

# **32nd International Symposium on Space Terahertz Technology (ISSTT 2022)**

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## October 17, 2022 (Monday)

**Venue:** Ruinas de San Francisco Auditorium (Hall)

08:15	<i>Coffee &amp; Registration (30 mins)</i>	
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**Venue:** Ruinas de San Francisco Auditorium

8:45	<b>ISSTT 2022 Opening Remarks &amp; Information</b>	
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**Venue:** Ruinas de San Francisco Auditorium

9:15	<b>Invited Talk I - Dr. Kartik Seth, NASA</b> Chair: <i>Jose V. Siles (NASA Jet Propulsion Laboratory)</i>	
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**Venue:** Ruinas de San Francisco Auditorium

<b>Session I – Instruments &amp; Systems for Future Missions I</b> Chair: <i>Victor Belitski (Chalmers University of Technology)</i>		
09:50	S1.1	“A Direct Up-Conversion G-band Radar Prototype for Atmospheric Measurements” ...1 <b>Raquel R. Monje, NASA Jet Propulsion Laboratory</b>
10:10	S1.2	“MetOp-SG Ice Cloud Imager 183-664 GHz Front-End Receivers Proto-Flight Model Qualification and Acceptance Test Results” ...2 <b>Bertrand Thomas, Radiometer Physics GmbH</b>
10:30	S1.3	“On-Ground Calibration Targets for the Ice Cloud Imager Instrument on the MetOP Second Generation Satellite”...3 <b>Axel Murk, University of Bern</b>
10:50	S1.4	“Highly-Compact Terahertz Spectrometers on Ultra-Small Platforms” ...4 <b>Goutam Chattopadhyay, NASA Jet Propulsion Laboratory</b>

**Venue:** Ruinas de San Francisco Auditorium (Patio)

11:10	<i>Coffee Break (30 mins)</i>	
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Venue: Ruinas de San Francisco Auditorium

<b>Session II – Best Student Paper Competition Finalists</b> Chair: <i>Jeffrey Hesler (Virginia Diodes, Inc.)</i>		
11:40	S2.1	“Optimization of a PID controlled TES detector array for use in an FIR double-Fourier interferometer” ...88 <b>Chris Benson, University of Lethbridge</b>
11:50	S2.2	“The effect of complex dispersion and impedance in the gain of superconducting traveling-wave kinetic inductance parametric amplifiers” ...92 <b>Javier Carrasco, University of Chile</b>
12:00	S2.3	“Gas Analysis with High-Resolution Fabry-Perot spectrometry in the 550-650 GHz Range” ...94 <b>Coralie Elmaleh, Université du Littoral Côte d'Opale</b>
12:10	S2.4	“Design and Characterisation of a 3.5-THz Fundamental Schottky Mixer” ...102 <b>Divya Jayasankar, Chalmers University of Technology</b>
12:20	S2.5	“Experimental characterisation of titanium nitride transmission lines for applications as kinetic inductance travelling wave parametric amplifiers” ...104 <b>Joseph Longden, Chalmers University of Technology</b>
12:30	S2.6	“A Cryogenic Scalable Small-Signal & Noise Model of GaN HEMTs” ...113 <b>Mohamed Aniss Mebarki, University of Chile</b>
12:40	S2.7	“Development of an instantaneous multiband digital 2SB receiver for the 67–116-GHz band” ...117 <b>David Monasterio, University of Chile</b>
12:50	S2.8	“Exploring the Limits of the Tunnel Junction Fabrication Technique for Josephson Junctions TWPA and the Preliminary Characterisation Results” ...120 <b>Javier Navarro Montilla, University of Oxford</b>
13:00	S2.9	“Design, Operation, and Characterization of a Laboratory Spatial-Spectral Fourier Transform Interferometer” ...126 <b>Jeremy Scott, University of Lethbridge</b>
13:10	S2.10	“Preliminary Characterisation of a Compact 240 GHz SIS Dual-Polarisation Receiver for Large Array Applications” ...136 <b>Jakob Wenninger, University of Oxford</b>

Venue: Ruinas de San Francisco Auditorium

<b>Diamond Sponsors Session</b> Chair: <i>Imran Mehdi (NASA Jet Propulsion Laboratory)</i>		
13:20	DS1	Virginia Diodes, Inc.
13:30	DS2	Genera Tecnologías, S.A.
13:40 - 15:00		Launch Break (90 mins)



**Venue:** Ruinas de San Francisco Auditorium

<b>Session III – Terahertz Sources I</b> Chair: <i>Alain Maestrini (NASA Jet Propulsion Laboratory)</i>		
15:00	S3.1	“An Upgrade to the 1.9THz Local Oscillator for the SOFIA GREAT Instrument”...5 <b>Thomas Crowe, Virginia Diodes, Inc.</b>
15:20	S3.2	“Electron Speed Saturation Effects in the Schottky Barrier Diodes Implemented in an 800 – 900 GHz Frequency Tripler”...6 <b>Diego Moro Melgar, ACST GmbH</b>
15:40	S3.3	“High-Power Compact Sources in the 200 - 300 GHz Frequency Range”...7 <b>Verónica Laín Rubio, ACST GmbH</b>
16:00	S3.4	“Ultra-broadband integrated room-temperature Schottky diode based local oscillators for line surveys in the 400-2070 GHz range”...8 <b>José V. Siles, NASA Jet Propulsion Laboratory</b>

**Venue:** Ruinas de San Francisco Auditorium (Patio)

16:20	<i>Coffee Break (30 mins)</i>	
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**Venue:** Ruinas de San Francisco Auditorium

<b>Session IV – Solid State Receivers</b> Chair: <i>Berhanu Bulcha (NASA Goddard Space Flight Center)</i>		
16:50	S4.1	“Terahertz Heterodyne Receiver Frontend Based on SiGe BiCMOS Technology for Space Applications”...9 <b>Nick Rothbart, German Aerospace Center (DLR)</b>
17:10	S4.2	“A Solid-State, Non-Cryogenic Receiver Operating at 2.5THz”...10 <b>Theodore Reck, Virginia Diodes, Inc.</b>
17:30	S4.3	“THz Receivers for Thermospheric Science”...12 <b>Alain Maestrini, NASA Jet Propulsion Laboratory</b>

**Venue:** Teatro Montemar

18:15	Plenary Talk – <b>Dr. John Mather, 2006 Nobel Prize of Physics, NASA</b> <b>“Opening the Infrared Treasure Chest with JWST”...N/A</b> Chair: <i>Paul Goldsmith (NASA Jet Propulsion Laboratory)</i>	
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20:00	<i>Ruta de la Tapa (Scavenger Tapas Night)</i>	
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**Venue:** Café Bar Central

22:00	<i>A Night of Magic</i> <b>Javi Benítez, 2018 FISM World Champion</b>	
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## October 18, 2022 (Tuesday)

**Venue:** Ruinas de San Francisco Auditorium (Hall)

08:30	Coffee & Registration (30 mins)
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**Venue:** Ruinas de San Francisco Auditorium

9:00	<b>Roundtable   Women on Space Terahertz Research</b> <i>Chairs: Martina Wiedner (Observatory of Paris), Kartik Sheth (NASA)</i>
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**Venue:** Ruinas de San Francisco Auditorium

Platinum Sponsors Session		
Chair: <i>Imran Mehdi (NASA Jet Propulsion Laboratory)</i>		
09:30	PS1	ACST
09:35	PS2	Thomas Keating
09:40	PS3	RPG / Rohde & Schwarz

**Venue:** Ruinas de San Francisco Auditorium

Session V – Novel Devices, Technologies & Components		
Chair: <i>Hiroshi Matsuo (National Astronomical Observatory of Japan, NAOJ)</i>		
09:50	S5.1	“Measurement of Transmission Losses of Superconducting Coplanar Waveguide and Microstrip Lines with On-chip Resonators at 2 mm Wavelength”...13 <b>Wenlei Shan, National Astronomical Observatory of Japan (NAOJ)</b>
10:10	S5.2	“A Micromachined 1.37 THz Waveguide-based 2X2 Beam Divider for HEB Detectors”...14 <b>Haotian Zhu, National Space Science Center (CAS)</b>
10:30	S5.3	“A Turnstile Quad-Ridge OMT for Full Octave-Bandwidth Receivers”...16 <b>Doug Henke, NRC Herzberg Astronomy and Astrophysics</b>
10:50	S5.4	“Recent research on (sub)mm-wave OMTs at NAOJ”...18 <b>Alvaro González, National Astronomical Observatory of Japan (NAOJ)</b>

**Venue:** Ruinas de San Francisco Auditorium (Patio)

11:10	Coffee Break (30 mins)
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Venue: Ruinas de San Francisco Auditorium

<b>Session VI – Instruments &amp; Systems for Ground Telescopes</b> Chair: <i>Patricio Mena (NRAO)</i>		
11:40	S6.1	“Results from ALMA Band 2 cryogenic LNA pre-production run” ...20 <b>Sener Türk, Max Planck Institute for Radio Astronomy</b>
12:00	S6.2	“ALMA Band 2 Cold Cartridge Assembly Design” ...21 <b>Victor Belitsky, Chalmers University</b>
12:20	S6.3	“ALMA Band 9 Sideband Separating Upgrade” ...25 <b>Ronald Hesper, Kapteyn Astronomical Institute - University of Groningen</b>
12:40	S6.4	“Status of ALMA Band 6v2 Receiver Development” ...31 <b>Joseph Lambert, National Radio Astronomy Observatory (NRAO)</b>
13:00	S6.5	“16-pixel, 3 mm band, Cryogenic Array Receiver for Users of the Sardinia Observatory (CARUSO)” ...34 <b>Hui Wang, STFC – RAL Space</b>

13:20 - 15:00	<i>Launch Break / LOC &amp; SOC Lunch (100 mins)</i>	
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Venue: Ruinas de San Francisco Auditorium

<b>Session VII – Terahertz Antennas &amp; Optical Components</b> Chair: <i>Heinz-Wilhelm Hübers (German Aerospace Center, DLR)</i>		
15:00	S7.1	“Algorithmic Design of Terahertz Silicon Metaoptics” ...35 <b>Conner Ballew, NASA Jet Propulsion Laboratory</b>
15:20	S7.2	“Optics for the TEMPERA-C polarimetric middle atmosphere temperature sounder” ...36 <b>Roland Albers, Bern University</b>
15:40	S7.3	“Monolithic focal plane array concept for space and ground applications” ...39 <b>Andrey Baryshev, Kapteyn Astronomical Institute (NOVA, RUG)</b>
16:00	S7.4	“3D Printed Submillimeter Reflectors: a New Design and Manufacturing Methodology” ...40 <b>Paul Goldsmith, NASA Jet Propulsion Laboratory</b>

Venue: Ruinas de San Francisco Auditorium (Patio)

16:20	<i>Coffee Break (30 mins)</i>	
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**Venue:** Ruinas de San Francisco Auditorium

<b>Session VIII – Cryogenic Receivers, Mixers &amp; Back-ends</b> Chair: <i>Netty Honingh (University of Cologne)</i>		
16:50	S8.1	“Towards the heterodyne receiver for balloons and SmallSats above 2 THz” ...44 <b>Boris Karasik, NASA Jet Propulsion Laboratory</b>
17:10	S8.2	“Performance analysis of superconductor insulator superconductor mixer for 260 GHz atmospheric window”...45 <b>Andrey Baryshev, Kapteyn Astronomical Institute (NOVA, RUG)</b>
17:30	S8.3	“Low noise, wide band MgB2 hot electron bolometer mixer at 5.3 THz and 20 K” ...46 <b>Behnam Mirzaei, Delft University of Technology</b>
17:50	S8.4	“On embedding of an HEB mixer into a THz photonic integrated circuit”...47 <b>Alexander Shurakov, Moscow Pedagogical State University</b>
18:10	S8.5	“2-18 GHz Ultra-wideband Cryogenic Amplifier with 4 K Noise Temperature” ...48 <b>Isaac López Fernández, Observatorio de Yebes</b>

18:30	<i>Baeza Historic City Center Visit or Olive Oil Museum Visit</i>	
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**Venue:** Plaza de Santa María (in front of the Cathedral)

19:45	<i>Flamenco under the stars with Arcángel, 2018 Latin Grammy Award Winner</i>	
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**Venue:** Hotel Puerta de la Luna

21:15	<i>Conference Banquet</i>	
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## October 19, 2022 (Wednesday)

**Venue:** Palacio de Jabalquinto

09:00	Registration / Poster Session (starts)
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**Venue:** Palacio de Jabalquinto

Poster Session	
Chair: Cecile Jung-Kubiak (NASA Jet Propulsion Laboratory)	
9:00 10:00	Poster Session Presentations (see complete list of poster presentation in the next pages)
10:00	Coffee Break
10:30 11:15	Poster Session Presentations (cont.) (see complete list of poster presentation in the next pages)

**Venue:** Ruinas de San Francisco Auditorium

Session IX – Measurement Techniques		
Chair: Christopher Groppi (Arizona State University)		
11:30	S9.1	“Versatile Radiometric Testbed for the Submillimeter Wave Instrument” ...50 <b>Mikko Kotiranta, University of Bern</b>
11:50	S9.2	“Harmonic phase and amplitude beam characterization of a wideband on-chip spectrometer” ...54 <b>Stephen Yates, SRON</b>
12:10	S9.3	“Characterization of widefield THz optics using phase shifting interferometry” ...55 <b>Nicolás Reyes, Max Planck Institute for Radioastronomy</b>
12:30	S9.4	“CCAT prime: Multi-map Holographic Measurement for FYST Testbed—near-field beam measurement and data análisis” ...57 <b>Xiadong Ren, University of Cologne</b>
12:50	S9.5	“Introducing LORENTZ: A Novel Low-temperature Near-field Terahertz Chamber for Instrument Characterisation” ...61 <b>Paul Moseley, European Space Agency</b>

**Venue:** Ruinas de San Francisco Auditorium

13:10	Invited Talk II – <b>Dr. Paul Hartogh</b> Chair: <i>Imran Mehdi (NASA Jet Propulsion Laboratory)</i>
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13:40 - 15:00	<i>Launch Break (80 min)</i>
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**Venue:** Ruinas de San Francisco Auditorium

<b>Session X – Far-Infrared Balloon-Borne Missions</b> Chair: <i>Kartik Sheth (NASA)</i>		
15:00	S10.1	“GUSTO Payload Design and Performance”...62 <b>Christopher Walker</b> , <i>University of Arizona</i>
15:20	S10.2	“The Terahertz Intensity Mapper (TIM): design and development status of a far-infrared balloon for spectroscopic galaxy evolution studies”...63 <b>Christopher Groppi</b> , <i>Arizona State University</i>
15:40	S10.3	“The OSAS-B instrument: a balloon-borne heterodyne spectrometer for atomic oxygen in the mesosphere and lower thermosphere”...65 <b>Martin Wienold</b> , <i>German Aerospace Center (DLR)</i>
16:00	S10.4	“ASTHROS - Astrophysics Stratospheric Telescope for High-Spectral Resolution Observations at Submillimeter-Wavelengths: Architecture Design and Subsystem Level Integration & Test Status”...66 <b>Jose V. Siles</b> , <i>NASA Jet Propulsion Laboratory</i>

**Venue:** Ruinas de San Francisco Auditorium (Hall)

16:20	<i>Coffee Break (30 mins)</i>
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**Venue:** Ruinas de San Francisco Auditorium

<b>Session XI – Terahertz Sources II</b> Chair: <i>Jian-Rong Gao (SRON)</i>		
16:50	S11.1	“Frequency stabilization of 3.5-THz and 4.7-THz quantum-cascade lasers by a phase-locked loop”...67 <b>Heiko Richter</b> , <i>DLR - Institute of Optical Sensor Systems</i>
17:10	S11.2	“The ammonia laser: a possible local oscillator for space applications?”...69 <b>Jean Francois Lampin</b> , <i>IEMN CNRS</i>
17:30	S11.3	“A tunable, high power source for GUSTO's local oscillator at 4.74 THz”...70 <b>Ali Khalatpour</b> , <i>Massachusetts Institute of Technology (MIT)</i>



**Venue:** Ruinas de San Francisco Auditorium

<b>Session XII – Instruments &amp; Systems for Future Missions II</b> Chair: <i>Martina Wiedner (Observatory of Paris)</i>		
17:50	S12.1	“Kinetic Inductance Detector based focal plane arrays for the Terahertz Intensity Mapper”...71 <b>Reinier Janssen, NASA Jet Propulsion Laboratory</b>
18:10	S12.2	“Reflector-Based Phased Array for High Power G-band radars”...72 <b>Alain Maestrini, NASA Jet Propulsion Laboratory</b>
18:30	S12.3	“French contribution on the SWI hardware and flight models acceptance levels”...N/A <b>Jeanne Treuttel, Observatory of Paris</b>

**Venue:** Ruinas de San Francisco Auditorium

18:50		<b>ISSTT 2022 Closing Remarks &amp; Student Award Winner</b>
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**Venue:** Teatro Montemar

19:30		Public Outreach Talk – <b>Dr. Paul Goldsmith, NASA</b> <b>“The Legacy of the Arecibo Telescope”</b> Chair: <i>Jose V. Siles (NASA Jet Propulsion Laboratory)</i>
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**Venue:** Discoteca Albacara

22:30		<i>Typical Spanish Late Social</i>
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## October 20, 2022 (Thursday)

10:00	<p><i>Departure to Granada</i></p> <p><b>(transit time ~1h30 min)</b></p>
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11:30	<p><i>Short visit to Granada</i></p>
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**Venue:** Carmen de los Martires Granada

13:30	<p><b>Invited Talk III - Dr. Antxon Alberdi, Director IAA</b>          Chair: <i>Jose V. Siles (NASA Jet Propulsion Laboratory)</i></p>
14:00	<p><i>Special reception/lunch offered by Andalusia in Cármen de los Mártires</i></p>

16:00	<p><i>Visit to Alhambra</i></p>
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08:30	<p><i>Departure to Baeza</i></p> <p><b>(transit time ~1h30 min)</b></p>
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**Venue:** Discoteca Albacara / Bar Central / Burladero de Copas

22:30	<p><i>Typical Spanish Late Social</i></p>
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## APPENDIX: LIST OF POSTER PRESENTATIONS

<b>Poster Session</b> Chair: <i>Cecile Jung-Kubiak (Jet Propulsion Laboratory)</i>	
<b>P1. INSTRUMENTS AND SYSTEMS FOR FUTURE MISSIONS</b>	
P1.1	“Architecture of ASTHROS’ Spectral Data Collection and Onboard Anomaly Detection Pipeline”...73 <b>Paul Horton, Arizona State University</b>
P1.2	“Atmospheric Phase Monitoring System Evolution for the NOEMA interferometer”...74 <b>Sylvain Mahieu, IRAM</b>
P1.3	“Heterodyne Array Receiver Study for the FIRSST Space Mission”...75 <b>Martina Wiedner, Observatory of Paris</b>
P1.4	“Jupiter Icy Moon Explorer, Submillimeter wave Instrument: Delivery status of the 1200 GHz high spectral resolution receiver front end”...76 <b>Jeanne Treuttel, Observatory of Paris</b>
P1.5	“Cold Optics on the Terahertz Intensity Mapper (TIM)”...77 <b>Talia Saeid, Arizona State University</b>
P1.6	“Multipixel 2-color Superconducting Receiver for ASTHROS”...78 <b>Jonathan Kawamura, NASA Jet Propulsion Laboratory</b>
P1.7	“Progress toward Antarctic Terahertz Intensity Interferometry”...79 <b>Hiroshi Matsuo, National Astronomical Observatory of Japan</b>
P1.8	“Breaking the 10mW/pixel limit for kinetic inductance detector readout electronics”...81 <b>Adrian STD-0026_ISSTT2022_Elmaleh, University of British Columbia</b>
P1.8	“The Space Interferometer for Cosmic Evolution (SPICE): The Far Infrared Universe at High Spectral Resolution”...84 <b>Locke Spencer, University of Lethbridge</b>
<b>P2. BEST STUDENT PAPER COMPETITION</b>	
P2.1	“G-Band Metamaterial-Based Circulator for FCC-Compliant Space-to-Earth Communication”...86 <b>Ali Alqaraghuli, Northeastern University</b>
P2.2	“Optimization of a PID controlled TES detector array for use in an FIR double-Fourier interferometer”...88 <b>Chris Benson, University of Lethbridge</b>



P2.3	<p>“Particle Swarm Algorithm Applied to Quadrature Hybrid Multi-Branch Directional Coupler Optimization for ALMA Band 3”...90  <b>Jorge Hernán Cárdenas</b>, <i>University of Antioquia</i></p>
P2.4	<p>“The effect of complex dispersion and impedance in the gain of superconducting traveling-wave kinetic inductance parametric amplifiers”...92  <b>Javier Carrasco</b>, <i>University of Chile</i></p>
P2.5	<p>“Gas Analysis with High-Resolution Fabry-Perot spectrometry in the 550-650 GHz Range”...94  <b>Coralie Elmaleh</b>, <i>Université du Littoral Côte d'Opale</i></p>
P2.6	<p>“A MKID-readout based on a heterogeneous, closely coupled architecture”...96  <b>Gerrit Grutzeck</b>, <i>Max-Planck-Institute for Radio Astronomy</i></p>
P2.7	<p>“Development of an FPGA-Based, 1024-Channel Spectrometer with Individual Channel Lock-in Amplification”...101  <b>Jonathan Hoh</b>, <i>Arizona State University</i></p>
P2.8	<p>“Design and Characterisation of a 3.5-THz Fundamental Schottky Mixer”...102  <b>Divya Jayasankar</b>, <i>Chalmers University of Technology</i></p>
P2.9	<p>“Experimental characterisation of titanium nitride transmission lines for applications as kinetic inductance travelling wave parametric amplifiers”...104  <b>Joseph Longden</b>, <i>University of Oxford</i></p>
P2.10	<p>“Design and Fabrication of All-metal Micromachined Finline Structures for Millimeter and Sub-millimeter Applications”...106  <b>Cristian López</b>, <i>Chalmers University of Technology</i></p>
P2.11	<p>“Sub-mm Wave Schottky Mixer Pumped with 170<math>\mu</math>W Optically Generated Local Oscillator Power”...108  <b>Javier Martínez Gil</b>, <i>ACST GmbH</i></p>
P2.12	<p>“CubeSounder: Development of Microwave Radiometer 3D Weather Imaging Sensors”...110  <b>Kyle Massingill</b>, <i>Arizona State University</i></p>
P2.13	<p>“Proof-of-concept experiment on a novel microwave circulator based on frequency converters”...111  <b>Sho Masui</b>, <i>Osaka Prefecture Univ. / National Astronomical Observatory of Japan</i></p>
P2.14	<p>“A Cryogenic Scalable Small-Signal &amp; Noise Model of GaN HEMTs”...113  <b>Mohamed Aniss Mebarki</b>, <i>Chalmers University of Technology</i></p>
P2.15	<p>“Development of an instantaneous multiband digital 2SB receiver for the 67–116-GHz band”...117  <b>David Monasterio</b>, <i>Universidad de Chile</i></p>
P2.16	<p>“Exploring the Limits of the Tunnel Junction Fabrication Technique for Josephson Junctions TWPA and the Preliminary Characterisation Results”...120  <b>Javier Navarro Montilla</b>, <i>University of Oxford</i></p>
P2.17	<p>“SIS photon detectors for THz observations beyond the gap energy”...124  <b>Ayako Niwa</b>, <i>Univeresity of Tsukuba</i></p>



P2.18	<p>“Design, Operation, and Characterization of a Laboratory Spatial-Spectral Fourier Transform Interferometer”...126  <b>Jeremy Scott, University of Lethbridge</b></p>
P2.19	<p>“Development of the wide IF 230 GHz SIS mixer design for KVN-Pyeongchang VLBI station”...128  <b>Naeun Shin, Seoul National University / Korea Astronomy &amp; Space science Institute</b></p>
P2.20	<p>“4x2 Hot Electron Bolometer mixer arrays for detection at 1.46, 1.9 and 4.7 THz for a balloon borne Terahertz observatory”...133  <b>Jose Silva, SRON/RUG</b></p>
P2.21	<p>“Orbiting Astronomical Satellite for Investigating Stellar Systems”...135  <b>Siddhartha Sirsi, University of Arizona</b></p>
P2.22	<p>“Preliminary Characterisation of a Compact 240 GHz SIS Dual-Polarisation Receiver for Large Array Applications”...136  <b>Jakob Wenninger, University of Oxford</b></p>
P2.23	<p>“Study of anti-reflection layer on dielectric lens for the new 72–116 GHz 7-beam receiver of the Nobeyama 45-m telescope”...143  <b>Yasumasa Yamasaki, Osaka Prefecture University/National Astronomical Observatory of Japan</b></p>
P2.24	<p>“Tunable Antenna-Coupled Intersubband Terahertz (TACIT) Mixer Integrated with Self-complementary Antenna”...145  <b>Changyun Yoo, University of California Santa Barbara</b></p>
<b>P3. SOLID-STATE RECEIVERS</b>	
P3.1	<p>“325 GHz and 650 GHz Dual-polarisation receivers Concept”...147  <b>Olivier Auriacombe, AAC Omnisys</b></p>
<b>P4. NOVEL DEVICES, TECHNOLOGIES &amp; COMPONENTS</b>	
P4.1	<p>“SIS technology development to serve Next Generation receivers for ALMA”...148  <b>Alexei Pavolotsky, Chalmers University of Technology</b></p>
P4.2	<p>“Integrated Schottky Technology for Supra-THz Applications”...151  <b>Vladimir Drakinskiy, Chalmers University of Technology</b></p>
P4.3	<p>“Estimation of Input Power Handling Capability of Next-Generation GaN Schottky Diodes for Millimeter Wave Frequency Multipliers”...152  <b>Priyanka Mondal, Observatory of Paris</b></p>
P4.4	<p>“Characterization of a Wide-Band Microstrip Parametric Amplifier Utilizing 4-Wave-Mixing Techniques”...153  <b>Emily Linden, Arizona State University</b></p>
P4.5	<p>“Analysis of the low temperature behavior of GaN-on-SiC Schottky barrier diodes”...154  <b>Beatriz Orfao, University of Salamanca</b></p>



P4.6	<p>“LO power division circuits for the CCAT-prime Heterodyne Array Instrument (CHAI)”...155  <b>Ignacio Barrueto, University of Cologne</b></p>
P4.7	<p>“Characterization of monolithically integrated lithium niobate ring resonator for a high sensitivity room temperature radiometer”...159  <b>Jessica César Cuello, University Carlos III of Madrid</b></p>
P4.8	<p>“Characterization of Microwave Properties of Superconducting NbTiN Films using TDS”...162  <b>Fedor Khan, Institute of Radioengineering and Electronics of RAS</b></p>
P4.9	<p>“A Low Loss Diplexer for Submillimeter-wave Sideband Separating Receivers” ...164  <b>Subash Khanal, NASA Jet Propulsion Laboratory</b></p>
P4.10	<p>“Design of RF waveguide structure for 2SB SIS receiver for Millimetron 211-275 GHz VLBI channel”...165  <b>Andrey Khudchenko, Astro Space Center of P.N. Lebedev Physical Institute RAS</b></p>
<b>P5. INSTRUMENTS &amp; SYSTEMS FOR GROUND TELESCOPES</b>	
P5.1	<p>“A 67-116 GHz MMIC-based dual-polarized 2SB down-converter for the ALMA Band 2 Warm Cartridge Assembly prototype development” ...167  <b>Bertrand Thomas, Radiometer Physics GmbH</b></p>
P5.2	<p>“SEPIA345: a dual polarization 2SB cartridge receiver for APEX telescope: Design and Performance”...168  <b>Denis Meledin, Chalmers University of Technology</b></p>
P5.3	<p>“ALMA Band 2 Receiver Automated Test System” ...172  <b>Jan Barkhof, NOVA</b></p>
P5.4	<p>“Development of ALMA Band 1 Corrugated Horns based on Metal 3D Printer”...173  <b>Keiko Kaneko, National Astronomical Observatory of Japan</b></p>
P5.5	<p>“Demonstrator of Cryogenic Multibeam Receiver with MMIC LNAs for 75-116 GHz” ...174  <b>Patrice Serres, IRAM</b></p>
P5.6	<p>“Study of ALMA Band 2 receiver optical design for ACA 7-m antenna”...176  <b>Hiroaki Imada, National Astronomical Observatory of Japan</b></p>
<b>P6. TERAHERTZ ANTENNAS &amp; OPTICAL COMPONENTS</b>	
P6.1	<p>“Design of a 480 GHz Metamaterial Flat Lens”...178  <b>Cassandra Whitton, Arizona State University</b></p>





P6.2	<p>“A Tunable Linear to Right-Handed Circularly Polarized THz Antenna Based on Graphene Switch” ...181  <b>Mohammad Alibakhshikenari, Universidad Carlos III de Madrid</b></p>
P6.3	<p>“A broadband and dual-polarization single-layer dichroic filter for applications in Sub-THz Range” ...184  <b>Daniel Montof, Chalmers University of Technology</b></p>
P6.4	<p>“Stepped Impedance Metal-Mesh Filters for Terahertz Frequencies” ...187  <b>Adhitya B. Sriram, Arizona State University</b></p>
P6.5	<p>“A Compact Dielectrically Loaded Quad-ridge Feed Horn for Octave Band Radio Astronomy Application” ...188  <b>Sara Salem Hesari, National Research Council Canada</b></p>
P6.6	<p>“A satellite tracking system at 78GHz using the over-moded TE<sub>21</sub> ground-station antenna pattern” ...189  <b>Hugh Gibson, Gibson Microwave Design (GMD)</b></p>
P6.7	<p>“Diffraction efficiency of reflective metallic gratings operating in the THz range...190  <b>María Manuela Fernández, INTA</b></p>
P6.8	<p>“Circularly Polarized Dielectric Resonator Antenna for the Terahertz Band Applications” ...192  <b>Wael Jaafar, Carleton University</b></p>
P6.9	<p>“Design and Analysis of a Spline-Profile Diagonal Horn Antenna at 104GHz for Microwave Holography” ...193  <b>Daniele Ronso Lima, Kapteyn Astronomical Institute</b></p>
<b>P7. CRYOGENIC RECEIVERS, MIXERS &amp; BACK-ENDS</b>	
P7.1	<p>“Design of a 350 GHz Circular Waveguide Superconductor-Insulator-Superconductor Mixer for Array Applications” ...194  <b>Boon Kok Tan, University of Oxford</b></p>
P7.2	<p>“Design of RF waveguide structure for 2SB SIS mixer at 210-280 GHz” ...200  <b>Sabrina Realini, Kapteyn Astronomical Institute, University of Groningen</b></p>
P7.3	<p>“Towards 100% array yield: understanding (and fixing) the causes of KID array inhomogeneity” ...N/A  <b>Eduard Driessen, IRAM</b></p>
P7.4	<p>“Design and Performance of the Terahertz Photon Counting System: Detectors and Cryogenics” ...202  <b>Hajime Ezawa, National Astronomical Observatory of Japan</b></p>
P7.5	<p>“Enhanced sensitivity of THz NbN hot electron bolometer mixers” ...203  <b>Behnam Mirzaei, Delft University of Technology</b></p>
P7.6	<p>“10.7 THz HEB heterodyne mixer designs” ...205  <b>Johanna Böhm, University of Cologne</b></p>



P7.7	<p>“Noise temperature and S-parameter measurements of an SIS-based microwave amplifier” ...208  <b>Takafumi Kojima</b>, <i>National Astronomical Observatory of Japan</i></p>
<b>P8. MEASUREMENT TECHNIQUES</b>	
P8.1	<p>“Wideband Permittivity Measurement System in the 67-116 GHz Range” ...210  <b>Ryo Sakai</b>, <i>National Astronomical Observatory of Japan</i></p>
P8.2	<p>“Applying Energy Absorption Interferometry to THz direct detectors using photomixers” ...212  <b>Ian Veenendaal</b>, <i>SRON</i></p>
P8.3	<p>“Space qualification of MMIC Schottky diodes chips for SWI instrument of JUICE mission” ...214  <b>Jérôme Valentin</b>, <i>Observatory of Paris</i></p>
P8.4	<p>“In situ 1-Port Cryogenic Vacuum Device Calibration” ...217  <b>Marko Neric</b>, <i>Arizona State University</i></p>
P8.5	<p>“Characterization of a 183 GHz radiometer receiver with heterodyne noise injection calibration system” ...219  <b>Tomas Thuroczy</b>, <i>IETR, Université de Rennes 1</i></p>
P8.6	<p>“Numerical and theoretical modeling of a heterodyne noise injection radiometer system” ...221  <b>Tomas Thuroczy</b>, <i>IETR, Université de Rennes 1</i></p>
<b>P9. TERAHERTZ SOURCES</b>	
P9.1	<p>“Frequency Locking of a 4.7 THz Quantum Cascade Laser using a delay line” ...222  <b>Sajjad Mahdizadeh</b>, <i>University of Cologne</i></p>
P9.2	<p>“Study on Oscillation Characteristics of G-band Gyrotron Traveling Wave Tubes with a Tapered Interaction Circuit” ...224  <b>Yelei Yao</b>, <i>University of Electronic Science and Technology of China (UESTC)</i></p>
P9.3	<p>“Phase-locking THz QC-VECSEL local oscillators using diode mixers and sources” ...225  <b>Chris Curwen</b>, <i>NASA Jet Propulsion Laboratory</i></p>

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**ADDITIONAL PAPER**

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