

Stanford



Chao-Lin Kuo

Professor of Physics and of Particle Physics and Astrophysics

CONTACT INFORMATION

- **Administrative Contact**

Dana Volponi

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Bio

ACADEMIC APPOINTMENTS

- Professor, Physics
- Professor, Particle Physics and Astrophysics

HONORS AND AWARDS

- Early Career Award, NSF (2011)
- Alfred P. Sloan Fellowship, Sloan Foundation (2009)

PROFESSIONAL EDUCATION

- Ph.D., UC Berkeley , Astrophysics (2003)
- B.Sc., National Taiwan University , Physics (1994)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

1. Searching/measuring primordial gravitational waves in the CMB (Cosmic Microwave Background) through experiments at the South Pole (BICEP and SPT), high plateaus in Tibet (AICPT) and Atacama (Simons Observatory), as well as in space (LiteBIRD).
2. Development and applications of superconducting detector and readout systems in astrophysics, cosmology, and other areas.
3. Novel detector concepts for axion searches (<https://youtu.be/UBscQSFzplE>)

Teaching

COURSES

2025-26

- Classical Electrodynamics: PHYSICS 220 (Win)

2024-25

- Classical Electrodynamics: PHYSICS 220 (Win)

2023-24

- Advanced Mechanics: PHYSICS 110, PHYSICS 210 (Aut)

2022-23

- Advanced Mechanics: PHYSICS 110, PHYSICS 210 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Jason Corbin, Nicholas Rapidis

Postdoctoral Faculty Sponsor

Osmond Wen, Cheng Zhang

Doctoral Dissertation Advisor (AC)

Taj Dyson, Tom Liu, Yuka Nakato, Sephora Ruppert, Zoe Smith, Matt Withers

Doctoral (Program)

Noor Al-Sayyad, Joseph Curti, Andrea Gaspert, Cady van Assendelft

Publications

PUBLICATIONS

- **Maximizing quantum enhancement in axion dark matter experiments** *PHYSICAL REVIEW D*
Kuo, C., Bartram, C. L., Chou, A. S., Dyson, T. A., Kurinsky, N. A., Rybka, G., Ruppert, S., Wen, O., Withers, M. O., Yi, A. K., Zhang, C.
2025; 111 (12)
- **Beehive haloscope for high-mass axion dark matter** *PHYSICAL REVIEW D*
Withers, M. O., Kuo, C.
2025; 111 (7)
- **High-volume tunable resonator for axion searches above 7 GHz** *PHYSICAL REVIEW APPLIED*
Dyson, T. A., Bartram, C. L., Davidson, A., Ezekiel, J. B., Futamura, L. M., Liu, T., Kuo, C.
2024; 21 (4)
- **Filamentary Dust Polarization and the Morphology of Neutral Hydrogen Structures** *ASTROPHYSICAL JOURNAL*
Halal, G., Clark, S. E., Cukierman, A., Beck, D., Kuo, C.
2024; 961 (1)
- **Laboratory Integration of the ALiCPT-1 Receiver** *IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY*
Salatino, M., Withers, M. O., Kuo, C., Thompson, K. L., Austermann, J., Groh, J. C., Karpel, E. D., Mauskopf, P., Meinke, J., Montana-Lopez, J. A., Parker, C., Roberson, C., Weeks, et al
2023; 33 (5)
- **SLAC microresonator RF (SMuRF) electronics: A tone-tracking readout system for superconducting microwave resonator arrays.** *The Review of scientific instruments*
Yu, C., Ahmed, Z., Frisch, J. C., Henderson, S. W., Silva-Feaver, M., Arnold, K., Brown, D., Connors, J., Cukierman, A. J., D'Ewart, J. M., Dober, B. J., Dusatko, J. E., Haller, et al
2023; 94 (1): 014712
- **Current Status of the ALi CMB Polarization Telescope Focal Plane Camera** *IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY*
Salatino, M., Austermann, J., Meinke, J., Sinclair, A. K., Walker, S., Bai, X., Beall, J., Connors, J., Dober, B., Duff, S. M., Givhan, R. C., Hilton, G., Hubmayr, et al
2021; 31 (5)

- **Symmetrically tuned large-volume conic shell-cavities for axion searches** *Journal of Cosmology and Astroparticle Physics*
Kuo, C.
2021; February (02)
- **LiteBIRD satellite: JAXA's new strategic L-class mission for all-sky surveys of cosmic microwave background polarization**
Hazumi, M., Ade, P. A., Adler, A., Allys, E., Arnold, K., Auguste, D., Aumont, J., Aurlien, R., Austermann, J., Baccigalupi, C., Banday, A. J., Banjeri, R., Barreiro, et al
edited by Lystrup, M., Perrin, M. D., Batalha, N., Siegler, N., Tong, E. C.
SPIE-INT SOC OPTICAL ENGINEERING.2021
- **Large-volume centimeter-wave cavities for axion searches** *Journal of Cosmology and Astroparticle Physics*
Kuo, C.
2020
- **Constraints on Primordial Gravitational Waves Using Planck, WMAP, and New BICEP2/Keck Observations through the 2015 Season** *PHYSICAL REVIEW LETTERS*
Ade, P. R., Ahmed, Z., Aikin, R. W., Alexander, K. D., Barkats, D., Benton, S. J., Bischoff, C. A., Bock, J. J., Bowens-Rubin, R., Brevik, J. A., Buder, I., Bullock, E., Buza, et al
2018; 121 (22)
- **Highly-multiplexed microwave SQUID readout using the SLAC Microresonator Radio Frequency (SMuRF) Electronics for Future CMB and Sub-millimeter Surveys**
Henderson, S. W., Ahmed, Z., Austermann, J., Becker, D., Bennett, D. A., Brown, D., Chaudhuri, S., Cho, H., D'Ewart, J. M., Dober, B., Duff, S. M., Dusatko, J. E., Fatigoni, et al
edited by Zmuidzinas, J., Gao
SPIE-INT SOC OPTICAL ENGINEERING.2018
- **BICEP2 / Keck Array IX: New bounds on anisotropies of CMB polarization rotation and implications for axionlike particles and primordial magnetic fields** *PHYSICAL REVIEW D*
Ade, P. R., Ahmed, Z., Aikin, R. W., Alexander, K. D., Barkats, D., Benton, S. J., Bischoff, C. A., Bock, J. J., Bowens-Rubin, R., Brevik, J. A., Buder, I., Bullock, E., Buza, et al
2017; 96 (10)
- **BICEP2/KECK ARRAY VIII: MEASUREMENT OF GRAVITATIONAL LENSING FROM LARGE-SCALE B-MODE POLARIZATION** *ASTROPHYSICAL JOURNAL*
Ade, P. A., Ahmed, Z., Aikin, R. W., Alexander, K. D., Barkats, D., Benton, S. J., BISCHOFF, C. A., Bock, J. J., Bowens-Rubin, R., Brevik, J. A., Buder, I., Bullock, E., Buza, et al
2016; 833 (2)
- **BICEP2/KECK ARRAY. VII. MATRIX BASED E/B SEPARATION APPLIED TO BICEP2 AND THE KECK ARRAY** *ASTROPHYSICAL JOURNAL*
Ade, P. A., Ahmed, Z., Aikin, R. W., Alexander, K. D., Barkats, D., Benton, S. J., BISCHOFF, C. A., Bock, J. J., Bowens-Rubin, R., Brevik, J. A., Buder, I., Bullock, E., Buza, et al
2016; 825 (1)
- **Joint Analysis of BICEP2/Keck Array and Planck Data** *PHYSICAL REVIEW LETTERS*
Ade, P. A., Aghanim, N., Ahmed, Z., Aikin, R. W., Alexander, K. D., Arnaud, M., Aumont, J., Baccigalupi, C., Banday, A. J., Barkats, D., Barreiro, R. B., Bartlett, J. G., Bartolo, et al
2015; 114 (10)
- **Detection of B-Mode Polarization at Degree Angular Scales by BICEP2.** *Physical review letters*
Ade, P. A., Aikin, R. W., Barkats, D., Benton, S. J., BISCHOFF, C. A., Bock, J. J., Brevik, J. A., Buder, I., Bullock, E., Dowell, C. D., Duband, L., Filippini, J. P., Fliescher, et al
2014; 112 (24): 241101-?