

**Thushara A. Perera**

**Curriculum Vitae**

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**Contact Information:**

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**Employment:**

Present

Associate Professor, Department of Physics, Illinois Wesleyan University

August 2008 to Present (Assistant Professor prior to 2014)

*Courses Taught:* Introductory Physics (algebra-based), Introductory Physics Labs, Fundamental Astronomy, Modern Physics Lecture and Lab, Mathematical Methods for the Physical Sciences, Electronics, Experimental Physics, Introduction to Astrophysics, Introduction to Cosmology, Introduction to Quantum Mechanics

*Research Areas:* Laboratory astrophysics studies of cosmic analog dusts, Analysis of astronomical data from the AzTEC (The Astronomical Thermal Emission Camera) bolometer array

Previous

Postdoctoral Research Associate, Department of Astronomy, University of Massachusetts Amherst

August 2005 to July 2008

*Research Areas:* Analysis of astronomical data from the AzTEC bolometer camera, experimental operations on AzTEC, experimental operations on the SPEED (Spectral Energy Distribution Camera) bolometer array

Postdoctoral Research Fellow, Kavli Institute for Cosmological Physics and the Enrico Fermi Institute, University of Chicago

August 2002 to July 2005

*Research Areas:* Optical and thermal characterization of Frequency Selective Bolometers for future astronomical instruments/surveys

Graduate Research Assistant, Department of Physics, Case Western Reserve University

September 1996 to July 2002

*Research Areas:* Development and use of Monte Carlo simulation tools for the study of backgrounds, data analysis, and detector characterization for the CDMS (Cryogenic Dark Matter Search) experiment

Graduate Teaching Assistant, Department of Physics, Case Western Reserve University

August 1994 to August 1996

*Courses Taught:* Introductory Physics Labs

**Education:**

Ph.D. Physics, Case Western Reserve University, January 2002

M.Sc. Physics, Case Western Reserve University, May 1996

B.A Physics and Mathematics, Ohio Wesleyan University, May 1994

**Ph.D. Thesis:**

“The Limiting Background in a Dark Matter Search at Shallow Depth,” Advisor: Daniel S. Akerib

**Technical Skills:**Detection and Measurement

Experience with superconducting and semiconductor detectors for far-IR/mm-waves and gamma-/x-rays

Experience with design and use of low-level measurement instrumentation, vacuum systems, liquid and dry cryostats, cold electronics (SQUID, JFET based) and room-temperature electronics

Instrument Design and Manufacturing

Experience with manual and computer controlled machining/prototyping tools

Experience with AutoCAD, Autodesk Fusion 360, Solidworks, HFSS, KiCAD, Verilog, PSoC Programmer

Programming and Data Analysis

Experience with Python, Matlab, IDL, C, C++, Fortran 77/90, LabVIEW, Mathematica

**Awards:**

Artistic and Scholarly Development (ASD) grant, Illinois Wesleyan University, 2019.

*\$3,500 to be used for laboratory studies of cosmic analog dusts*

National Science Foundation (NSF) grant AST-1313261, 2013

*\$178,261 to be used for “Experiments on Cooled Cosmic Dust Analogs to Determine their Optical Properties in the Millimeter/Sub-Millimeter”*

Artistic and Scholarly Development (ASD) grant, Illinois Wesleyan University, 2009.

*\$3,500 to be used for refinement of optimal filter software for extracting point sources from millimeter-wave sky maps*

Center for Cosmological Physics (CFCP) Postdoctoral Fellowship, University of Chicago, 2002

*The center appoints 10 “scholars in residence” with full salary compensation through an international competition. This enables the scholars to pursue research collaboratively but independently from specific research groups. Funded by the National Science Foundation*

Presidential Scholarship, Illinois Wesleyan University, 1990

*Highest financial (full tuition) award of the institution for incoming students*

**Affiliations and Honors:**

Member, American Astronomical Society

Member, American Physical Society

Phi Kappa Phi Honor Society, inducted 2019

Pi Mu Epsilon Mathematical Honor Society, inducted 1993

**Professional Service:**Illinois Wesleyan University

Department Chair, August 2018–present

Acting Department Chair, August–December 2017

Leadership and Service on University Faculty Committees

Chair of the Assessment Committee, 2018-2019

Served on Curriculum Council, Assessment Committee, University Council for Diversity,

May Term Advisory Committee, Pre-engineering Advisory Committee, Premedical/Pre dental Advisory Committee

Faculty advisor to the Society of Physics Students 2011–2017

Academic Community

Proposal reviewer/panelist for

NASA Astrophysics Research and Analysis Program (APRA), May 2018

National Science Foundation Graduate Research Fellowship Program, January 2018

Journal article referee for

Applied Optics, 2007–Present

International Journal of Infrared and Millimeter Waves, 2007–Present

Accuracy checker for *Modern Physics for Scientists and Engineers, 4th Edition*, a popular undergraduate physics textbook

Invited panelist for discussions on employment options for young scientists at

Faculty job search retreat, University of Illinois, Champaign, Illinois, 2011

Great Lakes Cosmology Workshop, Chicago, Illinois, July 2010

Broader Community

*Observatory Night* and *Astronomy Night* conductor for local boy scout and cub scout troops, 2012–Present

Instructor at the winter camp of “Space Explorers,” an inner-city K-12 Enrichment program for minority students in Chicago Illinois, 2003

Development of Cosmology exhibits for the Great Lakes Science Center in Cleveland Ohio, 1999-2002

**Publications:**

- 1) “A Novel Apparatus for Measuring the Far-IR to Millimeter-Wave Absorptivity of Cosmic Analog Dusts,” T. A. Perera et al, submitted to Applied Optics (April, 2021).
- 2) “A Scientific Explanation: The Physics of Marriage and Divorce in Updike’s ‘Here Come the Maples,’” James Plath and Thushara Perera, to appear in the John Updike Review, Vol. 8 (2021).
- 3) “Continuum observations of M 51 and M 83 at 1.1 mm with AzTEC,” W. F. Wall et al, Monthly Notices of the Royal Astronomical Society, 459, 1440 (2016).
- 4) “AzTEC/ASTE 1.1-mm survey of SSA22: Counterpart identification and photometric redshift survey of submillimetre galaxies,” H. Umehata et al, Monthly Notices of the Royal Astronomical Society, 440, 3462 (2014).
- 5) “An Efficient and Optimal Filter for Identifying Point Sources in Millimeter/Sub-Millimeter Wavelength Sky Maps,” T. A. Perera et al, Publications of the Astronomical Society of the Pacific, 125, 838 (2013).
- 6) “Deep 1.1 mm-wavelength imaging of the GOODS-S field by AzTEC/ASTE - II. Redshift distribution and nature of the submillimetre galaxy population,” M. S. Yun et al, Monthly Notices of the Royal Astronomical Society, 420, 957 (2012).
- 7) “AzTEC 1.1-mm images of 16 radio galaxies at  $0.5 < z < 5.2$  and a quasar at  $z = 6.3$ ” A. Humphrey et al, Monthly Notices of the Royal Astronomical Society, 418, 74 (2011).
- 8) “Temperature Variations of Cold Dust in the Triangulum Galaxy M 33,” S. Komugi et al, Publications of the Astronomical Society of Japan, 63, 1139 (2011).
- 9) “AzTEC millimetre survey of the COSMOS field - III. Source catalogue over 0.72 sq-degrees and plausible boosting by large-scale structure,” I. Aretxaga et al, Monthly Notices of the Royal Astronomical Society, 415, 3831 (2011).
- 10) “Detection of an ultrabright submillimetre galaxy in the Subaru/XMM-Newton Deep Field using AzTEC-ASTE,” S. Ikarashi et al, Monthly Notices of the Royal Astronomical Society, 415, 3081 (2011).
- 11) “On the Clustering of Submillimeter Galaxies,” C. Williams et al, Astrophysical Journal, 733, 92 (2011).
- 12) “AzTEC/ASTE 1.1-mm survey of the AKARI Deep Field South: source catalogue and number counts,” B. Hatsukade et al, Monthly Notices of the Royal Astronomical Society, 411, 102 (2011).
- 13) “Origins of the extragalactic background at 1 mm from a combined analysis of the AzTEC and MAMBO data in GOODS-N,” K. Penner et al, Monthly Notices of the Royal Astronomical Society, 410, 2749 (2011).
- 14) “Detection of Strong Millimeter Emission from the Circumstellar Dust Disk around V1094 Sco: Cold and Massive Disk around a T Tauri Star in a Quiescent Accretion Phase?,” T. Tsukagoshi et al, Astrophysical Journal, 726, 45 (2011).
- 15) “Deep 1.1mm-wavelength imaging of the GOODS-S field by AzTEC/ASTE - I. Source catalogue and

- number counts,” K. S. Scott et al, *Monthly Notices of the Royal Astronomical Society*, 405, 2260 (2010).
- 16) “The far-infrared/submillimeter properties of galaxies located behind the Bullet cluster,” M. Rex et al, *Astronomy and Astrophysics*, 518, L13 (2010).
  - 17) “An Investigation of the Dust Content in the Galaxy Pair NGC 1512/1510 from Near-Infrared to Millimeter Wavelengths,” L. Guilin et al, *Astronomical Journal*, 139, 1190 (2010).
  - 18) “An AzTEC 1.1-mm survey for ULIRGs in the field of the Galaxy Cluster MS0451.6-0305,” J. L. Wardlow et al, *Monthly Notices of the Royal Astronomical Society*, 401, 2299 (2010).
  - 19) “AzTEC half square degree survey of the SHADES fields - I. Maps, catalogues and source counts,” J. E. Austermann et al, *Monthly Notices of the Royal Astronomical Society*, 401, 160 (2010).
  - 20) “An AzTEC 1.1mm survey of the GOODS-N field - II. Multiwavelength identifications and redshift distribution,” E. L. Chapin et al, *Monthly Notices of the Royal Astronomical Society* 398, 1793 (2009).
  - 21) “The AzTEC/SMA Interferometric Imaging Survey of Submillimeter-selected High-redshift Galaxies.” J. D. Younger et al, *Astrophysical Journal*, 704, 803 (2009).
  - 22) “Spatial correlation between submillimetre and Lyman- $\alpha$  galaxies in the SSA22 protocluster,” Y. Tamura et al, *Nature*, 459, 61 (2009).
  - 23) “AzTEC Millimetre Survey of the COSMOS field - II. Source count overdensity and correlations with large-scale structure,” J. E. Austermann et al, *Monthly Notices of the Royal Astronomical Society* 393, 1573 (2009).
  - 24) “An AzTEC 1.1mm survey of the GOODS-N field - I. Maps, catalogue and source statistics,” T. A. Perera et al, *Monthly Notices of the Royal Astronomical Society* 391, 1227 (2008).
  - 25) “A bright, dust-obscured, millimetre-selected galaxy beyond the Bullet Cluster (1E0657-56),” G. W. Wilson et al, *Monthly Notices of the Royal Astronomical Society* 390, 1061 (2008).
  - 26) “AzTEC on ASTE Survey of Submillimeter Galaxies,” K. Kohno et al, *Panoramic Views of Galaxy Formation and Evolution*, ASP Conference Series 399, 264 (2008).
  - 27) “Spitzer IRAC infrared colours of submillimetre-bright galaxies,” M. S. Yun et al, *Monthly Notices of the Royal Astronomical Society* 389, 333 (2008).
  - 28) “Frequency selective bolometer development at Argonne National Laboratory,” A. Datesman et al, *Millimeter and Submillimeter Detectors and Instrumentation for Astronomy IV* (Editors W. D. William, W. S. Holland, S. Withington, J. Zmuidzinas), *Proceedings of the Society of Photo-Optical Instrumentation Engineers (SPIE)* 7020, 702029 (2008).
  - 29) “The AzTEC mm-Wavelength Camera,” G. W. Wilson, J. E. Austermann, T. A. Perera, K. S. Scott et al, *Monthly Notices of the Royal Astronomical Society* 386, 807 (2008).
  - 30) “AzTEC Millimeter Survey of the COSMOS field – I. Data Reduction and Source Catalogue,” K. S. Scott J. E. Austermann, T. A. Perera, G. W. Wilson et al, *Monthly Notices of the Royal Astronomical Society* 385, 2225 (2008).
  - 31) “Evidence for a Population of High-Redshift Submillimeter Galaxies from Interferometric Imaging,” J. D. Younger et al, *Astrophysical Journal* 671, 1531 (2007).
  - 32) “Optical performance of frequency-selective bolometers,” T. A. Perera et al, *Applied Optics* 45, 7643 (2006).
  - 33) “Limits on Spin-Independent Interactions of Weakly Interacting Massive Particles with Nucleons from the Two-Tower Run of the Cryogenic Dark Matter Search,” D. S. Akerib et al (CDMS collaboration), *Physical Review Letters* 96, 011302 (2006).
  - 34) “Limits on spin-dependent WIMP-nucleon interactions from the Cryogenic Dark Matter Search,” D. S. Akerib et al (CDMS collaboration), *Physical Review D* 73, 011102 (2006).
  - 35) “First Results from the Cryogenic Dark Matter Search in the Soudan Underground Lab,” D. S. Akerib et al (CDMS collaboration), *Physical Review Letters* 93, 211301 (2004), astro-ph/0405033.
  - 36) “A bolometer array for the SPECTral Energy Distribution (SPEED) Camera,” Robert F. Silverberg et al, *Nuclear Instruments and Methods in Physics Research A* 520, 421 (2004) and *Society of Photo-Optical Instrumentation Engineers (SPIE)* vol. 5498, 659 (2004).
  - 37) “Demonstration of feasibility of operating a silicon ZIP detector with 20 eV threshold,” D. S. Akerib et al, *Nuclear Instruments and Methods in Physics Research A* 520, 163 (2004).
  - 38) “Installation and commissioning of the CDMSII experiment at Soudan,” D. S. Akerib et al (CDMS collaboration), *Nuclear Instruments and Methods in Physics Research A* 520, 116 (2004).
  - 39) “New Results from the Cryogenic Dark Matter Search Experiment,” D. S. Akerib et al (CDMS collab-

- oration), Physical Review D 68, 082002 (2003).
- 40) “Exclusion Limits on the WIMP-Nucleon Cross-Section from the Cryogenic Dark Matter Search,” D. Abrams et al (CDMS collaboration), Physical Review D 66, 122003 (2002).
  - 41) “Present Results and Future Goals of the Cryogenic Dark Matter Search,” T.A. Perera et al, Proceedings of the 9th International Workshop on Low Temperature Detectors, American Institute of Physics Conference Proceedings 485 (2002).
  - 42) “Exclusion Limits on the WIMP-Nucleon Cross-Section from the Cryogenic Dark Matter Search,” R. Abusaidi et al (CDMS collaboration), Physical Review Letters 4, 5699 (2000).

**Professional Presentations:**

- 1) Talk “A New Laboratory for Terahertz Characterization of Cosmic Analog Dusts,” 71st International Symposium on Molecular Spectroscopy, Champaign, Illinois, June 2016
- 2) Talk “A New Laboratory for Mm-wave Characterization of Cosmic Dust Analogs,” Second Workshop on Experimental Laboratory Astrophysics, Kauai, Hawaii, February 2015
- 3) Talk “An Efficient and Optimal Technique for Identifying Point Sources in Millimeter/sub-millimeter Sky Maps,” American Astronomical Society Meeting, Indianapolis, Indiana, June 2013
- 4) Poster “Predicting and Measuring the Resonant Frequency of a Microcantilever,” T. A. Perera and G. S. Spalding, Conference on Laboratory Instruction Beyond the First Year of College, University of Pennsylvania, Philadelphia, July 2012.
- 5) Panelist “Faculty Job Search Retreat,” University of Illinois, Champaign, Illinois, July 2011.
- 6) Panelist “Career Development,” 10th Great Lakes Cosmology Workshop, Chicago, Illinois, July 2010.
- 7) Invited Talk “Measuring Ancient Light,” Meeting of the Illinois Section of the American Association of Physics Teachers, Illinois Wesleyan University, Bloomington, Illinois, April 2009.
- 8) Invited Talk “Discovering Galaxies and Galaxy Clusters at Millimeter Wavelengths,” Physics Colloquium, University of Miami, Coral Gables, Florida, February 2008.
- 9) Invited Talk “Discovering and Understanding the Earliest Galaxies: New Advances in a Young Field,” Physics Colloquium, Texas A&M University, College Station, Texas, May 2007.
- 10) Poster “Optimizing AzTEC Data Reduction for Sub-mm Galaxy Surveys,” T. A Perera et al, American Astronomical Society Meeting, Seattle, Washington, January 2007.
- 11) Poster “Milli-Jansky Sources in GOODS-N Detected with JCMT/AzTEC,” T. A Perera et al, American Astronomical Society Meeting, Seattle, Washington, January 2007.
- 12) Talk “Frequency Selective Bolometers,” URSI National Radio Science Meeting, University of Colorado at Boulder, Colorado, January 2006.
- 13) Invited Talk “Observing the Cosmic Infrared Background with Frequency Selective Bolometers,” Particle Astrophysics Seminar, Case Western Reserve University, Cleveland, Ohio, November 2004.
- 14) Talk “Update on the Cryogenic Dark Matter Search,” Seventh Great Lakes Cosmology Workshop, University of Michigan, Ann Arbor, Michigan, May 2003.
- 15) Talk “Present Results and Near Term Goals of the Cryogenic Dark Matter Search,” Cosmo-02 International Workshop on Particle Physics and the Early Universe, University of Chicago, Illinois, September 2002.
- 16) Talk “Latest Results from the Cryogenic Dark Matter Search,” American Astronomical Society Meeting, Albuquerque, New Mexico, June 2002.
- 17) Talk “Present Results and Future Goals of the Cryogenic Dark Matter Search,” 9th International Workshop on Low Temperature Detectors, University of Wisconsin, Madison, Wisconsin, July 2001.
- 18) Talk “Latest Results from the Cryogenic Dark Matter Search,” April Meeting, American Physical Society, Washington D.C., April 2001.
- 19) Talk “Searching for WIMPs in the Galactic Halo,” The Fifth Great Lakes Cosmology Workshop, Ohio State University, Ohio, May 1997.