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Ramón Navarro
Colin R. Cunningham
Eric Prieto
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Contents

Part One

- xxv *Conference Committee*
- xxix *Introduction*
- xxxi *The cosmic microwave background: observing directly the early universe (Plenary Paper)*
[8442-506]
P. de Bernardis, S. Masi, Univ. degli Studi di Roma La Sapienza (Italy)

SESSION 1 TELESCOPE STRUCTURES AND DOMES

- 8450 02 **Silicon carbide optics for space and ground based astronomical telescopes** [8450-2]
J. Robichaud, D. Sampath, C. Wainer, J. Schwartz, C. Peton, S. Mix, C. Heller, L-3 Integrated Optical Systems (United States)
- 8450 03 **LISA telescope assembly optical stability characterization for ESA** [8450-3]
A. L. Verlaan, H. Hogenhuis, J. Pijnenburg, M. Lemmen, TNO (Netherlands); S. Lucarelli, D. Scheulen, EADS Astrium GmbH (Germany); D. Ende, xperion AEROSPACE GmbH (Germany)
- 8450 04 **Vibration damping for the Segmented Mirror Telescope** [8450-4]
J. R. Maly, Moog CSA Engineering (United States); A. J. Yingling, Naval Postgraduate School (United States); S. F. Griffin, Boeing SVS (United States); B. N. Agrawal, Naval Postgraduate School (United States); R. G. Cobb, Air Force Institute of Technology (United States); T. S. Chambers, Moog CSA Engineering (United States)
- 8450 06 **Overall performance of the ALMA antenna during solar observation** [8450-6]
A. Busatta, A. Brunelli, F. Rampini, G. Marchiori, European Industrial Engineering s.r.l. (Italy)
- 8450 07 **The GREGOR dome, pathfinder for the EST dome** [8450-7]
R. H. Hammerschlag, Utrecht Univ. (Netherlands); J. N. Kommers, Hankom Engineering (Netherlands); S. Visser, Poly-Ned BV (Netherlands); F. C. M. Bettonvil, ASTRON (Netherlands) and Leiden Observatory (Netherlands); A. G. M. van Schie, Delft Univ. of Technology (Netherlands); S. J. van Leverink, Royal Duyvis Wiener B.V. (Netherlands); G. Sliepen, Institute for Solar Physics (Sweden); A.P. L. Jägers, Utrecht Univ. (Netherlands)
- 8450 08 **The solid telescope as answer to specic application requirements** [8450-8]
A. Riva, M. Gai, INAF - Osservatorio Astrofisico di Torino (Italy)

SESSION 2 ACTIVE STRUCTURES AND OPTICS

- 8450 0A **The opto-mechanical performance prediction of thin mirror segments for E-ELT** [8450-9]
J. Nijenhuis, R. Hamelinck, B. Braam, TNO (Netherlands)

- 8450 OB **Co-phasing of the segmented mirror based on the generalized phase diversity wavefront sensor** [8450-10]
C. Li, S. Zhang, Nanjing Institute of Astronomical Optics & Technology (China)
- 8450 OC **Extremely stable piezo mechanisms for the new Gravitational Wave Observatory** [8450-11]
J. Pijnenburg, N. Rijnveld, H. Hogenhuis, TNO (Netherlands)
- 8450 OD **Metrology for a solar imaging Fourier transform spectrometer working in the far UV: from the instrumental concept to the first experimental results** [8450-12]
C. Ruiz de Galarreta Fanjul, M. Bouzit, T. Appourchaux, K. Dassas, T. Viale, A. Philippon, J.-C. Vial, Institut d'Astrophysique Spatiale (France); J.-P. Maillard, Institut d'Astrophysique de Paris (France)
- 8450 OE **Shape memory alloys for astronomical instrumentation: space and ground-based applications** [8450-13]
M. Riva, INAF - Osservatorio Astronomico di Brera (Italy); D. Rigamonti, F. Zanetti, Politecnico di Milano (Italy); F. Passaretti, E. Villa, CNR-IENI (Italy); F. M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy)
- 8450 OF **Laboratory demonstration of a liquid atmospheric dispersion corrector** [8450-14]
J. Zheng, W. Saunders, J. S. Lawrence, F. Bastien, F. Cantalloube, Australian Astronomical Observatory (Australia)
- 8450 OG **Analysis of gravitational effects on liquid lenses (ANGEL)** [8450-15]
K. Newman, K. Stephens, The Univ. of Arizona (United States)
- 8450 OH **Flexure mount for a MEMS deformable mirror for the Gemini Planet Imager** [8450-16]
A. Hill, National Research Council Canada (Canada); S. Cornelissen, Boston Micromachines Corp. (United States); D. Dillon, Univ. of California, Santa Cruz (United States); C. Lam, Boston Micromachines Corp. (United States); D. Palmer, Lawrence Livermore National Lab. (United States); L. Saddlemyer, National Research Council Canada (Canada)
- 8450 OI **Curvature wavefront sensing performance simulations for active correction of the Javalambre wide-field telescopes** [8450-17]
S. Chueca, A. Marín-Franch, A. J. Cenarro, J. Varela, A. Ederoclite, D. Cristóbal-Hornillos, C. Hernández-Monteagudo, N. Gruel, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); M. Moles, Ctr. de Estudios de Física del Cosmos de Aragón (Spain) and Instituto de Astrofísica de Andalucía, CSIC (Spain); A. Yanes, F. Rueda, S. Rueda, R. Luis-Simoes, J. Hernández-Fuertes, A. López-Sainz, N. Maicas-Sacristán, J. L. Lamadrid, M.C. Díaz-Martín, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); K. Taylor, Observatorio Nacional (Brazil)
- 8450 OJ **Active optics: deformation systems compensating for optical aberrations with a minimum number of actuators** [8450-18]
M. Laslandes, E. Hugot, M. Ferrari, Lab. d'Astrophysique de Marseille, CNRS, Aix Marseille Univ. (France)
- 8450 OK **Stabilized dispersive focal plane systems for space** [8450-19]
P. W. A. Roming, A. J. Bayless, C. R. Beebe, M. J. Brooks, M. W. Davis, R. A. Klar, J. M. Roberts, R. J. Rose, G. S. Winters, Southwest Research Institute (United States)

SESSION 3 CORONOGRAPHY AND HIGH CONTRAST IMAGING

- 8450 0L **Architecture impacts on planning and activity scheduling in external occulter missions**
[8450-215]
I. J. E. Jordan, Computer Sciences Corp. (United States)
- 8450 0M **The vector-APP: a broadband apodizing phase plate that yields complementary PSFs**
[8450-21]
F. Snik, G. Otten, M. Kenworthy, Sterrewacht Leiden, Univ. Leiden (Netherlands);
M. Miskiewicz, M. Escuti, North Carolina State Univ. (United States); C. Packham, Univ. of
Florida (United States); J. Codona, Steward Observatory, The Univ. of Arizona (United
States)
- 8450 0N **Lab results of the circular phase mask concepts for high-contrast imaging of exoplanets**
[8450-22]
M. N'Diaye, K. Dohlen, Lab. d'Astrophysique de Marseille, CNRS, Univ. d'Aix-Marseille
(France); T. Fusco, ONERA (France); K. El Hadi, Lab. d'Astrophysique de Marseille, CNRS,
Univ. d'Aix-Marseille (France); R. Soummer, Space Telescope Science Institute (United
States); S. Cuevas, Instituto de Astronomía, Univ. Nacional Autónoma de México (Mexico);
M. Zerrad, Institut Fresnel, CNRS, Univ. d'Aix-Marseille (France); M. Ferrari, Lab.
d'Astrophysique de Marseille, CNRS, Univ. d'Aix-Marseille (France)

SESSION 4 TEST AND METROLOGY I

- 8450 0O **A review of the KMOS IFU component metrology programme** [8450-23]
S. Rolt, Durham Univ. (United Kingdom)
- 8450 0P **Test results of high-precision large cryogenic lens holders** [8450-24]
C. Gal, A. Reutlinger, A. Boesz, T. Leberle, A. Mottaghbonab, P. Eckert, M. Dubowy,
H. Gebler, Kayser-Threde GmbH (Germany); F. Grupp, Max-Planck-Institut für
extraterrestrische Physik (Germany) and Univ.-Sternwarte München (Germany); N. Geis,
A. Bode, R. Katterloher, Max-Planck-Institut für extraterrestrische Physik (Germany);
R. Bender, Max-Planck-Institut für extraterrestrische Physik (Germany) and Univ. Sternwarte
München (Germany)
- 8450 0Q **CTE measurement setup with 10 ppb/K sensitivity for characterizing lightweight and highly
stable materials for space applications** [8450-25]
R. Spannagel, Univ. of Applied Sciences Konstanz (Germany); M. Gohlke, EADS Astrium
GmbH (Germany) and Humboldt-Univ. zu Berlin (Germany); T. Schuldt, Univ. of Applied
Sciences Konstanz (Germany); U. Johann, D. Weise, EADS Astrium GmbH (Germany);
C. Braxmaier, Univ. of Applied Sciences Konstanz (Germany) and EADS Astrium GmbH
(Germany)

SESSION 5 TEST AND METROLOGY II

- 8450 0R **Wavefront calibration testing of the James Webb Space Telescope primary mirror center of
curvature optical assembly** [8450-26]
G. Olczak, C. Wells, ITT Exelis Inc. (United States); D. J. Fischer, TASC (United States);
M. T. Connolly, ITT Exelis Inc. (United States)

- 8450 OS **Tunable laser techniques for improving the precision of observational astronomy** [8450-27]
C. E. Cramer, S. W. Brown, K. R. Lykke, J. T. Woodward, National Institute of Standards and Technology (United States); S. Bailey, D. J. Schlegel, Lawrence Berkeley National Lab. (United States); A. S. Bolton, J. Brownstein, The Univ. of Utah (United States); P. E. Doherty, C. W. Stubbs, A. Vaz, Harvard Univ. (United States); A. Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (United States)
- 8450 OT **Results of the new metrology system of the European ALMA antenna** [8450-28]
F. Rampini, G. Marchiori, European Industrial Engineering s.r.l. (Italy)
- 8450 OU **An imaging displacement sensor with nanometer accuracy** [8450-29]
D. Woody, Owens Valley Radio Observatory, California Institute of Technology (United States); D. Redding, Jet Propulsion Lab. (United States)
- 8450 OV **Fine optical alignment correction of astronomical spectrographs via in-situ full-field moment-based wavefront sensing** [8450-192]
H. Lee, G. J. Hill, S. E. Tuttle, B. L. Vattiat, McDonald Observatory, The Univ. of Texas at Austin (United States)

SESSION 6 TEST AND METROLOGY III

- 8450 OW **SCOTS: a reverse Hartmann test with high dynamic range for Giant Magellan Telescope primary mirror segments** [8450-31]
P. Su, College of Optical Sciences, The Univ. of Arizona (United States); S. Wang, Beijing Institute of Technology (China); M. Khreishi, Y. Wang, T. Su, P. Zhou, R. E. Parks, College of Optical Sciences, The Univ. of Arizona (United States); K. Law, M. Rascon, T. Zobrist, H. Martin, Steward Observatory, The Univ. of Arizona (United States); J. H. Burge, College of Optical Sciences and Steward Observatory, The Univ. of Arizona (United States)
- 8450 OX **Applications of subaperture stitching interferometry for very large mirrors** [8450-32]
J. H. Burge, C. Zhao, College of Optical Sciences, The Univ. of Arizona (United States)
- 8450 OY **Photochromic point-diffraction interferometer for optical testing** [8450-33]
M. Quintavalla, INAF - Osservatorio Astronomico di Brera (Italy); G. Pariani, INAF - Osservatorio Astronomico di Brera (Italy) and Politecnico di Milano (Italy); G. Crimi, A. Bianco, INAF - Osservatorio Astronomico di Brera (Italy); C. Bertarelli, Politecnico di Milano (Italy)
- 8450 OZ **Testing large flats with computer generated holograms** [8450-34]
G. Pariani, Politecnico di Milano (Italy) and INAF - Osservatorio Astronomico di Brera (Italy); D. Tresoldi, INAF - Osservatorio Astronomico di Brera (Italy); P. Spanò, INAF - Osservatorio Astronomico di Brera (Italy) and NRC-Herzberg Institute of Astrophysics (Canada); A. Bianco, INAF - Osservatorio Astronomico di Brera (Italy)
- 8450 10 **Characterization of photochromic computer-generated holograms for optical testing** [8450-35]
G. Pariani, Politecnico di Milano (Italy) and INAF - Osservatorio Astronomico di Brera (Italy); C. Bertarelli, Politecnico di Milano (Italy) and Istituto Italiano di Tecnologia (Italy); A. Bianco, INAF - Osservatorio Astronomico di Brera (Italy); F. Schaal, C. Pruss, Univ. Stuttgart (Germany)

SESSION 7 OPTICAL FIBERS AND WAVEGUIDES

- 8450 11 **Second generation OH suppression filters using multicore fibers (Invited Paper)** [8450-36]
R. Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); T. A. Birks, Univ. of Bath (United Kingdom); J. Bland-Hawthorn, The Univ. of Sydney (Australia); J. L. Cruz, A. Diez, Univ. de Valencia (Spain); S. C. Ellis, Australian Astronomical Observatory (Australia); D. Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); R. G. Krämer, Friedrich-Schiller-Univ. Jena (Germany); B. J. Mangan, Univ. of Bath (United Kingdom); S. Min, The Univ. of Sydney (Australia); D. F. Murphy, Waterford Institute of Technology (Ireland); S. Nolte, Friedrich-Schiller-Univ. Jena (Germany); J. Olaya, Leibniz-Institut für Astrophysik Potsdam (Germany); J. U. Thomas, Friedrich-Schiller-Univ. Jena (Germany); C. Q. Trinh, The Univ. of Sydney (Australia); A. Tünnermann, C. Voigtländer, Friedrich-Schiller-Univ. Jena (Germany)
- 8450 13 **Optical fibers for precise radial velocities: an update** [8450-124]
B. Chazelas, F. Pepe, F. Wildi, Observatory of Geneva, Univ. of Geneva (Switzerland)
- 8450 14 **Light propagation in a fibre-brush-shape converter** [8450-39]
W. Sun, H. Yu, Q. Yan, F. Tian, X. Liu, Y. Jiang, Z. Huang, Harbin Engineering Univ. (China); Z. Hu, Nanjing Institute of Astronomical Optics & Technology (China)
- 8450 15 **Enabling photonic technologies for seeing-limited telescopes: fabrication of integrated photonic lanterns on a chip** [8450-40]
I. Spaleniak, Macquarie Univ. (Australia); N. Jovanovic, Macquarie Univ. (Australia) and Australian Astronomical Observatory (Australia); S. Gross, Macquarie Univ. (Australia); M. Ireland, J. Lawrence, Macquarie Univ. (Australia) and Australian Astronomical Observatory (Australia); M. Withford, Macquarie Univ. (Australia)

SESSION 8 MULTI-OBJECT SPECTROSCOPY I

- 8450 17 **Developments in high-density Cobra fiber positioners for the Subaru Telescope's Prime Focus Spectrometer** [8450-41]
C. D. Fisher, D. F. Braun, J. V. Kaluzny, M. D. Seiffert, Jet Propulsion Lab. (United States); R. G. Dekany, Caltech Optical Observatories (United States); R. S. Ellis, R. M. Smith, California Institute of Technology (United States)
- 8450 18 **Concepts for multi-IFU robotic positioning systems** [8450-42]
S. Miziarski, J. Brzeski, Australian Astronomical Observatory (Australia); J. Bland Hawthorn, The Univ. of Sydney (Australia); J. Gilbert, M. Goodwin, J. Heijmans, A. Horton, J. Lawrence, W. Saunders, G. A. Smith, N. Staszak, Australian Astronomical Observatory (Australia)
- 8450 19 **Recent testing of a micro autonomous positioning system for multi-object instrumentation** [8450-43]
W. A. Cochrane, Heriot Watt Univ. (United Kingdom); D. C. Atkinson, T. E. Bailie, C. Dickson, UK Astronomy Technology Ctr., Royal Observatory (United Kingdom); T. Lim, X. Luo, Heriot Watt Univ. (United Kingdom); D. M. Montgomery, H. Schnetler, UK Astronomy Technology Ctr., Royal Observatory (United Kingdom); W. D. Taylor, Institute for Astronomy, Royal Observatory (United Kingdom); B. Wilson, UK Astronomy Technology Ctr., Royal Observatory (United Kingdom)

- 8450 1A **Starbugs: all-singing, all-dancing fibre positioning robots** [8450-44]
J. Gilbert, M. Goodwin, J. Heijmans, R. Muller, S. Miziarski, J. Brzeski, L. Waller, W. Saunders, A. Bennet, J. Tims, Australian Astronomical Observatory (Australia)
- 8450 1B **Analysis of thermal influence on optical fiber positioning device of LAMOST** [8450-45]
Y. Jin, R. Zhang, Y. Gu, C. Zhai, Univ. of Science and Technology of China (China)

SESSION 9 MULTI-OBJECT SPECTROSCOPY II

- 8450 1C **Wide-field tracking of moving objects with a compact multi-object dispersed fixed-delay interferometer** [8450-46]
J. Ge, X. Wan, D. Myers, S. Powell, Bryant Space Science Ctr., Univ. of Florida (United States)
- 8450 1D **Optical MEMS for space spectro-imagers** [8450-47]
A. Liotard, Thales Alenia Space (France); F. Zamkotsian, Lab. d'Astrophysique de Marseille, CNRS (France); W. Noell, Ecole Polytechnique Fédérale de Lausanne (Switzerland); T. Viard, Thales Alenia Space (France); M. Freire, B. J. Guldemann, S. Kraft, European Space Research and Technology Ctr. (Netherlands)
- 8450 1E **Large micromirror array for generating programmable slit masks for multi-object spectroscopy** [8450-48]
M. Canonica, Ecole Polytechnique Fédérale de Lausanne (Switzerland); F. Zamkotsian, P. Lanzoni, Lab. d'Astrophysique de Marseille (France); W. Noell, N. de Rooij, Ecole Polytechnique Fédérale de Lausanne (Switzerland)
- 8450 1F **Cryogenic photogrammetry and radiometry for the James Webb Space Telescope microshutters** [8450-49]
V. J. Chambers, NASA Goddard Space Flight Ctr. (United States); P. A. Morey, B. J. Zukowski, Ball Aerospace & Technologies Corp. (United States); A. S. Kuttyrev, N. R. Collins, D. A. Rapchun, N. Memarsadeghi, S. H. Moseley, L. M. Sparr, P. N. Blake, NASA Goddard Space Flight Ctr. (United States)

SESSION 10 SLIT SPECTROSCOPY, SLICERS, AND POLARIMETRY I

- 8450 1G **Performance of a laser frequency comb calibration system with a high-resolution solar echelle spectrograph** [8450-50]
H.-P. Doerr, T. J. Kentischer, Kiepenheuer-Institut für Sonnenphysik (Germany); T. Steinmetz, Menlo Systems GmbH (Germany) and Max-Planck-Institut für Quantenoptik (Germany); R. A. Probst, Menlo Systems GmbH (Germany) and Max-Planck-Institut für Quantenoptik (Germany); M. Franz, Kiepenheuer-Institut für Sonnenphysik (Germany); R. Holzwarth, Menlo Systems GmbH (Germany) and Max-Planck-Institut für Quantenoptik (Germany); T. Udem, T. W. Hänsch, Max-Planck-Institut für Quantenoptik (Germany); W. Schmidt, Kiepenheuer-Institut für Sonnenphysik (Germany)

- 8450 1H **Astronomical optical frequency comb generation in nonlinear fibres and ring resonators: optimization studies** [8450-51]
J. M. Chavez Boggio, T. Fremberg, D. Bodenmüller, Leibniz-Institut für Astrophysik Potsdam (Germany); B. Bohm, Univ. of Potsdam (Germany); M. Wismolek, H. Sanyic, Laser Zentrum Hannover e.V. (Germany); H. Fernando, Leibniz-Institut für Astrophysik Potsdam (Germany); J. Neumann, D. Kracht, Laser Zentrum Hannover e.V. (Germany) and QUEST: Ctr. for Quantum Engineering and Space-Time Research (Germany); R. Haynes, M. M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany)
- 8450 1I **A near-infrared frequency comb for Y+J band astronomical spectroscopy** [8450-52]
S. Osterman, Univ. of Colorado at Boulder (United States); G. G. Ycas, National Institute of Standards and Technology (United States) and Univ. of Colorado at Boulder (United States); S. A. Diddams, F. Quinlan, National Institute of Standards and Technology (United States); S. Mahadevan, L. Ramsey, C. F. Bender, R. Terrien, B. Botzer, S. Sigurdsson, The Pennsylvania State Univ. (United States); S. L. Redman, National Institute of Standards and Technology (United States)
- 8450 1J **Potential applications of ring resonators for astronomical instrumentation** [8450-53]
S. C. Ellis, Australian Astronomical Observatory (Australia); A. Crouzier, Institut de Planétologie et d'Astrophysique de Grenoble (France) and Australian Astronomical Observatory (Australia); J. Bland-Hawthorn, The Univ. of Sydney (Australia); J. S. Lawrence, J. Kepple, Australian Astronomical Observatory (Australia)
- 8450 1K **The Photonic TIGER: a multicore fiber-fed spectrograph** [8450-54]
S. G. Leon-Saval, C. H. Betters, J. Bland-Hawthorn, The Univ. of Sydney (Australia)

SESSION 11 SLIT SPECTROSCOPY, SLICERS, AND POLARIMETRY II

- 8450 1L **Development of a slicer integral field unit for the existing optical imaging spectrograph FOCAS** [8450-55]
S. Ozaki, National Astronomical Observatory of Japan (Japan); Y. Tanaka, T. Hattori, Subaru Telescope, National Astronomical Observatory of Japan (United States); K. Mitsui, M. Fukusima, N. Okada, Y. Obuchi, S. Miyazaki, T. Yamashita, National Astronomical Observatory of Japan (Japan)
- 8450 1M **The KMOS Integral Field System: fabrication, alignment, and test of 1000+ optical surfaces** [8450-56]
C. M. Dubbeldam, P. Clark, R. Content, A. K. Kirby, K. Parkin, D. J. Robertson, S. Rolt, D. A. Ryder, R. M. Sharples, Durham Univ. (United Kingdom)
- 8450 1N **Multiplexing 32,000 spectra onto 8 detectors: the HARMONI field splitting, image slicing, and wavelength selecting optics** [8450-57]
M. Tecza, N. Thatte, F. Clarke, Univ. of Oxford (United Kingdom); D. Freeman, Kidger Optics Associates (United Kingdom); J. Kosmalski, Observatoire de Lyon (France)
- 8450 1P **CEOI microslice spectrograph** [8450-59]
R. Content, Australian Astronomical Observatory (Australia) and Durham Univ. (United Kingdom); S. Blake, C. Dunlop, D. Nandi, R. Sharples, G. Talbot, T. Shanks, D. Donoghue, N. Galiatsatos, P. Luke, Durham Univ. (United Kingdom)

SESSION 12 SLIT SPECTROSCOPY, SLICERS, AND POLARIMETRY III

- 8450 1R **The ESO transportable LGS Unit for measurements of the LGS photon return and other experiments** [8450-61]
D. Bonaccini Calia, I. Guidolin, European Southern Observatory (Germany); A. Friedenauer, M. Hager, TOPTICA Photonics AG (Germany); V. Karpov, MPB Communications Inc. (Canada); T. Pfrommer, R. Holzöhner, S. Lewis, W. Hackenberg, G. Lombardi, European Southern Observatory (Germany); M. Centrone, F. Pedichini, INAF - Osservatorio Astronomico di Roma (Italy)
- 8450 1S **Near-field calibration of an objective spectrophotometer to NIST radiometric standards for the creation and maintenance of standard stars for ground- and space-based applications** [8450-62]
J. T. McGraw, P. C. Zimmer, D. C. Zirzow, The Univ. of New Mexico (United States); J. T. Woodward, K. R. Lykke, C. E. Cramer, National Institute of Standards and Technology (United States); S. E. Deustua, Space Telescope Science Institute (United States); D. C. Hines, The Univ. of New Mexico (United States) and Space Telescope Science Institute (United States)
- 8450 1T **The ERA2 facility: towards application of a fibre-based astronomical spectrograph for imaging spectroscopy in life sciences** [8450-63]
M. M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany) and Univ. Potsdam (Germany); K. Zenichowski, Leibniz-Institut für Astrophysik Potsdam (Germany); N. Tarcea, Univ. Jena (Germany); J. Popp, Univ. Jena (Germany) and Institut für photonische Technologien (Germany); S. Adelhelm, M. Stolz, A. Kelz, C. Sandin, S.-M. Bauer, T. Fechner, T. Jahn, E. Popow, Leibniz-Institut für Astrophysik Potsdam (Germany); B. Roth, Hannoversches Zentrum für optische Technologien (Germany); P. Singh, M. Srivastava, D. Wolter, Leibniz-Institut für Astrophysik Potsdam (Germany)
- 8450 1U **CARMENES. V: non-cryogenic solutions for YJH-band NIR instruments** [8450-64]
P. J. Amado, Instituto de Astrofísica de Andalucía, CSIC (Spain); R. Lenzen, Max-Planck-Institut für Astronomie (Germany); M. C. Cardenas, Instituto de Astrofísica de Andalucía, CSIC (Spain); E. Sánchez-Blanco, Instituto de Astrofísica de Andalucía, CSIC (Spain) and Diseño Sistemas Ópticos (Spain); S. Becerril, M. A. Sánchez-Carrasco, Instituto de Astrofísica de Andalucía, CSIC (Spain); W. Seifert, A. Quirrenbach, Landessternwarte-ZAH (Germany); I. Ribas, Institut de Ciències de l'Espai, CSIC (Spain); A. Reiners, Institut für Astrophysik (Germany); H. Mandel, Landessternwarte-ZAH (Germany); J. A. Caballero, Ctr. for Astrobiology, CSIC (Spain)
- 8450 1V **PRAXIS: a low background NIR spectrograph for fibre Bragg grating OH suppression** [8450-65]
A. Horton, S. Ellis, J. Lawrence, Australian Astronomical Observatory (Australia); J. Bland-Hawthorn, The Univ. of Sydney (Australia)

SESSION 13a TECHNOLOGIES FOR CRYOGENIC INSTRUMENTS I

- 8450 1Y **Experience on a cryogenic linear mechanism based on superconducting levitation** [8450-68]
J. Serrano-Tellez, F. Romera-Juarez, D. González-de-María, M. Lamensans, H. Argelaguet-Vilaseca, LIDAX (Spain); J.-L. Pérez-Díaz, J. Sánchez-Casarrubios, E. Díez-Jiménez, I. Valiente-Blanco, Univ. Carlos III de Madrid (Spain)

- 8450 12 **The JWST MIRI FM wheel mechanisms characterisation for open loop drive** [8450-69]
Ö. Detre, U. Grözinger, O. Krause, F. Müller, S. Scheithauer, Max Planck Institute for Astronomy (Germany)
- 8450 20 **Development of a 2D precision cryogenic chopper for METIS** [8450-70]
S. L. Paalvast, H. Janssen, M. Teuwen, Janssen Precision Engineering B.V. (Netherlands); R. Huisman, SRON Netherlands Institute for Space Research (Netherlands); B. Brandl, Leiden Observatory, Leiden Univ. (Netherlands); F. Molster, NOVA (Netherlands); L. Venema, ASTRON (Netherlands)

SESSION 13b OPTICAL FABRICATION I

- 8450 21 **JWST: Tinsley achievements on the largest beryllium polishing project (Invited Paper)** [8450-82]
J. Daniel, L-3 Communications Tinsley Labs. Inc. (United States); T. Hull, Univ. of New Mexico (United States); J. B. Barentine, L-3 Communications Tinsley Labs. Inc. (United States)
- 8450 22 **Zero-expansion glass ceramic ZERODUR: recent developments reveal high potential (Invited Paper)** [8450-83]
P. Hartmann, R. Jedamzik, T. Westerhoff, SCHOTT AG (Germany)
- 8450 23 **Prototype segments polishing and testing for ELT M1** [8450-84]
J. Rodolfo, L. Chouarche, G. Chaussat, A. Hamy, J. Carel, B. Pernet, J. Billet, H. Leplan, E. Ruch, SAGEM Défense Sécurité (France)
- 8450 25 **Tinsley proves stress mirror polishing for giant segmented telescopes** [8450-86]
U. Müller, J. Daniel, L-3 Communications Tinsley Labs. Inc. (United States)

Part Two

SESSION 14a TECHNOLOGIES FOR CRYOGENIC INSTRUMENTS II

- 8450 26 **Development of a cryogenic all-silicon telescope (CAIT)** [8450-71]
D. R. McCarter, E. McCarter, R. Paquin, McCarter Machine, Inc. (United States)
- 8450 27 **Ultra-stable isostatic bonded optical mount design for harsh environments** [8450-72]
J. Pijnenburg, M. J. A. te Voert, J. de Vreugd, A. Vosteen, W. van Werkhoven, J. Mekking, B. H. Nijland, TNO (Netherlands)
- 8450 28 **Glue test results for high-precision large cryogenic lens holder** [8450-74]
A. Reutlinger, A. Mottaghionab, C. Gal, A. Boesz, Kayser-Threde GmbH (Germany); F. Grupp, Max-Planck-Institut für extraterrestrische Physik (Germany) and Univ.-Sternwarte München (Germany); N. Geis, A. Bode, R. Katterloher, Max-Planck-Institut für extraterrestrische Physik (Germany); R. Bender, Max-Planck-Institut für extraterrestrische Physik (Germany) and Univ.-Sternwarte München (Germany)

- 8450 29 **A new generation active arrays for optical flexibility in astronomical instrumentation** [8450-75]
G. Kroes, ASTRON (Netherlands); A. Jaskó, ASTRON (Netherlands) and Konkoly Thege Miklós Astronomical Institute (Hungary); J. H. Pragt, L. Venema, M. De Haan, ASTRON (Netherlands)

SESSION 14b OPTICAL FABRICATION II

- 8450 2A **Edge-control and surface-smoothness in sub-aperture polishing of mirror segments** [8450-85]
D. Walker, OpTIC Glyndŵr Univ. (United Kingdom), Univ. College London (United Kingdom) and Zeeko Ltd. (United Kingdom); A. Beaucamp, Zeeko Ltd. (United Kingdom) and Chubu Univ. (Japan); R. Evans, T. Fox-Leonard, N. Fairhurst, C. Gray, S. Hamidi, OpTIC, Glyndŵr Univ. (United Kingdom); H. Li, Univ. College London (United Kingdom) and Harbin Institute of Technology (China); W. Messalink, Univ. College London (United Kingdom) and Zeeko Ltd. (United Kingdom); J. Mitchell, P. Rees, G. Yu, OpTIC, Glyndŵr Univ. (United Kingdom)
- 8450 2B **Test production of a mirror segment for the Thirty Meter Telescope** [8450-88]
T. Oota, H. Shinonaga, K. Akutsu, Y. Hashimoto, I. Otsuka, Y. Iwasaki, Canon Inc. (Japan); M. Iye, T. Yamashita, National Astronomical Observatory of Japan (Japan); H. Akitaya, Hiroshima Univ. (Japan); R. Suzuki, National Astronomical Observatory of Japan (Japan)
- 8450 2D **Production of 8.4m segments for the Giant Magellan Telescope** [8450-90]
H. M. Martin, R. G. Allen, Steward Observatory, The Univ. of Arizona (United States); J. H. Burge, Steward Observatory and College of Optical Sciences, The Univ. of Arizona (United States); D. Kim, College of Optical Sciences, The Univ. of Arizona (United States); J. S. Kingsley, K. Law, R. D. Lutz, P. A. Strittmatter, Steward Observatory, The Univ. of Arizona (United States); P. Su, College of Optical Sciences, The Univ. of Arizona (United States); M. T. Tuell, S. C. West, Steward Observatory, The Univ. of Arizona (United States); P. Zhou, College of Optical Sciences, The Univ. of Arizona (United States)
- 8450 2E **Light-weight glass optics for segmented x-ray mirrors** [8450-91]
A. Winter, E. Breunig, R. Capelli, P. Friedrich, V. Burwitz, G. Hartner, B. Menz, Max-Planck-Institut für extraterrestrische Physik (Germany); T. Schmachtel, G. Derst, M. Neher, Carl Zeiss Jena GmbH (Germany)

SESSION 15a COATINGS AND FILTERS

- 8450 2F **Fabrication and tolerances of moth-eye structures for perfect antireflection in the mid-infrared wavelength region** [8450-76]
H. Imada, Univ. of Tsukuba (Japan); T. Miyata, S. Sako, T. Kamizuka, T. Nakamura, K. Asano, M. Uchiyama, K. Okada, The Univ. of Tokyo (Japan); T. Wada, T. Nakagawa, Japan Aerospace Exploration Agency (Japan); T. Onaka, I. Sakon, The Univ. of Tokyo (Japan)
- 8450 2G **Progress in UCO's search for silver-based telescope mirror coatings** [8450-77]
A. C. Phillips, J. S. Miller, M. Bolte, B. DuPraw, M. Radovan, D. Cowley, Univ. of California Observatories (United States)

- 8450 2H **Enhanced MgF₂ and LiF over-coated Al mirrors for FUV space astronomy** [8450-78]
M. A. Quijada, S. Rice, E. Mentzell, NASA Goddard Space Flight Ctr. (United States)
- 8450 2J **Towards ultra-precise optical interference filters on large area: computational and experimental optimization of the homogeneity of magnetron-sputtered precision optical coatings** [8450-80]
M. Vergöhl, A. Pflug, D. Rademacher, Fraunhofer Institute for Surface Engineering and Thin Films (Germany)
- 8450 2K **Optical reflector coatings for astronomical applications from EUV to IR** [8450-81]
M. Schürmann, P. J. Jobst, S. Yulin, T. Feigl, H. Heiße, S. Wilbrandt, O. Stenzel, A. Gebhardt, S. Risse, N. Kaiser, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

SESSION 15b OPTICAL FABRICATION III

- 8450 2L **Astrosital application in astronomical and space optics production** [8450-92]
M. A. Abdulkadyrov, A. N. Ignatov, A. P. Patrikeev, A. P. Semenov, Y. A. Sharov, Lytkarino Optical Glass Factory JSC (Russian Federation)
- 8450 2M **Diamond turning and polishing tests on new RSP aluminum alloys** [8450-93]
R. ter Horst, M. de Haan, ASTRON (Netherlands); G. Gubbels, R. Senden, RSP Technology (Netherlands); B. van Venrooy, A. Hoogstrate, TNO (Netherlands)
- 8450 2P **The 3.2m all SiC Telescope for SPICA** [8450-96]
D. Castel, E. Sein, S. Lopez, EADS Astrium (France); T. Nakagawa, Japan Aerospace Exploration Agency (Japan); M. Bougoin, BOOSTEC S.A. (France)
- 8450 2Q **Manufacturing of high-precision aspherical and freeform optics** [8450-97]
A. M. Hoogstrate, C. van Drunen, B. van Venrooy, R. Henselmans, TNO (Netherlands)
- 8450 2R **Development of CFRP mirrors for low-temperature application of satellite telescopes** [8450-98]
S. Utsunomiya, T. Kamiya, R. Shimizu, Japan Aerospace Exploration Agency (Japan)

SESSION 16 GRATINGS

- 8450 2S **Near-infrared metrology of high-performance silicon immersion gratings (Invited Paper)** [8450-99]
M. Gully-Santiago, W. Wang, The Univ. of Texas at Austin (United States); C. Deen, The Univ. of Texas at Austin (United States) and Max-Planck Institut für Astronomie (Germany); D. Jaffe, The Univ. of Texas at Austin (United States)
- 8450 2T **Development of silicon immersed grating for METIS on E-ELT** [8450-100]
A. H. van Amerongen, SRON Netherlands Institute for Space Research (Netherlands); T. Agocs, ASTRON (Netherlands); H. van Brug, TNO Science and Industry (Netherlands); G. Nieuwland, Philips Innovation Services (Netherlands); L. Venema, ASTRON (Netherlands); R. W. M. Hoogeveen, SRON Netherlands Institute for Space Research (Netherlands)

- 8450 2U **Silicon immersion gratings and their spectroscopic applications** [8450-101]
J. Ge, B. Zhao, S. Powell, A. Fletcher, X. Wan, L. Chang, H. Jakeman, D. Koukis, D. B. Tanner, Univ. of Florida (United States); D. Ebbets, J. Weinberg, S. Lipsky, R. Nyquist, Ball Aerospace & Technologies Corp. (United States); J. Bally, Univ. of Colorado at Boulder (United States)
- 8450 2V **High-performance astronomical gratings by Canon** [8450-103]
T. Sukegawa, S. Sugiyama, T. Kitamura, Y. Okura, M. Koyama, Canon Inc. (Japan)
- 8450 2W **Materials for VPHGs: practical considerations in the case of astronomical instrumentation (Invited Paper)** [8450-104]
A. Bianco, G. Pariani, INAF - Osservatorio Astronomico di Brera (Italy); A. Zanutta, INAF - Osservatorio Astronomico di Brera (Italy) and Politecnico di Milano (Italy); C. Bertarelli, Politecnico di Milano (Italy)
- 8450 2X **Performance of volume phase gratings manufactured using ultrafast laser inscription** [8450-105]
D. Lee, UK Astronomy Technology Ctr., Royal Observatory (United Kingdom); R. R. Thomson, Heriot-Watt Univ. (United Kingdom); C. R. Cunningham, UK Astronomy Technology Ctr., Royal Observatory (United Kingdom)
- 8450 2Y **Novel diffraction gratings fabricated by means of plasma nanotechnologies** [8450-106]
N. Ebizuka, M. Sekine, K. Ishikawa, H. Kondo, M. Hori, Nagoya Univ. (Japan); M. Sasaki, Toyota Technological Institute (Japan); A. Bianco, F. Maria Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); Y. Hirahara, Nagoya Univ. (Japan); W. Aoki, National Astronomical Observatory (Japan)
- 8450 2Z **High-performance dielectric diffraction gratings for space applications (Best Oral Presentation)** [8450-107]
U. D. Zeitner, Fraunhofer Institute of Applied Optics and Precision Engineering (Germany) and Friedrich-Schiller-Univ. Jena (Germany); F. Fuchs, Fraunhofer Institute of Applied Optics and Precision Engineering (Germany); E.-B. Kley, Fraunhofer Institute of Applied Optics and Precision Engineering (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

SESSION 17 REVOLUTIONARY TECHNOLOGIES

- 8450 31 **Innovative technology for optical and infrared astronomy (Invited Paper)** [8450-108]
C. R. Cunningham, C. J. Evans, UK Astronomy Technology Ctr., Royal Observatory (United Kingdom); F. Molster, Leiden Observatory, Leiden Univ. (Netherlands); S. Kendrew, Max-Planck-Institut für Astronomie (Germany); M. A. Kenworthy, F. Snik, Leiden Observatory, Leiden Univ. (Netherlands)
- 8450 33 **Extremely aspheric mirrors: prototype development of an innovative manufacturing process based on active optics** [8450-110]
Z. Challita, E. Hugot, M. Ferrari, J. Le Merrer, D. Le Mignant, J.-G. Cuby, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France)
- 8450 34 **Fast figuring of large optics by reactive atom plasma** [8450-111]
M. Castelli, R. Jourdain, P. Morantz, P. Shore, Cranfield Univ. (United Kingdom)

POSTERS: OPTICAL FIBERS AND POSITIONERS

- 8450 35 **Understanding incomplete scrambling in fibres: experimental investigations** [8450-38]
U. Lemke, Georg-August-Univ. Göttingen (Germany) and Durham Univ. (United Kingdom);
J. R. Allington-Smith, Durham Univ. (United Kingdom); J. Stürmer, ZAH Landessternwarte
Heidelberg (Germany)
- 8450 36 **Optical fiber systems for the BigBOSS instrument** [8450-114]
J. Edelstein, Univ. of California, Berkeley (United States); C. Poppett, Lawrence Berkeley
National Lab. (United States); M. Sirk, R. Besuner, Univ. of California, Berkeley (United
States); R. Lafever, Lawrence Berkeley National Lab. (United States); J. R. Allington-Smith,
G. J. Murray, Durham Univ. (United Kingdom)
- 8450 37 **Guide, focus/alignment system for BigBOSS** [8450-115]
K. Reil, SLAC National Accelerator Lab. (United States); C. Bebek, Lawrence Berkeley
National Lab. (United States); R. Besuner, Space Sciences Lab., Univ. of California, Berkeley
(United States); M. Lampton, Lawrence Berkeley National Lab. (United States) and Space
Sciences Lab., Univ. of California, Berkeley (United States); A. Roodman, SLAC National
Accelerator Lab. (United States); M. Sholl, Lawrence Berkeley National Lab. (United States)
- 8450 38 **Design and performance of an R- θ fiber positioner for the BigBOSS instrument** [8450-116]
J. H. Silber, C. Schenk, E. Anderssen, C. Bebek, F. Becker, Lawrence Berkeley National Lab.
(United States); R. Besuner, Space Sciences Lab., Univ. of California, Berkeley (United
States); M. Cepeda, Lawrence Berkeley National Lab. (United States); J. Edelstein,
H. Heetderks, Space Sciences Lab., Univ. of California, Berkeley (United States); P. Jelinsky,
T. Johnson, A. Karcher, P. Perry, R. Post, Lawrence Berkeley National Lab. (United States);
M. Sholl, Space Sciences Lab., Univ. of California, Berkeley (United States); K. Wilson,
Z. Zhou, Lawrence Berkeley National Lab. (United States)
- 8450 39 **Metrology system for the calibration of multi-dof precision mechanisms** [8450-117]
L. Zago, M. Sarajlic, F. Chevalley, Univ. of Applied Sciences of Western Switzerland
(Switzerland); D. Yang, Nanjing Institute for Astronomical Optics and Technology (China)
- 8450 3B **A high-resolution measurement device for detecting the positioning accuracy of the
optical fiber positioner** [8450-119]
Y. Gu, J. Xu, Y. Jin, C. Zhai, Univ. of Science and Technology of China (China)
- 8450 3D **LAMOST fiber unit positional precision passive detection exploiting the technique of
template matching** [8450-121]
M. Wang, Y. Zhao, A. Luo, National Astronomical Observatories (China)
- 8450 3E **A novel calibration method of CCD camera for LAMOST** [8450-122]
Y. Gu, Y. Jin, C. Zhai, Univ. of Science and Technology of China (China)
- 8450 3F **Applied stress on coated multimode optical fibres: a different point of view to bending
losses** [8450-123]
Y. Padilla Michel, Leibniz-Institut für Astrophysik Potsdam (Germany); M. Zoheidi, LEONI Fiber
Optics GmbH (Germany); M. M. Roth, R. Haynes, J.-C. Olaya, Leibniz-Institut für Astrophysik
Potsdam (Germany)

- 8450 3G **Development of different kind of IFU prototypes for the OPTIMOS-EVE study for the E-ELT** [8450-125]
I. Guinouard, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); L. S. de Oliveira, A. de Oliveira, Lab. Nacional de Astrofísica (Brazil); F. Hammer, M. Huertas-Company, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); B. Barbuy, Univ. de São Paulo (Brazil); F. Chemla, J.-J. Huet, H. Flores, M. Puech, S. Mei, Observatoire de Paris, CNRS, Univ. Paris Diderot (France)
- 8450 3H **On-sky tests of sky-subtraction methods for fiber-fed spectrographs** [8450-126]
M. Rodrigues, European Southern Observatory (France); M. Cirasuolo, Univ. of Edinburgh (United Kingdom) and UK Astronomy Technology Ctr., Royal Observatory (United Kingdom); F. Hammer, F. Royer, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); C. J. Evans, UK Astronomy Technology Ctr., Royal Observatory (United Kingdom); M. Puech, H. Flores, I. Guinouard, Observatoire de Paris, CNRS, Univ. Paris Diderot (France); G. Li Causi, INAF - Rome Astronomical Observatory (Italy); K. Disseau, Y. Yang, Observatoire de Paris, CNRS, Univ. Paris Diderot (France)
- 8450 3I **Development of the single fibres and IFUs of WEAVE** [8450-127]
I. Guinouard, P. Bonifacio, Observatoire de Paris à Meudon, CNRS, Univ. Paris Diderot (France); S. C. Trager, M. A. W. Verheijen, Kapteyn Astronomical Institute, Univ. of Groningen (Netherlands); I. Lewis, Univ. of Oxford (United Kingdom); G. Dalton, Univ. of Oxford and Rutherford Appleton Lab. (United Kingdom)
- 8450 3J **Optical fibre tapers: focal reduction and magnification** [8450-129]
D. M. Haynes, R. Haynes, J.-C. Olaya, Leibniz-Institut für Astrophysik Potsdam (Germany); S. G. Leon-Saval, The Univ. of Sydney (Australia)
- 8450 3K **Multimode to single-mode converters: new results on 1-to-61 photonic lanterns** [8450-130]
J. Olaya, K. Ehrlich, D. M. Haynes, R. Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); S. G. Leon-Saval, The Univ. of Sydney (Australia); D. Schirdewahn, Leibniz-Institut für Astrophysik Potsdam (Germany)
- 8450 3L **Multicore fibre Bragg grating developments for OH suppression** [8450-131]
S. Min, Australian Astronomical Observatory (Australia) and The Univ. of Sydney (Australia); C. Trinh, S. Leon-Saval, The Univ. of Sydney (Australia); N. Jovanovic, Australian Astronomical Observatory (Australia) and Macquarie Univ. (Australia); P. Gillingham, Australian Astronomical Observatory (Australia); J. Bland-Hawthorn, The Univ. of Sydney (Australia); J. Lawrence, Australian Astronomical Observatory (Australia); T. A. Birks, Univ. of Bath (United Kingdom); M. M. Roth, R. Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); L. Fogarty, The Univ. of Sydney (Australia)

POSTERS: COATINGS, FILTERS, GRATINGS AND SPECTROGRAPHS

- 8450 3M **Tests of VPHGs in the NIR for use at cryogenic temperatures** [8450-132]
M. Insausti, Instituto de Astrofísica de Canarias (Spain); F. Garzón, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain); R. Madrigal, A. Fimia, Univ. Miguel Hernández (Spain)

- 8450 3N **Slanted VPHGs in astronomical instrumentation: tests and perspectives** [8450-133]
A. Bianco, INAF - Osservatorio Astronomico di Brera (Italy); J. Arns, Kaiser Optical Systems, Inc. (United States); H. Dekker, European Southern Observatory (Germany); P. Spanò, A. Zanutta, F. M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy)
- 8450 3O **Reflective coating for near-infrared immersion gratings** [8450-134]
P. J. Kuzmenko, Lawrence Livermore National Lab. (United States); Y. Ikeda, Photocoding Inc. (Japan); N. Kobayashi, The Univ. of Tokyo (Japan); P. B. Mirkarimi, J. B. Alameda, Lawrence Livermore National Lab. (United States)
- 8450 3P **Fabrication and testing of germanium grisms for LMIRcam** [8450-135]
P. J. Kuzmenko, S. L. Little, L. M. Little, Lawrence Livermore National Lab. (United States); J. C. Wilson, M. F. Skrutskie, Univ. of Virginia (United States); P. M. Hinz, Steward Observatory, The Univ. of Arizona (United States); J. M. Leisenring, ETH Zurich (Switzerland); O. Durney, Steward Observatory, The Univ. of Arizona (United States)

Part Three

- 8450 3Q **Large filters for wide-field survey telescope LSST** [8450-136]
N. Morgado, L. Pinard, B. Sassolas, R. Flaminio, D. Forest, B. Lagrange, C. Michel, Lab. des Matériaux Avancés, CNRS (France); P. Antilogus, Lab. de Physique Nucléaire et de Hautes Energies (France)
- 8450 3R **MUSE optical coatings** [8450-137]
A. Remillieux, L. Adjali, R. Bacon, P. Caillier, G. Hansali, J. Kosmalski, F. Laurent, M. Loupiau, Observatoire de Lyon, CNRS, Univ. de Lyon (France); N. Morgado, Lab. des Matériaux Avancés, CNRS (France); H. Nicklas, Institut für Astrophysik, Georg-August-Univ. Göttingen (Germany); L. Pinard, Lab. des Matériaux Avancés, CNRS (France); B. Ploss, Optics Balzers Jena GmbH (Germany); E. Renault, Observatoire de Lyon, CNRS, Univ. de Lyon (France)
- 8450 3S **Design of the J-PAS and J-PLUS filter systems** [8450-138]
A. Marín-Franch, S. Chueca, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); M. Moles, Ctr. de Estudios de Física del Cosmos de Aragón (Spain) and Instituto de Astrofísica de Andalucía, CSIC (Spain); N. Benítez, Instituto de Astrofísica de Andalucía, CSIC (Spain); K. Taylor, Univ. de São Paulo (Brazil); J. Cepa, Instituto de Astrofísica de Canarias (Spain); A.J. Cenarro, D. Cristóbal-Hernillos, A. Ederoclite, N. Gruel, J. Hernández-Fuertes, A. López-Sainz, R. Luis-Simoes, F. Rueda-Teruel, S. Rueda-Teruel, J. Varela, A. Yanes-Díaz, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); U. Brauneck, A. Danielou, SCHOTT AG (Switzerland); R. Dupke, Observatório Nacional (Brazil); A. Fernández-Soto, Instituto de Física de Cantabria (Spain); C. Mendes de Oliveira, L. Sodré, Jr., Univ. de São Paulo (Brazil)
- 8450 3T **Research on a project of the new computational hyperspectral imager** [8450-139]
H. Li, F. Zhou, Z. Zhang, Beijing Institute of Space Mechanics and Electricity (China); G. Shi, Xidian Univ. (China)

- 8450 3U **Reflectivity, polarization properties, and durability of metallic mirror coatings for the European Solar Telescope** [8450-140]
A. Feller, N. Krishnappa, O. Pleier, J. Hirzberger, Max-Planck-Institut für Sonnensystemforschung (Germany); P.J. Jobst, M. Schürmann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)
- 8450 3V **Developing metal coated mesh filters for mid-infrared astronomy** [8450-141]
S. Sako, T. Miyata, T. Kamizuka, Institute of Astronomy, The Univ. of Tokyo (Japan); T. Nakamura, The Univ. of Tokyo (Japan); K. Asano, M. Uchiyama, Institute of Astronomy, The Univ. of Tokyo (Japan); T. Onaka, I. Sakon, The Univ. of Tokyo (Japan); T. Wada, Institute of Space and Astronomical Science, Japan Aerospace Exploration Agency (Japan)
- 8450 3W **Octadecanthiol for tarnish-resistant silver coatings** [8450-142]
A. C. Phillips, Univ. of California Observatories (United States); A. Cowley, Lick Observatory, Univ. of California, Santa Cruz (United States)
- 8450 3Y **Development of an integral field unit for a near-infrared multi-object imaging spectrograph SWIMS** [8450-144]
S. Ozaki, National Astronomical Observatory of Japan (Japan); Y. Kitagawa, K. Motohara, M. Konishi, H. Takahashi, Institute of Astronomy, The Univ. of Tokyo (Japan); T. Yoshikawa, Koyama Astronomical Observatory, Kyoto Sangyo Univ. (Japan); K. Tateuchi, N. Kato, Institute of Astronomy, The Univ. of Tokyo (Japan)
- 8450 40 **Electro-optical polarimeters for ground-based and space-based observations of the solar K-corona** [8450-146]
G. Capobianco, S. Fineschi, G. Massone, INAF - Osservatorio Astrofisico di Torino (Italy); E. Balboni, Associazione Apriti cielo (Italy); A. M. Malvezzi, Univ. degli Studi di Pavia (Italy); G. Crescenzo, L. Zangrilli, INAF - Osservatorio Astrofisico di Torino (Italy); P. Calcidese, Osservatorio Astronomico della regione Autonoma (Italy); E. Antonucci, INAF - Osservatorio Astrofisico di Torino (Italy); M. Patrini, Univ. degli Studi di Pavia (Italy)
- 8450 41 **Photopolymer-based volume phase holographic grating for astronomical instrumentations** [8450-148]
A. Zanutta, Politecnico di Milano (Italy) and INAF - Osservatorio Astronomico di Brera (Italy); A. Bianco, F. M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy)
- 8450 42 **Spectrally-quantified chemical reactivity of optical fluids and materials in the GMACS spectrograph for GMT** [8450-149]
T. W. Behm, J. P. Rheault, J. L. Marshall, D. L. DePoy, Texas A&M Univ. (United States)
- 8450 43 **Echelle volume binary grating: a step forward** [8450-150]
A. Bianco, INAF - Osservatorio Astronomico di Brera (Italy); N. Ebizuka, Nagoya Univ. (Japan)
- 8450 44 **Comparing modelling techniques when designing VPH gratings for BigBOSS** [8450-151]
C. Poppett, Lawrence Berkeley National Lab. (United States); J. Edelstein, M. Lampton, P. Jelinsky, Space Sciences Lab., Univ. of California, Berkeley (United States); J. Arns, Kaiser Optical Systems, Inc. (United States)

- 8450 45 **A single-mode Echelle spectrograph: eliminating modal variation, enabling higher precision Doppler study** [8450-152]
A. Ghasempour, J. Kelly, M. W. Muterspaugh, M. H. Williamson, Tennessee State Univ. (United States)
- 8450 46 **Planar integrated photonics spectrograph on silicon-nitride-on-insulator: densely integrated systems for astrophotonics and spectroscopy** [8450-153]
H. N. J. Fernando, A. Stoll, Leibniz-Institut für Astrophysik Potsdam (Germany); R. Eisermann, Leibniz-Institut für innovative Mikroelektronik (Germany); J. C. Boggio, Leibniz-Institut für Astrophysik Potsdam (Germany); L. Zimmermann, Leibniz-Institut für innovative Mikroelektronik (Germany); R. Haynes, M. M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany)
- 8450 47 **A high-resolution Fourier transform spectrometer for astronomical observations and development of wavelength standards** [8450-217]
U. Lemke, A. Reiners, S. Schäfer, Institute for Astrophysics Göttingen (Germany)

POSTERS: CRYOGENIC SPACE AND GROUND-BASED INSTRUMENTATION

- 8450 48 **Immersion grating mount design for IGRINS and GMTNIRS** [8450-154]
B. Moon, Korea Astronomy and Space Science Institute (Korea, Republic of); W. Wang, The Univ. of Texas at Austin (United States); C. Park, I. Yuk, M.-Y. Chun, Korea Astronomy and Space Science Institute (Korea, Republic of); D. T. Jaffe, The University of Texas at Austin (United States)
- 8450 4A **Improved stress prediction in adhesive bonded optical components** [8450-156]
J. de Vreugd, M. J. A. te Voert, J. R. Nijenhuis, J. A. C. Pijnenburg, E. Tabak, TNO (Netherlands)
- 8450 4B **Passive vibration isolation for SITELLE's closed cycle cooled cryostats** [8450-157]
M. Baril, T. Benedict, G. Barrick, K. Ho, Canada-France-Hawaii Telescope (United States)
- 8450 4C **Cryogenic actuator for subnanometer positioning** [8450-158]
B. v. Bree, H. Janssen, S. Paalvast, R. Albers, Janssen Precision Engineering B.V. (Netherlands)
- 8450 4D **Cryogenic actuator testing for the SAFARI ground calibration setup** [8450-159]
C. de Jonge, M. Eggens, A. C. T. Nieuwenhuizen, A. Detrain, H. Smit, P. Dieleman, SRON Netherlands Institute for Space Research (Netherlands)
- 8450 4E **MATISSE selection mechanism development** [8450-160]
J. Kragt, N. Tromp, G. Kroes, ASTRON (Netherlands); A. Jaskó, ASTRON (Netherlands) and MTA Research Ctr. for Astronomy and Earth Sciences (Hungary)
- 8450 4F **Cryogenic fast shutter design and test results for the MATISSE instrument** [8450-161]
J. Kragt, E. Elswijk, A. van Duin, ASTRON (Netherlands)

- 8450 4G **Conceptual phase A design of a cryogenic shutter mechanism for the SAFARI flight instrument** [8450-162]
M. Eigenmann, U. J. Wehmeier, Institute for Astronomy, ETH Zürich (Switzerland);
A. Vuilleumier, G. Messina, RUAG Space AG (Switzerland); M. R. Meyer, Institute for Astronomy, ETH Zürich (Switzerland)
- 8450 4H **Engineering technology development in the UK for HARMONI: an E-ELT first light instrument** [8450-163]
F. Clarke, Univ. of Oxford (United Kingdom); A. Gallie, D. Montgomery, UK Astronomy Technology Ctr., Royal Observatory (United Kingdom); M. Tecza, N. Thatte, Univ. of Oxford (United Kingdom)
- 8450 4I **Frida integral field unit opto-mechanical design** [8450-164]
S. Cuevas, Instituto de Astronomía, Univ. Nacional Autónoma de México (Mexico);
S. S. Eikenberry, Univ. of Florida (United States); V. Bringas, A. Corrales, Ctr. de Ingeniería y Desarrollo Industrial (Mexico); C. Espejo, Instituto de Astronomía, Univ. Nacional Autónoma de México (Mexico); D. Lucero, A. Rodríguez, Ctr. de Ingeniería y Desarrollo Industrial (Mexico); B. Sánchez, Instituto de Astronomía, Univ. Nacional Autónoma de México (Mexico); J. Uribe, Ctr. de Ingeniería y Desarrollo Industrial (Mexico)
- 8450 4J **An alternative design for a metal image slicing IFU for EAGLE** [8450-166]
C. M. Dubbeldam, D. J. Robertson, S. Rolt, R. Talbot, Durham Univ. (United Kingdom)
- 8450 4K **Modeling and structural analysis of honeycomb structure mirror** [8450-167]
Y. Li, Nanjing Institute of Astronomical Optics & Technology (China)
- 8450 4L **CARMENES (III): an innovative and challenging cooling system for an ultra-stable NIR spectrograph** [8450-168]
S. Becerril, Instituto de Astrofísica de Andalucía, CSIC (Spain); J. Lizon, European Southern Observatory (Germany); M. A. Sánchez-Carrasco, Instituto de Astrofísica de Andalucía, CSIC (Spain); E. Mirabet, Instituto de Astrofísica de Andalucía, CSIC (Spain) and European Southern Observatory (Germany); P. Amado, Instituto de Astrofísica de Andalucía, CSIC (Spain); W. Seifert, A. Quirrenbach, H. Mandel, Landessternwarte Heidelberg (Germany); J. A. Caballero, Ctr. de Astrobiología, CSIC, Instituto Nacional de Técnica Aeroespacial (Spain); I. Ribas, Institut de Ciències de l'Espai, CSIC-IEEC (Spain); A. Reiners, Institut für Astrophysik (Germany); M. Abril, R. Antona, C. Cárdenas, R. Morales, D. Pérez, A. Ramón, E. Rodríguez, Instituto de Astrofísica de Andalucía, CSIC (Spain); J. Herranz, Proactive Research & Development, S.L. (Spain)
- 8450 4M **Unintended consequences on vacuum hold time with conversion to PolyCold closed-cycle coolers** [8450-170]
T. Benedict, G. A. Barrick, Canada-France-Hawaii Telescope (United States)

POSTERS: OPTICAL FABRICATION

- 8450 4N **Optimization of the process chain for mirrors made of silicon carbide** [8450-171]
D. Waechter, Fraunhofer Institute for Production Technology (Germany); M. Kroedel, ECM Engineered Ceramic Materials GmbH (Germany); M. Huenten, F. Klocke, Fraunhofer Institute for Production Technology (Germany)

- 8450 4O **Deformation dynamic response test of the active stressed lap based on real-time control system** [8450-172]
Y. Li, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China); Y. Zheng, Nanjing Institute of Astronomical Optics & Technology (China); Y. Wang, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China)
- 8450 4P **ZERODUR for stressed mirror polishing II: improved modeling of the material behavior** [8450-173]
R. Jedamzik, C. Kunisch, T. Westerhoff, SCHOTT AG (Germany); U. Müller, J. Daniel, L-3 Communications Tinsley Labs. Inc. (United States)
- 8450 4Q **Fabrication of the LSST monolithic primary-tertiary mirror** [8450-174]
M. T. Tuell, H. M. Martin, Steward Observatory, The Univ. of Arizona (United States); J. H. Burge, Steward Observatory and College of Optical Sciences, The Univ. of Arizona (United States); D. A. Ketelsen, K. Law, Steward Observatory, The Univ. of Arizona (United States); W. J. Gressler, National Optical Astronomy Observatory (United States); C. Zhao, College of Optical Sciences, The Univ. of Arizona (United States)
- 8450 4R **Accomplished the task of production of primary and secondary mirrors of Devasthal Optical Telescope under the project ARIES (India, Belgium, Russia): fabrication features** [8450-176]
A. P. Semenov, Lytkarino Optical Glass Factory JSC (Russian Federation)
- 8450 4S **Methods of testing of large-size convex secondary mirrors with diameter up to 4m** [8450-178]
M. A. Abdulkadyrov, Lytkarino Optical Glass Factory JSC (Russian Federation)
- 8450 4T **Methods of fabrication and testing of unique large-size optics in LZOS, JSC (VST, VISTA and other projects)** [8450-179]
A. P. Semenov, M. A. Abdulkadyrov, S. P. Belousov, V. E. Patrikeev, V. V. Pridnya, Lytkarino Optical Glass Factory JSC (Russian Federation)
- 8450 4V **Diamond milling of metal mirrors with optical surface quality** [8450-181]
C. Iserlohe, A. Eckart, C. Straubmeier, D. Moratschke, Univ. zu Köln (Germany); B. Brandl, Sterrewacht Leiden (Netherlands)
- 8450 4X **Manufacturing and testing of a convex aspherical mirror for ASSIST** [8450-183]
R. ter Horst, ASTRON (Netherlands); R. Stuik, Leiden Observatory, Leiden Univ. (Netherlands)
- 8450 4Z **Development of testing convex hyperbolic mirror using Hindle method based on stitching technology** [8450-185]
Z. Jiang, X. Li, B. Ji, Nanjing Institute of Astronomical Optics & Technology (China)
- 8450 50 **Game-changing approaches to affordable advanced lightweight mirrors II: new cases analyzed for extreme ZERODUR lightweighting and relief from the classical polishing parameter constraint** [8450-186]
T. Hull, L-3 Integrated Optical Systems (United States); T. Westerhoff, SCHOTT AG (Germany); J. W. Pepi, L-3 Integrated Optical Systems (United States); R. Jedamzik, SCHOTT AG (Germany); G. J. Gardopee, F. Piché, A. R. Clarkson, L-3 Integrated Optical Systems (United States); A. Leys, SCHOTT North America, Inc. (United States); M. Schaefer, SCHOTT AG (Germany); V. Seibert, SCHOTT North America, Inc. (United States)

- 8450 51 **Development of high-throughput silicon lens and grism with moth-eye antireflection structure for mid-infrared astronomy** [8450-187]
T. Kamizuka, T. Miyata, S. Sako, Institute of Astronomy, The Univ. of Tokyo (Japan); H. Imada, Univ. of Tsukuba (Japan); T. Nakamura, The Univ. of Tokyo (Japan); K. Asano, M. Uchiyama, K. Okada, Institute of Astronomy, The Univ. of Tokyo (Japan); T. Wada, T. Nakagawa, Institute of Space and Astronomical Science, Japan Aerospace Exploration Agency (Japan); T. Onaka, I. Sakon, The Univ. of Tokyo (Japan)
- 8450 52 **Development of full shell foil x-ray mirrors** [8450-189]
E. Balsamo, Univ. of Maryland, Baltimore County (United States) and CRESST (United States); K. C. Gendreau, NASA Goddard Space Flight Ctr. (United States); Z. Arzoumanian, NASA Goddard Space Flight Ctr. (United States) and CRESST (United States) and Universities Space Research Association (United States); L. Jalota, Univ. of Maryland, Baltimore County (United States) and CRESST (United States); S. J. Kenyon, NASA Goddard Space Flight Ctr. (United States); D. Fickau, Mechanical Systems Engineering Services (United States) and NASA Goddard Space Flight Center (United States) and Stinger Ghaffarian Technologies, Inc. (United States); N. Spartana, Mechanical Systems Engineering Services (United States) and CRESST (United States) and Stinger Ghaffarian Technologies, Inc. (United States); D. Hahne, Bastion Technologies, Inc. (United States) and NASA Goddard Space Flight Ctr. (United States); R. Koenecke, NASA Goddard Space Flight Ctr. (United States); Y. Soong, NASA Goddard Space Flight Ctr. (United States) and CRESST (United States) and Universities Space Research Association (United States); P. Serlemitsos, T. Okajima, NASA Goddard Space Flight Ctr. (United States); R. Campion, Thomas Jefferson High School for Science and Technology (United States); L. Detweiler, The Univ. of Alabama in Huntsville (United States)

POSTERS: TEST AND METROLOGY

- 8450 53 **New modelling of freeform surfaces for optical design of astronomical instruments** [8450-30]
S. Pascal, M. Gray, S. Vives, D. Le Mignant, M. Ferrari, J.-G. Cuby, K. Dohlen, Lab. d'Astrophysique de Marseille, CNRS, Aix-Marseille Univ. (France)
- 8450 55 **Image moment-based wavefront sensing for in-situ full-field image quality assessment** [8450-191]
H. Lee, G. J. Hill, McDonald Observatory, The Univ. of Texas at Austin (United States)
- 8450 57 **MAPS: where have the robots got to? (Best Poster Presentation)** [8450-194]
W. D. Taylor, UK Astronomy Technology Ctr. (United Kingdom) and Institute of Astronomy, Royal Observatory (United Kingdom); H. Schnetler, Institute for Astronomy, Royal Observatory (United Kingdom); W. A. Cochrane, UK Astronomy Technology Ctr., Royal Observatory (United Kingdom) and Heriot Watt Univ. (United States); M. Black, S. A. McLay, UK Astronomy Technology Ctr., Royal Observatory (United Kingdom)
- 8450 58 **The optical alignment of the Gemini planet imager adaptive optics bench** [8450-195]
J. Pazder, National Research Council Canada (Canada) and Herzberg Institute of Astrophysics (Canada); B. Bauman, Lawrence Livermore National Lab. (United States); D. Dillon, Lick Observatory, Univ. of California, Santa Cruz (United States); M. Fletcher, National Research Council Canada (Canada) and Herzberg Institute of Astrophysics (Canada); J. Lacoursière, Consultant (Canada); V. Reshetov, National Research Council Canada (Canada) and Herzberg Institute of Astrophysics (Canada)

- 8450 59 **4DAD: a device to align angularly and laterally a high-power laser using a conventional sighting telescope as metrology** [8450-196]
C. Dupuy, T. Pfrommer, D. Bonaccini Calia, European Southern Observatory (Germany)
- 8450 5A **Finite element simulation in fabrication of high-precision reflector panels** [8450-197]
L. Yan, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (United States); Y. Chen, Nanjing Institute of Astronomical Optics & Technology (China)
- 8450 5B **Research on large aperture telescope drive control technology** [8450-198]
X. Li, D. Wang, Nanjing Institute of Astronomical Optics & Technology (China); X. Song, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China); C. Ren, Z. Zhang, Nanjing Institute of Astronomical Optics & Technology (China)
- 8450 5C **Design and control of one precise tracking simulation bed for Chinese 20/30 meter optic/infrared telescope** [8450-199]
C. Ren, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China); X. Li, Nanjing Institute of Astronomical Optics & Technology (China); X. Song, Y. Niu, A. Li, Z. Zhang, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China)

POSTERS: ACTIVE INSTRUMENTS

- 8450 5D **Potential of phase-diversity for metrology of active instruments** [8450-200]
V. Korkiakoski, Leiden Observatory (Netherlands); L. Venema, T. Agocs, ASTRON (Netherlands); C. U. Keller, Leiden Observatory (Netherlands); N. Doelman, TNO (Netherlands); R. Fraanje, R. Andrei, M. Verhaegen, Delft Ctr. for Systems and Control (Netherlands)
- 8450 5E **Control system for 6 degree of freedom electric platform of sub-mirror in the giant telescope** [8450-201]
A. Li, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China); H. Wang, Y. Wang, D. Yang, Z. Zhang, Nanjing Institute of Astronomical Optics & Technology (China)
- 8450 5F **Optimizing optical systems with active components** [8450-202]
T. Agócs, ASTRON (Netherlands); L. Venema, V. Korkiakoski, Leiden Observatory (Netherlands); G. Kroes, ASTRON (Netherlands)
- 8450 5G **Design and test of a novel cost-effective piezo driven actuator with a two-stage flexure amplifier for chopping mirrors** [8450-203]
Q. Wu, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China); D. Yang, Nanjing Institute of Astronomical Optics & Technology (China); A. Li, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China); G. Zhou, Nanjing Institute of Astronomical Optics & Technology (China); B. Yang, Shanghai Jiao Tong Univ. (China)
- 8450 5H **Research of active optics force actuator based on voice coil motor** [8450-204]
Y. Gu, Z. Chen, Y. Jin, C. Zhai, Univ. of Science and Technology of China (China)

- 8450 5I **Extinction controlled adaptive mask coronagraph Lyot and phase mask dual concept for wide extinction area** [8450-205]
P. Bourget, N. Schuhler, D. Mawet, P. Haguenauer, J. Girard, F. Gonté, European Southern Observatory (Chile)
- 8450 5K **Analog front end board electronics proposal for the HAWC Observatory** [8450-207]
A. Bernal, Instituto de Astronomía, Univ. Nacional Autónoma de México (Mexico)
- 8450 5L **ELENA MCP detector: absolute detection efficiency for low-energy neutral atoms** [8450-208]
R. Rispoli, E. De Angelis, L. Colasanti, N. Vertolli, S. Orsini, INAF - Istituto di Astrofisica e Planetologia Spaziali di Roma (Italy); J. A. Scheer, Univ. of Bern (Switzerland); A. Mura, A. Milillo, INAF - Istituto di Astrofisica e Planetologia Spaziali di Roma (Italy); P. Wurz, Univ. of Bern (Switzerland); S. Selci, Istituto dei Sistemi Complessi, CNR (Italy); A. M. Di Lellis, AMDL srl (Italy); R. Leoni, Istituto di Fotonica e Nanotecnologie, CNR (Italy); M. D'Alessandro, Istituto dei Sistemi Complessi, CNR (Italy); F. Mattioli, S. Cibella, Istituto di Fotonica e Nanotecnologie, CNR (Italy)
- 8450 5N **Synchronous control design for active surface of radio telescope** [8450-210]
D. Wang, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate School of the Chinese Academy of Sciences (China); Z. Zhang, Nanjing Institute of Astronomical Optics & Technology (China); X. Song, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate School of the Chinese Academy of Sciences (China)
- 8450 5O **New technologies and new performances of the JCMT radio-telescope: a preliminary design study** [8450-211]
S. Mian, S. De Lorenzi, L. Ghedin, F. Rampini, G. Marchiori, European Industrial Engineering s.r.l. (Italy); S. Craig, Advanced Technology Solar Telescope (United States)
- 8450 5P **A smart car for the surface shape measurement of large antenna based on laser tracker** [8450-212]
Y. Gu, J. Hu, Y. Jin, C. Zhai, Univ. of Science and Technology of China (China)
- 8450 5Q **Study on functional integration of the SKA and the solar thermal power system** [8450-213]
Z. Dong, Chongqing Univ. of Science and Technology (China); D. Yang, Y. Zhang, Nanjing Institute of Astronomical Optics & Technology (China); X. Zhou, Southwest Technology and Engineering Research Institute (China)
- 8450 5R **High stability piezomotor driven mirror mounts for LINC-NIRVANA** [8450-216]
A. Bramigk, H. Marth, Physik Instrumente GmbH & Co. KG (Germany); R.-R. Rohloff, Max-Planck-Institut für Astronomie (Germany)

Author Index

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Session Chairs

- 1 Telescope Structures and Domes
Andrew T. Sarawit, Simpson Gumpertz & Heger Inc. (United States)
- 2 Active Structures and Optics
David M. Montgomery, UK Astronomy Technology Centre
(United Kingdom)
- 3 Coronagraphy and High Contrast Imaging
Jinxue Wang, Raytheon Company (United States)

- 4 Test and Metrology I
V. Alfonso Feria, Jet Propulsion Laboratory (United States)
- 5 Test and Metrology II
V. Alfonso Feria, Jet Propulsion Laboratory (United States)
- 6 Test and Metrology III
Eric Ruch, Sagem Défense Sécurité (France)
- 7 Optical Fibers and Waveguides
Eric Prieto, Observatoire Astronomique de Marseille-Provence (France)
- 8 Multi-Object Spectroscopy I
Eric Prieto, Observatoire Astronomique de Marseille-Provence (France)
- 9 Multi-Object Spectroscopy II
David M. Montgomery, UK Astronomy Technology Centre (United Kingdom)
- 10 Slit Spectroscopy, Slicers, and Polarimetry I
Eric Prieto, Observatoire Astronomique de Marseille-Provence (France)
- 11 Slit Spectroscopy, Slicers, and Polarimetry II
Huub Janssen, Janssen Precision Engineering B.V. (Netherlands)
- 12 Slit Spectroscopy, Slicers, and Polarimetry III
Jinxue Wang, Raytheon Company (United States)
- 13a Technologies for Cryogenic Instruments I
Colin R. Cunningham, UK Astronomy Technology Centre (United Kingdom)
- 13b Optical Fabrication I
Roland Geyl, Sagem Défense Sécurité (France)
- 14a Technologies for Cryogenic Instruments II
Huub Janssen, Janssen Precision Engineering B.V. (Netherlands)
- 14b Optical Fabrication II
Peter Hartmann, SCHOTT AG (Germany)
- 15a Coatings and Filters
Roland Geyl, Sagem Défense Sécurité (France)

- 15b Optical Fabrication III
 Peter Hartmann, SCHOTT AG (Germany)
- 16 Gratings
 Colin R. Cunningham, UK Astronomy Technology Centre
 (United Kingdom)
- 17 Revolutionary Technologies
 Ramon Navarro, ASTRON (Netherlands)

Introduction

Ever since the invention of the telescope, new technologies have been used in astronomy to improve observations and to eventually enable better understand our position in the universe.

For almost forty years, SPIE has organized conferences on astronomical telescopes and instrumentation. These events grew to become huge symposia with specialized parallel conferences on all major instrumental areas, such as space- and ground-based telescopes, detectors, interferometers, and adaptive optics. The increasing complexity of astronomical instrumentation resulted in the need for yet another conference dedicated to the enabling technologies. This conference "Modern Technologies in Space- and Ground-based Telescopes and Instrumentation" was held for the first time in 2002 with 47 contributions, as part of the SPIE symposium of several conferences on astronomical telescopes and instrumentation. In 2012 the number of papers has increased to over 200. Six full days were necessary to schedule about half of the submitted contributions for oral presentations, seven days if you take into account the entire day with parallel sessions. The other half of the contributions was presented as posters. Several participants felt rather exhausted after this full conference week. The readers of these proceedings are in a more comfortable position: they can take their time to study the interesting and well written contributions from scientists, engineers and technologists from laboratories all over the world. However, they will of course miss out on the presentations, which often contain additional details and graphs and an increasing number of videos.

This volume documents the completion of the fabrication of the optical components for the James Webb Space Telescope. The test and metrology of these components is just as interesting. The next generation of extremely large ground-based telescopes requires technology development due to the large number of mirror segments. The tendency for the instrumentation for this new generation of telescopes is to become more active. Photonic techniques used in optical fibres and miniaturised mechanisms for positioners allow larger surveys with multi object spectrographs. Spectroscopy benefits from improvements in volume phase holographic gratings and immersed grating techniques. New mechanisms and optical mounts were presented for cryogenic space and ground-based instrumentation. And there is much more to explore in these proceedings.

We hope that the readers find these proceedings exciting, and that they stimulate ideas for their own research.

We look forward to seeing you at the next conference on "Modern Technologies."
in Montreal in the summer of 2014.

Ramón Navarro
Colin Cunningham
Eric Prieto

xxx