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Jet Propulsion Lab. (United States); A. Refregier, J. Amiaux, J.-L. Augueres, O. Boulade,
C. Cara, Service d'Astrophysique, CEA (France); A. Amara, S. Lilly, ETH Zurich (Switzerland);
E. Atad-Etchedgui, The Royal Observatory, Edinburgh (United Kingdom); A.-M. Di Giorgio,
INAF, Istituto di Fisica dello Spazio Interplanetario (Italy); L. Duvet, European Space Research
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- 7731 1L **The E-NIS instrument on-board the ESA Euclid Dark Energy Mission: a general view after
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Osservatorio Astronomico di Brera (Italy); A. Cimatti, Univ. degli Studi di Bologna (Italy);
A. Bianco, INAF, Osservatorio Astronomico di Brera (Italy); C. Bonoli, F. Bortoletto, INAF,
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Spaziale Fisica Cosmica (Italy); R. Content, Durham Univ. (United Kingdom); L. Corcione,
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CNRS (France); P. Leutenegger, Thales Alenia Space (Italy); S. Ligi, INAF, Osservatorio
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P. Spanò, INAF, Osservatorio Astronomico di Brera (Italy); G. Talbot, Durham Univ. (United
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Science and Industry (Netherlands); F. Zamkotsian, Lab. d'Astrophysique de Marseille, CNRS
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- 7731 1N **A 4-meter wide field coronagraph space telescope for general astrophysics and exoplanet observations** [7731-60]
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- 7731 1O **A space imaging concept based on a 4m structured spun-cast borosilicate monolithic primary mirror** [7731-61]
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States); S. Golwala, California Institute of Technology (United States); K. Gorski, Jet Propulsion Lab. (United States) and California Institute of Technology (United States); S. Hanany, Univ. of Minnesota, Minneapolis (United States); W. Holmes, Jet Propulsion Lab. (United States); K. Irwin, National Institute of Standards and Technology (United States); B. Keating, Univ. of California, San Diego (United States); C.-L. Kuo, Stanford Univ. (United States); A. Lee, Univ. of California, Berkeley (United States); A. Lange, California Institute of Technology (United States) and Jet Propulsion Lab. (United States); C. Lawrence, Jet Propulsion Lab. (United States); S. Meyer, The Univ. of Chicago (United States); N. Miller, Univ. of California, San Diego (United States); H. Nguyen, Jet Propulsion Lab. (United States); E. Pierpaoli, The Univ. of Southern California (United States); N. Ponthieu, J.-L. Puget, Institut d'Astrophysique Spatiale (France); J. Raab, Northrop Grumman Aerospace Systems (United States); P. Richards, Univ. of California, Berkeley (United States); C. Satter, M. Seiffert, Jet Propulsion Lab. (United States); M. Shimon, Univ. of California, San Diego (United States); B. Williams, Jet Propulsion Lab. (United States); J. Zmuidzinas, California Institute of Technology (United States) and Jet Propulsion Lab. (United States)

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- 7731 1T **LEGOLAS: localizing evidence of gravitational waves by observations of light source astrometric signature** [7731-66]
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- 7731 1X **Optical design and performance of MIRIS near-infrared camera** [7731-166]
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- 7731 1Y **Development of mechanical structure for the compact space IR camera MIRIS** [7731-167]
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- 7731 1Z **The design and capabilities of the EXIST optical and infra-red telescope (IRT)** [7731-70]
A. S. Kuttyrev, Univ. of Maryland, College Park (United States) and NASA Goddard Space Flight Ctr. (United States); S. H. Moseley, NASA Goddard Space Flight Ctr. (United States); C. Golisano, ITT Corp. (United States); Q. Gong, NASA Goddard Space Flight Ctr. (United States); B. T. Allen, Harvard-Smithsonian Ctr. for Astrophysics (United States); N. Gehrels, NASA Goddard Space Flight Ctr. (United States); J. E. Grindlay, J. S. Hong, Harvard-Smithsonian Ctr. for Astrophysics (United States); B. E. Woodgate, NASA Goddard Space Flight Ctr. (United States)
- 7731 20 **Actuated hybrid mirrors for space telescopes** [7731-71]
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- 7731 21 **Shape correction of thin mirrors in a reconfigurable modular space telescope** [7731-72]
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- 7731 25 **THESIS: the terrestrial habitable-zone exoplanet spectroscopy infrared spacecraft** [7731-76]
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- 7731 29 **The pupil mapping exoplanet coronagraphic observer (PECO)** [7731-80]
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- 7731 2A **Optical design of dilute aperture visible nulling coronagraph imaging (DAVINCI)** [7731-81]
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- 7731 2B **Visible nulling coronagraphy testbed development for exoplanet detection** [7731-82]
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- 7731 2C **Single aperture imaging astrometry with a diffracting pupil: application to exoplanet mass measurement with a small coronagraphic space telescope** [7731-83]
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- 7731 2D **Laboratory demonstration of high-contrast imaging at $2 \lambda/D$ on a temperature-stabilized testbed in air** [7731-84]
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- 7731 2E **New Worlds Probe** [7731-85]
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- 7731 2F **Broadband suppression and occulter position sensing at the Princeton occulter testbed** [7731-86]
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- 7731 2G **Error budgeting and tolerancing of starshades for exoplanet detection (Invited Paper)** [7731-87]
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- 7731 2I **Direct imaging and spectroscopy of habitable planets using JWST and a starshade** [7731-89]
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- 7731 2J **Alternative starshade missions** [7731-90]
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- 7731 2K **Science drivers and requirements for an Advanced Technology Large Aperture Space Telescope (ATLAST): implications for technology development and synergies with other future facilities** [7731-91]
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- 7731 2L **Comparative concepts for ATLAST optical designs** [7731-92]
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 (United States); M. R. Bolcar, J. G. Budinoff, B. H. Dean, M. C. Clampin, NASA Goddard
 Space Flight Ctr. (United States); D. C. Ebbets, Ball Aerospace & Technologies Corp. (United
 States); Q. Gong, T. R. Gull, J. M. Howard, A. L. Jones, R. G. Lyon, B. A. Pasquale, C. Perrygo,
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 Astronomical Institute, Univ. of Groningen (Netherlands); A. Cassatella, European Space
 Astronomy Ctr. (Spain); M. Cohen, Radio Astronomy Lab., Univ. of California, Berkeley
 (United States); N. Cox, European Space Astronomy Ctr. (Spain); E. Figueredo, The Open
 Univ. (United Kingdom) and Univ. of Sao Paulo (Brazil); H. Fujiwara, N. Ikeda, Japan
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 Korea Astronomy and Space Science Institute (Korea, Republic of); H. Kataza, Japan
 Aerospace Exploration Agency (Japan); D. Kester, SRON National Institute for Space
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 Japan Aerospace Exploration Agency (Japan); T. G. Mueller, Max-Planck-Institut für
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 Agency (Japan); S. H. Oh, Seoul National Univ. (Korea, Republic of) and National Institute of
 Mathematical Sciences (Korea, Republic of); S. Oliver, Astronomy Ctr., Univ. of Sussex
 (United Kingdom); C. Pearson, Rutherford Appleton Lab. (United Kingdom) and Univ. of
 Lethbridge (Canada); N. Rahman, Astronomy Ctr., Univ. of Sussex (United Kingdom) and
 Univ. of Maryland, College Park (United States); M. Rowan-Robinson, Imperial College of
 Science Technology and Medicine (United Kingdom); A. Salama, European Space
 Astronomy Ctr. (Spain); R. Savage, Astronomy Ctr., Univ. of Sussex (United Kingdom) and
 Univ. of Warwick (United Kingdom); S. Serjeant, The Open Univ. (United Kingdom);
 G. J. White, The Open Univ. (United Kingdom) and Rutherford Appleton Lab. (United
 Kingdom); C. Yamauchi, Japan Aerospace Exploration Agency (Japan)

POSTER SESSION: ATLAST

- 7731 2Q **Spacecraft conceptual design for the 8-meter Advanced Technology Large Aperture Space Telescope (ATLAST)** [7731-96]
R. C. Hopkins, NASA Marshall Space Flight Ctr. (United States); P. Capizzo, Raytheon, NASA Marshall Space Flight Ctr. (United States); S. Fincher, L. S. Hornsby, D. Jones, NASA Marshall Space Flight Ctr. (United States); G. Mosier, NASA Goddard Space Flight Ctr. (United States); H. P. Stahl, D. Thomas, K. S. Thompson, NASA Marshall Space Flight Ctr. (United States)
- 7731 2R **Thermal analysis of the Advanced Technology Large Aperture Space Telescope (ATLAST) 8-meter primary mirror** [7731-97]
L. Hornsby, R. C. Hopkins, H. P. Stahl, NASA Marshall Space Flight Ctr. (United States)
- 7731 2S **Coronagraphic wavefront control for the ATLAST 9.2m telescope** [7731-98]
R. G. Lyon, W. R. Oegerle, L. D. Feinberg, M. R. Bolcar, B. H. Dean, G. E. Mosier, NASA Goddard Space Flight Ctr. (United States); M. Postman, Space Telescope Science Institute (United States)

POSTER SESSION: EUCLID

- 7731 2T **Euclid ENIS spectrograph focal-plane design** [7731-99]
F. Bortoletto, C. Bonoli, M. D'Alessandro, E. Giro, INAF, Osservatorio Astronomico di Padova (Italy); V. De Caprio, INAF-IASF Milano (Italy); L. Corcione, S. Ligori, INAF, Osservatorio Astronomico di Torino (Italy); G. Morgante, INAF-IASF Bologna (Italy)
- 7731 2U **A frame simulator for data produced by multi-accumulation readout detectors** [7731-100]
C. Bonoli, F. Bortoletto, E. Giro, INAF, Osservatorio Astronomico di Padova (Italy); L. Corcione, S. Ligori, INAF, Osservatorio Astronomico di Torino (Italy); L. Nicastro, INAF-IASF Bologna (Italy)
- 7731 2V **The Euclid near-infrared calibration source** [7731-101]
R. Holmes, P. Bizenberger, O. Krause, Max-Planck-Institut für Astronomie (Germany); M. Schweitzer, Max-Planck-Institut für extraterrestrische Physik (Germany); A. M. Glauser, ETH Zurich (Switzerland) and UK Astronomy Technology Ctr. (United Kingdom)
- 7731 2W **The data handling unit of the Euclid imaging channels: from the observational requirements to the unit architecture** [7731-102]
A. M. Di Giorgio, INAF, Istituto di Fisica dello Spazio Interplanetario (Italy); P. H. Leutenegger, A. Bonati, Thales Alenia Space Italia S.p.A. (Italy); R. Scaramella, Osservatorio Astronomico di Roma (Italy); A. Refregier, J. Amiaux, C. Cara, J.-L. Augeres, Service d'Astrophysique, CEA (France); M. Schweitzer, Max-Planck-Institut für extraterrestrische Physik (Germany)
- 7731 2X **The ground support equipment for the E-NIS instrument on-board the ESA-Euclid Dark Energy Mission in the baseline configuration presented in phase A** [7731-103]
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- 7731 2Y **EUCLID: design of the prism DMD NIR spectrograph** [7731-104]
R. Content, R. M. Sharples, S. Blake, R. G. Talbot, Durham Univ. (United Kingdom)

- 7731 27 **Opto-mechanical design of a DMD multislit spectrograph for the ESA Euclid Mission** [7731-105]
R. Grange, F. Zamkotsian, L. Martin, T. Pamplona, O. Le Fevre, Lab. d'Astrophysique de Marseille (France); L. Valenziano, INAF, Istituto Astrofisica Spaziale Fisica Cosmica (Italy); F. M. Zerbi, INAF, Osservatorio Astronomico di Brera (Italy); A. Cimatti, Osservatorio Astrofisico di Arcetri (Italy)
- 7731 30 **Space evaluation of 2048x1080 mirrors DMD chip for ESA's EUCLID Mission** [7731-106]
F. Zamkotsian, P. Lanzoni, E. Grassi, R. Barette, C. Fabron, Lab. d'Astrophysique de Marseille, CNRS (France); K. Tangen, Visitech AS (Norway); L. Valenziano, INAF, Istituto Astrofisica Spaziale Fisica Cosmica (Italy); L. Marchand, L. Duvet, European Space Agency (Netherlands)

POSTER SESSION: GAIA

- 7731 31 **Astrometric instrument model software tool for Gaia data reduction: challenges and implementation** [7731-107]
D. Busonero, F. Russo, D. Loreggia, A. Riva, D. Bonino, L. Corcione, M. Gai, M. G. Lattanzi, INAF, Osservatorio Astronomico di Torino (Italy)
- 7731 32 **Towards a demonstrator for autonomous object detection on board Gaia** [7731-108]
S. Mignot, Observatoire de Paris (France)
- 7731 33 **Monitoring, diagnostic, and calibration of the Gaia astrometric instrument response within the astrometric verification unit** [7731-109]
D. Busonero, M. Gai, M. G. Lattanzi, INAF, Osservatorio Astronomico di Torino (Italy)

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- 7731 34 **The data processing pipelines for the Herschel/SPIRE imaging Fourier transform spectrometer** [7731-110]
T. R. Fulton, Blue Sky Spectroscopy Inc. (Canada); J.-P. Baluteau, Lab. d'Astrophysique de Marseille (France); G. Bendo, Imperial College London (United Kingdom); D. Benielli, Lab. d'Astrophysique de Marseille (France); R. Gastaud, Lab. AIM, CEA Saclay (France); M. Griffin, Cardiff Univ. (United Kingdom); S. Guest, Rutherford Appleton Lab. (United Kingdom); P. Imhof, Blue Sky Spectroscopy Inc. (Canada); T. L. Lim, Rutherford Appleton Lab. (United Kingdom); N. Lu, California Institute of Technology (United States); D. A. Naylor, Institute for Space Imaging Science, Univ. of Lethbridge (Canada); P. Panuzzo, Lab. AIM, CEA Saclay (France); E. Polehampton, Rutherford Appleton Lab. (United Kingdom) and Institute for Space Imaging Science, Univ. of Lethbridge (Canada); A. Schwartz, California Institute of Technology (United States); C. Surace, Lab. d'Astrophysique de Marseille (France); B. M. Swinyard, Rutherford Appleton Lab. (United Kingdom); K. Xu, California Institute of Technology (United States)
- 7731 35 **In-flight characterisation of Herschel-SPIRE optical performances** [7731-111]
M. Ferlet, Rutherford Appleton Lab. (United Kingdom)

- 7731 36 **Status of the SPIRE photometer data processing pipelines during the early phases of the Herschel Mission** [7731-112]
C. D. Dowell, Jet Propulsion Lab. (United States); M. Pohlen, Cardiff Univ. (United Kingdom) and Rutherford Appleton Lab. (United Kingdom); C. Pearson, Rutherford Appleton Lab. (United Kingdom) and Institute for Space Imaging Science, Univ. of Lethbridge (United Kingdom); M. Griffin, Cardiff Univ. (United Kingdom); T. Lim, Rutherford Appleton Lab. (United Kingdom); G. J. Bendo, Imperial College London (United Kingdom); D. Benielli, Lab. d'Astrophysique de Marseille, CNRS (France); J. J. Bock, Jet Propulsion Lab. (United States); P. Chaniel, Service d'Astrophysique, CEA (France) and Imperial College London (United Kingdom); D. L. Clements, Imperial College London (United Kingdom); L. Conversi, European Space Astronomy Ctr. (Spain); M. Ferlet, Rutherford Appleton Lab. (United Kingdom); T. Fulton, Blue Sky Spectroscopy Inc. (Canada); R. Gastaud, Service d'Astrophysique, CEA (France); J. Glenn, Univ. of Colorado at Boulder (United States); T. Grundy, S. Guest, K. J. King, S. J. Leeks, Rutherford Appleton Lab. (United Kingdom); L. Levenson, California Institute of Technology (United States); N. Lu, NASA Herschel Science Ctr. (United States); H. Morris, Rutherford Appleton Lab. (United Kingdom); H. Nguyen, Jet Propulsion Lab. (United States); B. O'Halloran, Imperial College London (United Kingdom); S. Oliver, Astronomy Ctr., Univ. of Sussex (United Kingdom); P. Panuzzo, Service d'Astrophysique, CEA (France); A. Papageorgiou, Cardiff Univ. (United Kingdom); E. Polehampton, Rutherford Appleton Lab. (United Kingdom) and Institute for Space Imaging Science, Univ. of Lethbridge (United Kingdom); D. Rigopoulou, Rutherford Appleton Lab. (United Kingdom); H. Roussel, Institut d'Astrophysique de Paris, CNRS, Univ. Pierre et Marie Curie (France); N. Schneider, Service d'Astrophysique, CEA (France); B. Schulz, A. Schwartz, D. L. Shupe, NASA Herschel Science Ctr. (United States); B. Sibthorpe, UK Astronomy Technology Ctr. (United Kingdom); S. Sidher, Rutherford Appleton Lab. (United Kingdom); A. J. Smith, Astronomy Ctr., Univ. of Sussex (United Kingdom); B. M. Swinyard, Rutherford Appleton Lab. (United Kingdom); M. Trichas, Imperial College London (United Kingdom); I. Valtchanov, European Space Astronomy Ctr. (Spain); A. L. Woodcraft, Institute for Astronomy, Univ. of Edinburgh (United Kingdom); C. K. Xu, L. Zhang, NASA Herschel Science Ctr. (United States)

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- 7731 38 **WFC3 detectors: on-orbit performance** [7731-113]
S. M. Baggett, J. W. MacKenty, Space Telescope Science Institute (United States); R. A. Kimble, NASA Goddard Space Flight Ctr. (United States); T. Borders, B. Hilbert, S. Deustua, V. Kozhurina-Platais, K. S. Long, A. Riess, R. Gilliland, Space Telescope Science Institute (United States); R. J. Hill, Conceptual Analytics, LLC (United States); J. Kalirai, Space Telescope Science Institute (United States)
- 7731 39 **Commissioning of the cosmic origins spectrograph on the Hubble Space Telescope: an overview of COS servicing mission observatory verification** [7731-114]
D. J. Sahnou, The Johns Hopkins Univ. (United States); C. D. Keyes, T. B. Ake, A. Aloisi, Space Telescope Science Institute (United States); S. Béland, Univ. of Colorado at Boulder (United States); C. P. Biagetti, Space Telescope Science Institute (United States); E. B. Burgh, Univ. of Colorado at Boulder (United States); G. Chapman, Space Telescope Science Institute (United States); T. Delker, Ball Aerospace & Technologies Corp. (United States); K. France, Univ. of Colorado at Boulder (United States); S. D. Friedman, Space Telescope Science Institute (United States); C. S. Froning, Univ. of Colorado at Boulder (United States); P. Ghavamian, P. Goudfrooij, Space Telescope Science Institute (United States); J. C. Green, Univ. of Colorado at Boulder (United States); G. F. Hartig, P. E. Hodge, D. Lennon, D. Massa, Space Telescope Science Institute (United States); J. B. McPhate,

Space Sciences Lab., Univ. of California, Berkeley (United States); S.-M. Niemi, C. Oliveira, R. Osten, Space Telescope Science Institute (United States); S. N. Osterman, S. V. Penton, Univ. of Colorado at Boulder (United States); M. Reinhart, B. Shaw, T. E. Smith, D. R. Soderblom, A. Welty, T. P. Wheeler, B. R. York, Space Telescope Science Institute (United States); W. Zheng, The Johns Hopkins Univ. (United States)

7731 3A **HST/WFC3 in-orbit grism performance** [7731-115]

H. Kuntschner, European Southern Observatory (Germany); H. Bushouse, Space Telescope Science Institute (United States); M. Kümmel, J. R. Walsh, European Southern Observatory (Germany); J. MacKenty, Space Telescope Science Institute (United States)

7731 3B **Monitoring of the wavelength calibration lamps for the Hubble Space Telescope** [7731-116]

I. Pascucci, Space Telescope Science Institute (United States) and The Johns Hopkins Univ. (United States); C. Proffitt, Space Telescope Science Institute (United States) and Computer Sciences Corp. (United States); P. Ghavamian, Space Telescope Science Institute (United States); D. Sahnou, Space Telescope Science Institute (United States) and The Johns Hopkins Univ. (United States); C. Oliveira, A. Aloisi, T. Keyes, Space Telescope Science Institute (United States); S. V. Penton, Univ. of Colorado at Boulder (United States)

7731 3C **Persistence and count-rate nonlinearity in the HST WFC3 IR detector** [7731-117]

S. Deustua, K. S. Long, P. McCullough, Space Telescope Science Institute (United States); A. G. Riess, Space Telescope Science Institute (United States) and The Johns Hopkins Univ. (United States); J. MacKenty, Space Telescope Science Institute (United States); R. Kimble, NASA Goddard Space Flight Ctr. (United States); S. M. Baggett, B. Hilbert, Space Telescope Science Institute (United States); R. J. Hill, NASA Goddard Space Flight Ctr. (United States) and Conceptual Analytics, LLC (United States); C. Pavlovsky, L. D. Petro, Space Telescope Science Institute (United States)

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7731 3D **Development and utilization of a point spread function for the Extrasolar Planet Observation and Characterization/Deep Impact Extended Investigation (EPOXI) Mission** [7731-118]

R. K. Barry, NASA Goddard Space Flight Ctr. (United States); D. Lindler, Sigma Space Corp. (United States); L. D. Deming, NASA Goddard Space Flight Ctr. (United States); M. F. A'Hearn, Univ. of Maryland, College Park (United States); S. Ballard, Harvard Univ. (United States); B. Carcich, Cornell Univ. (United States); D. Charbonneau, J. Christiansen, Harvard Univ. (United States); T. Hewagama, NASA Goddard Space Flight Ctr. (United States) and Univ. of Maryland, College Park (United States); L. McFadden, NASA Goddard Space Flight Ctr. (United States); D. Wellnitz, Univ. of Maryland, College Park (United States)

7731 3E **The ring of fire: an internal illumination system for detector sensitivity and filter bandpass characterization** [7731-119]

V. E. Scarpine, S. M. Kent, Fermi National Accelerator Lab. (United States); S. E. Deustua, Space Telescope Science Institute (United States); M. J. Sholl, Lawrence Berkeley National Lab. (United States); S. L. Mufson, Indiana Univ. (United States); M. N. Ott, NASA Goddard Space Flight Ctr. (United States); M. P. Wiesner, Northern Illinois Univ. (United States); B. J. Baptista, Indiana Univ. (United States)

- 7731 3F **Monte Carlo simulations as a tool for radiation damage evaluation** [7731-120]
S. Ligori, A. Riva, INAF, Osservatorio Astronomico di Torino (Italy); M. Mauri, European Organization for Nuclear Research (Switzerland); L. Corcione, INAF, Osservatorio Astronomico di Torino (Italy); F. Bortoletto, C. Bonoli, E. Giro, INAF, Osservatorio Astronomico di Padova (Italy)

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- 7731 3G **An attitude control testbed for JDEM** [7731-123]
K. Reil, A. Roodman, Kavli Institute for Particle Astrophysics and Cosmology, SLAC National Accelerator Lab. (United States); M. Sholl, Space Sciences Lab., Univ. of California, Berkeley (United States)
- 7731 3H **A simple optical design for a space Dark Energy Mission** [7731-124]
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- 7731 3I **ACCESS: design and preliminary performance** [7731-184]
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Part Three

POSTER SESSION: JWST

- 7731 3J **The JWST/NIRCam coronagraph flight occulters** [7731-125]
J. E. Krist, K. Balasubramanian, R. E. Muller, S. B. Shaklan, Jet Propulsion Lab. (United States); D. M. Kelly, Steward Observatory, The Univ. of Arizona (United States); D. W. Wilson, C. A. Beichman, E. Serabyn, Jet Propulsion Lab. (United States); Y. Mao, Lockheed Martin Space Systems Co. (United States); P. M. Echternach, J. T. Trauger, K. M. Liewer, Jet Propulsion Lab. (United States)
- 7731 3K **Simulation and image reconstruction of IFU-spectrometer data from JWST-MIRI** [7731-126]
A. M. Glauser, Institute for Astronomy, ETH Zürich (Switzerland) and UK Astronomy Technology Ctr. (United Kingdom); A. Glasse, UK Astronomy Technology Ctr. (United Kingdom); J. E. Morrison, Steward Observatory, The Univ. of Arizona (United States); B. D. Kelly, M. Wells, UK Astronomy Technology Ctr. (United Kingdom); F. Lahuis, SRON Netherlands Institute for Space Research (Netherlands) and Leiden Observatory, Leiden Univ. (Netherlands); G. S. Wright, UK Astronomy Technology Ctr. (United Kingdom)

- 7731 3L **Characterization of the tunable filter imager etalon on the JWST Fine Guidance Sensor** [7731-127]
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- 7731 3M **Compared sensitivities of VLT, JWST and ELT for direct exoplanet detection in nearby stellar moving groups** [7731-128]
C. Hanot, O. Absil, J. Surdej, Institut d'Astrophysique et de Géophysique, Univ. de Liège (Belgium); A. Boccaletti, LESIA, Observatoire de Paris à Meudon (France); C. Vérinaud, Lab. d'Astrophysique de l'Observatoire de Grenoble (France)
- 7731 3N **Performance verification of the MIRI imager flight model at CEA** [7731-129]
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- 7731 3O **OGSE telescope WFE testing at 30K** [7731-130]
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- 7731 3P **Optical wavefront characterization using phase retrieval for the NIRSpec demonstration model for the James Webb Space Telescope** [7731-131]
J. S. Smith, D. L. Aronstein, P. S. Davila, B. H. Dean, NASA Goddard Space Flight Ctr. (United States); B. Dörner, CRAL, Observatoire de Lyon (France); X. Gnata, M. Melf, J.-F. Pittet, EADS Astrium GmbH (Germany); M. B. Te Plate, European Space Research and Technology Ctr. (Netherlands)
- 7731 3Q **Wavelength calibration of the JWST-MIRI medium resolution spectrometer** [7731-132]
J. R. Martínez-Galarza, Leiden Observatory, Leiden Univ. (Netherlands); A. M. Glauser, Institute of Astronomy, ETH Zurich (Switzerland) and UK Astronomy Technology Ctr. (United Kingdom); A. Hernán-Caballero, R. Azzollini, Consejo Superior de Investigaciones Científicas (Spain); A. Glasse, UK Astronomy Technology Ctr. (United Kingdom); S. Kendrew, B. Brandl, Leiden Observatory, Leiden Univ. (Netherlands); F. Lahuis, SRON Netherlands Institute for Space Research (Netherlands)
- 7731 3R **Speckle differential imagery performance using a JWST tunable filter etalon prototype** [7731-134]
P. Ingraham, R. Doyon, M. Beaulieu, Univ. de Montréal (Canada); N. Rowlands, A. Scott, COM DEV Canada (Canada)
- 7731 3S **MIRI-JWST spectrometer main optics flight model realization and performance test results** [7731-135]
G. Kroes, A. Oudenhuysen, M. de Haan, ASTRON (Netherlands) and NOVA (Netherlands); R. Jager, NOVA (Netherlands); E. Pauwels, Pi Environments B.V. (Netherlands)

- 7731 3T **Use of a pathfinder optical telescope element for James Webb Space Telescope risk mitigation** [7731-136]
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- 7731 3U **Applying the tool: stray light cross-checks of the James Webb Space Telescope** [7731-138]
D. L. Skelton, Sigma Space Corp. (United States)
- 7731 3V **Manufacturing and integration status of the JWST OSIM optical simulator** [7731-139]
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- 7731 3W **Planetary system and star formation science with non-redundant masking on JWST** [7731-140]
A. Sivaramakrishnan, American Museum of Natural History (United States); D. Lafrenière, Univ. de Montréal (Canada); P. G. Tuthill, M. J. Ireland, The Univ. of Sydney (Australia); J. P. Lloyd, Cornell Univ. (United States); F. Martinache, Subaru Telescope, National Astronomical Observatory of Japan (United States); R. B. Makidon, R. Soummer, Space Telescope Science Institute (United States); R. Doyon, M. Beaulieu, Univ. de Montréal (Canada); S. Parmentier, Stony Brook Univ. (United States); C. A. Beichman, NASA ExoPlanet Science Institute, California Institute of Technology (United States)

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- 7731 3X **Development and tests of interferometry facility in 6-m diameter radiometer thermal vacuum chamber in Tsukuba Space Center** [7731-142]
M. Suganuma, H. Katayama, M. Naitoh, T. Imai, M. Miyamoto, K. Maruyama, Japan Aerospace Exploration Agency (Japan); H. Kaneda, Nagoya Univ. (Japan); Y. Tange, T. Nakagawa, Japan Aerospace Exploration Agency (Japan)
- 7731 3Y **ZERODUR 8m mirror for space telescope** [7731-143]
P. Hartmann, T. Westerhoff, R. Reiter, R. Jedamzik, V. Wittmer, H. Kohlmann, SCHOTT AG (Germany)

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- 7731 3Z **Nano-JASMINE: current status and data output** [7731-144]
Y. Kobayashi, National Astronomical Observatory of Japan (Japan) and The Univ. of Tokyo (Japan); T. Yano, National Astronomical Observatory of Japan (Japan); N. Gouda, National Astronomical Observatory of Japan (Japan) and The Univ. of Tokyo (Japan); Y. Niwa, J. Murooka, The Univ. of Tokyo (Japan); Y. Yamada, Kyoto Univ. (Japan); N. Sako, S. Nakasuka, The Univ. of Tokyo (Japan)

- 7731 41 **CCD centroiding analysis for Nano-JASMINE observation data** [7731-146]
Y. Niwa, T. Yano, H. Araki, N. Gouda, Y. Kobayashi, National Astronomical Observatory of Japan (Japan); Y. Yamada, Kyoto Univ. (Japan); S. Tazawa, H. Hanada, National Astronomical Observatory of Japan (Japan)

POSTER SESSION: SOLAR PLANETARY SCIENCE

- 7731 42 **The telescope and the double Fabry-Pérot interferometer for the ADAHELI solar space mission** [7731-147]
V. Greco, CNR, Istituto Nazionale di Ottica Applicata (Italy); F. Cavallini, INAF, Osservatorio Astrofisico di Arcetri (Italy); F. Berrilli, Univ. degli Studi di Roma Tor Vergata (Italy)
- 7731 43 **The thermo-optical design and experiment research on H α and white light telescope** [7731-148]
Z. Chen, M. Wu, S. Yang, X. Gu, S. Wang, National Astronomical Observatories (China)
- 7731 44 **Simulation of the metrology of the PROBA-3/ASPIICS formation flying solar coronagraph** [7731-149]
F. Stathopoulos, National Technical Univ. of Athens (Greece); A. Antonopoulos, Univ. of Athens (Greece); S. Vives, Lab. d'Astrophysique de Marseille, CNRS, Univ. de Provence (France); L. Damé, LATMOS/IPSL, CNRS, Univ. Versailles St-Quentin (France)
- 7731 45 **The space instrument SODISM and the ground instrument SODISM II** [7731-150]
M. Meftah, M. Meissonnier, A. Irbah, S. Abbaki, LATMOS-IPSL, CNRS/INSU, Univ. Versailles St-Quentin (France); P. Assus, Observatoire de la Côte d'Azur, CNRS (France); E. Bertran, LATMOS-IPSL, CNRS/INSU, Univ. Versailles St-Quentin (France); J. P. Dubois, IAS, CNRS, Univ. Paris 11 (France); E. Ducourt, C. Dufour, J. P. Marcovici, G. Poiet, A. J. Vieau, G. Thuillier, LATMOS-IPSL, CNRS/INSU, Univ. Versailles St-Quentin (France)
- 7731 46 **Stray light analysis and optimization of the ASPIICS/PROBA-3 formation flying solar coronagraph** [7731-151]
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Introduction

This conference continues a SPIE biannual series¹ devoted to space-based astronomical sciences across the spectrum from the optical to the infrared, with occasional excursions into the millimeter wave region. As noted in this year's call for papers, 2010 looks to be a pivotal year for these sciences due particularly to the outcomes of two interrelated selection processes in Europe and the United States:

- Mission selection from the results of the European Space Agency (ESA) Cosmic Vision 2015–2025 Competitive Definition Phase, currently scheduled for 2010–2011 (and already well advanced)
- Recommendations of Astro2010: The Astronomy and Astrophysics Decadal Survey being conducted for the National Aeronautics and Space Administration (NASA) by the National Academy of Sciences and scheduled for release in September 2010.

Implementation of the results of these processes will, of course, be governed by multiple external factors, most importantly including:

- The ongoing global economic crisis, the resultant reduction of available resources, and the shifting personal and national priorities resulting from the crisis
- Possible competition from and/or synergies with the NASA manned exploration infrastructure that is continuing to undergo definition and refinement.

This Introduction is intended to identify and outline some of the most significant discussion threads that can be found in the papers. It does not pretend to follow the conference flow in detail or to summarize all important points found in the presentations. Emphasis is placed on the papers presented orally, but important supporting material was also presented throughout the poster sessions, and many of these manuscripts are also published in these proceedings.

DEVELOPMENT AND ACQUISITION STRATEGIES

The first session of the conference was devoted to papers addressing strategies relating to development of space telescope concepts in general. These specifically included realistic cost analysis; the availability and potential use of new enabling technologies; and possible benefits to be realized from systems designed for on-orbit servicing.

¹ Supplemented during alternate years by a similar but briefer conference at SPIE Optics+Photonics, the annual SPIE summer conference generally held in San Diego.

CURRENT CONSTELLATION

Several sessions were devoted to updating the status and latest results from space telescopes presently in various phases of their operational lives. This was particularly timely, since many of the extant systems have either been launched or have entered new operational phases since the 2008 Marseille conference². To be more specific:

- The Hubble Space Telescope (HST) received Servicing Mission 4 (SM4) in May 2009 that included the installation of two new instruments and repairs to the two other instruments that remained on the telescope, as well as maintenance for the spacecraft itself
- ESA launched the Herschel far infrared observatory³ in May 2009 as well. The vehicle has been successfully checked out and is now fully operational and producing results of great scientific merit
- Earlier in 2009 (March), NASA launched the Kepler observatory to search for transiting exoplanets, and has been rewarded with early and continuing success
- At the time of the conference, the NASA Wide Field Infrared Survey Explorer (WISE) was well into its ten month survey (launch occurred in December 2009) of the infrared sky which will provide a detailed foundation for future observational campaigns, most notably those of the James Webb Space Telescope (see below)
- Finally, results from two IR space telescopes currently operating in their warm modes (i.e., limited to the near-IR due to cryogen depletion) were reported. These telescopes are NASA's Spitzer (launched in 2003) and the Japanese AKARI (launched in 2006).

JAMES WEBB SPACE TELESCOPE (JWST)

JWST is clearly the flagship space telescope acquisition for the coming decade. Scheduled for launch in 2014, its many pieces are beginning to come together, perhaps most spectacularly the Optical Telescope Element (OTE), whose individual segments are completing polishing and testing in readiness for assembly. Several sessions were accordingly devoted to JWST and addressed multiple aspects of the total program, notably:

- Derivation of the science goals for JWST and flowdown to the specifications and design
- An overview of the complete development and acquisition program, including the measurement and testing programs
- A more focused overview of the development and fabrication of the OTE
- Detailed discussions of each of the science instruments as well as the Integrated Science Instrument Module (ISIM) as a whole

² Astronomical Telescopes and Instrumentation 2008: Telescopes and Systems.

³ Along with its companion Planck space telescope.

- Specific, high priority foundational technologies (such as the wavefront sensing and control system) essential to enable the system.

FUTURE SYSTEM POSSIBILITIES

Approximately a third of the conference was devoted to consideration of possible future systems, including their science capabilities, system concepts, instrument designs and expected data output, and foundational technologies. We can expect that these potential systems will become the subjects of intense competition over the next year or two, particularly once the Decadal Survey recommendations have been published. Several thematic threads, mostly based upon significant science problems, are apparent in the papers.

- Planet finding, always with an underlying emphasis upon finding and characterizing terrestrial analogs, was addressed in a number of sessions. Four⁴ principal technical approaches were presented and discussed: astrometric measurements of stellar systems, planetary transits of the parent star, internal coronagraphs for direct viewing of exoplanets, and external occulter using a separate telescope and starshade some tens of thousands of kilometers from the telescope, also for direct viewing. Contributing subsystem technologies and testbeds were also considered, and there was a growing attention to concepts that would enable partial solutions (such as limiting attention to giant planets only, characterization of proto-planetary dust disks, and so on) while staying within severe fiscal constraints
- Investigation of dark energy provided a second area of major emphasis. A number of papers addressed general considerations for a Joint Dark Energy Mission (JDEM), but the majority of papers on this subject were specific to the ESA Euclid mission concept, specifically addressing the science requirements for the mission and the design and capabilities of proposed instruments. In general, concepts under consideration for the JDEM mission include instrumentation capable of addressing all three of the known scientific approaches to the study of dark energy: Baryonic Acoustic Oscillation, Weak Gravitational Lensing, and Type 1A Supernovae
- Two sessions were devoted to infrared astronomy that may be enabled by Japanese development of the Space IR Telescope for Cosmology and Astrophysics (SPICA). As in other cases, these sessions treated the science that could be realized with this observatory, provided an overview of the mission and system concept, and described a possible suite of instruments
- A small number of papers distributed throughout several different sessions⁵ addressed technology and concepts for astrometry. This discipline contributes to almost all astrophysical topics: exoplanet detection and

⁴ Use of a space-based interferometer for planet finding has been considered in the past, but no papers were presented on the topic at this Conference.

⁵ Based upon specific applications of the technology.

mass determination (as noted above), cosmological mass distribution for dark matter and energy studies, and gravitational curvature of light for general relativity studies

- Finally, several papers presented throughout the conference discussed concepts for space telescopes that could be used for general purpose astronomy and astrophysics, notably in infrared spectral regions. These included both small (i.e., meter class apertures) and medium/large (4 meter class) systems, and several papers addressed approaches to increasing the affordability of such systems
- The conference concluded with a session addressing various aspects of the Advanced Technology Large Aperture Telescope (ATLAST) concept for a large UV to Near IR telescope at aperture sizes ranging from 8 meters to 16 meters or larger. Such a large general purpose telescope would have a wide range of possible applications, and would be capable of addressing almost all of the scientific issues discussed during the course of the conference.

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