

Sunil Golwala — Curriculum Vitae

Division of Physics, Mathematics, and Astronomy
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Research Interests

Observations of the Sunyaev-Zeldovich effect to study dark energy and cluster astrophysics
Direct searches for dark matter
Galaxy formation and evolution, especially at sub/millimeter wavelengths
Measurements of the cosmic microwave background
Development of cryogenic detectors for particle physics, cosmology, and astrophysics

Education

Ph. D., Physics, University of California, Berkeley, 2000
Dissertation title: *Exclusion Limits on the WIMP-Nucleon Elastic-Scattering Cross Section from the Cryogenic Dark Matter Search*
Advisor: Bernard Sadoulet
M. A., Physics, University of California, Berkeley, 1995
B. A., Physics, with general and subject honors, University of Chicago, 1993

Employment

Director, Caltech Submillimeter Observatory, 2013– (operations suspended 2015).
Professor of Physics, California Institute of Technology, 2010–
Associate Professor of Physics, California Institute of Technology, 2010
Assistant Professor of Physics, California Institute of Technology, 2003–
Millikan Postdoctoral Scholar, Physics, California Institute of Technology, 2000–2003
Graduate Student Research Assistant, Center for Particle Astrophysics and Department of Physics, University of California, Berkeley, 1994–2000
Graduate Student Instructor, Department of Physics, University of California, Berkeley, 1993

Fellowships and Awards

Department of Energy High Energy Physics Outstanding Junior Investigator, 2006–2009
Alfred P. Sloan Foundation Research Fellow, September, 2004–September, 2006
Millikan Postdoctoral Fellowship, Physics, California Institute of Technology, 2000–2003
Mitsuyoshi Tanaka Dissertation Award in Experimental Particle Physics, American Physical Society, 2001
Department of Education Graduate Fellowship, University of California, Berkeley, 1993–1994
Richter Grant for Undergraduate Research, University of Chicago, 1992–1993

Professional Memberships

American Physical Society
American Astronomical Society
Society of Photo-Industrial Engineers

Teaching

Physics 1a (Fall 2009, 2011, 2012): freshman mechanics (teaching assistant)
Physics 1b (Winter 2010): freshman relativity and electrostatics (teaching assistant)
Physics 1c (Spring 2005, 2011, 2012): freshman electricity and magnetism (teaching assistant, 50% lecturer in 2012)
Physics 106ab (Fall/Winter 2004-2005, 2005-2006, 2006-2007): junior-level analytical mechanics (lecturer)
Physics 106bc (Winter-Spring 2013, 2014, 2015, 2016, 2017): junior-level electricity and magnetism (lecturer)
Physics 125ab (Fall/Winter 2007-2008, 2008-2009): junior-level quantum mechanics (lecturer)
Physics 135c (Spring 2007): seminar course on non-accelerator particle physics (organizer)

Past and Present Advisees/Supervisees

Research Faculty:

Dr. Jack Sayers

Research Assistant Professor

June 2016–

Bolocam massive cluster Sunyaev-Zeldovich effect analysis, gradient index silicon optics with integral metamaterial antireflection structures, microstrip-coupled titanium nitride kinetic inductance detectors, LCT and CSST Sunyaev-Zeldovich effect science planning

Research and Engineering Staff:

Dr. Matthew Hollister

Associate and Senior Research Engineer

Sep 2012–Sep 2016

MUSIC mm/submm camera, MAKO submm camera, CCAT LWCam and X-Spec design studies, CAMLS microwave limb sounder (JPL), HAWC+ submm camera for SOFIA (JPL), SuperCDMS SNOLAB cryogenic hardware and wiring design and HEMT screener design, instrumentation for development of gradient index silicon optics with integral metamaterial broadband antireflection structures, instrumentation for development of microstrip-coupled titanium nitride kinetic inductance detectors

Current position: Applications Physicist II, Fermi National Accelerator Laboratory, L2 manager for Cryogenics for SuperCDMS SNOLAB

Postdoctoral:

- Dr. Philippe Rossinot
June 2004–April 2006
antenna-coupled bolometer arrays, Bolocam instrumentation support
Current position: Responsible for Economy of Knowledge Pole, Groupe
Caisse des Depots, Paris, France
- Dr. Gensheng Wang
September 2004–August 2007
antenna-coupled bolometer arrays, MKID noise physics, and CDMS data
analysis
Current position: Assistant Physicist, High Energy Physics Division, Ar-
gonne National Laboratory
- Dr. Jack Sayers
January 2008–June 2016
NASA Postdoctoral Program Fellow at JPL with Dr. Hien Nguyen, June
2008–June 2010
Senior Postdoctoral Scholar, June 2010–November 2012 and December
2013–June 2016
Norris-CCAT Senior Postdoctoral Scholar, December 2012–November 2013.
Bolocam massive cluster Sunyaev-Zeldovich effect observations and anal-
ysis, atmospheric noise studies, Bolocam observer support, MUSIC
mm/submm camera, CCAT LWCam mm/submm camera, CCAT Sunyaev-
Zeldovich effect science planning
Current position: Research Assistant Professor, Caltech
- Dr. R. Walter Ogburn
Moore Postdoctoral Scholar, January 2008–January 2010
BICEP2/Keck Array CMB polarization experiments
Current position: Research Associate, Department of Physics and Kavli
Institute for Particle Astrophysics and Cosmology, SLAC National Ac-
celerator Laboratory
- Dr. Matthew Hollister
February 2009–September 2012
NASA Postdoctoral Program Fellow at JPL with Dr. Peter Day, Septem-
ber 2010–September 2012
MUSIC mm/submm camera, MAKO submm camera, CCAT LWCam and
X-Spec design studies
- Dr. Thomas Downes
September 2009–June 2011
MUSIC mm/submm camera, Bolocam massive cluster Sunyaev-Zeldovich
effect observations
Current position: Associate Scientist, Department of Physics, University
of Wisconsin, Milwaukee
- Dr. James Schlaerth
January 2011–February 2012
MUSIC mm/submm camera
Current Position: Lieutenant, US Navy

Dr. Fabien Defrance

May 2017–

development of development of gradient index silicon optics with integral metamaterial broadband antireflection structures, microstrip-coupled titanium nitride kinetic inductance detectors

Graduate:

Jack Sayers

July, 2003–December, 2007

Ph. D., physics, 2008

NASA Graduate Student Research Program Fellow, 2004–2007

Bolocam Sunyaev-Zeldovich survey analysis/atmospheric noise studies

Current position: Research Assistant Professor, Caltech

Zeeshan Ahmed

September, 2005–July, 2011

Ph. D., physics, 2011

CDMS II data analysis, development of a multi-wire proportional chamber for radioactivity screening

Current position: Panofsky Fellow, SLAC National Accelerator Laboratory

Amy Trangsrud

September 2005–July, 2011 (taken over from A. Lange, January 2010)

Ph. D., physics, 2011

NASA Earth and Space Sciences Fellow, 2009–2011

Development of focal plane array for SPIDER balloon-borne CMB polarization receiver

Current position: Systems engineer, JPL

Justus Brevik

April, 2006–June, 2012 (taken over from A. Lange, January 2010)

Development and commissioning of detector arrays, focal plane hardware, and readout system for BICEP2 CMB polarization receiver

Current position: Staff scientist, Superconductive Electronics Group, National Institute of Standards and Technology

David Moore

April, 2007–June, 2012

Ph. D., physics, 2012

Development of MKID-based dark matter and optical/UV photon detectors, CDMS low-mass WIMP search analysis

APS Mitsuyoshi Tanaki Dissertation Prize in Experimental Particle Physics, 2012

Current position: Assistant Professor, Physics, Yale University

Randol Aikin

September, 2007–June, 2013

Ph. D., physics, 2013

Receiver design, commissioning, and optics data analysis for BICEP2 CMB polarization receiver

Current position: Private industry

Nicole Czakon
 July, 2008–June 2013
 Ph. D., physics, 2013
 NASA Graduate Student Research Fellow 2009–2012
 MUSIC submm/mm camera, Bolocam massive cluster Sunyaev-Zeldovich
 effect observations and analysis.
 Current position: Analytics manager, eBay Advertising

Rebecca Tucker
 October, 2009–June 2014
 Ph. D., physics, 2014
 NDSEG Fellow, October, 2008–September, 2011
 NSF Graduate Research Fellow, October, 2011–June, 2014
 SPIDER CMB polarization receiver development
 Current position: Data scientist, Netflix

Ran Duan
 September, 2008–June, 2015
 Ph. D., electrical engineering, 2015
 Design of photolithographic bandpass filters for MUSIC, software-defined
 radio readout of MKIDs, millimeter-wave antenna design
 Current position: FAST Fellow, National Astronomical Observatories of
 China

Chenguang Ji
 April, 2012–June, 2015
 Ph. D., materials science, 2015
 microstrip-coupled titanium nitride kinetic inductance detectors
 Current position: unknown

Seth Siegel
 September, 2009–October, 2015
 Ph. D., physics, 2016
 Moore Graduate Fellow, October, 2009–September, 2010
 NASA Earth and Space Sciences Fellow, September, 2012 – August, 2015
 MUSIC construction and commissioning, Bolocam massive cluster Sunyaev-
 Zeldovich effect analysis
 Current position: McGill Postdoctoral Fellow in Astrophysics

Brett Cornell
 September, 2010–
 NASA Space Technology Research Fellow, August, 2011–July, 2015
 Ph. D. expected September, 2017
 Development of MKID-based dark matter detectors, SuperCDMS WIMP
 search analysis

Yen-Yung Chang
 October, 2015–
 Taiwan Department of Education Graduate Fellowship, 2017–2019
 Development of MKID-based dark matter detectors, blackbody radiation
 mitigation for SuperCDMS SNOLAB experiment
 Completed written exams, candidacy exam expected Spring, 2018

Ted Macioce

October, 2015–

Simulations of astronomical and instrumental sources of statistical and systematic noise in observations of the Sunyaev-Zeldovich effects in future instrumentation, development of gradient-index lenses with meta-material broadband antireflection structures

Preparing for written exams, Summer, 2017, candidacy expected Spring 2018

Taylor Aralis

June, 2016–

Rose Hills Foundation Graduate Fellow, October, 2016–September, 2017
Screening of HEMT amplifiers for the SuperCDMS SNOLAB experiment (development and execution)

Readout firmware and software and analysis software for MKID-based dark matter detectors

Preparing for written exams, Summer, 2017, candidacy expected Spring, 2018

Undergraduate, etc.:

Six post-undergraduate research assistants

Five undergraduate senior theses

Eleven SURFs/summer researchers who continued academic-year research

Nine summer-only SURFs/researchers

Two academic-year undergraduate volunteers

Four local high-school student volunteers

Two local high school teachers working with single or groups of high school students

Community and Scientific Service

Member of the Bolocam and MUSIC instrument teams. Bolocam was available as the 1 mm and 2 mm facility camera at the Caltech Submillimeter Observatory 2004–2012. 50% of the Observatory's time was available to the international astronomical community. Tens of publications have been produced from Bolocam data to date and more are in preparation. The Multiwavelength Sub/millimeter Inductance Camera (MUSIC) replace Bolocam in 2013 and provided simultaneous imaging at 850 μm , 1.1 mm, 1.3 mm, and 2 mm for 2013–2015, though the closing of the CSO. Two papers have been published based on MUSIC data and a number of others are in preparation.

Chair/Co-Chair, Cosmology/CMB/Sunyaev-Zel'dovich science working group and member, instrumentation working group, CCAT, 2004–2014

SuperCDMS Collaboration Board and Council Chair, 2012–2015

Author of *Sub-Kelvin Detectors for Non-Accelerator Particle Physics* section for the Particle Data Group's *Review of Particle Physics*, 2009–2014.

Director, Caltech Submillimeter Observatory, 2013–

Coordinating Panel for Advanced Detectors, APS Division of Particles and Fields, 2016–

Journal Reviews:

Applied Physics Letters
Astrophysical Journal
Nuclear Instruments and Methods A
Physical Review C
Physical Review Letters
Review of Scientific Instruments

Proposal Review Panels:

NSF Physics Division Particle and Nuclear Astrophysics
NSF Office of Polar Programs Antarctic Aeronomy and Astrophysics
NSF Astronomical Sciences Division Extragalactic Astronomy
NSF Astronomical Sciences Division Astronomical Technologies and Instrumentation
NSF Astronomical Sciences Division Mid-Scale Innovations Program
NSF Major Research Infrastructure
DOE EPSCoR
DOE High Energy Physics (HEP and Advanced Detector Research Competitive and CAREER)
NASA Postdoctoral Program
JPL Director's Research and Development Fund
W. M. Keck Foundation
Assorted national science agencies outside the US (Canada, France, Georgia, Hong Kong, Ireland, Netherlands),

Caltech Committee Memberships

Keck Institute for Space Studies, member of development committee, 2004–2007
Cahill Astrophysics Building Committee, 2004–2008
Physics Graduate Admissions Committee, 2003–2007, 2010–2011
PMA Division Strategic Planning Committee, 2010–2012
Faculty Board Educational Outreach Committee, 2007–2013
Ad Hoc Honor Code Committee, 2013–2015
Physics Staffing Committee, 2010–2016
PMA Tombrello/Garmire/Neugebauer Graduate Fellowship Committee, 2015
PMA Committee on Graduate Fellowships, 2015–2016
PMA Committee on Graduate Experience, 2015–2016
Physics Undergraduate Committee, 2014–2016
PMA Student Shop Committee, 2015–2016
PMA Experimental Prize Fellow Committee, 2009–2016 (Chair, 2008–2010, 2015)
Physics liaison to Caltech Academics and Research Committee Student-Faculty Conference, 2017
Faculty representative to Student Health Committee, 2015–

Outreach Activities

Participant in Caltech Classroom Connection, Fall 2004–. CCC is a program that couples Caltech researchers (faculty, postdocs, and graduate students) with high school science teachers in the local school districts. The Caltech participants aid in development and execution of (math- and physics-related) classroom activities and act as role models for students thinking about career plans. A portion of my research group engages in biweekly in-class activities with 3 physics classes at Gabrielino High School (San Gabriel) led by Kevin McClure.

Participant in Caltech Summer Research Connection, 2008, 2012, 2014, 2016. Postdoctoral scholar/research faculty Jack Sayers mentored local high school teachers and a number of high school students on summer research projects. In one case, the students received coauthorship on a journal paper.

Assorted public lectures

Sunil Golwala — Publications

Asterisks indicate refereed publications.

INSPIRE reports a h -index of 39, reduced to 34 when the Review of Particle Physics is excluded.

1. Z. Ahmed, D. S. Akerib, *et al.*, “Search for annual modulation in low-energy CDMS-II data,” astro-ph.CO/1203.1309, to be submitted to *Physical Review Letters*.
2. S. R. Siegel, J. Sayers, *et al.*, “Constraints on the Mass, Concentration, and Nonthermal Pressure Support of Six CLASH Clusters from a Joint Analysis of X-ray, SZ, and Lensing Data,” astro-ph.CO/1612.05377, 2016, <https://arxiv.org/abs/1612.05377>.
3. A. D. Beyer, M. I. Hollister, *et al.*, “Fabricating with crystalline Si to improve superconducting detector performance,” *J. Phys. Conf. Series* **834**, 012006/1–8 (2017).
4. *R. Agnese, A. J. Anderson, *et al.*, “Projected sensitivity of the SuperCDMS SNOLAB experiment,” *Phys. Rev. D* **95**, 082002/1–17 (2017).
5. *C. E. Romero, B. S. Mason, *et al.*, “Galaxy Cluster Pressure Profiles as Determined by Sunyaev Zeldovich Effect Observations with MUSTANG and Bolocam. II. Joint Analysis of 14 Clusters,” *Astroph. J.* **838**, 86/1–21 (2017).
6. *J. Sayers, S. R. Golwala, *et al.*, “A Comparison and Joint Analysis of Sunyaev-Zeldovich Effect Measurements from Planck and Bolocam for a Set of 47 Massive Galaxy Clusters,” *Astroph. J.* **832**, 26/1–11 (2016).
7. *V. Asboth, A. Conley, *et al.*, “HerMES: a search for high-redshift dusty galaxies in the HerMES Large Mode Survey - catalogue, number counts and early results,” *Mon. Not. Roy. Astron. Soc.* **462**, 1989–2000 (2016).
8. *J. Sayers, M. Zemcov, *et al.*, “Peculiar Velocity Constraints from Five-band SZ Effect Measurements toward RX J1347.5-1145 with MUSIC and Bolocam from the CSO,” *Astroph. J.* **820**, 101/1–13 (2016).
9. *M. Donahue, S. Ettori, *et al.*, “The Morphologies and Alignments of Gas, Mass, and the Central Galaxies of CLASH Clusters of Galaxies,” *Astroph. J.* **819**, 36/1–18 (2016).
10. *R. Agnese, A. J. Anderson, *et al.*, “New Results from the Search for Low-Mass Weakly Interacting Massive Particles with the CDMS Low Ionization Threshold Experiment,” *Phys. Rev. Lett.* **116**, 071301/1–6 (2016).
11. *BICEP2 Collaboration, P. A. R. Ade, *et al.*, “BICEP2 III: Instrumental Systematics,” *Astroph. J.* **814**, 110/1–28 (2015).
12. *R. Agnese, A. J. Anderson, *et al.*, “Improved WIMP-search reach of the CDMS II germanium data,” *Phys. Rev. D* **92**, 072003/1–23 (2015).
13. *BICEP2 Collaboration, Keck Array Collaboration, *et al.*, “Antenna-coupled TES Bolometers Used in BICEP2, Keck Array, and Spider,” *Astroph. J.* **812**, 176/1–17 (2015).
14. *R. L. Schmitt, G. Tatkowski, *et al.*, “Thermal conductance measurements of bolted copper joints for SuperCDMS,” *Cryogenics* **70**, 41–46 (2015).

15. *BICEP2 and Keck Array Collaborations, P. A. R. Ade, *et al.*, “BICEP2/Keck Array V: Measurements of B-mode Polarization at Degree Angular Scales and 150 GHz by the Keck Array,” *Astroph. J.* **811**, 126/1–13 (2015).
16. *A. H. Young, T. Mroczkowski, *et al.*, “Measurements of the Sunyaev-Zel’dovich Effect in MACS J0647.7+7015 and MACS J1206.2-0847 at High Angular Resolution with MUSTANG,” *Astroph. J.* **809**, 185/1–14 (2015).
17. *C. E. Romero, B. S. Mason, *et al.*, “Galaxy Cluster Pressure Profiles, as Determined by Sunyaev-Zeldovich Effect Observations with MUSTANG and Bolocam. I. Joint Analysis Technique,” *Astroph. J.* **807**, 121/1–11 (2015).
18. *BICEP2 and Keck Array Collaborations, P. A. R. Ade, *et al.*, “BICEP2/Keck Array. IV. Optical Characterization and Performance of the BICEP2 and Keck Array Experiments,” *Astroph. J.* **806**, 206/1–23 (2015).
19. *N. G. Czakon, J. Sayers, *et al.*, “Galaxy Cluster Scaling Relations between Bolocam Sunyaev-Zel’dovich Effect and Chandra X-Ray Measurements,” *Astroph. J.* **806**, 18/1–28 (2015).
20. *K. Schneck, B. Cabrera, *et al.*, “Dark matter effective field theory scattering in direct detection experiments,” *Phys. Rev. D* **91**, 092004/1–13 (2015).
21. *R. Agnese, A. J. Anderson, *et al.*, “First Direct Limits on Lightly Ionizing Particles with Electric Charge Less than $e/6$,” *Phys. Rev. Lett.* **114**, 111302/1–5 (2015).
22. *BICEP2/Keck and Planck Collaborations, P. A. R. Ade, *et al.*, “Joint Analysis of BICEP2/Keck Array and Planck Data,” *Phys. Rev. Lett.* **114**, 101301/1–17 (2015).
23. *R. Agnese, A. J. Anderson, *et al.*, “Maximum likelihood analysis of low energy CDMS II germanium data,” *Phys. Rev. D* **91**, 052021/1–13 (2015).
24. C. Ji, A. Beyer, *et al.*, “Design of antenna-coupled lumped-element titanium nitride KIDs for long-wavelength multi-band continuum imaging,” in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series* (SPIE, Bellingham, Washington, 2014), Vol. 9153, pp. 915321/1–15.
25. J. Sayers, C. Bockstiegel, *et al.*, “The status of MUSIC: the multiwavelength sub-millimeter inductance camera,” in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series* (SPIE, Bellingham, Washington, 2014), Vol. 9153, pp. 915304/1–18.
26. *P. A. R. Ade, R. W. Aikin, *et al.*, “BICEP2. II. Experiment and three-year Data Set,” *Astroph. J.* **792**, 62/1–29 (2014).
27. *P. A. R. Ade, R. W. Aikin, *et al.*, “Detection of B-Mode Polarization at Degree Angular Scales by BICEP2,” *Phys. Rev. Lett.* **112**, 241101/1–25 (2014).
28. N. R. Zobrist, M. Daal, *et al.*, “A Distributed Method for Modeling Effective Cryogenic Flat Cable Heat Sinking,” *J. Low. Temp. Phys.* **176**, 1096–1102 (2014).
29. E. Kramer, N. Kellaris, *et al.*, “Material Selection for Cryogenic Support Structures,” *J. Low. Temp. Phys.* **176**, 1103–1108 (2014).

30. A. E. Lowitz, E. M. Barrentine, *et al.*, “A Comparison of Fundamental Noise in Kinetic Inductance Detectors and Transition Edge Sensors for Millimeter-Wave Applications,” *J. Low. Temp. Phys.* **176**, 504–510 (2014).
31. B. Cornell, D. C. Moore, *et al.*, “Particle Detection Using MKID-Based Athermal-Phonon Mediated Detectors,” *J. Low. Temp. Phys.* **176**, 891–897 (2014).
32. *R. Agnese, A. J. Anderson, *et al.*, “Search for Low-Mass Weakly Interacting Massive Particles with SuperCDMS,” *Phys. Rev. Lett.* **112**, 241302/1–6 (2014).
33. *R. Agnese, A. J. Anderson, *et al.*, “Search for Low-Mass Weakly Interacting Massive Particles Using Voltage-Assisted Calorimetric Ionization Detection in the SuperCDMS Experiment,” *Phys. Rev. Lett.* **112**, 041302/1–6 (2014).
34. *Z. Ahmed, M. A. Bowles, *et al.*, “A prototype low-background multiwire proportional chamber,” *J. Instr.* **9**, 1009P (2014).
35. *J. Sayers, T. Mroczkowski, *et al.*, “A Measurement of the Kinetic Sunyaev-Zel’dovich Signal towards MACS J0717.5+3745,” *Astroph. J.* **778**, 52/1–20 (2013).
36. *R. Agnese, A. J. Anderson, *et al.*, “Demonstration of Surface Electron Rejection with Interleaved Germanium Detectors for Dark Matter Search,” *Appl. Phys. Lett.* **103**, 164105/1–5 (2013).
37. *R. Agnese, Z. Ahmed, *et al.*, “Silicon Detector Dark Matter Results from the Final Exposure of CDMS II,” *Phys. Rev. Lett.* **111**, 251301/1–6 (2013).
38. R. Bunker, Z. Ahmed, *et al.*, “The BetaCage, an ultra-sensitive screener for surface contamination,” in *American Institute of Physics Conference Series*, edited by L. Miramonti and L. Pandola (American Institute of Physics, Melville, New York, 2013), Vol. 1549, pp. 132–135.
39. *R. Agnese, Z. Ahmed, *et al.*, “Silicon detector results from the first five-tower run of CDMS II,” *Phys. Rev. D* **88**, 031104(R)/1–5 (2013).
40. *J. Sayers, N. G. Czakon, *et al.*, “Sunyaev-Zel’dovich-measured Pressure Profiles from the Bolocam X-Ray/SZ Galaxy Cluster Sample,” *Astroph. J.* **768**, 177/1–15 (2013).
41. *A. A. Fraisse, P. A. R. Ade, *et al.*, “SPIDER: probing the early Universe with a suborbital polarimeter,” *J. Cosmo. Astrop. Phys.* **4**, 47/1–23 (2013).
42. *J. Sayers, T. Mroczkowski, *et al.*, “The Contribution of Radio Galaxy Contamination to Measurements of the Sunyaev-Zel’dovich Decrement in Massive Galaxy Clusters at 140 GHz with Bolocam,” *Astroph. J.* **764**, 152/1–10 (2013).
43. *T. Mroczkowski, S. Dicker, *et al.*, “A Multi-wavelength Study of the Sunyaev-Zel’dovich Effect in the Triple-Merger Cluster MACS J0717.5+3745 with MUSTANG and Bolocam,” *Astroph. J.* **761**, 47/1–15 (2012).
44. A. G. Viereg, P. A. R. Ade, *et al.*, “Optical characterization of the Keck array polarimeter at the South Pole,” in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series* (SPIE, Bellingham, Washington, 2012), Vol. 8452, pp. 845226/1–13, astro-ph.IM/1208.0844.

45. S. Kernasovskiy, P. A. R. Ade, *et al.*, “Optimization and sensitivity of the Keck array,” in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series* (SPIE, Bellingham, Washington, 2012), Vol. 8452, pp. 84521B/1–12, astro-ph.IM/1208.0857.
46. R. W. Ogburn, P. A. R. Ade, *et al.*, “BICEP2 and Keck array operational overview and status of observations,” in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series* (SPIE, Bellingham, Washington, 2012), Vol. 8452, pp. 84521A/1–14, astro-ph.IM/1208.0638.
47. R. O’Brien, P. A. R. Ade, *et al.*, “Antenna-coupled TES bolometers for the Keck array, Spider, and Polar-1,” in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series* (SPIE, Bellingham, Washington, 2012), Vol. 8452, pp. 84521G/1–11, astro-ph.IM/1208.1247.
48. B. Cornell, D. C. Moore, *et al.*, “High-resolution gamma-ray detection using phonon-mediated detectors,” in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series* (SPIE, Bellingham, Washington, 2012), Vol. 8453, pp. 84532N/1–8, astro-ph.IM/1208.1247.
49. S. R. Golwala, C. Bockstiegel, *et al.*, “Status of MUSIC, the Multiwavelength Sub/millimeter Inductance Camera,” in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series* (SPIE, Bellingham, Washington, 2012), Vol. 8452, pp. 845205/1–21, astro-ph.IM/1211.0595.
50. *A. Morandi, M. Limousin, *et al.*, “X-ray, lensing and Sunyaev-Zel’dovich triaxial analysis of Abell 1835 out to R_{200} ,” *Mon. Not. Roy. Astron. Soc.* **425**, 2069–2082 (2012).
51. *K. Umetsu, E. Medezinski, *et al.*, “CLASH: Mass Distribution in and around MACS J1206.2-0847 from a Full Cluster Lensing Analysis,” *Astroph. J.* **755**, 56/1–26 (2012).
52. *S. R. Golwala, “The Review of Particle Physics: Particle Detectors for Non-Accelerator Physics: Sub-Kelvin Detectors,” *Phys. Rev. D* **86**, 010001/375–377 (2012).
53. *D. C. Moore, S. R. Golwala, *et al.*, “Position and energy-resolved particle detection using phonon-mediated microwave kinetic inductance detectors,” *Appl. Phys. Lett.* **100**, 232601/1–4 (2012).
54. *M. Postman, D. Coe, *et al.*, “The Cluster Lensing and Supernova Survey with Hubble: An Overview,” *Astroph. J. Suppl.* **199**, 25/1–25 (2012).
55. *J. Sayers, N. G. Czakon, *et al.*, “Bolocam Observations of Two Unconfirmed Galaxy Cluster Candidates from the Planck Early Sunyaev-Zel’dovich Sample,” *Astroph. J. Lett.* **749**, L15/1–5 (2012).
56. *M. Zemcov, J. Aguirre, *et al.*, “High Spectral Resolution Measurement of the Sunyaev-Zel’dovich Effect Null with Z-Spec,” *Astroph. J.* **749**, 114/1–13 (2012).
57. Z. Staniszewski, R. W. Aikin, *et al.*, “The Keck Array: A Multi Camera CMB Polarimeter at the South Pole,” *J. Low. Temp. Phys.* **167**, 827–833 (2012).
58. J. A. Schlaerth, N. G. Czakon, *et al.*, “The Status of MUSIC: A Multicolor Sub/millimeter MKID Instrument,” *J. Low. Temp. Phys.* **167**, 347–353 (2012).
59. D. C. Moore, S. Golwala, *et al.*, “Phonon Mediated Microwave Kinetic Inductance Detectors,” *J. Low. Temp. Phys.* **167**, 329–334 (2011).

60. J. A. Bonetti, A. D. Turner, *et al.*, “Characterization and Fabrication of the TES Arrays for the Spider, Keck and BICEP2 CMB Polarimeters,” *J. Low. Temp. Phys.* **167**, 146–151 (2012).
61. *P. D. Mauskopf, P. F. Horner, *et al.*, “A high signal-to-noise ratio map of the Sunyaev-Zel’dovich increment at 1.1-mm wavelength in Abell 1835,” *Mon. Not. Roy. Astron. Soc.* **000**, 2284–2294 (2012).
62. *A. Zitrin, Y. Rephaeli, *et al.*, “Cluster-cluster lensing and the case of Abell 383,” *Mon. Not. Roy. Astron. Soc.* **420**, 1621–1629 (2012).
63. *J. Sayers, N. G. Czakon, *et al.*, “143 GHz Brightness Measurements of Uranus, Neptune, and Other Secondary Calibrators with Bolocam between 2003 and 2010,” *Astroph. J.* **744**, 169/1–4 (2012).
64. *D. T. O’Dea, P. A. R. Ade, *et al.*, “SPIDER Optimization. II. Optical, Magnetic, and Foreground Effects,” *Astroph. J.* **738**, 63/1–14 (2011).
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