograph (GHOST) design** [9147-54]
M. J. Ireland, Australian National Univ. (Australia); A. Anthony, G. Burley, E. Chisholm, NRC - Herzberg Institute of Astrophysics (Canada); V. Churilov, Australian Astronomical Observatory (Australia); J. Dunn, NRC - Herzberg Institute of Astrophysics (Canada); G. Frost, J. Lawrence, Australian Astronomical Observatory (Australia); D. Loop, NRC - Herzberg Institute of Astrophysics (Canada); P. McGregor, The Australian National Univ. (Australia); S. Martell, Univ. of New South Wales (Australia); A. McConnachie, NRC - Herzberg Institute of Astrophysics (Canada); R. M. McDermid, Australian Astronomical Observatory (Australia) and Macquarie Univ. (Australia); J. Pazder, V. Reshetov, NRC - Herzberg Institute of Astrophysics (Canada); J. G. Robertson, A. Sheinis, J. Tims, Australian Astronomical Observatory (Australia); P. Young, The Australian National Univ. (Australia); R. Zhelem, Australian Astronomical Observatory (Australia)

SESSION 8 HIGH SPATIAL RESOLUTION INSTRUMENTS I

- 9147 1K **The integral field spectrograph for the Gemini planet imager** [9147-55]
J. E. Larkin, J. K. Chilcote, T. Aliado, Univ. of California, Los Angeles (United States); B. J. Bauman, Lawrence Livermore National Lab. (United States); G. Brims, J. M. Canfield, Univ. of California, Los Angeles (United States); A. Cardwell, Gemini Observatory (Chile); D. Dillon, UARC, Univ. of California, Santa Cruz (United States); R. Doyon, Univ. de Montréal (Canada); J. Dunn, NRC - Herzberg Institute of Astrophysics (Canada); M. P. Fitzgerald, Univ. of California, Los Angeles (United States); J. R. Graham, Univ. of California, Berkeley (United States); S. Goodsell, M. Hartung, P. Hibon, Gemini Observatory (Chile); P. Ingraham, Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States) and Univ. de Montréal (Canada); C. A. Johnson, E. Kress, Univ. of California, Los Angeles (United States); Q. M. Konopacky, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); B. A. Macintosh, Lawrence Livermore National Lab. (United States) and Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States); K. G. Magnone, Univ. of California, Los Angeles (United States); J. Maire, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); I. S. McLean, Univ. of California, Los Angeles (United States); D. Palmer, Lawrence Livermore National Lab. (United States); M. D. Perrin, Space Telescope Science Institute (United States); C. Quiroz, F. Rantakyro, N. Sadakuni, Gemini Observatory (Chile); L. Saddlemyer, NRC - Herzberg Institute of Astrophysics (Canada); A. Serio, Gemini Observatory (Chile); S. Thibault, Univ. Laval (Canada); S. J. Thomas, NASA Ames Research Ctr. (United States) and UARC, Univ. of California, Santa Cruz (United States); P. Vallee, Univ. de Montréal (Canada); J. L. Weiss, Univ. of California, Los Angeles (United States)
- 9147 1L **The SPHERE IFS at work** [9147-56]
R. Claudi, E. Giro, M. Turatto, A. Baruffolo, INAF - Osservatorio Astronomico di Padova (Italy); P. Bruno, INAF - Osservatorio Astrofisico di Catania (Italy); E. Cascone, V. DeCaprio, INAF - Osservatorio Astronomico di Capodimonte (Italy); S. Desidera, INAF - Osservatorio Astronomico di Padova (Italy); R. Dorn, European Southern Observatory (Germany); D. Fantinel, INAF - Osservatorio Astronomico di Padova (Italy); G. Finger, European Southern Observatory (Germany); R. Gratton, L. Lessio, INAF - Osservatorio Astronomico di Padova (Italy); J. L. Lizon, European Southern Observatory (Germany); A. L. Maire, D. Mesa,

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9147 1M **The LINC-NIRVANA high resolution imager: challenges from the lab to first light** [9147-57]
T. M. Herbst, Max-Planck-Institut für Astronomie (Germany); R. Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); A. Eckart, Univ. zu Köln (Germany); G. Weigelt, Max-Planck-Institut für Radioastronomie (Germany)

9147 1O **Operation and performance of the mid-infrared camera, NOMIC, on the Large Binocular Telescope** [9147-59]
W. F. Hoffmann, P. M. Hinz, D. Defrère, J. M. Leisenring, A. J. Skemer, P. A. Arbo, M. Montoya, Steward Observatory, The Univ. of Arizona (United States); B. Mennesson, Jet Propulsion Lab. (United States)

9147 1P **FRIDA, the diffraction limited NIR imager and IFS for the Gran Telescopio Canarias: status report** [9147-60]
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N. Jovanovic, Subaru Telescope, National Astronomical Observatory of Japan (United States); O. Guyon, Subaru Telescope, National Astronomical Observatory of Japan (United States) and Steward Observatory, The Univ. of Arizona (United States); F. Martinache, Observatoire de la Côte d'Azur (France); C. Clergeon, G. Singh, Subaru Telescope, National Astronomical Observatory of Japan (United States) and LESIA, Observatoire de Paris à Meudon (France); T. Kudo, Subaru Telescope, National Astronomical Observatory of Japan (United States); K. Newman, College of Optical Sciences, The Univ. of Arizona (United States) and NASA Ames Research Ctr. (United States); J. Kuhn, E. Serabyn, Jet

Propulsion Lab. (United States); B. Norris, P. Tuthill, P. Stewart, The Univ. of Sydney (Australia); E. Huby, G. Perrin, S. Lacour, S. Vievard, LESIA, Observatoire de Paris à Meudon (France); N. Murakami, O. Fumika, Hokkaido Univ. (Japan); Y. Minowa, Y. Hayano, Subaru Telescope, National Astronomical Observatory of Japan (United States); J. White, Gemini Observatory (United States); O. Lai, Subaru Telescope, National Astronomical Observatory of Japan (United States); F. Marchis, SETI Institute (United States); G. Duchene, Univ. of California, Berkeley (United States) and Univ. Grenoble Alpes, CNRS, Institut de Planetologie et d'Astrophysique de Grenoble (France); T. Kotani, Subaru Telescope, National Astronomical Observatory of Japan (United States); J. Woillez, European Southern Observatory (Germany)

9147 1R **High contrast polarimetry in the infrared with SPHERE on the VLT [9147-62]**

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P. Bastien, O. Hernandez, L. Albert, É. Artigau, R. Doyon, Univ. de Montréal (Canada); L. Drissen, Univ. Laval (Canada); D. Lafrenière, A. F. J. Moffat, N. St-Louis, Univ. de Montréal (Canada)

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C. MacKay, Univ. of Cambridge (United Kingdom); R. Rebolo, Consejo Superior de Investigaciones Científicas (Spain); J. Crass, D. L. King, Univ. of Cambridge (United Kingdom); L. Labadie, Univ. zu Köln (Germany); V. González Escalera, M. Puga, Instituto de Astrofísica de Canarias (Spain); A. Pérez Garrido, Univ. Politécnica de Cartagena (Spain); R. López, A. Oscoz, J. A. Pérez-Prieto, L. F. Rodríguez-Ramos, S. Velasco, Instituto de Astrofísica de Canarias (Spain); I. Villó, Univ. Politécnica de Cartagena (Spain)

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H. Kuntschner, L. Jochum, P. Amico, J. K. Dekker, F. Kerber, E. Marchetti, M. Accardo, R. Brast, M. Brinkmann, R. D. Conzelmann, B.-A. Delabre, M. Duchateau, E. Fedrigo, G. Finger, C. Frank, F. G. Rodriguez, B. Klein, J. Knudstrup, M. Le Louarn, L. Lundin, A. Modigliani, M. Mueller, M. Neeser, S. Tordo, E. Valenti, European Southern Observatory (Germany); F. Eisenhauer, E. Sturm, H. Feuchtgruber, E. M. George, M. Hartl, R. Hofmann, H. Huber, M. P. Plattner, J. Schubert, K. Tarantik, E. Wiezorrek, Max-Planck-Institut für extraterrestrische Physik (Germany); M. R. Meyer, S. P. Quanz, A. M. Glauser, ETH Zürich (Switzerland); H. Weisz, Ingenieurbureau für den Maschinenbau (Germany); S. Esposito,

M. Xompero, G. Agapito, J. Antichi, V. Biliotti, M. Bonaglia, R. Briguglio, L. Carbonaro, G. Cresci, L. Fini, E. Pinna, A. T. Puglisi, F. Quirós-Pacheco, A. Riccardi, G. Di Rico, INAF - Osservatorio Astrofisico di Arcetri (Italy); C. Arcidiacono, INAF - Osservatorio Astronomico di Bologna (Italy); M. Dolci, INAF - Osservatorio Astronomico di Teramo (Italy)

- 9147 1V **High-contrast planet imager for Kyoto 4m segmented telescope** [9147-67]
T. Matsuo, Kyoto Univ. (Japan); N. Murakami, Hokkaido Univ. (Japan); T. Kotani, National Astronomical Observatory of Japan (Japan); H. Kawahara, The Univ. of Tokyo (Japan); N. Natsume, M. Kino, K. Yamamoto, Kyoto Univ. (Japan); H. Imada, Univ. of Tsukuba (Japan); M. Kurita, Kyoto Univ. (Japan); M. Iribe, H. Nishida, Osaka Electro-Communication Univ. (Japan); M. Kida, H. Kitou, Hokkaido Univ. (Japan); K. Ishikawa, RIKEN (Japan); Y. Uda, Osaka Electro-Communication Univ. (Japan); H. Tokoro, Nano-Optonics Research Institute (Japan); T. Nagata, F. Iwamuro, Kyoto Univ. (Japan); N. Miura, The Univ. of Tokyo (Japan); S. Oya, Subaru Telescope, National Astronomical Observatory of Japan (United States); Y. Itoh, Nishi-Harima Astronomical Observatory (Japan); H. Shibai, Osaka Univ. (Japan); M. Tamura, National Astronomical Observatory of Japan (Japan) and The Univ. of Tokyo (Japan)
- 9147 1W **Construction and status of the CHARIS high contrast imaging spectrograph** [9147-68]
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- 9147 1Z **The E-ELT instrument roadmap: a status report (Invited Paper)** [9147-71]
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- 9147 21 **METIS: the mid-infrared E-ELT imager and spectrograph** [9147-73]
B. R. Brandl, Leiden Univ. (Netherlands); M. Feldt, Max-Planck-Institut für Astronomie (Germany); A. Glasse, UK Astronomy Technology Ctr. (United Kingdom); M. Guedel, Univ. Wien (Austria); S. Heikamp, M. Kenworthy, Leiden Univ. (Netherlands); R. Lenzen,

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- 9147 22 **GMTNIRS (Giant Magellan Telescope Near-Infrared Spectrograph): optimizing the design for maximum science productivity and minimum risk** [9147-74]
D. T. Jaffe, The Univ. of Texas at Austin (United States); S. Barnes, Stuart Barnes Optical Design (New Zealand); C. Brooks, M. Gully-Santiago, The Univ. of Texas at Austin (United States); S. Pak, Kyung Hee Univ. (Korea, Republic of); C. Park, I. Yuk, Korea Astronomy and Space Science Institute (Korea, Republic of)

- 9147 23 **HIRES: the high resolution spectrograph for the E-ELT** [9147-75]
F. M. Zerbi, Scientific Directorate of INAF (Italy); F. Bouchy, Lab. d'Astrophysique de Marseille, CNRS (France); J. Fynbo, Dark Cosmology Ctr. (Denmark); R. Maiolino, Univ. of Cambridge (United Kingdom); N. Piskunov, Uppsala Univ. (Sweden); R. Rebolo Lopez, Instituto de Astrofísica de Canarias (Spain); N. Santos, Univ. do Porto (Portugal); K. Strassmeier, Leibniz-Institut für Astrophysik Potsdam (Germany); S. Udry, Observatoire Astronomique, Univ. de Genève (Switzerland); L. Vanzi, Pontificia Univ. Católica de Chile (Chile); M. Riva, INAF - Osservatorio Astronomico di Brera (Italy); A. Basden, Univ. of Durham (United Kingdom); I. Boisse, Lab. d'Astrophysique de Marseille, CNRS (France); X. Bonfils, Observatoire de Science de l'Univ. de Grenoble (France); D. Buscher, Univ. of Cambridge (United Kingdom); A. Cabral, Univ. de Lisboa (Portugal); P. Dimarcantonio, INAF - Osservatorio Astronomico di Trieste (Italy); I. Di Varano, Observatoire Astronomique, Univ. de Genève (Switzerland); D. Henry, UK Astronomy Technology Ctr. (United Kingdom); M. Monteiro, Univ. do Porto (Portugal); T. Morris, G. Murray, Durham Univ. (United Kingdom); E. Oliva, INAF - Osservatorio Astrofisico di Arcetri (Italy); I. Parry, Univ. of Cambridge (United Kingdom); F. Pepe, Observatoire Astronomique, Univ. de Genève (Switzerland); A. Quirrenbach, Landessternwarte Heidelberg (Germany); J. L. Rasilla, Instituto de Astrofísica de Canarias (Spain); P. Rees, UK Astronomy Technology Ctr. (United Kingdom); E. Stempels, Uppsala Univ. (Sweden); L. Valenziano, INAF - IASF Bologna (Italy); M. Wells, UK Astronomy Technology Ctr. (United Kingdom); F. Wildi, Observatoire Astronomique, Univ. de Genève (Switzerland); L. Origlia, INAF - Osservatorio Astronomico di Bologna (Italy); C. Allende Prieto, Instituto de Astrofísica de Canarias (Spain); A. Chiavassa, Observatoire de la Côte d'Azur (France); S. Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy); P. Figueira, Univ. do Porto (Portugal); B. Gustafsson, Uppsala Univ. (Sweden); A. Hatzes, Thüringer Landessternwarte Tautenburg (Germany); M. Haehnelt, Univ. of Cambridge (United Kingdom); K. Heng, Univ. Bern (Switzerland); G. Israelian, Instituto de Astrofísica de Canarias (Spain); O. Kochukhov, Uppsala Univ. (Sweden); C. Lovis, Observatoire Astronomique, Univ. de Genève (Switzerland); A. Marconi, Univ. degli Studi di Firenze (Italy); C. J. A. P. Martins, Univ. do Porto (Portugal); P. Noterdaeme, P. Petitjean, Institut d'Astrophysique de Paris (France); T. Puzia, Pontificia Univ. Católica de Chile (Chile); D. Queloz, Univ. of Cambridge (United Kingdom); A. Reiners, Georg-August-Univ. Göttingen (Germany); M. Zoccali, Pontificia Univ. Católica de Chile (Chile)

- 9147 24 **The Infrared Imaging Spectrograph (IRIS) for TMT: instrument overview** [9147-76]
A. M. Moore, Caltech Optical Observatories (United States); J. E. Larkin, Univ. of California, Los Angeles (United States); S. A. Wright, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada) and Univ. of Toronto (Canada); B. Bauman, Lawrence Livermore

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F. Hammer, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); B. Barbuy, Univ. de São Paulo (Brazil); J. G. Cuby, Aix Marseille Univ., CNRS, Lab. d'Astrophysique de Marseille (France); L. Kaper, Univ. van Amsterdam (Netherlands); S. Morris, Durham Univ. (United Kingdom); C. J. Evans, UK Astronomy Technology Ctr. (United Kingdom); P. Jagourel, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); G. Dalton, Univ. of Oxford (United Kingdom) and Rutherford Appleton Lab. (United Kingdom); P. Rees, UK Astronomy Technology Ctr. (United Kingdom); M. Puech, M. Rodrigues, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); D. Pearson, UK Astronomy Technology Ctr. (United Kingdom); K. Disseau, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France)

9147 28 **Conceptual design of the MOBIE imaging spectrograph for TMT** [9147-80]

B. C. Bigelow, Giant Magellan Telescope Organization (United States); M. V. Radovan, Univ. of California Observatories (United States); R. A. Bernstein, Giant Magellan Telescope Organization (United States); P. M. Onaka, H. Yamada, S. Isani, Institute for Astronomy, Univ. of Hawai'i (United States); S. Miyazaki, S. Ozaki, National Astronomical Observatory of Japan (Japan)

9147 29 **Astrophotonic micro-spectrographs in the era of ELTs** [9147-81]

N. Blind, Max-Planck-Institut für extraterrestrische Physik (Germany) and Institut de Planétologie et d'Astrophysique de Grenoble, Univ. J. Fourier, CNRS (France); E. Le Coarer, P. Kern, Institut de Planétologie et d'Astrophysique de Grenoble, Univ. J. Fourier, CNRS (France); J. Bland-Hawthorn, The Univ. of Sydney (Australia)

POSTER SESSION: INSTRUMENT PROGRAMS AND NEW SCIENCE INSTRUMENTS AND UPGRADES

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9147 2D **Optical, mechanical and electronic design and integration of POMM, a polarimeter for the Observatoire du mont Mégantic** [9147-85]

M. R. Leclerc, P. Côté, F. Duchesne, INO (Canada); P. Bastien, Univ. de Montréal (Canada); O. Hernandez, Univ. de Montréal (Canada) and Observatoire du Mont Mégantic (Canada); P. Colonna d'Istria, Univ. de Montréal (Canada); M. Demers, M. Girard, M. Savard, D. Lemieux, INO (Canada); S. Thibault, D. Brousseau, Univ. Laval (Canada)

9147 2F **A polarimetric unit for HARPS-North at the Telescopio Nazionale Galileo: HANPO** [9147-87]

F. Leone, Univ. degli Studi di Catania (Italy) and INAF - Osservatorio Astrofisico di Catania (Italy); M. Cecconi, R. Cosentino, A. Ghedina, INAF - Fundación Galileo Galilei (Spain); M. Giarrusso, Univ. degli Studi di Catania (Italy) and INAF - Osservatorio Astrofisico di Catania (Italy); M. Gonzalez, V. Lorenzi, INAF - Fundación Galileo Galilei (Spain); M. Munari, INAF - Osservatorio Astrofisico di Catania (Italy); H. Perez Ventura, L. Riverol, J. San Juan, INAF - Fundación Galileo Galilei (Spain); S. Scuderi, INAF - Osservatorio Astrofisico di Catania (Italy)

9147 2G **An off-the-shelf guider for the Palomar 200-inch telescope: interfacing amateur astronomy software with professional telescopes for an easy life** [9147-88]

F. Clarke, J. Lynn, N. Thatte, M. Tecza, Univ. of Oxford (United Kingdom)

9147 2H **Design updates and status of the fourth generation TripleSpec spectrograph** [9147-89]

E. Schlawin, T. L. Herter, C. Henderson, Cornell Univ. (United States); J. C. Wilson, Univ. of Virginia (United States); R. Probst, D. Sprayberry, National Optical Astronomy Observatory (United States); M. Bonati, P. Schurter, D. James, M. Warner, R. Tighe, Cerro Tololo Inter-American Observatory (Chile); J. D. Adams, Univ. Research Space Association (United States); M. Martinez, Cerro Tololo Inter-American Observatory (Chile)

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M. D. Herlevich, P. Miller, C. H. Murphey, Univ. of Florida (United States); C. Packham, The Univ. of Texas at San Antonio (United States)

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K. Sakimoto, T. Harao, Hiroshima Univ. (Japan); H. Miyamoto, Molex Japan Co., Ltd.
(Japan); R. Matsui, R. Itoh, K. Takaki, I. Ueno, T. Ohsugi, Hiroshima Univ. (Japan); H. Nakaya,
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A. Krabbe, Univ. Stuttgart (Germany) and Deutsches SOFIA Institut (Germany);
L. W. Looney, Univ. of Illinois at Urbana-Champaign (United States); A. Poglitsch, W. Raab,
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für Astronomie (Germany); F. Rebell, Univ. Stuttgart (Germany); M. L. Savage, SOFIA-USRA,
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Observatory (United States); B. Macintosh, Stanford Univ. (United States); J. Graham, Univ.
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POSTER SESSION: SURVEY AND HIGH MULTIPLEX INSTRUMENTS

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S.-Y. Wang, Institute of Astronomy and Astrophysics, Academia Sinica (Taiwan); J. C. Geary, S. M. Amato, Harvard-Smithsonian Ctr. for Astrophysics (United States); Y.-S. Hu, H.-H. Ling, P.-J. Huang, Institute of Astronomy and Astrophysics, Academia Sinica (Taiwan); G. Furesz, Harvard-Smithsonian Ctr. for Astrophysics (United States); H.-Y. Chen, Y.-C. Chang, Institute of Astronomy and Astrophysics, Academia Sinica (Taiwan); A. Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (United States); M. Lehner, Institute of Astronomy and Astrophysics, Academia Sinica (Taiwan); T. Norton, Harvard-Smithsonian Ctr. for Astrophysics (United States)

- 9147 73 **Final optical design for the WEAVE two-degree prime focus corrector** [9147-266]
T. Agócs, NOVA ASTRON (Netherlands); D. C. Abrams, E. Lhomé, K. Dee, Isaac Newton Group of Telescopes (Spain); G. Dalton, STFC Rutherford Appleton Lab. (United Kingdom) and Univ. of Oxford (United Kingdom); K. Middleton, STFC Rutherford Appleton Lab. (United Kingdom); P. Bonifacio, GEPI, Observatoire de Paris (France); J. A. L. Aguerri, Instituto de Astrofísica de Canarias (Spain); S. C. Trager, Univ. of Groningen (Netherlands)
- 9147 74 **The guider and wavefront curvature sensor subsystem for the Large Synoptic Survey Telescope** [9147-267]
V. J. Riot, Lawrence Livermore National Lab. (United States); K. Arndt, Purdue Univ. (United States); C. Claver, Large Synoptic Survey Telescope (United States); P. E. Doherty, Harvard Univ. (United States); D. K. Gilmore, P. A. Hascall, S. Herrmann, SLAC National Accelerator Lab. (United States); I. Kotov, P. O'Connor, Brookhaven National Lab. (United States); J. Sebag, Large Synoptic Survey Telescope (United States); C. W. Stubbs, Harvard Univ. (United States); M. Warner, Cerro Tololo Inter-American Observatory (Chile)
- 9147 75 **VIRUS: assembly, testing and performance of 33,000 fibres for HETDEX** [9147-269]
A. Kelz, T. Jahn, D. Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); G. J. Hill, H. Lee, J. D. Murphy, The Univ. of Texas at Austin (United States); J. Neumann, Leibniz-Institut für Astrophysik Potsdam (Germany); H. Nicklas, Georg-August-Univ. Göttingen (Germany); M. Rutowska, C. Sandin, O. Streicher, Leibniz-Institut für Astrophysik Potsdam (Germany); S. Tuttle, The Univ. of Texas at Austin (United States); M. Fabricius, Max-Planck-Institut für extraterrestrische Physik (Germany); S. M. Bauer, Leibniz-Institut für Astrophysik Potsdam (Germany); B. Vattiat, The Univ. of Texas at Austin (United States); H. Anwand, Georg-August-Univ. Göttingen (Germany); R. Savage, The Univ. of Texas at Austin (United States)
- 9147 77 **A multi-pixel room-temperature local oscillator subsystem for array receivers at 1.9 THz** [9147-272]
J. V. Siles, I. Mehdi, C. Lee, R. Lin, J. Kawamura, E. Schlecht, P. J. Bruneau, P. F. Goldsmith, Jet Propulsion Lab. (United States)
- 9147 78 **Multi-object fibre spectroscopy at the WHT: performance enhancements of AF2+WYFFOS** [9147-374]
L. Domínguez Palmero, D. Cano, C. Fariña, R. Bassom, E. Lhomé, N. O'Mahony, J. Skvarc, A. Ridings, C. R. Benn, D. C. Abrams, M. Balcells, Isaac Newton Group of Telescopes (Spain)
- 9147 79 **The Zwicky transient facility observing system** [9147-375]
R. M. Smith, R. G. Dekany, Caltech Optical Observatories (United States); C. Bebek, Lawrence Berkeley National Lab. (United States); E. Bellm, K. Bui, J. Cromer, P. Gardner, Caltech Optical Observatories (United States); M. Hoff, Lawrence Berkeley National Lab. (United States); S. Kaye, S. Kulkarni, Caltech Optical Observatories (United States); A. Lambert, M. Levi, Lawrence Berkeley National Lab. (United States); D. Reiley, Caltech Optical Observatories (United States)

POSTER SESSION: HIGH SPECTRAL AND SPATIAL RESOLUTION INSTRUMENTS

- 9147 7B **Gemini planet imager observational calibrations X: non-redundant masking on GPI** [9147-135]
A. Z. Greenbaum, Johns Hopkins Univ. (United States); A. Cheetham, The Univ. of Sydney (Australia); A. Sivaramakrishnan, P. Tuthill, B. Norris, Space Telescope Science Institute (Australia); L. Pueyo, The Univ. of Sydney (United States); N. Sadakuni, F. Rantakyö,

P. Hibon, S. Goodsell, M. Hartung, A. Serio, A. Cardwell, Gemini Observatory (Chile); L. Poyneer, Lawrence Livermore National Lab. (United States); B. Macintosh, Lawrence Livermore National Lab. (United States) and Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States); D. Savransky, Cornell Univ. (United States); M. D. Perrin, The Univ. of Sydney (Australia); S. Wolff, Johns Hopkins Univ. (United States); P. Ingraham, Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States); S. Thomas, NASA Ames Research Ctr. (United States)

- 9147 7C **InnoPOL: an EMCCD imaging polarimeter and 85-element curvature AO system on the 3.6-m AEOS telescope for cost effective polarimetric speckle suppression** [9147-274]
D. Harrington, Institute for Astronomy, Univ. of Hawai'i (United States) and Kiepenheuer-Institut für Sonnenphysik (Germany); S. Berdyugina, Kiepenheuer-Institut für Sonnenphysik (Germany); M. Chun, C. Ftaclas, Institute for Astronomy, Univ. of Hawai'i (United States); D. Gisler, Kiepenheuer-Institut für Sonnenphysik (Germany); J. Kuhn, Institute for Astronomy, Univ. of Hawai'i (United States)
- 9147 7D **APSU @ ESPRESSO: final design towards the integration** [9147-275]
M. Riva, P. Conconi, M. Moschetti, S. Dell'Agostino, M. Genoni, M. Aliverti, INAF - Osservatorio Astronomico di Brera (Italy); F. Pepe, D. Mégevand, Observatoire de Genève, Univ. de Genève (Switzerland); F. M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); S. Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy); A. Cabral, Univ. de Lisboa (Portugal); P. Spanò, NRC - Herzberg Institute de Astrophysics (Canada)
- 9147 7F **Design of a radial velocity spectrograph for the Moletai Astronomical Observatory** [9147-277]
C. A. Jurgenson, D. A. Fischer, T. M. McCracken, R. A. Stoll, A. E. Szymkowiak, M. J. Giguere, Yale Univ. (United States); F. G. Santoro, G. Muller, ASTRO Electro-Mechanical Engineering (United States)
- 9147 7G **ESPRESSO front end: modular opto-mechanical integration for astronomical instrumentation** [9147-278]
M. Riva, M. Aliverti, M. Moschetti, M. Landoni, S. Dell'Agostino, INAF - Osservatorio Astronomico di Brera (Italy); F. Pepe, D. Mégevand, Observatoire de Genève, Univ. de Genève (Switzerland); F. M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); S. Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy); A. Cabral, Univ. de Lisboa (Portugal)
- 9147 7H **Gemini planet imager observational calibrations IV: wavelength calibration and flexure correction for the integral field spectrograph** [9147-279]
S. G. Wolff, Johns Hopkins Univ. (United States); M. D. Perrin, Space Telescope Science Institute (United States); J. Maire, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); P. J. Ingraham, Stanford Univ. (United States); F. T. Rantakyro, P. Hibon, Gemini Observatory (Chile)
- 9147 7I **RHEA: the ultra-compact replicable high-resolution exoplanet and asteroseismology spectrograph** [9147-280]
T. Feger, C. Bacigalupo, Macquarie Univ. (Australia); T. R. Bedding, The Univ. of Sydney (Australia); J. Bento, D. W. Coutts, Macquarie Univ. (Australia); M. J. Ireland, Australian National Univ. (Australia); Q. A. Parker, Macquarie Univ. (Australia) and Australian Astronomical Observatory (Australia); A. Rizzuto, I. Spaleniak, Macquarie Univ. (Australia)

- 9147 7J **SHARK (System for coronagraphy with High order Adaptive optics from R to K band), a proposal for the LBT 2nd generation instrumentation** [9147-281]
 J. Farinato, INAF - Osservatorio Astronomico di Padova (Italy); F. Pedichini, INAF - Osservatorio Astronomico di Roma (Italy); E. Pinna, INAF - Osservatorio Astrofisico di Arcetri (Italy); F. Bacciotti, C. Baffa, INAF - Osservatorio Astronomico di Arcetri (Italy); A. Baruffolo, M. Bergomi, INAF - Osservatorio Astronomico di Padova (Italy); P. Bruno, INAF - Osservatorio Astrofisico di Catania (Italy); E. Cappellaro, INAF - Osservatorio Astronomico di Padova (Italy); L. Carbonaro, INAF - Osservatorio Astronomico di Arcetri (Italy); A. Carlotti, Institut de Planétologie et d'Astrophysique de Grenoble (France); M. Centrone, INAF - Osservatorio Astronomico di Roma (Italy); L. Close, J. Codona, Steward Observatory, The Univ. of Arizona (United States); S. Desidera, M. Dima, INAF - Osservatorio Astronomico di Padova (Italy); S. Esposito, INAF - Osservatorio Astronomico di Arcetri (Italy); D. Fantinel, G. Farisato, INAF - Osservatorio Astronomico di Padova (Italy); A. Fontana, INAF - Osservatorio Astronomico di Roma (Italy); W. Gaessler, Max-Planck-Institut für Astronomie (Germany); E. Giallongo, INAF - Osservatorio Astronomico di Roma (Italy); R. Gratton, INAF - Osservatorio Astronomico di Padova (Italy); D. Greggio, INAF - Osservatorio Astronomico di Padova (Italy) and Univ. degli Studi di Padova (Italy); J. C. Guerra, O. Guyon, P. Hinz, Steward Observatory, The Univ. of Arizona (United States); F. Leone, Univ. degli Studi di Catania (Italy); F. Lisi, INAF - Osservatorio Astronomico di Arcetri (Italy); D. Magrin, INAF - Osservatorio Astronomico di Padova (Italy); L. Marafatto, INAF - Osservatorio Astronomico di Padova (Italy) and Univ. di Padova (Italy); M. Munari, I. Pagano, INAF - Osservatorio Astrofisico di Catania (Italy); A. Puglisi, INAF - Osservatorio Astronomico di Arcetri (Italy); R. Ragazzoni, B. Salasnich, INAF - Osservatorio Astronomico di Padova (Italy); E. Sani, INAF - Osservatorio Astronomico di Arcetri (Italy); S. Scuderi, INAF - Osservatorio Astrofisico di Catania (Italy); M. Stangalini, V. Testa, INAF - Osservatorio Astronomico di Roma (Italy); C. Verinaud, Institut de Planétologie et d'Astrophysique de Grenoble (France); V. Viotto, INAF - Osservatorio Astronomico di Padova (Italy)
- 9147 7K **Gemini planet imager observational calibrations III: empirical measurement methods and applications of high-resolution microlens PSFs** [9147-282]
 P. Ingraham, Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States) and Univ. de Montréal (Canada); J.-B. Ruffio, SETI Institute (United States) and Institut Supérieur de l'Aéronautique et de l'Espace (Canada); M. D. Perrin, S. G. Wolff, Space Telescope Science Institute (United States); Z. H. Draper, Univ. of Victoria (Canada); J. Maire, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); F. Marchis, SETI Institute (United States); V. Fesquet, Gemini Observatory (Chile)
- 9147 7M **A laser locked Fabry-Perot etalon with 3 cm/s stability for spectrograph calibration** [9147-284]
 Y. V. Gurevich, Yale Univ. (United States); J. Stürmer, Landessternwarte Heidelberg (Germany); C. Schwab, The Pennsylvania State Univ. (United States); T. Führer, Technische Univ. Darmstadt (Germany); S. K. Lamoreaux, Yale Univ. (United States); A. Quirrenbach, Landessternwarte Heidelberg (Germany); T. Walther, Technische Univ. Darmstadt (Germany)
- 9147 7O **Gemini planet imager observational calibrations II: detector performance and calibration** [9147-286]
 P. Ingraham, Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States) and Univ. de Montréal (Canada); M. D. Perrin, Space Telescope Science Institute (United States); N. Sadakuni, Gemini Observatory (Chile); J.-B. Ruffio, SETI Institute (United States) and Institut Supérieur de l'Aéronautique et de l'Espace (France); J. Maire, Dunlap

Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); J. Chilcote, J. Larkin, Univ. of California, Los Angeles (United States); F. Marchis, SETI Institute (United States); R. Galicher, LESIA, CNRS, Observatoire de Paris, Univ. Paris Diderot (France); J. Weiss, Univ. of California, Los Angeles (United States)

- 9147 7P **How to inject light efficiently into single-mode fibers** [9147-287]
N. Jovanovic, Subaru Telescope, National Astronomical Observatory of Japan (United States); O. Guyon, Subaru Telescope, National Astronomical Observatory of Japan (United States) and Steward Observatory, Univ. of Arizona (United States); F. Martinache, Observatoire de la Côte d'Azur (France); C. Schwab, The Pennsylvania State Univ. (United States); N. Cvetojevic, The Univ. of Sydney (Australia) and The Australian Astronomical Observatory (Australia)
- 9147 7Q **Manufacturing, integration, and test results of the MATISSE cold optics bench** [9147-288]
F. C. M. Bettonvil, NOVA ASTRON (Netherlands) and Leiden Univ. (Netherlands); G. Kroes, T. Agočs, NOVA ASTRON (Netherlands); A. van Duin, ASTRON (Netherlands); E. Elswijk, M. de Haan, R. ter Horst, J. Kragt, NOVA ASTRON (Netherlands); J. Kuindersma, ASTRON (Netherlands); R. Navarro, R. Roelfsema, M. Schuil, T. Tromp, L. Venema, NOVA ASTRON (Netherlands); F. van Kessel, Irmato Group (Netherlands); A. Jaskó, MTA Research Ctr. for Astronomy and Earth Sciences (Hungary)
- 9147 7R **Concept and optical design of the cross-disperser module for CRIRES+** [9147-289]
E. Oliva, A. Tozzi, D. Ferruzzi, INAF - Osservatorio Astrofisico di Arcetri (Italy); L. Origlia, INAF - Osservatorio Astronomico di Bologna (Italy); A. Hatzes, R. Follert, T. Löwinger, Thüringer Landessternwarte Tautenburg (Germany); N. Piskunov, U. Heiter, M. Lockhart, T. Marquart, E. Stempels, Uppsala Univ. (Sweden); A. Reiners, G. Anglada-Escude, U. Seemann, Georg-August-Univ. Göttingen (Germany); R. J. Dorn, P. Bristow, D. Baade, B. Delabre, D. Gojak, J. Grunhut, B. Klein, M. Hilker, D. J. Ives, Y. Jung, H. U. Kaeufl, F. Kerber, J. L. Lizon, L. Pasquini, J. Paufigue, E. Pozna, A. Smette, J. Smoker, E. Valenti, European Southern Observatory (Germany)
- 9147 7S **Opto-mechanical design of a new cross dispersion unit for the CRIRES+ high resolution spectrograph for the VLT** [9147-290]
J. L. Lizon, B. Klein, European Southern Observatory (Germany); E. Oliva, INAF - Osservatorio di Arcetri (Italy); T. Löwinger, Thüringer Landessternwarte Tautenburg (Germany); G. Anglada Escude, Georg-August-Univ. Göttingen (Germany); D. Baade, P. Bristow, R. J. Dorn, European Southern Observatory (Germany); R. Follert, Thüringer Landessternwarte Tautenburg (Germany); J. Grunhut, European Southern Observatory (Germany); A. Hatzes, Thüringer Landessternwarte Tautenburg (Germany); U. Heiter, Uppsala Univ. (Sweden); D. Ives, Y. Jung, F. Kerber, M. Lockhart, European Southern Observatory (Germany); T. Marquart, Uppsala Univ. (Sweden); L. Origlia, INAF - Osservatorio di Bologna (Italy); L. Pasquini, J. Paufigue, European Southern Observatory (Germany); N. Piskunov, Uppsala Univ. (Sweden); E. Pozna, European Southern Observatory (Germany); A. Reiners, Georg-August-Univ. Göttingen (Germany); A. Smette, J. Smoker, European Southern Observatory (Germany); U. Seemann, Georg-August-Univ. Göttingen (Germany); E. Stempels, INAF - Osservatorio di Arcetri (Italy); E. Valenti, European Southern Observatory (Germany)
- 9147 7T **HiJaK: the high-resolution J, H and K spectrometer** [9147-291]
P. S. Muirhead, Z. J. Hall, M. J. Veyette, Boston Univ. (United States)

- 9147 7U **Combining vector-phase coronagraphy with dual-beam polarimetry** [9147-293]
F. Snik, G. Otten, M. Kenworthy, Leiden Observatory, Leiden Univ. (Netherlands); D. Mawet, European Southern Observatory (Chile); M. Escuti, North Carolina State Univ. (United States)
- 9147 7V **An atmospheric turbulence and telescope simulator for the development of AOLI** [9147-294]
M. Puga, R. López, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain); D. King, Univ. of Cambridge (United Kingdom); A. Oscoz, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain)
- 9147 7W **Stable Imaging for Astronomy (SIA)** [9147-295]
M. Beaulieu, S. Ottogalli, O. Preis, Y. Bresson, J.-P. Rivet, L. Abe, F. Vakili, Univ. de Nice Sophia-Antipolis, Observatoire de la Côte d'Azur, CNRS (France)
- 9147 7X **Adapting a very high resolution echelle spectrograph to an 8 meter class telescope** [9147-297]
R. O. Reynolds, L. Dettmann, Large Binocular Telescope Observatory (United States)
- 9147 7Y **Development of compact and ultra-high-resolution spectrograph with multi-GHz optical frequency comb** [9147-298]
M. Endo, The Univ. of Tokyo (Japan) and Exploratory Research for Advanced Technology (Japan); T. Sukegawa, Canon Inc. (Japan); A. Silva, Y. Kobayashi, The Univ. of Tokyo (Japan) and Exploratory Research for Advanced Technology (Japan)
- 9147 7Z **The habitable-zone planet finder calibration system** [9147-299]
S. Halverson, S. Mahadevan, L. Ramsey, R. Terrien, A. Roy, C. Schwab, C. Bender, F. Hearty, E. Levi, The Pennsylvania State Univ. (United States); S. Osterman, Johns Hopkins Univ. Applied Physics Lab. (United States); G. Ycas, S. Diddams, National Institute of Standards and Technology (United States)
- 9147 80 **A stable and inexpensive wavelength reference for precise wavelength calibration of radial velocity spectrographs** [9147-300]
T. Feger, Macquarie Univ. (Australia); M. J. Ireland, The Australian National Univ. (Australia); J. Bento, C. Bacigalupo, Macquarie Univ. (Australia)
- 9147 81 **Performance modeling of an upgraded NIRSPEC on Keck** [9147-301]
E. C. Martin, M. P. Fitzgerald, I. S. McLean, Univ. of California, Los Angeles (United States); S. M. Adkins, W. M. Keck Observatory (United States); T. Aliado, G. Brims, C. Johnson, K. Magnone, E. Wang, J. Weiss, Univ. of California, Los Angeles (United States)
- 9147 82 **Optical cavity characterization of the Tor Vergata Fabry-Pérot interferometer** [9147-304]
L. Giovannelli, F. Berrilli, D. Del Moro, Univ. degli Studi di Roma "Tor Vergata" (Italy); V. Greco, Istituto Nazionale di Ottica Applicata - CNR (Italy); R. Piazzesi, Univ. degli Studi di Roma "Tor Vergata" (Italy); A. Sordini, Istituto Nazionale di Ottica Applicata - CNR (Italy); M. Stangalini, INAF - Osservatorio Astronomico di Roma (Italy)
- 9147 83 **Gemini planet imager observational calibrations VII: on-sky polarimetric performance of the Gemini planet imager** [9147-305]
S. J. Wiktorowicz, Univ. of California, Santa Cruz (United States); M. Millar-Blanchaer Univ. of Toronto (Canada); M. D. Perrin, Space Telescope Science Institute (United States);

J. R. Graham, Univ. of California, Berkeley (United States); M. P. Fitzgerald, Univ. of California, Los Angeles (United States); J. Maire, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); P. Ingraham, Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States) and Univ. de Montréal (Canada); D. Savransky, Cornell Univ. (United States); B. A. Macintosh, Lawrence Livermore National Lab. (United States) and Stanford Univ. (United States); S. J. Thomas, NASA Ames Research Ctr. (United States); J. K. Chilcote, Univ. of California, Los Angeles (United States); Z. H. Draper, Univ. of Victoria (Canada); I. Song, Univ. of Georgia (United States); A. Cardwell, Gemini Observatory (Chile); S. J. Goodsell, Gemini Observatory (United States); M. Hartung, P. Hibon, F. Rantakyö, N. Sadakuni, Gemini Observatory (Chile)

- 9147 84 **Gemini planet imager observational calibrations V: astrometry and distortion** [9147-306]
 Q. M. Konopacky, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); S. J. Thomas, NASA Ames Research Ctr. (United States); B. A. Macintosh, Stanford Univ. (United States) and Lawrence Livermore National Lab. (United States); D. Dillon, Univ. of California Observatories (United States); N. Sadakuni, Univ. of California Observatories (United States) and Gemini Observatory (Chile); J. Maire, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); M. Fitzgerald, Univ. of California, Los Angeles (United States); S. Hinkley, California Institute of Technology (United States); P. Kalas, Univ. of California, Berkeley (United States); T. Esposito, Univ. of California, Los Angeles (United States); C. Marois, NRC - Dominion Astrophysical Observatory (Canada); P. J. Ingraham, Stanford Univ. (United States); F. Marchis, SETI Institute (United States); M. D. Perrin, Space Telescope Science Institute (United States); J. R. Graham, J. J. Wang, Univ. of California, Berkeley (United States); R. J. De Rosa, Arizona State Univ. (United States) and Univ. of Exeter (United Kingdom); K. Morzinski, Steward Observatory, The Univ. of Arizona (United States); L. Pueyo, Space Telescope Science Institute (United States); J. K. Chilcote, J. E. Larkin, Univ. of California, Los Angeles (United States); D. Fabrycky, The Univ. of Chicago (United States); S. J. Goodsell, Gemini Observatory (Chile); B. R. Oppenheimer, American Museum of Natural History (United States); J. Patience, Arizona State Univ. (United States); L. Saddlemyer, NRC - Dominion Astrophysical Observatory (Canada); A. Sivaramakrishnan, Space Telescope Science Institute (United States)

- 9147 85 **Gemini planet imager observational calibrations VI: photometric and spectroscopic calibration for the integral field spectrograph** [9147-307]
 J. Maire, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); P. J. Ingraham, Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States); R. J. De Rosa, Arizona State Univ. (United States) and Univ. of Exeter (United Kingdom); M. D. Perrin, Space Telescope Science Institute (United States); A. Rajan, Arizona State Univ. (United States); D. Savransky, Cornell Univ. (United States); J. J. Wang, Univ. of California, Berkeley (United States); J.-B. Ruffio, SETI Institute (United States); S. G. Wolff, Johns Hopkins Univ. (Canada); J. K. Chilcote, Univ. of California, Los Angeles (United States); R. Doyon, Univ. de Montréal (Canada); J. R. Graham, Univ. of California, Berkeley (United States); A. Z. Greenbaum, Johns Hopkins Univ. (United States); Q. M. Konopacky, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); J. E. Larkin, Univ. of California, Los Angeles (United States); B. A. Macintosh, Kavli Institute for Particle Astrophysics and Cosmology, Stanford Univ. (United States) and Lawrence Livermore National Lab. (United States); C. Marois, NRC - Herzberg Institute of Astrophysics (Canada); M. Millar-Blanchaer, Univ. of Toronto (Canada); J. Patience, Arizona State Univ. (United States); L. A. Pueyo, A. Sivaramakrishnan, Space Telescope Science Institute (United States); S. J. Thomas, NASA Ames Research Ctr. (United States); J. L. Weiss, Univ. of California, Los Angeles (United States)

- 9147 86 **A robotic, compact, and extremely high resolution optical spectrograph for a close-in super-Earth survey** [9147-308]
J. Ge, S. Powell, B. Zhao, F. Varosi, B. Ma, S. Sithajan, J. Liu, R. Li, N. Grieves, S. Schofield, L. Avner, H. Jakeman, W. A. Yoder, J. A. Gittelmacher, M. A. Singer, Univ. of Florida (United States); M. Muterspaugh, M. Williamson, J. E. Maxwell, Tennessee State Univ. (United States)
- 9147 87 **Characterizing instrumental effects on polarization at a Nasmyth focus using NaCo** [9147-309]
J. de Boer, European Southern Observatory (Chile) and Leiden Observatory, Leiden Univ. (Netherlands); J. H. Girard, D. Mawet, European Southern Observatory (Chile); F. Snik, C. U. Keller, Leiden Observatory, Leiden Univ. (Netherlands); J. Milli, European Southern Observatory (Chile) and IPAG, Univ. Joseph Fourier, CNRS (France)

Part Five

- 9147 88 **The upgrade of a high dispersion spectro-polarimeter, VESPolA: new circular polarimetry mode and extremely high resolution mode** [9147-310]
T. Arasaki, Kyoto Sangyo Univ. (Japan); Y. Ikeda, Photocoding (Japan); N. Akika, H. Kawakita, Kyoto Sangyo Univ. (Japan)
- 9147 89 **FIDEOS: a high resolution echelle spectrograph for the ESO 1m telescope at La Silla** [9147-311]
M. Tala, A. Berdja, M. Jones, L. Vanzi, S. Ropert, Pontificia Univ. Católica de Chile (Chile); M. Flores, Univ. de Santiago de Chile (Mexico); C. Viscasillas, Univ. Católica de Avila (Spain)
- 9147 8C **HARPS-N @ TNG, two year harvesting data: performances and results** [9147-314]
R. Cosentino, INAF - Telescopio Nazionale Galileo (Spain); C. Lovis, F. Pepe, Observatoire Astronomique de l'Univ. de Genève (Switzerland); A. C. Cameron, Univ. of St. Andrews (United Kingdom); D. W. Latham, Harvard-Smithsonian Ctr. for Astrophysics (United States); E. Molinari, INAF - Telescopio Nazionale Galileo (Spain); S. Udry, Observatoire Astronomique de l'Univ. de Genève (Switzerland); N. Bezawada, UK Astronomy Technology Ctr. (United Kingdom); N. Buchschacher, Observatoire Astronomique de l'Univ. de Genève (Switzerland); P. Figueira, Natural History Museum of Denmark (Denmark); M. Fleury, Observatoire Astronomique de l'Univ. de Genève (Switzerland); A. Ghedina, INAF - Telescopio Nazionale Galileo (Spain); A. G. Glenday, Harvard-Smithsonian Ctr. for Astrophysics (United States); M. Gonzalez, J. Guerra, INAF - Telescopio Nazionale Galileo (Spain); D. Henry, UK Astronomy Technology Ctr. (United Kingdom); I. Hughes, C. Maire, F. Motalebi, Observatoire Astronomique de l'Univ. de Genève (Switzerland); D. Phillips, Harvard-Smithsonian Ctr. for Astrophysics (United States)
- 9147 8D **Development of infrared echelle spectrograph and mid-infrared heterodyne spectrometer on a small telescope at Haleakala, Hawaii for planetary observation** [9147-315]
T. Sakanoi, Y. Kasaba, M. Kagitani, H. Nakagawa, Tohoku Univ. (Japan); J. Kuhn, S. Okano, Institute for Astronomy, Univ. of Hawai'i (United States)
- 9147 8E **ERIS: the exoplanet high-resolution image simulator for CHARIS** [9147-316]
M. A. Limbach, T. D. Groff, N. J. Kasdin, Princeton Univ. (United States); T. Brandt, Institute for Advanced Studies (United States); K. Mede, The Univ. of Tokyo (Japan); C. Loomis, Princeton Univ. (United States); M. Hayashi, N. Takato, National Astronomical Observatory of Japan (Japan)

- 9147 8F **The solar system at 10 parsec: exploiting the ExAO of LBT in the visual wavelengths** [9147-317]
M. Stangalini, F. Pedichini, M. Centrone, INAF - Osservatorio Astronomico di Roma (Italy); S. Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); J. Farinato, INAF - Osservatorio Astronomico di Padova (Italy); E. Giallongo, INAF - Osservatorio Astronomico di Roma (Italy); F. Quirós-Pacheco, E. Pinna, INAF - Osservatorio Astrofisico di Arcetri (Italy)
- 9147 8H **SPRAT: Spectrograph for the Rapid Acquisition of Transients** [9147-319]
A. S. Piascik, I. A. Steele, S. D. Bates, C. J. Mottram, R. J. Smith, R. M. Barnsley, B. Bolton, Liverpool John Moores Univ. (United Kingdom)
- 9147 8I **DIPOL-2: a double image high precision polarimeter** [9147-321]
V. Pirola, A. Berdyugin, Univ. of Turku (Finland); S. Berdyugina, Kiepenheuer-Institut für Sonnenphysik (Germany)
- 9147 8J **H.O.R.S. a new visiting instrument for G.T.C. based on the Utrecht Echelle Spectrograph** [9147-322]
J. Peñate, F. Gracia, C. Allende, J. Calvo, S. Santana, Instituto de Astrofísica de Canarias (Spain)
- 9147 8K **ESPRESSO front end exposure meter: a chromatic approach to radial velocity correction** [9147-323]
M. Landoni, M. Riva, INAF - Osservatorio Astronomico di Brera (Italy); F. Pepe, Observatoire de Genève (Switzerland); P. Conconi, F. M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); A. Cabral, Univ. de Lisboa (Portugal); S. Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy); D. Megevand, Observatoire de Genève (Switzerland)
- 9147 8L **First calibration and visible wavelength observations of Khayyam: a tunable spatial heterodyne spectroscopy (SHS)** [9147-324]
S. Hosseini, Univ. of California, Davis (United States); W. Harris, The Univ. of Arizona (United States)
- 9147 8M **The metrology system for the multi-object optical and near-infrared spectrograph MOONS** [9147-325]
M. Torres-Torriti, L. Vanzi, R. Dünner, F. Belmar, L. Dauvin, T.-C. Chen, Pontificia Univ. Católica de Chile (Chile); M. Cirasuolo, W. Taylor, H. Schnettler, D. Montgomery, P. Rees, UK Astronomy Technology Ctr. (United Kingdom); A. Cabral, Univ. de Lisboa (Portugal)
- 9147 8N **Green astro-comb for HARPS-N** [9147-326]
N. Langellier, Harvard Univ. (United States); C.-H. Li, A. G. Glenday, Harvard-Smithsonian Ctr. for Astrophysics (United States); G. Chang, Massachusetts Institute of Technology (United States) and Hamburg Univ. (Germany); H.-W. Chen, J. Lim, Massachusetts Institute of Technology (United States); G. Furesz, Harvard-Smithsonian Ctr. for Astrophysics (United States); F. Kärtner, Massachusetts Institute of Technology (United States) and Hamburg Univ. (Germany); D. F. Phillips, Harvard-Smithsonian Ctr. for Astrophysics (United States); D. Sasselov, Harvard Univ. (United States) and Harvard-Smithsonian Ctr. for Astrophysics (United States); A. Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (United States); R. Walsworth, Harvard Univ. (United States) and Harvard-Smithsonian Ctr. for Astrophysics (United States)

- 9147 8O **A coronagraph based on two spatial light modulators for active amplitude apodizing and phase corrections** [9147-328]
J. Dou, Nanjing Institute of Astronomical Optics and Technology (China); D. Ren, Nanjing Institute of Astronomical Optics and Technology (China) and California State Univ., Northridge (United States); X. Zhang, Y. Zhu, G. Zhao, Z. Wu, R. Chen, Nanjing Institute of Astronomical Optics and Technology (China); C. Liu, F. Yang, C. Yang, Nanjing Institute of Astronomical Optics and Technology (China) and Univ. of Chinese Academy of Sciences (China)
- 9147 8P **Novel infrared polarimeter for the ESO CRILES+ instrument** [9147-329]
M. Lockhart, N. Piskunov, E. Stempels, Uppsala Univ. (Sweden); M. Escuti, North Carolina State Univ. (United States); E. Oliva, INAF - Osservatorio Astrofisico di Arcetri (Italy); H.-U. Käufl, European Southern Observatory (Germany); U. Heiter, T. Marquart, Uppsala Univ. (Sweden); G. Anglada-Escude, Georg-August-Univ. Göttingen (Germany); D. Baade, P. Bristow, R. J. Dorn, European Southern Observatory (Germany); R. Follert, Thüringer Landessternwarte Tautenburg (Germany); D. Gojak, J. H. Grunhut, European Southern Observatory (Germany); A. Hatzes, Thüringer Landessternwarte Tautenburg (Germany); M. Hilker, D. Ives, Y. Jung, F. Kerber, B. Klein, J.-L. Lizon, European Southern Observatory (Germany); T. Löwinger, Thüringer Landessternwarte Tautenburg (Germany); L. Origlia, INAF - Osservatorio Astrofisico di Arcetri (Italy); L. Pasquini, J. Paufigue, E. Pozna, European Southern Observatory (Germany); A. Reiners, U. Seemann, Georg-August-Univ. (Germany); A. Smette, J. Smoker, E. Valenti, European Southern Observatory (Germany)
- 9147 8Q **ESPRESSO Coudé-Train: complexities of a simultaneous optical feeding from the four VLT unit telescopes** [9147-330]
A. Cabral, M. Abreu, J. Coelho, R. Gomes, Ctr. de Astronomia e Astrofísica da Univ. de Lisboa (Portugal); M. Monteiro, Ctr. de Astrofísica da Univ. do Porto (Portugal); A. Oliveira, P. Santos, Univ. de Lisboa (Portugal); G. Ávila, B.-A. Delabre, European Southern Observatory (Germany); M. Riva, INAF - Osservatorio Astronomico di Brera (Italy); P. Di Marcantonio, I. Coretti, INAF - Osservatorio Astronomico di Trieste (Italy); N. C. Santos, Univ. de Lisboa (Portugal) and Univ. do Porto (Portugal); F. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); D. Mégevand, Observatoire de l'Univ. de Genève (Switzerland)
- 9147 8R **Fast multichannel astronomical photometer based on silicon photo multipliers mounted at the Telescopio Nazionale Galileo** [9147-371]
F. Ambrosino, F. Meddi, C. Rossi, S. Sclavi, Univ. degli Studi di Roma La Sapienza (Italy); R. Nesci, INAF - Istituto di Astrofisica e Planetologia Spaziali (Italy); I. Bruni, INAF - Osservatorio Astronomico di Bologna (Italy); A. Ghedina, L. Riverol, L. Di Fabrizio, INAF - Fundación Galileo Galilei (Spain)
- 9147 8S **Photometric study of the Paranal observatory using MASS database** [9147-373]
A. Abahamid, Univ. Cadi Ayyad (Morocco); M. Sarazin, European Southern Observatory (Germany); G. Lombardi, European Southern Observatory (Chile)
- 9147 8T **First performance of the GeMS+GMOS system** [9147-65]
P. Hibon, Gemini South Observatory (Chile); B. Neichel, Lab. d'Astrophysique de Marseille (France); V. Garrel, Gemini South Observatory (Chile); B. Prout, F. Rigaut, The Australian National Univ. (Australia); A. Koning, Univ. of Victoria (Canada); G. Sivo, G. Gimeno, R. Carrasco, C. Winge, P. Pessev, A. Serio, G. Arriagada, Gemini South Observatory (Chile)

POSTER SESSION: EXTREMELY LARGE TELESCOPES AND INSTRUMENTS

- 9147 8U **Design and analysis of a large-diameter precision optical mount for NFIRAOS** [9147-303]
J. Fitzsimmons, A. Hill, National Research Council Canada (Canada)
- 9147 8V **HARMONI instrument control electronics** [9147-331]
J. V. Gigante, L. F. Rodríguez, Instituto de Astrofísica de Canarias (Spain); G. Zins, Institut de Planétologie et d'Astrophysique de Grenoble (France); H. Schnettler, UK Astronomy Technology Ctr. (United Kingdom); A. Pecontal, Ctr. de Recherche Astrophysique de Lyon (France); J. M. Herreros, Instituto de Astrofísica de Canarias (Spain); F. Clarke, Univ. of Oxford (United Kingdom); I. Bryson, UK Astronomy Technology Ctr. (United Kingdom); N. Thatte, Univ. of Oxford (United Kingdom)
- 9147 8W **A novel systems engineering approach to the design of a precision radial velocity spectrograph: the GMT-Consortium Large Earth Finder (G-CLEF)** [9147-333]
W. Podgorski, Harvard-Smithsonian Ctr. for Astrophysics (United States); J. Bean, The Univ. of Chicago (United States); H. Bergner, Harvard-Smithsonian Ctr. for Astrophysics (United States); M.-Y. Chun, Korea Astronomy and Space Science Institute (Korea, Republic of); J. Crane, Carnegie Observatories (United States); I. Evans, J. Evans, G. Furesz, Harvard-Smithsonian Ctr. for Astrophysics (United States); D. Guzman, Pontificia Univ. Católica de Chile (Chile); K.-M. Kim, Korea Astronomy and Space Science Institute (Korea, Republic of); K. McCracken, M. Mueller, T. Norton, Harvard-Smithsonian Ctr. for Astrophysics (United States); C. Park, Korea Astronomy and Space Science Institute (Korea, Republic of); S. Park, D. Plummer, A. Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (United States); A. Uomoto, Carnegie Observatories (United States); I.-S. Yuk, Korea Astronomy and Space Science Institute (Korea, Republic of)
- 9147 8X **The infrared imaging spectrograph (IRIS) for TMT: volume phase holographic grating performance testing and discussion** [9147-334]
S. Chen, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); E. Meyer, S. A. Wright, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada) and Univ. of Toronto (Canada); A. M. Moore, Caltech Optical Observatories (United States); J. E. Larkin, Univ. of California, Los Angeles (United States); J. Maire, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); E. Mieda, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada) and Univ. of Toronto (Canada); L. Simard, NRC - Dominion Astrophysical Observatory (Canada)
- 9147 8Y **Development of a subwavelength grating vortex coronagraph of topological charge 4 (SGVC4)** [9147-335]
C. Delacroix, O. Absil, B. Carlomagno, P. Piron, Univ. de Liège (Belgium); P. Forsberg, M. Karlsson, Uppsala Univ. (Sweden); D. Mawet, European Southern Observatory (Chile); S. Habraken, J. Surdej, Univ. de Liège (Belgium)
- 9147 8Z **Integral field spectroscopy of high redshift galaxies with the HARMONI spectrograph on the European Extremely Large Telescope** [9147-336]
S. Kendrew, S. Zieleniewski, N. Thatte, J. Devriendt, R. Houghton, Univ. of Oxford (United Kingdom); T. Fusco, ONERA (France); M. Tecza, F. Clarke, K. O'Brien, Univ. of Oxford (United Kingdom)

- 9147 90 **Trade-off study for high resolution spectroscopy in the near infrared with ELT telescopes: seeing-limited vs. diffraction limited instruments** [9147-337]
N. Sanna, E. Oliva, F. Massi, G. Cresci, INAF - Osservatorio Astrofisico di Arcetri (Italy);
L. Origlia, INAF - Osservatorio Astronomico di Bologna (Italy)
- 9147 91 **Simulations of high-z galaxy observations with an ELT-MOS** [9147-338]
K. Disseau, M. Puech, H. Flores, F. Hammer, Y. Yang, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); L. Pentericci, INAF - Osservatorio Astronomico di Roma (Italy)
- 9147 92 **All-sky homogeneity of precipitable water vapour over Paranal** [9147-339]
R. R. Querel, National Institute of Water and Atmospheric Research (New Zealand) and Univ. de Chile (Chile); F. Kerber, European Southern Observatory (Germany)
- 9147 93 **Simulating observations with HARMONI: the integral field spectrograph for the European Extremely Large Telescope** [9147-340]
S. Zieleniewski, N. Thatte, S. Kendrew, R. Houghton, M. Tecza, F. Clarke, Univ. of Oxford (United Kingdom); T. Fusco, ONERA (France); M. Swinbank, Durham Univ. (United Kingdom)
- 9147 94 **The MANIFEST fibre positioning system for the Giant Magellan Telescope** [9147-341]
J. S. Lawrence, D. M. Brown, J. Brzeski, S. Case, Australian Astronomical Observatory (Australia); M. Colless, The Australian National Univ. (Australia); T. Farrell, L. Gers, J. Gilbert, M. Goodwin, Australian Astronomical Observatory (Australia); G. Jacoby, Giant Magellan Telescope (United States) and Carnegie Observatories (United States); A. M. Hopkins, M. Ireland, K. Kuehn, N. P. F. Lorente, S. Miziaski, R. Muller, V. Nichani, A. Rakman, Australian Astronomical Observatory (Australia); S. Richards, The Univ. of Sydney (Australia); W. Saunders, N. F. Staszak, J. Tims, M. Vuong, L. Waller, Australian Astronomical Observatory (Australia)
- 9147 95 **A mechanical design concept for EAGLE on the revised E-ELT** [9147-342]
C. M. Dubbeldam, Durham Univ. (United Kingdom)
- 9147 96 **Science case and requirements for the MOSAIC concept for a multi-object spectrograph for the European Extremely Large Telescope** [9147-343]
C. J. Evans, UK Astronomy Technology Ctr. (United Kingdom); M. Puech, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); B. Barbay, Univ. de São Paulo (Brazil); P. Bonifacio, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); J.-G. Cuby, Aix Marseille Univ., CNRS, Lab. d'Astrophysique de Marseille (France); E. Guenther, Thüringer Landessternwarte Tautenburg (Germany); F. Hammer, P. Jagourel, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); L. Kaper, Univ. van Amsterdam (Netherlands); S. L. Morris, Durham Univ. (United Kingdom); J. Afonso, Observatório Astronómico de Lisboa (Portugal); P. Amram, Aix Marseille Univ., CNRS, Lab. d'Astrophysique de Marseille (France); H. Aussel, CEA, AIM, Service d'Astrophysique (France); A. Basden, Durham Univ. (United Kingdom); N. Bastian, Liverpool John Moores Univ. (United Kingdom); G. Battaglia, Instituto de Astrofísica de Canarias (Spain); B. Biller, The Royal Observatory, Edinburgh (United Kingdom); N. Bouché, Univ. de Toulouse, UPS-OMP, CNRS (France); E. Caffau, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); S. Charlot, UPMC-CNRS, Institut d'Astrophysique de Paris (France); Y. Clenet, LESIA, Observatoire de Paris, CNRS-UPMC, Univ. Paris-Diderot (France); F. Combes, LERMA, Observatoire de Paris, CNRS (France); C. Conselice, The Univ. of Nottingham (United Kingdom); T. Contini, Univ. de Toulouse, UPS-OMP, CNRS (France); G. Dalton, Univ. of Oxford (United Kingdom) and Rutherford Appleton Lab. (United Kingdom); B. Davies, Liverpool John Moores Univ. (United States); K. Disseau, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); J. Dunlop, The

Royal Observatory, Edinburgh (United Kingdom); F. Fiore, INAF - Osservatorio Astronomico di Roma (Italy); H. Flores, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); T. Fusco, ONERA (France); D. Gadotti, European Southern Observatory (Chile); A. Gallazzi, INAF - Osservatorio Astrofisico di Arcetri (Italy); E. Giallongo, INAF - Osservatorio Astronomico di Roma (Italy); T. Gonçalves, Observatório do Valongo (Brazil); D. Gratadour, LESIA, Observatoire de Paris, CNRS-UPMC, Univ. Paris-Diderot (France); V. Hill, Observatoire de la Côte d'Azur (France); M. Huertas-Company, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); R. Ibata, Observatoire de Strasbourg (France); S. Larsen, Radboud Univ. Nijmegen (Netherlands); O. Le Fèvre, Aix Marseille Univ., CNRS, Lab. d'Astrophysique de Marseille (France); B. Lemasle, Univ. von Amsterdam (Netherlands); C. Maraston, Univ. of Portsmouth (United Kingdom); S. Mei, GEPI, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); Y. Mellier, UPMC-CNRS, Institut d'Astrophysique de Paris (France); G. Östlin, Stockholm Univ. (Sweden); T. Paumard, LESIA, Observatoire de Paris, CNRS-UPMC, Univ. Paris-Diderot (France); R. Pello, Univ. de Toulouse, UPS-OMP, CNRS (France); L. Pentericci, INAF - Osservatorio Astronomico di Roma (Italy); P. Petitjean, UPMC-CNRS, Institut d'Astrophysique de Paris (France); M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany); D. Rouan, LESIA, Observatoire de Paris, CNRS-UPMC, Univ. Paris-Diderot (France); D. Schaerer, Observatoire de Genève, Univ. de Genève (Switzerland); E. Telles, Observatorio Nacional (Brazil); S. Trager, Univ. of Groningen (Netherlands); N. Welikala, Univ. of Oxford (United Kingdom); S. Zibetti, INAF - Osservatorio Astrofisico di Arcetri (Italy); B. Ziegler, Univ. Wien (Austria)

- 9147 97 **The spectrograph units for the HARMONI integral field spectrograph** [9147-344]
K. O'Brien, J. R. Allen, J. D. Lynn, N. A. Thatte, Univ. of Oxford (United Kingdom); I. Bryson, UK Astronomy Technology Ctr. (United Kingdom); F. Clarke, Univ. of Oxford (United Kingdom); H. Schnettler, UK Astronomy Technology Ctr. (United Kingdom); M. Tecza, Univ. of Oxford (United Kingdom)
- 9147 99 **Mid-IR AGPMs for ELT applications** [9147-346]
B. Carlomagno, C. Delacroix, O. Absil, Univ. de Liège (Belgium); P. Forsberg, Uppsala Univ. (Sweden); S. Habraken, A. Jolivet, Univ. de Liège (Belgium); M. Karlsson, Uppsala Univ. (Sweden); D. Mawet, European Southern Observatory (Chile); P. Piron, J. Surdej, Univ. de Liège (Belgium); E. Vargas Catalan, Uppsala Univ. (Sweden)
- 9147 9A **The opto-mechanical design of the GMT-consortium large earth finder (G-CLEF)** [9147-347]
M. Mueller, D. Baldwin, Harvard-Smithsonian Ctr. for Astrophysics (United States); J. Bean, The Univ. of Chicago (United States); H. Bergner, Harvard-Smithsonian Ctr. for Astrophysics (United States); B. Bigelow, GMTO Corp. (United States); M.-Y. Chun, Korea Astronomy and Space Science Institute (Korea, Republic of); J. Crane, Carnegie Observatories (United States); J. Foster, G. Fűrész, T. Gauron, Harvard-Smithsonian Ctr. for Astrophysics (United States); D. Guzman, Pontificia Univ. Católica de Chile (Chile); E. Hertz, Harvard-Smithsonian Ctr. for Astrophysics (United States); A. Jordán, Pontificia Univ. Católica de Chile (Chile); K.-M. Kim, Korea Astronomy and Space Science Institute (Korea, Republic of); K. McCracken, T. Norton, M. Ordway, Harvard-Smithsonian Ctr. for Astrophysics (United States); C. Park, Korea Astronomy and Space Science Institute (Korea, Republic of); S. Park, W. Podgorski, A. Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (United States); A. Uomoto, Carnegie Observatories (United States); I.-S. Yuk, Korea Astronomy and Space Science Institute (Korea, Republic of)

- 9147 9B **SKA pulsar search: technological challenges and best algorithms development** [9147-348]
C. Baffa, INAF - Osservatorio Astrofisico di Arcetri (Italy)
- 9147 9C **The infrared imaging spectrograph (IRIS) for TMT: reflective ruled diffraction grating performance testing and discussion** [9147-349]
E. Meyer, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada) and Univ. of Toronto (Canada); S. Chen, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); S. A. Wright, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada) and Univ. of Toronto (Cambodia); A. M. Moore, Caltech Optical Observatories (United States); J. E. Larkin, Univ. of California, Los Angeles (United States); L. Simard, NRC – Dominion Astrophysical Observatory (Canada); J. Maire, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada); E. Mieda, Dunlap Institute for Astronomy and Astrophysics, Univ. of Toronto (Canada) and Univ. of Toronto (Canada); J. Gordon, Univ. of Toronto (Canada)
- 9147 9D **Three possible types of coronagraphs for the E-ELT PCS instrument** [9147-350]
A. Carlotti, IPAG, CNRS (France); M. N'Diaye, L. Pueyo, Space Telescope Science Institute (United States); D. Mawet, European Southern Observatory (Chile)
- 9147 9E **The high contrast imaging modes of MICADO** [9147-351]
P. Baudoz, A. Boccaletti, S. Lacour, R. Galicher, Y. Clénet, D. Gratadour, É. Gendron, T. Buey, G. Rousset, Lab. d'Etudes Spatiales et d'Instrumentation en Astrophysique, Observatoire de Paris-Meudon (France); M. Hartl, R. Davies, Max-Planck-Institut für extraterrestrische Physik (Germany)
- 9147 9F **An aperture masking mode for the MICADO instrument** [9147-352]
S. Lacour, P. Baudoz, E. Gendron, A. Boccaletti, R. Galicher, Y. Clénet, D. Gratadour, T. Buey, G. Rousset, LESIA, Observatoire de Paris (France); M. Hartl, R. Davies, Max-Planck-Institut für extraterrestrische Physik (Germany)
- 9147 9G **The G-CLEF spectrograph optical design** [9147-353]
G. Fűrész, Harvard-Smithsonian Ctr. for Astrophysics (United States); H. Epps, Univ. of California Observatories, Lick Observatory (United States) and Univ. of California Santa Cruz (United States); S. Barnes, Stuart Barnes Optical Design (Netherlands); W. Podgorski, A. Szentgyorgyi, M. Mueller, D. Baldwin, Harvard-Smithsonian Ctr. for Astrophysics (United States); J. Bean, The Univ. of Chicago (United States); H. Bergner, Harvard-Smithsonian Ctr. for Astrophysics (United States); M.-Y. Chun, Korea Astronomy and Space Science Institute (Korea, Republic of); J. Crane, Carnegie Observatories (United States); J. Evans, I. Evans, J. Foster, T. Gauron, Harvard-Smithsonian Ctr. for Astrophysics (United States); D. Guzman, Pontificia Univ. Católica de Chile (Chile); E. Hertz, Harvard-Smithsonian Ctr. for Astrophysics (United States); A. Jordán, Pontificia Univ. Católica de Chile (Chile); K.-M. Kim, Korea Astronomy and Space Science Institute (Korea, Republic of); K. McCracken, T. Norton, M. Ordway, Harvard-Smithsonian Ctr. for Astrophysics (United States); C. Park, Korea Astronomy and Space Science Institute (Korea, Republic of); S. Park, D. Plummer, Harvard-Smithsonian Ctr. for Astrophysics (United States); A. Uomoto, Carnegie Observatories (United States); I.-S. Yuk, Korea Astronomy and Space Science Institute (Korea, Republic of)
- 9147 9H **On-instrument wavefront sensor design for the TMT infrared imaging spectrograph (IRIS) update** [9147-354]
J. Dunn, V. Reshetov, J. Atwood, J. Pazder, B. Wooff, D. Loop, L. Saddlemyer, NRC - Herzberg Institute of Astrophysics (Canada); A. M. Moore, Caltech Optical Observatories (United States); J. E. Larkin, Univ. of California, Los Angeles (United States)

- 9147 9I **DKIST visible broadband imager interference filters** [9147-355]
F. Wöger, National Solar Observatory (United States)
- 9147 9J **Optical and mechanical design of the fore-optics of HARMONI** [9147-356]
J. Sánchez-Capuchino, E. Hernández, A. Bueno, J. M. Herreros, Instituto de Astrofísica de Canarias (Spain); N. Thatte, Univ. of Oxford (United Kingdom); I. Bryson, UK Astronomy Technology Ctr. (United Kingdom); F. Clarke, M. Tecza, Univ. of Oxford (United Kingdom)
- 9147 9K **Beating the heat! Automated characterization of piezoelectric tubes for Starbugs** [9147-357]
R. Piersiak, Stony Brook Univ. (United States); M. Goodwin, J. Gilbert, R. Muller, Australian Astronomical Observatory (Australia)
- 9147 9L **Wireless software update system based on Zigbee for LAMOST** [9147-358]
S. Li, Y. Gu, Y. Jin, C. Zhai, Univ. of Science and Technology of China (China)
- 9147 9M **Cryogenic testing of components for the HARMONI spectrograph** [9147-359]
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Introduction

This conference, the fifth in the series on Ground-based and Airborne Instrumentation for Astronomy, attracted a very rich programme of papers discussing all aspects of the design and delivery of complete instrument systems. The range of innovation in the instrument building community was particularly remarkable at this meeting. Instrument concepts matched to the $\sim 1000\text{m}^2$ collecting area of the extremely large telescopes were discussed alongside highly scientifically focused instruments for telescopes with $\sim 1\text{m}^2$ apertures. Meanwhile, the current large telescope observatories are considering their instrument suites in the light of future new developments. Survey instruments are becoming an enduring and significant theme at our meeting, whether designed for observing hundreds of galaxies, or hundreds of points on a radial velocity curve to reveal exo-planetary systems.

At this meeting, ~ 350 papers were presented, either as oral or poster contributions. Six invited reviews were requested on major existing facilities or planned new ones. The presentations were arranged into 10 sessions over the five days of the meeting. The major topics were:

- Instrument Programmes at Major Observatories
- New instruments and Upgrades to Existing Instruments
- High Multiplex and Survey Instruments
- High Spectral Resolution Instruments
- High Spatial Resolution Instruments
- Instruments for Extremely Large Telescopes

On behalf of the program committee, it is a pleasure to acknowledge the contribution of all participants in making this a busy and very productive meeting.

Suzanne K. Ramsay
Hideki Takami
Ian S. McLean

