The 33rd International Symposium on Space Terahertz Technology

ISSTT 2024

April 8 – 11, 2025

Charlottesville, Virginia, USA

The 33rd International Symposium on Space Terahertz Technology was held in Charlottesville, Virginia USA from April 7th to April 11th, 2024, featuring excellent presentations on millimeter, submillimeter-wave and Terahertz technologies and applications in astrophysics, planetary science, Earth science and remote sensing. A special session on metamaterials was also held. Students submitted abstracts for the Student Poster Competition in which winners earned a ten-minute oral presentation as well as a cash prize. New this year was two "Speed Geeking" sessions to help facilitate focus on additional posters in a more inclusive, interactive format.

In addition, all in-person conference participants were treated to a welcome reception, a fabulous symposium dinner at a local venue, ample networking opportunities, a Solar Eclipse party, and two incredible excursions on the final day to visit nearby area sites.

Scientific Organizing Committee Members

- Patricio Mena, Chair (National Radio Astronomy Observatory, USA)
- Andrey Baryshev (Kapteyn Astronomical Institute, Netherlands)
- Victor Belitsky (Chalmers University of Technology, Sweden)
- Michael Cyberey (University of Virginia, USA)
- Brian Ellison (Science and Technology Facilities Council, UK)
- Jian-Rong Gao (Delft University of Technology, Netherlands)
- Gregory Goltsman (Moscow State Pedagogical University, Russia)
- Christopher Groppi (Arizona State University, USA)
- Jeffrey Hesler (Virginia Diodes, USA)
- Netty Honingh (University of Cologne, Germany)
- Heinz-Wilhelm Hübers (German Aerospace Center, Germany)
- Boris Karasik (NASA Jet Propulsion Laboratory, USA)
- Andrey Khudchenko (Aerospace Center, Russian Academy of Sciences, Russia)
- Alain Maestrini (NASA Jet Propulsion Laboratory, USA)
- Hiroshi Matsuo (National Astronomical Observatory of Japan)
- Imran Mehdi (NASA Jet Propulsion Laboratory, USA)
- Christophe Risacher (Institute of Millimetric Radio Astronomy, France)
- Kameljeet Saini (National Radio Astronomy Observatory, USA)

- Shengcai Shi (Purple Mountain Observatory, Chinese Academy of Sciences, China)
- José Siles (NASA Jet Propulsion Laboratory, USA)
- Jan Stake (Chalmers University of Technology, Sweden)
- Edward Tong (Center for Astrophysics, Harvard & Smithsonian, USA)
- Yoshinori Uzawa (National Astronomical Observatory of Japan)
- Min-Jye Wang (Academia Sinica Institute of Astronomy and Astrophysics, Taiwan)
- Ghassan Yassin (University of Oxford, UK)

Local Organizing Committee Members

- Bert Hawkins, Chair (National Radio Astronomy Observatory, USA)
- Sheryl Donley (National Radio Astronomy Observatory, USA)
- Jeffrey Hesler (Virginia Diodes, Inc., USA)
- Patricio Mena (National Radio Astronomy Observatory, USA)
- Karen Prairie (National Radio Astronomy Observatory, USA)
- Kamaljeet Saini (National Radio Astronomy Observatory, USA)

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Program Overview

Monday, April 8, 2024

Session 1	**Moderator: Hiroshi Matsuo**
CARUSO (Modified title below: The Integration of LNA Based Receivers for Millimeter and Sub-millimeter Wavelength Radio Astronomy)	Byron Alderman
wSMA Receiver Cartridges	Lingzhen Zeng
Phoenix: A Far-IR Mission for Cosmology	Al Kogut
Heterodyne Spectrometer Instrument (HSI) for Far-IR Spectroscopy Space Telescope (FIRSST)	Martina Wiedner
A Compact Terahertz Instrument for Continuity Microwave Limb Sounding of Atmosphere	Subash Khanal
U-WISHeS and V-WiSHeS: Terahertz Heterodyne Flight Spectrometers under Development Targeting the Ura	Carrie Anderson

Invited Talk	**Moderator: Patricio Mena**
Implementation and Applications of Advanced Electromagnetic Surfaces*	Sean Hum

Session 2	**Moderator: Ricardo Finger**
Metasurface-Based Terahertz Quantum-Cascade Lasers Operating Beyond 5 THz	Anthony Kim
Superconducting Glide-Symmetric Bifilar Transmission Lines for Tunable Stop-Band and Filtering Applications	Jorge Cardenas
Design Considerations for a W-band Josephson Junction Travelling Wave Parametric Amplifier	Javier Navarro Montilla
Demonstration of a Compact High-Resolution Spectrograph for Far-Infrared Astronomy: Silicon-Based Virtually Imaged Phased Array	Bugao Zou
Development of Fully-Integrated Optically-Controlled THz Switches for Tunable and Reconfigurable Filters	Peizhao Li

Session 3	**Moderator: Philip Mauskopf**
Design and Simulation of an Ultra-Wideband 211-375 GHz SIS Mixer based on a Micromachined Metallic Substrate	Cristian Lopez
Improved Process Flow of Heterogeneously Integrated Gallium Arsenide Schottky Diodes	Christopher Moore
A Planar RF-LO Coupler Design for Heterodyne Receiver at 220 GHz	Yan-Jun Wang
Silicon Micromachined 400-600-GHz Orthomode Transducer	Zahraa Rizk

Tuesday, April 9, 2024

Session 4	**Moderator: Sean Hum**
Demonstration of Multi-Layer Antireflective Treatments for Gradient Index Silicon Optics at THz Frequencies	Cecile Jung-Kubiak
Si Metalens for Quasi-optical THz HEB Mixer Arrays	Dingding Ren
Design and Measurements of a 480GHz Metamaterial Flat Lens	Cassandra Whitton
Inverse-Designed Volumetric and Multi-Layer Silicon Metaoptics	Connor Ballew
A Low Loss Dual-poloarization Optical Diplexing Scheme for Millimeter to Terahertz Waves	Keara Carter

Invited Talks	**Moderator: Bert Hawkins**
SIS Foundry Panel*	Panel
The ALMA2030 Wideband Sensitivity Upgrade*	Crystal Brogan

Session 5	**Moderator: Cecile Jung-Kubiak**
On the Sensitivity Limitation in the HEB Mixers	Boris Karasik
Wideband Cryogenic Isolators for Sideband-separating Receivers	Lingzhen Zeng
Design of Reverse-Coupler Orthomode Transducer for the 209-281 GHz	Alessandro Navarrini
Comprehensive Laboratory Characterization of the AMKID Instrument	Nicolas Reyes
Installation and Testing of the wSMA Prototype Receiver System	Paul Grimes

Wednesday, April 10, 2024

Session 6	**Moderator: Shengcai Shi**
Estimating Sensitivity of Ultra-Wideband Cryogenic IF-LNAs to Input Mismatch by Noise Wave Measurement	Ricardo Amils
345 GHz SIS Junction Development for the ngEHT	Jacob Kooi
Lumped-Element Aluminum KIDs with Hierarchical Phased-Array Antennas	Fabien Defrance
A Wideband RF and Wideband IF DSB SIS Mixer	Victor Belitsky
Production of ALMA Band 2 Cryogenic 1st Stage LNA	Patrick Putz
A New Technique for Measurement of the IF Output Impedance of SIS Mixers	Philip Dindo
Embedding Impedance Recovery in a Twin-Junction SIS Mixer	Ghassan Yassin

Invited Talk	**Moderator: Bert Hawkins**
Understanding the Interplay of Physics and Chemistry During Planet Formation*	Ilse Cleeves

Session 7	**Moderator: Jeanne Treuttel**
Overview of the ESO ALMA Development Studies	Carlos De Breuck
4.7-THz Schottky Diode Harmonic Mixer: Design, Fabrication, and Performance Optimization	Divya Jayasankar
1.90THz-2.06 THz Schottky Receiver with 4000-6000K DSB Noise Temperature at Room Temperature	Alain Maestrini
Development Status of the ALMA Band 6v2 SIS Mixers	Joseph Lambert
Lumped-element Model Analysis for THz HEB Mixer Based on Sputtered MgB2 Thin Films	Changyun Yoo
Session 8	**Moderator: Andrey Baryshev**
Dual Band 1.3mm/3mm Receivers for the NOEMA Observatory	Christophe Risacher
Findings for the OSAS-B 4.7-THz Heterodyne Spectrometer for Atomic Oxygen in the Mesosphere and Lower Thermosphere	Martin Wienold
Cryogenic Receiver System for the Black Hole Explorer	Edward Tong
The Terahertz Intensity Mapper: Design, Modeling, and Characterization of the Cryogenic Receiver	Jianyang Fu
Highly-Compact Terahertz Planetary/Cometary Instruments	Subash Khanal
Enhancing the IRAM30m Telescope for the Next 15 years	Carlos Duran

**Invited talks not included*

Poster Session

Progress Towards a Focal Plane Unit for CHAI Based on Superconducting Planar Circuity	Ignacio Barrueto
Waveguide Circuitry for the Prototype ALMA Band 6v2 Sideband Separating SIS Mixer	Philip Dindo
Upgrading the Future of ALMA: the Wideband Sensitivity Upgrade	Donovan Meyer
Broadband Microfabricated Waveguide Terminations for Low-power Applications at Teraherz Frequencies	Karl Flosason
3D-Printed All-Metal Wideband Dual-Polarization Cryogenic Dichroic Filters	Lief Helldner
A Turnstile OMT using Magic-Tees and Integrated Noise-Injection Couplers	Doug Henke
Development of the High-Resolution Spectrometer of the Millimetron Space Observatory	Ivan Tretyakov

Amplitude and Phase Beam Pattern Measurements of a waveguide-type HEBM at 1.9 Thz	Yoshihisa Irimajiri
Wideband OMT with Modified Bøifot Layout and Co-aligned Waveguide Outputs	Victor Belitsky
Design of Octave-Band Magic-T Using Stepped Ridges and Posts	Doug Henke
Investigating Pin-Hole Issues in Josephson Junction Travelling Wave Parametric Amplifiers Requiring Large Area of Dielectric Layer	Javier Navarro Montilla
Development of a Phase-Modulating Beam Multiplexer for a THz Local Oscillator	Barbara Pedroni
S-Parameter Measurements of ALMA Band 2 Orthomode Transducer using Cryogenic System at Room Temperature	Sho Masui
Improvement of the Polarization Performance of ALMA Band 9	Sabrina Realini
A 200 GHz Fully Integrated Quasi-Optical Detector Using Orthogonal Heterostructure Backward Diodes with Improved Performance	Yu Shi
An Initial Concept of a Resonance Phase Matched Junction-Loaded Travelling Wave Parametric Tripler	BK Tan
FYST CCAT Heterodyne Array Instrument Precursor	Kateryna Vynokurova
Highly-Balanced Quadrature Hybrid with 55% Bandwidth	Yuh-Jing Hwang