

# PROCEEDINGS OF SPIE

## ***Ground-based and Airborne Instrumentation for Astronomy III***

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

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D. R. Harbeck, P. Martin, WIYN Observatory (United States); J. Cavin, Univ. of Wisconsin-Madison (United States); G. H. Jacoby, WIYN Observatory (United States) and National Optical Astronomy Observatory (United States); G. Muller, A. Yeatts, R. McCloskey, J. W. Ivens, D. Blanco, WIYN Observatory (United States); C. Corson, WIYN Observatory (United States) and National Optical Astronomy Observatory (United States); S. Gott, National Optical Astronomy Observatory (United States); C. Harmer, WIYN Observatory (United States)

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S. M. Kahn, N. Kurita, K. Gilmore, M. Nordby, SLAC National Accelerator Lab. (United States); P. O'Connor, Brookhaven National Lab. (United States); R. Schindler, SLAC National Accelerator Lab. (United States); J. Oliver, Harvard Univ. (United States); R. Van Berg, Univ. of Pennsylvania (United States); S. Olivier, V. Riot, Lawrence Livermore National Lab. (United States); P. Antilogus, Institut National de Physique Nucléaire et de Physique des Particules (France); T. Schalk, M. Huffer, G. Bowden, J. Singal, M. Foss, SLAC National Accelerator Lab. (United States)
- 7735 0K **Optical design of the ESPRESSO spectrograph at VLT** [7735-20]  
P. Spanò, INAF, Osservatorio Astronomico di Brera (Italy); D. Mégevand, Observatoire de Genève, Univ. de Genève (Switzerland); J. M. Herreros, Instituto de Astrofísica de Canarias (Spain); F. M. Zerbi, INAF, Osservatorio Astronomico di Brera (Italy); A. Cabral, Univ. de Lisboa (Portugal); P. Di Marcantonio, INAF, Osservatorio Astronomico di Trieste (Italy); C. Lovis, Observatoire de Genève, Univ. de Genève (Switzerland); S. Cristiani, INAF, Osservatorio Astronomico di Trieste (Italy); R. Rebolo, Instituto de Astrofísica de Canarias (Spain); N. Santos, Univ. do Porto (Portugal); F. Pepe, Observatoire de Genève, Univ. de Genève (Switzerland)
- 7735 0L **VIRUS: a massively replicated 33k fiber integral field spectrograph for the upgraded Hobby-Eberly Telescope** [7735-21]  
G. J. Hill, H. Lee, B. L. Vattiat, McDonald Observatory, The Univ. of Texas at Austin (United States); J. J. Adams, The Univ. of Texas at Austin (United States); J. L. Marshall, Texas A&M Univ. (United States); N. Drory, Max-Planck-Institut für extraterrestrische Physik (Germany); D. L. DePoy, Texas A&M Univ. (United States); G. Blanc, The Univ. of Texas at Austin (United States); R. Bender, Max-Planck-Institut für extraterrestrische Physik (Germany) and Univ.-Sternwarte München (Germany); J. A. Booth, T. Chonis, M. E. Cornell, McDonald Observatory, The Univ. of Texas at Austin (United States); K. Gebhardt, The Univ. of Texas at Austin (United States); J. Good, McDonald Observatory, The Univ. of Texas at Austin (United States); F. Grupp, Univ.-Sternwarte München (Germany); R. Haynes, Astrophysikalisches Institut Potsdam (Germany) and innoSPEC Potsdam (Germany); A. Kelz, Astrophysikalisches Institut Potsdam (Germany); P. J. MacQueen, McDonald Observatory, The Univ. of Texas at



Austin (United States); N. Mollison, J. D. Murphy, The Univ. of Texas at Austin (United States); M. D. Rafal, McDonald Observatory, The Univ. of Texas at Austin (United States); W. N. Rambold, M. M. Roth, Astrophysikalisches Institut Potsdam (Germany) and innoFSPEC Potsdam (Germany); R. Savage, McDonald Observatory, The Univ. of Texas at Austin (United States); M. P. Smith, Univ. of Wisconsin-Madison (United States)

- 7735 0M **The Keck Cosmic Web Imager** [7735-22]  
C. Martin, A. Moore, P. Morrissey, M. Matuszewski, S. Rahman, California Institute of Technology (United States); S. Adkins, W. M. Keck Observatory (United States); H. Epps, UCO/Lick Observatory, Univ. of California (United States)

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#### SESSION 4    TECHNIQUES AND COMPONENTS I

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- 7735 0N **PIMMS: photonic integrated multimode microspectrograph** [7735-23]  
J. Bland-Hawthorn, The Univ. of Sydney (Australia); J. Lawrence, Macquarie Univ. (Australia) and Anglo-Australian Observatory (Australia); G. Robertson, S. Campbell, B. Pope, C. Betters, S. Leon-Saval, The Univ. of Sydney (Australia); T. Birks, Univ. of Bath (United Kingdom); R. Haynes, Anglo-Australian Observatory (Australia) and InnoFSPEC, Astrophysikalisches Institut Potsdam (Germany); N. Cvetojevic, N. Jovanovic, Macquarie Univ. (Australia)
- 7735 0O **Hexabundles: first results** [7735-24]  
J. J. Bryant, J. W. O'Byrne, J. Bland-Hawthorn, S. G. Leon-Saval, The Univ. of Sydney (Australia)
- 7735 0P **The Cosmic Web Imager: an integral field spectrograph for the Hale Telescope at Palomar Observatory: instrument design and first results** [7735-25]  
M. Matuszewski, D. Chang, R. M. Crabill, D. C. Martin, California Institute of Technology (United States); A. M. Moore, Caltech Optical Observatories (United States); P. Morrissey, S. Rahman, California Institute of Technology (United States)
- 7735 0Q **Engineering a highly segmented very wide-field spectrograph** [7735-26]  
R. Ragazzoni, INAF, Osservatorio Astronomico di Padova (Italy); A. Fontana, INAF, Osservatorio Astronomico di Roma (Italy); D. Maccagni, Istituto di Fisica Spaziale e Fisica Cosmica (Italy); A. Baruffolo, INAF, Osservatorio Astronomico di Padova (Italy); A. G. Bianco, Istituto di Fisica Spaziale e Fisica Cosmica (Italy); A. diPaola, INAF, Osservatorio Astronomico di Roma (Italy); J. Farinato, G. Gentile, INAF, Osservatorio Astronomico di Padova (Italy); E. Giallongo, F. Pedichini, R. Speziali, V. Testa, INAF, Osservatorio Astronomico di Roma (Italy)
- 7735 0R **The low-resolution imaging spectrograph red channel CCD upgrade: fully depleted, high-resistivity CCDs for Keck** [7735-27]  
C. Rockosi, R. Stover, R. Kibrick, C. Lockwood, M. Peck, D. Cowley, M. Bolte, UCO/Lick Observatory, Univ. of California, Santa Cruz (United States); S. Adkins, W. M. Keck Observatory (United States); B. Alcott, S. L. Allen, B. Brown, G. Cabak, W. Deich, D. Hilyard, UCO/Lick Observatory, Univ. of California, Santa Cruz (United States); M. Kassis, W. M. Keck Observatory (United States); K. Lanclos, J. Lewis, T. Pfister, A. Phillips, L. Robinson, M. Saylor, M. Thompson, J. Ward, M. Wei, C. Wright, UCO/Lick Observatory, Univ. of California, Santa Cruz (United States)
- 7735 0S **High-resolution imaging and spectroscopy in the visible from large ground-based telescopes with natural guide stars** [7735-28]  
C. Mackay, T. D. Staley, D. King, F. Suess, K. Weller, Univ. of Cambridge (United Kingdom)

7735 OT **High-precision calibration of spectrographs using laser frequency combs** [7735-29]  
T. Wilken, Max-Planck-Institut für Quantenoptik (Germany); C. Lovis, Observatoire de Genève (Switzerland); A. Manescau, European Southern Observatory (Germany); T. Steinmetz, Max-Planck-Institut für Quantenoptik (Germany) and Menlo Systems GmbH (Germany); L. Pasquini, G. Lo Curto, European Southern Observatory (Germany); T. W. Hänsch, Max-Planck-Institut für Quantenoptik (Germany); R. Holzwarth, Max-Planck-Institut für Quantenoptik (Germany) and Menlo Systems GmbH (Germany); T. Udem, Max-Planck-Institut für Quantenoptik (Germany)

7735 OU **A new method to quantitatively compare focal ratio degradation due to different end termination techniques** [7735-30]  
C. Poppett, J. Allington-Smith, Durham Univ. (United Kingdom)

7735 OV **SPHERE IFS: the spectro differential imager of the VLT for exoplanets search** [7735-179]  
R. U. Claudi, INAF, Osservatorio Astronomico di Padova (Italy); M. Turatto, INAF, Osservatorio Astrofisico di Catania (Italy); E. Giro, D. Mesa, U. Anselmi, INAF, Osservatorio Astronomico di Padova (Italy); P. Bruno, INAF, Osservatorio Astrofisico di Catania (Italy); E. Cascone, INAF, Osservatorio Astronomico di Capodimonte (Italy); V. De Caprio, INAF - IASF Milano (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. G. Gratton, L. Lessio, INAF, Osservatorio Astronomico di Padova (Italy); J. L. Lizon, European Southern Observatory (Germany); B. Salasnich, INAF, Osservatorio Astronomico di Padova (Italy); S. Scuderi, INAF, Osservatorio Astrofisico di Catania (Italy); K. Dohlen, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France); J. L. Beuzit, P. Puget, J. Antichi, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); N. Hubin, M. Kasper, European Southern Observatory (Germany)

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## SESSION 5 INSTRUMENTATION AND TECHNIQUES FOR EXOPLANET DETECTION

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7735 OW **Fiber-stabilized PSF for sub-m/s Doppler precision at Lick Observatory** [7735-170]  
J. F. P. Spronck, Yale Univ. (United States); C. Schwab, Landessternwarte Heidelberg (Germany); D. A. Fischer, Yale Univ. (United States)

7735 OX **High spatial resolution and high contrast optical speckle imaging with FASTCAM at the ORM** [7735-32]  
L. Labadie, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain); R. Rebolo, Instituto de Astrofísica de Canarias (Spain) and Consejo Superior de Investigaciones Científicas (Spain); B. Femenía, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain); I. Villó, A. Díaz-Sánchez, Univ. Politécnica de Cartagena (Spain); A. Oscoz, R. López, J. A. Pérez-Prieto, Instituto de Astrofísica de Canarias (Spain); A. Pérez-Garrido, Univ. Politécnica de Cartagena (Spain); S. R. Hildebrandt, Lab. de Physique Subatomique et de Cosmologie, Univ. de Grenoble (France); V. Béjar-Sánchez, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain); J. José Piqueras, Max-Planck-Institut für Sonnensystemforschung (Germany); L. F. Rodríguez, Instituto de Astrofísica de Canarias (Spain)

7735 OZ **Along the path towards extremely precise radial velocity measurements** [7735-34]  
G. Lo Curto, European Southern Observatory (Germany); C. Lovis, Observatoire de Genève (Switzerland); T. Wilken, Max-Planck-Institut für Quantenoptik (Germany); G. Avila, European Southern Observatory (Germany); B. Chazelas, Observatoire de Genève (Switzerland);

M. Esposito, Instituto de Astrofísica de Canarias (Spain); T. W. Hänsch, Max-Planck-Institut für Quantenoptik (Germany); J. González-Hernández, Instituto de Astrofísica de Canarias (Spain); R. Holzwarth, Max-Planck-Institut für Quantenoptik (Germany) and Menlo Systems GmbH (Germany); G. Ihle, A. Manescau, L. Pasquini, European Southern Observatory (Germany); F. Pepe, Observatoire de Genève (Switzerland); R. Rebolo, Instituto de Astrofísica de Canarias (Spain); A. Segovia, P. Sinclair, European Southern Observatory (Germany); T. Steinmetz, Max-Planck-Institut für Quantenoptik (Germany) and Menlo Systems GmbH (Germany); T. Udem, Max-Planck-Institut für Quantenoptik (Germany); F. Wildi, Observatoire de Genève (Switzerland)

- 7735 10 **The prototype design of most powerful exoplanet tracker based on LAMOST** [7735-35]  
K. Zhang, National Astronomical Observatories, Nanjing Institute of Astronomical Optics & Technology (China), Nanjing Institute of Astronomical Optics & Technology (China), and Graduate Univ. of Chinese Academy of Sciences (China); Y. Zhu, L. Wang, National Astronomical Observatories, Nanjing Institute of Astronomical Optics & Technology (China) and Nanjing Institute of Astronomical Optics & Technology (China)
- 7735 11 **High contrast stellar observations within the diffraction limit at the Palomar Hale telescope** [7735-36]  
B. Mennesson, Jet Propulsion Lab. (United States); C. Hanot, Univ. de Liège (Belgium); E. Serabyn, S. R. Martin, K. Liewer, F. Loya, D. Mawet, Jet Propulsion Lab. (United States)
- 7735 12 **Impact of calibration on extrasolar planets direct imaging with IRDIS, the infrared dual-imaging camera and spectrograph for SPHERE** [7735-37]  
M. Langlois, Ctr. de Recherche Astrophysique de Lyon, CNRS, Univ. Claude-Bernard Lyon I, Observatoire de Lyon (France); A. Vigan, K. Dohlen, C. Moutou, Observatoire Astronomique de Marseille, CNRS, Univ. de Provence (France); D. Mouillet, Lab. d'Astrophysique de l'Observatoire de Grenoble, CNRS, Univ. Joseph Fourier (France); F. Wildi, Observatoire de Genève, Univ. de Genève (Switzerland); A. Boccaletti, LESIA, CNRS, Observatoire de Paris-Meudon (France)
- 7735 13 **CARMENES: Calar Alto high-resolution search for M dwarfs with exo-earths with a near-infrared Echelle spectrograph** [7735-38]  
A. Quirrenbach, Landessternwarte Heidelberg (Germany); P. J. Amado, Instituto de Astrofísica de Andalucía, CSIC (Spain); H. Mandel, Landessternwarte Heidelberg (Germany); J. A. Caballero, Ctr. de Astrobiología, CSIC-INTA (Spain); R. Mundt, Max-Planck-Institut für Astronomie (Germany); I. Ribas, Institut de Ciències de l'Espai, CSIC-IEEC (Spain); A. Reiners, Institut für Astrophysik, Georg-August-Univ. Göttingen (Germany); M. Abril, Instituto de Astrofísica de Andalucía, CSIC (Spain); J. Aceituno, Calar Alto Observatory, MPG-CSIC (Spain); C. Afonso, Max-Planck-Institut für Astronomie (Germany); D. Barrado y Navascués, Calar Alto Observatory, MPG-CSIC (Spain); J. L. Bean, Institut für Astrophysik, Georg-August-Univ. Göttingen (Germany); V. J. S. Béjar, Instituto de Astrofísica de Canarias (Spain); S. Becerril, Instituto de Astrofísica de Andalucía, CSIC (Spain); A. Böhm, Max-Planck-Institut für Astronomie (Germany); M. C. Cárdenas, A. Claret, Instituto de Astrofísica de Andalucía, CSIC (Spain); J. Colomé, Institut de Ciències de l'Espai, CSIC-IEEC (Spain); L. P. Costillo, Instituto de Astrofísica de Andalucía, CSIC (Spain); S. Dreizler, Institut für Astrophysik, Georg-August-Univ. Göttingen (Germany); M. Fernández, Instituto de Astrofísica de Andalucía, CSIC (Spain); X. Francisco, Institut de Ciències de l'Espai, CSIC-IEEC (Spain); D. Galadí, Calar Alto Observatory, MPG-CSIC (Spain); R. Garrido, Instituto de Astrofísica de Andalucía, CSIC (Spain); J. I. González Hernández, Instituto de Astrofísica de Canarias (Spain); J. Guàrdia, Institut de Ciències de l'Espai, CSIC-IEEC (Spain);

E. W. Guenther, Thüringer Landessternwarte Tautenburg (Germany); F. Gutiérrez-Soto, Instituto de Astrofísica de Andalucía, CSIC (Spain); V. Joergens, Max-Planck-Institut für Astronomie (Germany); A. P. Hatzes, Thüringer Landessternwarte Tautenburg (Germany); J. Helmling, Calar Alto Observatory, MPG-CSIC (Spain); T. Henning, Max-Planck-Institut für Astronomie (Germany); E. Herrero, Institut de Ciències de l'Espai, CSIC-IEEC (Spain); M. Kürster, W. Laun, R. Lenzen, U. Mall, Max-Planck-Institut für Astronomie (Germany); E. L. Martín, Ctr. de Astrobiología, CSIC-INTA (Spain); S. Marín-Ruiz, E. Mirabet, Instituto de Astrofísica de Andalucía, CSIC (Spain); D. Montes, Univ. Complutense de Madrid (Spain); J. C. Morales, Institut de Ciències de l'Espai, CSIC-IEEC (Spain); R. Morales Muñoz, Instituto de Astrofísica de Andalucía, CSIC (Spain); A. Moya, Ctr. de Astrobiología, CSIC-INTA (Spain); V. Naranjo, Max-Planck-Institut für Astronomie (Germany); O. Rabaza, A. Ramón, Instituto de Astrofísica de Andalucía, CSIC (Spain); R. Rebolo, Instituto de Astrofísica de Canarias (Spain); S. Reffert, Landessternwarte Heidelberg (Germany); F. Rodler, Instituto de Astrofísica de Canarias (Spain); E. Rodríguez, Ctr. de Astrobiología, CSIC-INTA (Spain); A. Rodríguez Trinidad, Instituto de Astrofísica de Andalucía, CSIC (Spain); R. R. Rohloff, Max-Planck-Institut für Astronomie (Germany); M. A. Sánchez Carrasco, Instituto de Astrofísica de Andalucía, CSIC (Spain); C. Schmidt, Institut für Astrophysik, Georg-August-Univ. Göttingen (Germany); W. Seifert, Landessternwarte Heidelberg (Germany); J. Setiawan, Max-Planck-Institut für Astronomie (Germany); E. Solano, Ctr. de Astrobiología, CSIC-INTA (Spain); O. Stahl, Landessternwarte Heidelberg (Germany); C. Storz, Max-Planck-Institut für Astronomie (Germany); J. C. Suárez, Ctr. de Astrobiología, CSIC-INTA (Spain); U. Thiele, Calar Alto Observatory, MPG-CSIC (Spain); K. Wagner, Max-Planck-Institut für Astronomie (Germany); G. Wiedemann, Hamburger Sternwarte (Germany); M. R. Zapatero Osorio, Ctr. de Astrobiología, CSIC-INTA (Spain); C. del Burgo, UNINOVA-CA3 (Portugal); E. Sánchez-Blanco, Instituto de Astrofísica de Andalucía, CSIC (Spain); W. Xu, Wenli Xu Optical System Engineering (Germany)

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## SESSION 6 GROUND-BASED INFRARED INSTRUMENTS I

- 7735 14 **The FIRE infrared spectrometer at Magellan: construction and commissioning** [7735-39]  
 R. A. Simcoe, Massachusetts Institute of Technology (United States); A. J. Burgasser, Univ. of California, San Diego (United States); J. J. Bochanski, P. L. Schechter, Massachusetts Institute of Technology (United States); R. A. Bernstein, UCO/Lick Observatory, Univ. of California, Santa Cruz (United States); B. C. Bigelow, UC Observatories, Univ. of California, Santa Cruz (United States); J. L. Pipher, W. Forrest, C. McMurtry, Univ. of Rochester (United States); M. J. Smith, Smithsonian Astrophysical Observatory (United States); J. Fishner, Massachusetts Institute of Technology (United States)
- 7735 15 **Recent progress on the KMOS multi-object integral-field spectrograph for ESO VLT** [7735-40]  
 R. Sharples, Durham Univ. (United Kingdom); R. Bender, Univ.-Sternwarte München (Germany) and Max-Planck-Institut für Extraterrestrische Physik (Germany); A. Agudo Berbel, Max-Planck-Institut für extraterrestrische Physik (Germany); R. Bennett, N. Bezawada, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); N. Bouché, Max-Planck-Institut für extraterrestrische Physik (Germany); D. Bramall, Durham Univ. (United Kingdom); M. Casali, European Southern Observatory (Germany); M. Cirasuolo, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); P. Clark, Durham Univ. (United Kingdom); M. Cliffe, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); R. Davies, Max-Planck-Institut für extraterrestrische Physik (Germany); R. Davies, Univ. of Oxford (United Kingdom); N. Drory, Max-Planck-Institut für extraterrestrische Physik (Germany); M. Dubbeldam, Durham Univ. (United Kingdom); A. Fairley, UK Astronomy Technology Ctr., The Royal Observatory

Edinburgh (United Kingdom); G. Finger, European Southern Observatory (Germany); R. Genzel, Max-Planck-Institut für extraterrestrische Physik (Germany); R. Haefner, A. Hess, Univ.-Sternwarte München (Germany); P. Jeffers, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); I. Lewis, Univ. of Oxford (United Kingdom); D. Montgomery, J. Murray, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); B. Muschelok, Univ.-Sternwarte München (Germany); N. Förster Schreiber, Max-Planck-Institut für extraterrestrische Physik (Germany); J. Pirard, S. Ramsay-Howat, European Southern Observatory (Germany); P. Rees, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); J. Richter, Univ.-Sternwarte München (Germany); D. Robertson, Durham Univ. (United Kingdom); I. Robson, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); S. Rolt, Durham Univ. (United Kingdom); R. Saglia, J. Schlichter, Univ.-Sternwarte München (Germany); M. Tecza, Univ. of Oxford (United Kingdom); S. Todd, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); M. Wegner, Univ.-Sternwarte München (Germany); E. Wiezorrek, Max-Planck-Institut für extraterrestrische Physik (Germany)

- 7735 16 **GNOSIS: an OH suppression unit for near-infrared spectrographs** [7735-41]  
 S. C. Ellis, J. Bland-Hawthorn, The Univ. of Sydney (Australia); J. S. Lawrence, Anglo-Australian Observatory (Australia) and Macquarie Univ. (Australia); J. Bryant, The Univ. of Sydney (Australia); R. Haynes, innoFSPEC (Germany); A. Horton, S. Lee, Anglo-Australian Observatory (Australia); S. Leon-Saval, The Univ. of Sydney (Australia); H.-G. Löhmannsröben, innoFSPEC (Germany); J. Mladenoff, Anglo-Australian Observatory (Australia); J. O'Byrne, The Univ. of Sydney (Australia); W. Rambold, M. Roth, innoFSPEC (Germany); C. Trinh, The Univ. of Sydney (Australia)
- 7735 17 **Spectropolarimetry with the SALT RSS** [7735-42]  
 J. D. Brink, D. A. H. Buckley, South African Astronomical Observatory (South Africa) and Southern African Large Telescope (South Africa); K. H. Nordsieck, Univ. of Wisconsin-Madison (United States); S. B. Potter, South African Astronomical Observatory (South Africa)
- 7735 18 **ARCHONS: a highly multiplexed superconducting optical to near-IR camera** [7735-43]  
 B. A. Mazin, K. O'Brien, S. McHugh, Univ. of California, Santa Barbara (United States); B. Bumble, NASA Jet Propulsion Lab. (United States); D. Moore, S. Golwala, J. Zmuidzinas, California Institute of Technology (United States)
- 7735 19 **NESSI: the New Mexico Tech Extrasolar Spectroscopic Survey Instrument** [7735-44]  
 C. Jurgenson, F. Santoro, M. Creech-Eakman, K. Houairi, H. Bloemhard, New Mexico Institute of Mining and Technology (United States); G. Vasisht, M. Swain, P. Deroo, Jet Propulsion Lab. (United States); C. Moore, L. Schmidt, P. Boston, D. Rodeheffer, New Mexico Institute of Mining and Technology (United States); P. Chen, Jet Propulsion Lab. (United States)
- 7735 1A **Commissioning of the infrared imaging survey (IRIS) system** [7735-45]  
 K. W. Hodapp, Univ. of Hawai'i (United States); R. Chini, Ruhr-Univ. Bochum (Germany); B. Reipurth, Univ. of Hawai'i (United States); M. Murphy, Univ. Católica del Norte (Chile); R. Lemke, R. Watermann, Ruhr-Univ. Bochum (Germany); S. Jacobson, Univ. of Hawai'i (United States); K. Bischoff, Halfmann Teleskoptechnik GmbH & Co. KG (Germany); T. Chonis, D. Dement, R. Terrien, K. Bott, S. Provence, Univ. of Hawai'i (United States)

7735 1B **Development of the mid-IR echelle high-dispersion spectrograph employing the germanium immersion grating** [7735-46]  
Y. Hirahara, T. Hirao, Y. Tatamitani, T. Yonezu, N. Ebizuka, Nagoya Univ. (Japan);  
K. Kawaguchi, Okayama Univ. (Japan); H. Tokoro, T. N. Oka, Nagoya Univ. (Japan)

7735 1C **The Apache Point Observatory Galactic Evolution Experiment (APOGEE) high-resolution near-infrared multi-object fiber spectrograph** [7735-47]  
J. C. Wilson, F. Hearty, M. F. Skrutskie, S. Majewski, Univ. of Virginia (United States);  
R. Schiavon, Gemini Observatory (United States); D. Eisenstein, Steward Observatory, The Univ. of Arizona (United States); J. Gunn, Princeton Univ. (United States); B. Blank, C. Henderson, PulseRay (United States); S. Smee, R. Barkhouser, A. Harding, The Johns Hopkins Univ. (United States); G. Fitzgerald, T. Stolberg, New England Optical Systems Inc. (United States); J. Arns, Kaiser Optical Systems Inc. (United States); M. Nelson, S. Brunner, A. Burton, E. Walker, C. Lam, Univ. of Virginia (United States); P. Maseman, Steward Observatory, The Univ. of Arizona (United States); J. Barr, Univ. of Virginia (United States); F. Leger, L. Carey, Univ. of Washington (United States); N. MacDonald, Apache Point Observatory (United States); T. Horne, Steward Observatory, The Univ. of Arizona (United States); E. Young, SOFIA / USRA (United States); G. Rieke, M. Rieke, Steward Observatory, The Univ. of Arizona (United States); T. O'Brien, The Ohio State Univ. (United States); S. Hope, J. Krakula, The Johns Hopkins Univ. (United States); J. Crane, Carnegie Observatories (United States); B. Zhao, Univ of Florida (United States); M. Carr, Princeton Univ. (United States); C. Harrison, R. Stoll, M. A. Vernieri, C Technologies, Inc. (United States); J. Holtzman, New Mexico State Univ. (United States); M. Shetrone, The Univ. of Texas at Austin (United States); C. Allende-Prieto, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain); J. Johnson, The Ohio State Univ. (United States); P. Frinchaboy, Texas Christian Univ. (United States); G. Zasowski, Univ. of Virginia (United States); D. Bizyaev, B. Gillespie, Apache Point Observatory (United States); D. Weinberg, The Ohio State Univ. (United States)

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## SESSION 7 GROUND-BASED INFRARED INSTRUMENTS II

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7735 1E **Design and development of MOSFIRE: the multi-object spectrometer for infrared exploration at the Keck Observatory** [7735-49]  
I. S. McLean, Univ. of California, Los Angeles (United States); C. C. Steidel, California Institute of Technology (United States); H. Epps, UCO/Lick Observatory, Univ. of California, Santa Cruz (United States); K. Matthews, California Institute of Technology (United States); S. Adkins, W. M. Keck Observatory (United States); N. Konidaris, B. Weber, California Institute of Technology (United States); T. Aliado, G. Brims, J. Canfield, Univ. of California, Los Angeles (United States); J. Cromer, J. Fucik, California Institute of Technology (United States); K. Kulas, G. Mace, K. Magnone, Univ. of California, Los Angeles (United States); H. Rodriguez, California Institute of Technology (United States); E. Wang, J. Weiss, Univ. of California, Los Angeles (United States)

7735 1F **OCTOCAM: a fast multichannel imager and spectrograph for the 10.4m GTC** [7735-50]  
A. de Ugarte Postigo, INAF, Osservatorio Astronomico di Brera (Italy); J. Gorosabel, Instituto de Astrofísica de Andalucía, CSIC (Spain); P. Spanò, M. Riva, INAF, Osservatorio Astronomico di Brera (Italy); O. Rabaza, Instituto de Astrofísica de Andalucía, CSIC (Spain); V. De Caprio, INAF-IASF (Italy); R. Cunniffe, Instituto de Astrofísica de Andalucía, CSIC (Spain); P. Kubánek, Instituto de Astrofísica de Andalucía, CSIC (Spain) and Univ. of Valencia (Spain); A. Riva, INAF, Osservatorio Astronomico di Torino (Italy); M. Jelinek, Instituto de Astrofísica de Andalucía, CSIC (Spain); M. I. Andersen, Niels Bohr Institute, Univ. of Copenhagen (Denmark); A. J. Castro-Tirado, Instituto de Astrofísica de Andalucía, CSIC (Spain); F. M. Zerbi,

INAF, Osservatorio Astronomico di Brera (Italy) and European Southern Observatory (Germany); A. Fernández-Soto, Instituto de Fisica de Cantabria (Spain)

- 7735 1H **EAGLE ISS: a modular twin-channel integral-field near-IR spectrograph** [7735-199]  
P. Hastings, B. Stobie, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); S. Vivès, P. Vola, Observatoire Astronomique de Marseille-Provence (France); M. Wells, C. Evans, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom)
- 7735 1I **Performances of X-shooter, the new wide-band intermediate resolution spectrograph at the VLT** [7735-53]  
J. Vernet, H. Dekker, S. D'Odorico, E. Mason, European Organisation for Astronomical Research in the Southern Hemisphere (Germany); P. Di Marcantonio, INAF, Osservatorio Astronomico di Trieste (Italy); M. Downing, European Organisation for Astronomical Research in the Southern Hemisphere (Germany); E. Elswijk, ASTRON - NOVA (Netherlands); G. Finger, G. Fischer, F. Kerber, L. Kern, J.-L. Lizon, C. Lucuix, V. Mainieri, A. Modigliani, F. Patat, S. Ramsay, European Organisation for Astronomical Research in the Southern Hemisphere (Germany); P. Santin, INAF, Osservatorio Astronomico di Trieste (Italy); M. Vidali, EC, JRC, Institute for Reference Materials and Measurements (Italy); P. Groot, Radboud Univ. Nijmegen (Netherlands); I. Guinouard, F. Hammer, Observatoire de Paris à Meudon (France); L. Kaper, Univ. of Amsterdam (Netherlands); P. Kjaergaard-Rasmussen, Niels Bohr Institute for Astronomy (Denmark); R. Navarro, ASTRON - NOVA (Netherlands); S. Randich, INAF, Osservatorio Astrofisico di Arcetri (Italy); F. Zerbi, INAF, Osservatorio Astronomico di Brera (Italy)
- 7735 1J **Commissioning the VISTA IR camera** [7735-54]  
G. B. Dalton, Rutherford Appleton Lab. (United Kingdom) and Univ. of Oxford (United Kingdom); W. J. Sutherland, J. P. Emerson, Queen Mary, Univ. of London (United Kingdom); G. F. W. Woodhouse, D. L. Terrett, M. S. Whalley, Rutherford Appleton Lab. (United Kingdom)
- 7735 1K **FMOS the fibre multiple-object spectrograph, part VIII: current performances and results of the engineering observations** [7735-55]  
M. Kimura, National Astronomical Observatory of Japan, Subaru Telescope (United States); M. Akiyama, Tohoku Univ. (Japan); G. B. Dalton, Univ. of Oxford (United Kingdom) and Rutherford Appleton Lab. (United Kingdom); F. Iwamuro, Kyoto Univ. (Japan); I. J. Lewis, Univ. of Oxford (United Kingdom); T. Maihara, K. Ohta, Kyoto Univ. (Japan); P. Tait, N. Takato, N. Tamura, National Astronomical Observatory of Japan, Subaru Telescope (United States); I. A. J. Tosh, Rutherford Appleton Lab. (United Kingdom); S. Smedley, Australian Astronomical Observatory (Australia); E. Curtis Lake, Univ. of Oxford (United Kingdom); T. Inagaki, E. Jeschke, National Astronomical Observatory of Japan, Subaru Telescope (United States); K. Kawate, Y. Moritani, M. Sumiyoshi, K. Yabe, Kyoto Univ. (Japan)
- 7735 1L **LUCIFER1 commissioning at the LBT** [7735-56]  
N. Ageorges, Max-Planck-Institut für extraterrestrische Physik (Germany); W. Seifert, Landessternwarte Heidelberg (Germany); M. Jütte, V. Knierim, Ruhr-Univ. Bochum (Germany); M. Lehmitz, Max-Planck-Institut für Astronomie (Germany); A. Germeroth, Landessternwarte Heidelberg (Germany); P. Buschkamp, Max-Planck-Institut für extraterrestrische Physik (Germany); K. Polsterer, Ruhr-Univ. Bochum (Germany); A. Pasquali, V. Naranjo, Max-Planck-Institut für Astronomie (Germany); H. Gemperlein, Max-Planck-Institut für extraterrestrische Physik (Germany); J. Hill, LBT Observatory, Univ. of Arizona (United States); C. Feiz, Landessternwarte Heidelberg (Germany); R. Hofmann,

Max-Planck-Institut für extraterrestrische Physik (Germany); W. Laun, Max-Planck-Institut für Astronomie (Germany); R. Lederer, Max-Planck-Institut für extraterrestrische Physik (Germany); R. Lenzen, U. Mall, Max-Planck-Institut für Astronomie (Germany); H. Mandel, P. Müller, A. Quirrenbach, L. Schäffner, Landessternwarte Heidelberg (Germany); C. Storz, Max-Planck-Institut für Astronomie (Germany); P. Weiser, Fachhochschule für Technik und Gestaltung (Germany)

- 7735 1M **Preliminary design of IGRINS (Immersion GRating INfrared Spectrograph) [7735-68]**  
I. Yuk, Korea Astronomy and Space Science Institute (Korea, Republic of); D. T. Jaffe, The Univ. of Texas at Austin (United States); S. Barnes, McDonald Observatory, The Univ. of Texas at Austin (United States); M. Chun, C. Park, Korea Astronomy and Space Science Institute (Korea, Republic of); S. Lee, Korea Astronomy and Space Science Institute (Korea, Republic of) and The Univ. of Texas at Austin (United States); H. Lee, McDonald Observatory, The Univ. of Texas at Austin (United States); W. Wang, The Univ. of Texas at Austin (United States); K. Park, Korea Astronomy and Space Science Institute (Korea, Republic of); S. Pak, Kyung Hee Univ. (Korea, Republic of); J. Strubhar, McDonald Observatory, The Univ. of Texas at Austin (United States); C. Deen, The Univ. of Texas at Austin (United States); H. Oh, Korea Astronomy and Space Science Institute (Korea, Republic of) and Kyung Hee Univ. (Korea, Republic of); H. Seo, Kyung Hee Univ. (Korea, Republic of); T. Pyo, National Astronomical Observatory of Japan, Subaru Telescope (United States); W. Park, Kyung Hee Univ. (Korea, Republic of) and Seoul National Univ. (Korea, Republic of); J. Lacy, The Univ. of Texas at Austin (United States); J. Goertz, McDonald Observatory, The Univ. of Texas at Austin (United States); J. Rand, M. Gully-Santiago, The Univ. of Texas at Austin (United States)

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## SESSION 8    TECHNIQUES AND COMPONENTS II

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- 7735 1N **GPI: cryogenic spectrograph optics performances [7735-57]**  
S. Thibault, Univ. Laval (Canada); P. Vallée, E. Artigau, J. Maire, R. Doyon, Univ. de Montréal (Canada); J. Lavigne, INO (Canada); J. Larkin, Univ. of California, Los Angeles (United States)
- 7735 1O **Sparse aperture masking (SAM) at NAOS/CONICA on the VLT [7735-58]**  
P. Tuthill, The Univ. of Sydney (Australia); S. Lacour, Observatoire de Paris-Meudon (France); P. Amico, European Southern Observatory (Germany); M. Ireland, B. Norris, P. Stewart, T. Evans, The Univ. of Sydney (Australia); A. Kraus, Institute for Astronomy (United States); C. Lidman, Australian Astronomical Observatory (Australia); E. Pompei, N. Kornweibel, European Southern Observatory (Germany)
- 7735 1P **The first VisAO-fed integral field spectrograph: VisAO IFS [7735-59]**  
K. B. Follette, L. M. Close, D. Kopon, J. R. Males, V. Gasho, K. M. Bruntag, Steward Observatory, The Univ. of Arizona (United States); A. Uomoto, Carnegie Observatories (United States)
- 7735 1Q **XMS and NG1dF: extreme multiplex spectrographs for wide-field multi-object spectroscopy [7735-60]**  
R. Content, Durham Univ. (United Kingdom); S. Barden, Anglo-Australian Observatory (Australia); S. Becerril, Instituto de Astrofísica de Andalucía, CSIC (Spain); A. Boehm, Max-Planck-Institut für Astronomie (Germany); P. Clark, Durham Univ. (United Kingdom); P. Costillo, Instituto de Astrofísica de Andalucía, CSIC (Spain); C. M. Dobbeldam, Durham Univ. (United Kingdom); T. Farrell, Anglo-Australian Observatory (Australia); K. Glazebrook, Swinburne Univ. (Australia); R. Haynes, Anglo-Australian Observatory (Australia);



K. Meisenheimer, Max-Planck-Institut für Astronomie (Germany); S. Miziarski, Anglo-Australian Observatory (Australia); N. Nikoloudakis, Durham Univ. (United Kingdom);  
L. F. Prada, Instituto de Astrofísica de Andalucía, CSIC (Spain); R. Rohloff, Max-Planck-Institut für Astronomie (Germany); T. Shanks, R. M. Sharples, Durham Univ. (United Kingdom);  
K. Wagner, Max-Planck-Institut für Astronomie (Germany)

- 7735 1R **Focal plane detectors for Dark Energy Camera (DECAM)** [7735-61]  
J. Estrada, Fermi National Accelerator Lab. (United States); R. Alvarez, T. Abbott, Cerro Tololo Inter-American Observatory (Chile); J. Annis, Fermi National Accelerator Lab. (United States); M. Bonati, Cerro Tololo Inter-American Observatory (Chile); E. Buckley-Geer, Fermi National Accelerator Lab. (United States); J. Campa, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); H. Cease, S. Chappa, Fermi National Accelerator Lab. (United States); D. DePoy, Texas A&M Univ. (United States); G. Derylo, H. T. Diehl, B. Flaugher, J. Hao, Fermi National Accelerator Lab. (United States); S. Holland, Lawrence Berkeley National Lab. (United States); D. Huffman, Fermi National Accelerator Lab. (United States); I. Karliner, Univ. of Illinois at Urbana-Champaign (United States); D. Kubik, Fermi National Accelerator Lab. (United States); S. Kuhlmann, Argonne National Lab. (United States); K. Kuk, H. Lin, Fermi National Accelerator Lab. (United States); N. Roe, Lawrence Berkeley National Lab. (United States); V. Scarpine, Fermi National Accelerator Lab. (United States); R. Schmidt, Cerro Tololo Inter-American Observatory (Chile); K. Schultz, T. Shaw, Fermi National Accelerator Lab. (United States); V. Simaitis, Univ. of Illinois at Urbana-Champaign (United States); H. Spinka, Argonne National Lab. (United States); W. Stuermer, D. Tucker, Fermi National Accelerator Lab. (United States); A. Walker, Cerro Tololo Inter-American Observatory (Chile); W. Wester, Fermi National Accelerator Lab. (United States)
- 7735 1S **On-sky demonstration of optical speckle stabilization using the SPIFS-POC** [7735-62]  
M. Keremedjiev, S. S. Eikenberry, Univ. of Florida (United States); J. C. Carson, Max-Planck-Institut für Astronomie (Germany)

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R. Klein, Univ. of California, Berkeley (United States); A. Poglitsch, W. Raab, N. Geis, Max-Planck-Institut für extraterrestrische Physik (Germany); M. Hamidouche, NASA Ames Research Ctr. (United States); L. W. Looney, Univ. of Illinois at Urbana-Champaign (United States); R. Hönl, Max-Planck-Institut für extraterrestrische Physik (Germany); K. Nishikida, Univ. of California, Berkeley (United States); R. Genzel, Max-Planck-Institut für extraterrestrische Physik (Germany); T. K. Henning, Max-Planck-Institut für Astronomie (Germany)
- 7735 1U **FORCAST: a first light facility instrument for SOFIA** [7735-64]  
J. D. Adams, T. L. Herter, G. E. Gull, J. Schoenwald, C. P. Henderson, Cornell Univ. (United States); L. D. Keller, Ithaca College (United States); J. M. De Buizer, NASA Ames Research Ctr., Univ. Space Research Association (United States); G. J. Stacey, T. Nikola, Cornell Univ. (United States)
- 7735 1V **CASIMIR: a high resolution far-IR/submm spectrometer for airborne astronomy** [7735-65]  
M. L. Edgar, M. Emprechtinger, A. Karpov, California Institute of Technology (United States); R. Lin, Jet Propulsion Lab. (United States); S. Lin, California Institute of Technology (United States); F. Maiwald, I. Mehdi, Jet Propulsion Lab. (United States); D. Miller, S. J. E. Radford,

F. Rice, California Institute of Technology (United States); J. Ward, Jet Propulsion Lab. (United States) and Raytheon Co. (United States); J. Zmuidzinas, California Institute of Technology (United States)

- 7735 1W **The cosmic infrared background experiment (CIBER): instrumentation and first results** [7735-66]  
M. Zemcov, California Institute of Technology (United States) and Jet Propulsion Lab. (United States); J. Battle, Jet Propulsion Lab. (United States); J. Bock, Jet Propulsion Lab. (United States) and California Institute of Technology (United States); A. Cooray, Univ. of California, Irvine (United States); V. Hristov, California Institute of Technology (United States); B. Keating, Univ. of California, San Diego (United States); D. H. Lee, Korea Astronomy and Space Science Institute (Korea, Republic of); L. Levenson, P. Mason, California Institute of Technology (United States); T. Matsumoto, Japan Aerospace Exploration Agency (Japan) and Seoul National Univ. (Korea, Republic of); S. Matsuura, Japan Aerospace Exploration Agency (Japan); U. W. Nam, Korea Astronomy and Space Science Institute (Korea, Republic of); T. Renbarger, Univ. of California, San Diego (United States); I. Sullivan, California Institute of Technology (United States); K. Tsumura, T. Wada, Japan Aerospace Exploration Agency (Japan)

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## SESSION 10 SOLAR INSTRUMENTATION

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- 7735 1X **Feasibility study of high-resolution integral-field spectrographs for EST with multislit and multi-wavelength capabilities** [7735-67]  
A. Calcines, M. Collados, R. L. López, Instituto de Astrofísica de Canarias (Spain)
- 7735 1Y **ZIMPOL-3: a powerful solar polarimeter** [7735-238]  
R. Ramelli, Istituto Ricerche Solari Locarno (Switzerland); S. Balemi, Scuola Univ. Professionale della Svizzera Italiana (Switzerland); M. Bianda, Istituto Ricerche Solari Locarno (Switzerland); I. Defilippis, L. Gamma, Scuola Univ. Professionale della Svizzera Italiana (Switzerland); S. Hagenbuch, ETH Zürich (Switzerland); M. Rogantini, Scuola Univ. Professionale della Svizzera Italiana (Switzerland); P. Steiner, ETH Zürich (Switzerland); J. O. Stenflo, Istituto Ricerche Solari Locarno (Switzerland) and ETH Zürich (Switzerland)

## Part Two

- 7735 1Z **Auxiliary full-disc telescope for the European Solar Telescope** [7735-69]  
M. Sobotka, M. Klvaňa, Astronomical Institute of the ASCR, v.v.i. (Czech Republic); Z. Melich, Z. Ráil, Institute of Plasma Physics of the ASCR, v.v.i. (Czech Republic); F. Bettonvil, Utrecht Univ. (Netherlands); B. Gelly, Themis S.L. (Spain)
- 7735 20 **Spectrograph capabilities of the European Solar Telescope** [7735-70]  
A. Calcines, M. Collados, Instituto de Astrofísica de Canarias (Spain); A. Feller, B. Grauf, Max-Planck-Institut für Sonnensystemforschung (Germany); C. Grivel-Gelly, Instituto de Astrofísica de Canarias (Spain); J. Hirzberger, Max-Planck-Institut für Sonnensystemforschung (Germany); A. López Ariste, Themis S.L. (Spain); R. López López, Instituto de Astrofísica de Canarias (Spain); P. Mein, F. Sayède, Observatoire de Paris-Meudon (France)

- 7735 21 **The ATST visible broadband imager: a case study for real-time image reconstruction and optimal data handling** [7735-71]  
F. Wöger, H. Uitenbroek, A. Tritschler, W. McBride, D. Elmore, T. Rimmele, B. Cowan, S. Wampler, B. Goodrich, National Solar Observatory (United States)

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**SESSION 11 INSTRUMENTATION FOR ELTs I**

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- 7735 23 **The TMT instrumentation program (Invited Paper)** [7735-73]  
L. Simard, D. Crampton, Thirty Meter Telescope Project (United States) and National Research Council Canada (Canada); B. Ellerbroek, C. Boyer, Thirty Meter Telescope Project (United States)
- 7735 24 **An overview of the E-ELT instrumentation programme (Invited Paper)** [7735-74]  
S. Ramsay, S. D'Odorico, M. Casali, J. C. González, N. Hubin, M. Kasper, H. U. Käufl, M. Kissler-Patig, E. Marchetti, J. Paufique, L. Pasquini, R. Siebenmorgen, A. Richichi, J. Vernet, F. M. Zerbi, European Southern Observatory (Germany)
- 7735 25 **Science instrument development for the Giant Magellan Telescope** [7735-75]  
D. T. Jaffe, The Univ. of Texas at Austin (United States); D. L. DePoy, Texas A&M Univ. (United States); D. G. Fabricant, Harvard-Smithsonian Ctr. for Astrophysics (United States); P. M. Hinz, The Univ. of Arizona (United States); G. Jacoby, M. Johns, P. McCarthy, GMTO Corp. (United States); P. J. McGregor, The Australian National Univ. (Australia); S. Shectman, Carnegie Institution for Science (United States); A. Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (United States)
- 7735 26 **Pixel-One** [7735-76]  
F. Pedichini, A. Di Paola, V. Testa, INAF, Roma (Italy)
- 7735 27 **Progress of the conceptual design for the MOBIE imaging spectrograph for the Thirty Meter Telescope** [7735-77]  
B. C. Bigelow, Univ. of California Observatories, Univ. of California, Santa Cruz (United States); R. A. Bernstein, Univ. of California Observatories, Univ. of California, Santa Cruz (United States) and Univ. of California, Santa Cruz (United States)
- 7735 28 **DIORAMAS: a wide-field visible and near-infrared imaging multi-slit spectrograph for the EELT** [7735-78]  
O. Le Fèvre, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France); D. Maccagni, INAF - IASF Milano (Italy); S. Paltani, Observatoire de Genève, Univ. de Genève (Switzerland); L. Hill, D. Le Mignant, L. Tresse, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France); F. Garzon Lopez, Instituto de Astrofísica de Canarias (Spain); O. Almaini, The Univ. of Nottingham (United Kingdom); J. Brinchmann, Univ. of Leiden (Netherlands); S. Charlot, Institut d'Astrophysique de Paris (France); B. Ciardi, Max-Planck-Institut für Astrophysik (Germany); A. Fontana, INAF, Osservatorio Astronomico di Roma (Italy); J. Gallego, Univ. Complutense de Madrid (Spain); B. Garilli, INAF - IASF Milano (Italy); O. Ilbert, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France); B. Meneux, Max-Planck-Institut für extraterrestrische Physik (Germany); V. de Caprio, INAF - IASF Milano (Italy); B. Delabre, European Southern Observatory (Germany); L. Genolet, Observatoire de Genève, Univ. de Genève (Switzerland); M. Jaquet, L. Martin, F. Roman, G. Rousset, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France)

7735 29

**The infrared imaging spectrograph (IRIS) for TMT: instrument overview [7735-79]**

J. E. Larkin, Univ. of California, Los Angeles (United States); A. M. Moore, California Institute of Technology (United States); E. J. Barton, Univ. of California, Irvine (United States); B. Bauman, Lawrence Livermore National Lab. (United States); K. Bui, California Institute of Technology (United States); J. Canfield, Univ. of California, Los Angeles (United States); D. Crampton, Herzberg Institute of Astrophysics, National Research Council Canada (Canada); A. Delacroix, California Institute of Technology (United States); M. Fletcher, Herzberg Institute of Astrophysics, National Research Council Canada (Canada); D. Hale, California Institute of Technology (United States); D. Loop, Herzberg Institute of Astrophysics, National Research Council Canada (Canada); C. Niehaus, Univ. of California, Los Angeles (United States); A. C. Phillips, Univ. of California Observatories, Univ. of California, Santa Cruz (United States); V. Reshetov, L. Simard, Herzberg Institute of Astrophysics, National Research Council Canada (Canada); R. Smith, California Institute of Technology (United States); R. Suzuki, National Astronomical Observatory of Japan, Subaru Telescope (United States) and Thirty Meter Telescope Observatory Corp. (United States); T. Usuda, National Astronomical Observatory of Japan, Subaru Telescope (United States); S. A. Wright, Univ. of California, Irvine (United States) and Univ. of California, Berkeley (United States)

7735 2A

**MICADO: the E-ELT adaptive optics imaging camera [7735-80]**

R. Davies, N. Ageorges, L. Barl, Max Planck Institute for extraterrestrial Physics (Germany); L. R. Bedin, Space Telescope Science Institute (United States); R. Bender, Max Planck Institute for extraterrestrial Physics (Germany) and Munich Univ. Observatory (Germany); P. Bernardi, F. Chapron, Y. Clenet, Observatoire de Paris-Meudon (France); A. Deep, E. Deul, Leiden Observatory, Leiden Univ. (Netherlands); M. Drost, NOVA-ASTRON (Netherlands); F. Eisenhauer, Max Planck Institute for extraterrestrial Physics (Germany); R. Falomo, INAF, Astronomical Observatory of Padova (Italy); G. Fiorentino, Kapteyn Astronomical Institute, Univ. of Groningen (Netherlands); N. M. Förster Schreiber, Max Planck Institute for extraterrestrial Physics (Germany); E. Gendron, Observatoire de Paris-Meudon (France); R. Genzel, Max Planck Institute for extraterrestrial Physics (Germany); D. Gratadour, Observatoire de Paris-Meudon (France); L. Greggio, INAF, Astronomical Observatory of Padova (Italy); F. Grupp, Munich Univ. Observatory (Germany); E. Held, INAF, Astronomical Observatory of Padova (Italy); T. Herbst, Max Planck Institute for Astronomy (Germany); H. Hess, Munich Univ. Observatory (Germany); Z. Hubert, Observatoire de Paris-Meudon (France); K. Jahnke, Max Planck Institute for Astronomy (Germany); K. Kuijken, Leiden Observatory, Leiden Univ. (Netherlands); D. Lutz, Max Planck Institute for extraterrestrial Physics (Germany); D. Magrin, INAF, Astronomical Observatory of Padova (Italy); B. Muschelok, Munich Univ. Observatory (Germany); R. Navarro, NOVA-ASTRON (Netherlands); E. Noyola, Max Planck Institute for extraterrestrial Physics (Germany) and Munich Univ. Observatory (Germany); T. Paumard, Observatoire de Paris-Meudon (France); G. Piotto, R. Ragazzoni, A. Renzini, INAF, Astronomical Observatory of Padova (Italy); G. Rousset, Observatoire de Paris-Meudon (France); H. Rix, Max Planck Institute for Astronomy (Germany); R. Saglia, L. Tacconi, M. Thiel, Max Planck Institute for extraterrestrial Physics (Germany); E. Tolstoy, Kapteyn Astronomical Institute, Univ. of Groningen (Netherlands); S. Trippe, Institut de Radioastronomie Millimétrique (France); N. Tromp, NOVA-ASTRON (Netherlands); E. A. Valentijn, G. Verdoes Kleijn, Kapteyn Astronomical Institute, Univ. of Groningen (Netherlands); M. Wegner, Munich Univ. Observatory (Germany)

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**SESSION 12 INSTRUMENTATION FOR ELTs II**

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- 7735 2B **SIMPLE: a high-resolution near-infrared spectrometer for the E-ELT** [7735-81]  
L. Origlia, INAF, Osservatorio Astronomico di Bologna (Italy); E. Oliva, INAF, Osservatorio Astrofisico di Arcetri (Italy); R. Maiolino, INAF, Osservatorio Astronomico di Roma (Italy); B. Gustafsson, N. Piskunov, O. Kochucov, Uppsala Astronomical Observatory, Uppsala Univ. (Sweden); L. Vanzi, D. Minniti, M. Zoccali, Pontificia Univ. Católica de Chile (Chile); A. Hatzes, E. Guenther, Thüringer Landessternwarte Tautenburg (Germany)
- 7735 2C **Design concepts for a mid-infrared instrument for the Thirty-Meter Telescope** [7735-82]  
A. T. Tokunaga, Univ. of Hawai'i (United States); C. Packham, Univ. of Florida (United States); Y. K. Okamoto, Ibaraki Univ. (Japan); H. Kataza, Japan Aerospace Exploration Agency (Japan); M. Richter, Univ. of California, Davis (United States); J. Carr, U.S. Naval Research Lab. (United States); M. Chun, Univ. of Hawai'i (United States); C. Telesco, Univ. of Florida (United States); M. Honda, Kanagawa Univ. (Japan); J. Najita, National Optical Astronomy Observatory (United States); T. Onaka, I. Sakon, The Univ. of Tokyo (Japan); T. Yamashita, National Astronomical Observatory of Japan (Japan)
- 7735 2D **EAGLE: a MOAO fed multi-IFU NIR workhorse for E-ELT** [7735-83]  
J. Cuby, Lab. d'Astrophysique de Marseille, Technopôle de Marseille-Etoile (France); S. Morris, Durham Univ. (United Kingdom); T. Fusco, ONERA (France); M. Lehnert, GEPI, Observatoire de Paris-Meudon (France); P. Parr-Burman, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); G. Rousset, GEPI, Observatoire de Paris-Meudon (France); J. Amans, Observatoire de Paris-Meudon (France); S. Beard, I. Bryson, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); M. Cohen, GEPI, Observatoire de Paris-Meudon (France); N. Dipper, Durham Univ. (United Kingdom); C. Evans, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); M. Ferrari, Lab. d'Astrophysique de Marseille, Technopôle de Marseille-Etoile (France); E. Gendron, LESIA, Observatoire de Paris-Meudon (France); J. Gimenez, Lab. d'Astrophysique de Marseille, Technopôle de Marseille-Etoile (France); D. Gratadour, LESIA, Observatoire de Paris-Meudon (France); P. Hastings, Z. Hubert, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); E. Hugot, Lab. d'Astrophysique de Marseille, Technopôle de Marseille-Etoile (France); P. Jagourel, P. Laporte, GEPI, Observatoire de Paris-Meudon (France); V. Lebrun, D. Le Mignant, F. Madec, Lab. d'Astrophysique de Marseille, Technopôle de Marseille-Etoile (France); R. Myers, Durham Univ. (United Kingdom); B. Neichel, ONERA (France) and GEPI, Observatoire de Paris-Meudon (France); T. Morris, Durham Univ. (United Kingdom); C. Robert, ONERA (France); H. Schnettler, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); M. Swinbank, G. Talbot, Durham Univ. (United Kingdom); W. Taylor, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); F. Vidal, LESIA, Observatoire de Paris-Meudon (France); S. Vivès, P. Vola, N. Welikala, Lab. d'Astrophysique de Marseille, Technopôle de Marseille-Etoile (France); M. Wells, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom)
- 7735 2E **EPICS: direct imaging of exoplanets with the E-ELT** [7735-84]  
M. Kasper, European Organisation for Astronomical Research in the Southern Hemisphere (Germany); J. Beuzit, C. Verinaud, Lab. d'Astrophysique de l'Observatoire de Grenoble, CNRS (France); R. G. Gratton, INAF, Osservatorio Astronomico di Padova (Italy); F. Kerber, N. Yaitskova, European Organisation for Astronomical Research in the Southern Hemisphere (Germany); A. Boccaletti, Observatoire de Paris-Meudon (France); N. Thatte, Univ. of Oxford (United Kingdom); H. M. Schmid, ETH Zürich (Switzerland); C. Keller, Utrecht Univ. (Netherlands); P. Baudoz, Observatoire de Paris-Meudon (France); L. Abe, Lab. Fizeau,

CNRS, Univ. de Nice Sophia Antipolis (France); E. Aller-Carpentier, European Organisation for Astronomical Research in the Southern Hemisphere (Germany); J. Antichi, Lab. d'Astrophysique de l'Observatoire de Grenoble, CNRS (France); M. Bonavita, INAF, Osservatorio Astronomico di Padova (Italy); K. Dohlen, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France); E. Fedrigo, European Organisation for Astronomical Research in the Southern Hemisphere (Germany); H. Hanenburg, ASTRON (Netherlands); N. Hubin, European Organisation for Astronomical Research in the Southern Hemisphere (Germany); R. Jager, ASTRON (Netherlands); V. Korkiakoski, Lab. d'Astrophysique de l'Observatoire de Grenoble, CNRS (France); P. Martinez, European Organisation for Astronomical Research in the Southern Hemisphere (Germany); D. Mesa, INAF, Osservatorio Astronomico di Padova (Italy); O. Preis, P. Rabou, Lab. d'Astrophysique de l'Observatoire de Grenoble, CNRS (France); R. Roelfsema, ASTRON (Netherlands); G. Salter, M. Tecza, Univ. of Oxford (United Kingdom); L. Venema, ASTRON (Netherlands)

7735 2F **CODEX [7735-85]**

L. Pasquini, European Southern Observatory (Germany); S. Cristiani, INAF, Osservatorio Astronomico di Trieste (Italy); R. García López, Instituto de Astrofísica de Canarias (Spain); M. Haehnelt, Institute of Astronomy, Univ. of Cambridge (United Kingdom); M. Mayor, Observatoire Astronomique, Univ. de Genève (Switzerland); J. Liske, A. Manescau, G. Avila, H. Dekker, O. Iwert, B. Delabre, G. Lo Curto, European Southern Observatory (Germany); V. D'Odorico, P. Molaro, M. Viel, E. Vanzella, P. Bonifacio, P. Di Marcantonio, P. Santin, M. Comari, R. Cirami, I. Coretti, INAF, Osservatorio Astronomico di Trieste (Italy); F. M. Zerbi, P. Spanò, M. Riva, INAF, Osservatorio Astronomico di Brera (Italy); R. Rebolo, G. Israelian, A. Herrero, M. R. Zapatero Osorio, F. Tenegi, Instituto de Astrofísica de Canarias (Spain); B. Carswell, G. Becker, Institute of Astronomy, Univ. of Cambridge (United Kingdom); S. Udry, F. Pepe, C. Lovis, D. Naef, M. Dessesauges, D. Mégevand, Observatoire Astronomique, Univ. de Genève (Switzerland)

7735 2G **Instrument concept and science case for the mid-IR E-ELT imager and spectrograph METIS [7735-86]**

B. R. Brandl, Leiden Observatory, Leiden Univ. (Netherlands); R. Lenzen, Max-Planck-Institut für Astronomie (Germany); E. Pantin, DSM/DAPNIA, Service d'Astrophysique, CEA Saclay (France); A. Glasse, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); J. Blommaert, Katholieke Univ. Leuven (Belgium); L. Venema, NOVA-ASTRON (Netherlands); F. Molster, NOVA, Leiden Univ. (Netherlands); R. Siebenmorgen, European Southern Observatory (Germany); S. Kendrew, Leiden Observatory, Leiden Univ. (Netherlands); M. Baes, Sterrenkundig Observatorium, Univ. Gent (Belgium); H. Böhnhardt, Max-Planck-Institut für Sonnensystemforschung (Germany); W. Brandner, Max-Planck-Institut für Astronomie (Germany); E. van Dishoeck, Leiden Observatory, Leiden Univ. (Netherlands); T. Henning, Max-Planck-Institut für Astronomie (Germany); H. U. Käufel, European Southern Observatory (Germany); P. Lagage, DSM/DAPNIA, Service d'Astrophysique, CEA Saclay (France); T. J. T. Moore, Liverpool John Moores Univ. (United Kingdom); C. Waelkens, Katholieke Univ. Leuven (Belgium); P. van der Werf, Leiden Observatory, Leiden Univ. (Netherlands)

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**SESSION 13 INSTRUMENTATION FOR ELTs III**

7735 2H **The infrared imaging spectrograph (IRIS) for TMT: spectrograph design [7735-87]**

A. M. Moore, Caltech Optical Observatories (United States); B. J. Bauman, Lawrence Livermore National Lab. (United States); E. J. Barton, Univ. of California, Irvine (United States); D. Crampton, Thirty Meter Telescope Project (United States) and Herzberg Institute of

Astrophysics, National Research Council of Canada (Canada); A. Delacroix, Caltech Optical Observatories (United States); J. E. Larkin, Univ. of California, Los Angeles (United States); L. Simard, Thirty Meter Telescope Project (United States) and Herzberg Institute of Astrophysics, National Research Council of Canada (Canada); R. Suzuki, Thirty Meter Telescope Project (United States) and National Astronomical Observatory of Japan, Subaru Telescope (United States); S. A. Wright, Univ. of California, Berkeley (United States)

7735 2I

**HARMONI: a single-field wide-band integral-field spectrograph for the European ELT**  
[7735-88]

N. Thatte, M. Tecza, F. Clarke, R. L. Davies, Univ. of Oxford (United Kingdom); A. Remillieux, R. Bacon, Ctr. de Recherche Astrophysique de Lyon, CNRS, Observatoire de Lyon (France); D. Lunney, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); S. Arribas, Consejo Superior de Investigaciones Científicas (Spain); E. Mediavilla, Instituto de Astrofísica de Canarias (Spain); F. Gago, European Southern Observatory (Germany); N. Bezawada, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); P. Ferruit, Observatoire de Lyon (France); A. Fragoso, Instituto de Astrofísica de Canarias (Spain); D. Freeman, Kidger Optics Associates (United Kingdom); J. Fuentes, Instituto de Astrofísica de Canarias (Spain); T. Fusco, ONERA (France); A. Gallie, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); A. Garcia, SENER Ingeniería y Sistemas (Spain); T. Goodsall, Univ. of Oxford (United Kingdom); F. Gracia, Instituto de Astrofísica de Canarias (Spain); A. Jarno, J. Kosmalski, Ctr. de Recherche Astrophysique de Lyon, CNRS, Observatoire de Lyon (France); J. Lynn, Univ. of Oxford (United Kingdom); S. McLay, D. Montgomery, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); A. Pecontal, Ctr. de Recherche Astrophysique de Lyon, CNRS, Observatoire de Lyon (France); H. Schnetler, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); H. Smith, Univ. of Oxford (United Kingdom); D. Sosa, Instituto de Astrofísica de Canarias (Spain); G. Battaglia, European Southern Observatory (Germany); N. Bowles, Univ. of Oxford (United Kingdom); L. Colina, Consejo Superior de Investigaciones Científicas (Spain); E. Emsellem, European Southern Observatory (Germany); A. Garcia-Perez, Univ. of Hertfordshire (United Kingdom); S. Gladysz, European Southern Observatory (Germany); I. Hook, P. Irwin, Univ. of Oxford (United Kingdom); M. Jarvis, Univ. of Hertfordshire (United Kingdom); R. Kennicutt, Univ. of Cambridge (United Kingdom); A. Levan, Univ. of Warwick (United Kingdom); A. Longmore, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); J. Magorrian, Univ. of Oxford (United Kingdom); M. McCaughrean, European Space Research and Technology Ctr. (Netherlands); L. Origlia, INAF, Osservatorio Astronomico di Bologna (Italy); R. Rebolo, Instituto de Astrofísica de Canarias (Spain); D. Rigopoulou, Univ. of Oxford (United Kingdom); S. Ryan, Univ. of Hertfordshire (United Kingdom); M. Swinbank, Durham Univ. (United Kingdom); N. Tanvir, Univ. of Leicester (United Kingdom); E. Tolstoy, Kapteyn Astronomical Institute, Univ. of Groningen (Netherlands); A. Verma, Univ. of Oxford (United Kingdom)

7735 2J

**METIS opto-mechanical design and packaging study** [7735-200]

G. Kroes, R. ter Horst, J. Kragt, R. Roelfsema, R. Navarro, NOVA-ASTRON (Netherlands); L. Venema, ASTRON (Netherlands); R. Lenzen, R. R. Rohloff, Max-Planck-Institut für Astronomie (Germany); G. Durand, E. Pantin, S. Ronayette, DSM/DAPNIA, Service d'Astrophysique, CEA Saclay (France); S. Todd, R. Bennett, A. Glasse, UK Astronomy Technology Ctr., The Royal Observatory Edinburgh (United Kingdom); J. Blommaert, Katholieke Univ. Leuven (Belgium); B. Brandl, Leiden Observatory, Leiden Univ. (Netherlands); M. Teuwen, H. Janssen, Janssen Precision Engineering (Netherlands); R. Huisman, SRON (Netherlands)

- 7735 2K **GMTNIRS (Giant Magellan Telescope near-infrared spectrograph): design concept** [7735-90]  
S. Lee, McDonald Observatory, The Univ. of Texas at Austin (United States) and Korea Astronomy and Space Science Institute (Korea, Republic of); I. Yuk, Korea Astronomy and Space Science Institute (Korea, Republic of); H. Lee, McDonald Observatory, The Univ. of Texas at Austin (United States); W. Wang, The Univ. of Texas at Austin (United States); C. Park, K. Park, M. Chun, Korea Astronomy and Space Science Institute (Korea, Republic of); S. Pak, Kyung Hee Univ. (Korea, Republic of); J. Strubhar, McDonald Observatory, The Univ. of Texas at Austin (United States); C. Deen, M. Gully-Santiago, J. Rand, The Univ. of Texas at Austin (United States); H. Seo, Kyung Hee Univ. (Korea, Republic of); J. Kwon, Korea Astronomy and Space Science Institute (Korea, Republic of); H. Oh, Korea Astronomy and Space Science Institute (Korea, Republic of) and Kyung Hee Univ. (Korea, Republic of); S. Barnes, Univ. of Canterbury (New Zealand) and McDonald Observatory, The Univ. of Texas at Austin (United States); J. Lacy, The Univ. of Texas at Austin (United States); J. Goertz, McDonald Observatory, The Univ. of Texas at Austin (United States); W. Park, Seoul National Univ. (Korea, Republic of) and The Univ. of Texas at Austin (United States); T. Pyo, National Astronomical Observatory of Japan, Subaru Telescope (United States); D. T. Jaffe, Korea Astronomy and Space Science Institute (Korea, Republic of)

- 7735 2L **Project overview of OPTIMOS-EVE: the fibre-fed multi-object spectrograph for the E-ELT** [7735-91]  
R. Navarro, NOVA-ASTRON (Netherlands); F. Chemla, P. Bonifacio, H. Flores, I. Guinouard, J. -M. Huet, M. Puech, F. Royer, Observatoire de Paris-Meudon (France); J. H. Pragt, NOVA-ASTRON (Netherlands); G. Wulterkens, Radboud Univ. Nijmegen (Netherlands); E. C. Sawyer, M. E. Caldwell, I. A. J. Tosh, M. S. Whalley, G. F. W. Woodhouse, Rutherford Appleton Lab. (United Kingdom); P. Spanò, INAF, Osservatorio Astronomico di Brera (Italy); P. Di Marcantonio, INAF, Osservatorio Astronomico di Trieste (Italy); M. I. Andersen, Niels Bohr Institute, Univ. of Copenhagen (Denmark); G. B. Dalton, Rutherford Appleton Lab. (United Kingdom) and Univ. of Oxford (United Kingdom); L. Kaper, Univ. van Amsterdam (Netherlands); F. Hammer, Observatoire de Paris-Meudon (France)

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#### POSTER SESSION I

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- 7735 2M **Converting a liquid nitrogen-cooled camera to closed-cycle cooling** [7735-92]  
T. Benedict, J. Ward, G. Barrick, Canada-France-Hawaii Telescope (United States)
- 7735 2N **Integration and characterization of HAWAII-1RG detector with FORCAST fast-readout electronics for LMIRcam** [7735-93]  
J. M. Leisenring, M. J. Nelson, Univ. of Virginia (United States); W. F. Hoffmann, Univ. of Arizona (United States); J. Schoenwald, Cornell Univ. (United States); A. Wong, M. F. Skrutskie, Univ. of Virginia (United States)
- 7735 2O **Readout electronics for the Dark Energy Camera** [7735-94]  
J. Castilla, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); O. Ballester, L. Cardiel, Institut de Física d'Altes Energies (Spain); S. Chappa, Fermi National Accelerator Lab. (United States); J. de Vicente, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); S. Holm, D. Huffman, M. Kozlovsky, Fermi National Accelerator Lab. (United States); G. Martinez, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); J. Olsen, T. Shaw, W. Stuermer, Fermi National Accelerator Lab. (United States)



- 7735 2P **Hyper Suprime-Cam: development of the CCD readout electronics** [7735-95]  
H. Nakaya, National Astronomical Observatory of Japan (Japan); T. Uchida, High Energy Accelerator Research Organization (Japan); H. Miyatake, H. Fujimori, S. Mineo, H. Aihara, Univ. of Tokyo (Japan); H. Furusawa, Y. Kamata, H. Karoji, S. Kawanomoto, Y. Komiyama, S. Miyazaki, T. Morokuma, Y. Obuchi, Y. Okura, National Astronomical Observatory of Japan (Japan); M. Tanaka, High Energy Accelerator Research Organization (Japan); Y. Tanaka, F. Uraguchi, Y. Utsumi, National Astronomical Observatory of Japan (Japan)
- 7735 2Q **Implementation of the control electronics for KMOS instrument** [7735-96]  
H. Hess, I. Ilijevski, H. Kravcar, J. Richter, J. Rühfel, C. Schwab, Univ. Observatory Munich (Germany)
- 7735 2R **An optical frequency comb for infrared spectrograph calibration** [7735-97]  
G. G. Ycas, Univ. of Colorado at Boulder (United States) and National Institute of Standards and Technology (United States); F. Quinlan, National Institute of Standards and Technology (United States); S. Osterman, Ctr. for Astrophysics and Space Astronomy, Univ. of Colorado (United States); G. Nave, S. A. Diddams, National Institute of Standards and Technology (United States)
- 7735 2S **Comprehensive transient-state study for CARMENES NIR high-thermal stability** [7735-98]  
S. Becerril, M. A. Sánchez, M. C. Cárdenas, O. Rabaza, A. Ramón, M. Abril, L. P. Costillo, R. Morales, A. Rodríguez, P. J. Amado, Instituto de Astrofísica de Andalucía, CSIC (Spain)
- 7735 2T **FOROS: Fresnel optical propagation code for SPHERE** [7735-99]  
N. Yaitskova, European Organisation for Astronomical Research in the Southern Hemisphere (Germany); K. Dohlen, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France); P. Rabou, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); A. Boccaletti, Observatoire de Paris-Meudon (France); M. Carbillet, Lab. Fizeau, CNRS, Univ. de Nice Sophia Antipolis (France); J. Beuzit, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); M. Kasper, N. Hubin, European Organisation for Astronomical Research in the Southern Hemisphere (Germany)
- 7735 2U **High contrast imaging with IRDIS near infrared polarimeter** [7735-100]  
M. Langlois, Ctr. de Recherche Astrophysique de Lyon, CNRS, Univ. Claude Bernard Lyon I (France); K. Dohlen, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France); J. Augereau, D. Mouillet, Lab. d'Astrophysique de l'Observatoire de Grenoble, CNRS, Univ. Joseph Fourier (France); A. Boccaletti, LESIA, Observatoire de Paris-Meudon (France); H. Schmid, ETH Zürich (Switzerland)
- 7735 2V **The performance of the calibration module for SPHERE** [7735-101]  
F. P. Wildi, B. Michaud, M. Crausaz, R. Dubosson, Observatoire Astronomique de l'Univ. de Genève (Switzerland); D. Mouillet, Lab. d'Astrophysique de l'Observatoire de Grenoble, CNRS, Univ. Joseph Fourier (France); K. Dohlen, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France); H.-M. Schmid, ETH Zürich (Switzerland); J.-L. Beuzit, Lab. d'Astrophysique de l'Observatoire de Grenoble, CNRS, Univ. Joseph Fourier (France)
- 7735 2X **Comparison of methods for detection and characterization of exoplanets with SPHERE/IRDIS** [7735-103]  
A. Vigan, C. Moutou, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France); M. Langlois, Ctr. de Recherche Astrophysique de Lyon, CNRS, Univ. Claude-Bernard Lyon I (France); D. Mouillet, Lab. d'Astrophysique de l'Observatoire de Grenoble, CNRS, Univ.

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- 7735 2Y **Half-toning for high-contrast imaging: design, analysis, and testing of microdot coronagraphs for the SPHERE and EPICS instruments** [7735-104]  
P. Martinez, European Southern Observatory (Germany); C. Dorrer, Aktiwave LLC (United States); M. Kasper, European Southern Observatory (Germany); A. Boccaletti, LESIA, Observatoire de Paris-Meudon (France); K. Dohlen, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France)
- 7735 30 **Performance characterization of the HiCIAO instrument for the Subaru Telescope** [7735-106]  
R. Suzuki, Thirty Meter Telescope Observatory Corp. (United States) and National Astronomical Observatory of Japan, Subaru Telescope (United States); T. Kudo, National Astronomical Observatory of Japan, Subaru Telescope (United States) and National Astronomical Observatory of Japan (Japan); J. Hashimoto, Graduate Univ. for Advanced Studies (Japan); J. Carson, Max-Planck-Institut für Astronomie (Germany); S. Egner, National Astronomical Observatory of Japan, Subaru Telescope (United States); M. Goto, Max-Planck-Institut für Astronomie (Germany); M. Hattori, Y. Hayano, National Astronomical Observatory of Japan, Subaru Telescope (United States); K. Hodapp, Univ. of Hawai'i (United States); M. Ito, National Astronomical Observatory of Japan, Subaru Telescope (United States); M. Iye, National Astronomical Observatory of Japan (Japan); S. Jacobson, Univ. of Hawai'i (United States); R. Kandori, N. Kusakabe, National Astronomical Observatory of Japan (Japan); M. Kuzuhara, The Univ. of Tokyo (Japan); T. Matsuo, National Astronomical Observatory of Japan (Japan); M. Mcelwain, Princeton Univ. (United States); J. Morino, National Astronomical Observatory of Japan (Japan); S. Oya, Y. Saito, National Astronomical Observatory of Japan, Subaru Telescope (United States); R. Shelton, V. Stahlberger, Univ. of Hawai'i (United States); H. Suto, National Astronomical Observatory of Japan (Japan); H. Takami, National Astronomical Observatory of Japan, Subaru Telescope (United States); C. Thalmann, Max-Planck-Institut für Astronomie (Germany); M. Watanabe, National Astronomical Observatory of Japan, Subaru Telescope (United States); H. Yamada, Univ. of Hawai'i (United States); M. Tamura, National Astronomical Observatory of Japan (Japan)
- 7735 31 **Data reduction pipeline for the Gemini Planet Imager** [7735-108]  
J. Maire, Univ. de Montréal (Canada); M. D. Perrin, Univ. of California, Los Angeles (United States); R. Doyon, E. Artigau, Univ. de Montréal (Canada); J. Dunn, Herzberg Institute of Astrophysics, National Research Council Canada (Canada); D. T. Gavel, UCO/Lick Observatory, Univ. of California, Santa Cruz (United States); J. R. Graham, Univ. of California, Berkeley (United States); D. Lafrenière, Univ. de Montréal (Canada); J. E. Larkin, Univ. of California, Los Angeles (United States); J. Lavigne, Univ. de Montréal (Canada); B. A. Macintosh, Lawrence Livermore National Lab. (United States); C. Marois, Herzberg Institute of Astrophysics, National Research Council Canada (Canada); B. Oppenheimer, American Museum of Natural History (United States); D. W. Palmer, L. A. Poyneer, Lawrence Livermore National Lab. (United States); S. Thibault, Univ. Laval (Canada); J. Véran, Herzberg Institute of Astrophysics, National Research Council Canada (Canada)
- 7735 32 **An apodizing phase plate coronagraph for VLT/NACO** [7735-109]  
M. A. Kenworthy, Leiden Observatory, Leiden Univ. (Netherlands) and Steward Observatory, The Univ. of Arizona (United States); S. P. Quanz, M. R. Meyer, Institut für Astronomie,

ETH Zürich (Switzerland); M. E. Kasper, European Southern Observatory (Germany); R. Lenzen, Max-Planck-Institut für Astronomie (Germany); J. L. Codona, Steward Observatory, The Univ. of Arizona (United States); J. H. Girard, European Southern Observatory (Chile); P. M. Hinz, Steward Observatory, The Univ. of Arizona (United States)

- 7735 33 **An eight-octant phase-mask coronagraph for the Subaru coronagraphic extreme AO (SCExAO) system: system design and expected performance** [7735-110]  
N. Murakami, Hokkaido Univ. (Japan); O. Guyon, F. Martinache, National Astronomical Observatory of Japan, Subaru Telescope (United States); T. Matsuo, National Astronomical Observatory of Japan (Japan) and Jet Propulsion Lab. (United States); K. Yokochi, Tokyo Univ. of Agriculture and Technology (Japan) and National Astronomical Observatory of Japan (Japan); J. Nishikawa, M. Tamura, National Astronomical Observatory of Japan (Japan); T. Kurokawa, Tokyo Univ. of Agriculture and Technology (Japan); N. Baba, Hokkaido Univ. (Japan); F. Vogt, V. Garrel, National Astronomical Observatory of Japan, Subaru Telescope (United States); T. Yoshikawa, The Univ. of Tokyo (Japan)
- 7735 34 **Fabrication and testing of phase masks for optical vortex coronagraph to observe extrasolar planets** [7735-111]  
E. Mari, F. Tamburini, C. Barbieri, A. Bianchini, Univ. of Padua (Italy); M. Prasciolu, Lab. Nazionale TASC, Istituto Officina dei Materiali, CNR (Italy); M. Massari, Univ. of Padua (United States) and Lab. for Nanofabrication of Nanodevices, Veneto Nanotech (Italy); F. Romanato, Univ. of Padua (Italy) and Lab. Nazionale TASC, Istituto Officina dei Materiali, CNR (Italy) and Lab. for Nanofabrication of Nanodevices, Veneto Nanotech (Italy)
- 7735 35 **A 64 Mpixel camera for the Wendelstein Fraunhofer Telescope Nasmyth wide-field port: WWFI** [7735-112]  
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(United States); S. B. Potter, D. O'Donoghue, South African Astronomical Observatory (South Africa); O. H. W. Siegmund, Univ. of California, Berkeley (United States); P. Schellart, South African Astronomical Observatory (South Africa) and Southern African Large Telescope (South Africa); M. Spark, South African Astronomical Observatory (South Africa) and Univ. of Cape Town (South Africa); B. Y. Welsh, Univ. of California, Berkeley (United States); E. Zietsman, South African Astronomical Observatory (South Africa) and Univ. of South Africa (South Africa)

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# Introduction

Astronomical instrumentation is entering an era of unprecedented productivity and creativity. Our well-established ground-based 8-10m class observatories are being equipped with second and third generation instruments, often of substantial size and complexity. Meanwhile, designs are underway for new instruments that will deliver the scientific results from the planned extremely large telescopes (apertures of 20-m and more). The engineering challenge is not only to produce these new instruments, but to ensure that they perform at the highest level, are reliable and affordable.

Equally important, innovative optical/IR instrumentation for many kinds of smaller telescopes, solar telescopes and airborne platforms has provided new opportunities and challenges in recent years. Adaptive optics, wide-field multi-object surveys, and 3D spectroscopy are all becoming "standard" facilities as detector sizes continue to grow. Increasingly, new instrumentation is designed with adaptive optics incorporated in the overall system.

This conference, the third in the series, was established with the following aims: (1) to provide an overview of the performance and lessons learned from those instruments already in operation; (2) to give insight into the design and status of future instruments proposed, planned or already in development; (3) to create a forum for the exchange of technical information on achievements and problems amongst instrument builders in both the academic and industrial worlds. Without doubt, these goals were achieved.

At this meeting, 285 papers were presented, either as oral or poster contributions, a record for this conference series. Seven invited reviews were requested on major existing facilities or planned new ones. Topics covered the entire range of UV, optical and infrared instrumentation for both ground-based and airborne astronomy. Specific areas of interest included:

- performance of recently developed instrumentation
- lessons learned from existing major instrumentation programs
- design reports of new instruments - imagers, spectrographs, polarimeters
- new techniques and technologies
- instruments for airborne astronomy
- instruments for ground-based solar telescopes
- instrumentation for future Extremely Large Telescopes (ELTs)

The conference was subdivided into 13 sessions spread over six days, including a special topical session (Session 5) on Instrumentation and Techniques for Exoplanet Detection. On behalf of the program committee, it is a pleasure to acknowledge all participants.

**Ian S. McLean**  
**Suzanne K. Ramsay**  
**Hideki Takami**  
**Conference Chairs**