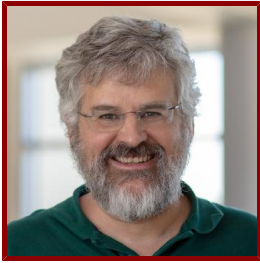


Stanford



Kent Irwin

Director, Hansen Experimental Physics Laboratory (HEPL), Professor of Physics, of Particle Physics and Astrophysics and of Photon Science

CONTACT INFORMATION

- **Administrative Contact**

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BIO

Irwin Group web page:

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ACADEMIC APPOINTMENTS

- Professor, Physics
- Professor, Particle Physics and Astrophysics
- Professor, Photon Science Directorate

ADMINISTRATIVE APPOINTMENTS

- Faculty Director, Hansen Experimental Physics Laboratory, (2020- present)
- Professor of Physics and of Particle Physics and Astrophysics and Photon Science, Stanford and SLAC, (2013- present)
- Fellow, National Institute of Standards and Technology (NIST), (2007-2013)
- Professor Adjoint, Astrophysics and Planetary Sciences, University of Colorado, (2006-2013)
- Supervisory Physicist, National Institute of Standards and Technology (NIST), (2002-2007)
- Physicist, National Institute of Standards and Technology (NIST), (1996-2002)
- Postdoctoral Researcher, National Institute of Standards and Technology (NIST), (1995-1996)

HONORS AND AWARDS

- Department of Commerce Gold Medal, United States Department of Commerce (DOC) (2012)
- Fellow, American Physical Society (2007)
- Joseph F. Keithley Award, American Physical Society (2007)
- Arthur S. Flemming Award, George Washington University (2006)

PROFESSIONAL EDUCATION

- Ph.D., Stanford University (1995)
- M.S., Stanford University (1995)

- B.S., California Institute of Technology (1988)

LINKS

- Irwin Group: <https://sites.stanford.edu/irwinlab/>

Teaching

COURSES

2021-22

- Modern Physics: PHYSICS 25 (Spr)

2020-21

- Modern Physics: PHYSICS 25 (Spr)

2019-20

- Modern Physics: PHYSICS 25 (Spr)

2018-19

- Modern Physics: PHYSICS 25 (Spr)
- Modern Physics Laboratory: PHYSICS 26 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Rachel Gruenke, Alex Wollack, Cyndia Yu

Postdoctoral Faculty Sponsor

Maria Simanovskaia

Orals Evaluator

Saarik Kalia

Doctoral Dissertation Advisor (AC)

Stephen Kuenstner, Nicholas Rapidis, Jyotirmai Singh

Postdoctoral Research Mentor

Fedja Kadribasic

Publications

PUBLICATIONS

- **A Simulation-based Method for Correcting Mode Coupling in CMB Angular Power Spectra** *ASTROPHYSICAL JOURNAL*
Leung, J., Hartley, J., Nagy, J. M., Netterfield, C. B., Shariff, J. A., Ade, P. R., Amiri, M., Benton, S. J., Bergman, A. S., Bihary, R., Bock, J. J., Bond, J. R., Bonetti, et al
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- **BICEP/Keck XV: The BICEP3 Cosmic Microwave Background Polarimeter and the First Three-year Data Set** *ASTROPHYSICAL JOURNAL*
Ade, P. R., Ahmed, Z., Amiri, M., Barkats, D., Thakur, R., Bischoff, C. A., Beck, D., Bock, J. J., Boenish, H., Bullock, E., Buza, Cheshire, J. R., Connors, J., et al

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- **The Design and Integrated Performance of SPT-3G** *ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES*
Sobrin, J. A., Anderson, A. J., Bender, A. N., Benson, B. A., Dutcher, D., Foster, A., Goeckner-Wald, N., Montgomery, J., Nadolski, A., Rahlin, A., Ade, P. R., Ahmed, Z., Anderes, et al
2022; 258 (2)
- **CMB-S4: Forecasting Constraints on Primordial Gravitational Waves** *ASTROPHYSICAL JOURNAL*
Abazajian, K., Addison, G. E., Adshead, P., Ahmed, Z., Akerib, D., Ali, A., Allen, S. W., Alonso, D., Alvarez, M., Amin, M. A., Anderson, A., Arnold, K. S., Ashton, et al
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- **BICEP/Keck XIV: Improved constraints on axionlike polarization oscillations in the cosmic microwave background** *PHYSICAL REVIEW D*
Ade, P. R., Ahmed, Z., Amiri, M., Barkats, D., Thakur, R., Bischoff, C. A., Beck, D., Bock, J. J., Boenish, H., Bullock, E., Buza, Cheshire, J. R., Connors, J., et al
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- **Metastable Brominated Nanodiamond Surface Enables Room Temperature and Catalysis-Free Amine Chemistry.** *The journal of physical chemistry letters*
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- **Optimal Cosmic Microwave Background Lensing Reconstruction and Parameter Estimation with SPTpol Data** *ASTROPHYSICAL JOURNAL*
Millea, M., Daley, C. M., Chou, T., Anderes, E., Ade, P. R., Anderson, A. J., Austermann, J. E., Avva, J. S., Beall, J. A., Bender, A. N., Benson, B. A., Bianchini, F., Bleem, et al
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- **The XFASTER Power Spectrum and Likelihood Estimator for the Analysis of Cosmic Microwave Background Maps** *ASTROPHYSICAL JOURNAL*
Gambrel, A. E., Rahlin, A. S., Song, X., Contaldi, C. R., Ade, P. R., Amiri, M., Benton, S. J., Bergman, A. S., Bihary, R., Bock, J. J., Bond, J. R., Bonetti, J. A., Bryan, et al
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- **Constraints on Lambda CDM extensions from the SPT-3G 2018 EE and TE power spectra** *PHYSICAL REVIEW D*
Balkenhol, L., Dutcher, D., Ade, P. R., Ahmed, Z., Anderes, E., Anderson, A. J., Archipley, M., Avva, J. S., Aylor, K., Barry, P. S., Thakur, R., Benabed, K., Bender, et al
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- **Mitigation of Finite Bandwidth Effects in Time-Division-Multiplexed SQUID Readout of TES Arrays** *IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY*
Durkin, M., Adams, J. S., Bandler, S. R., Chervenak, J. A., Denison, E., Doriese, W. B., Duff, S. M., Finkbeiner, F. M., Fowler, J. W., Gard, J. D., Hilton, G. C., Hummatov, R., Irwin, et al
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- **Detection of Galactic and Extragalactic Millimeter-wavelength Transient Sources with SPT-3G** *ASTROPHYSICAL JOURNAL*
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- **Performance of a Broad-Band, High-Resolution, Transition-Edge Sensor Spectrometer for X-ray Astrophysics** *IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY*
Smith, S. J., Adams, J. S., Bandler, S. R., Beaumont, S., Chervenak, J. A., Denison, E. V., Doriese, W. B., Durkin, M., Finkbeiner, F. M., Fowler, J. W., Hilton, G. C., Hummatov, R., Irwin, et al
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- **Search for dark photon dark matter: Dark E field radio pilot experiment** *PHYSICAL REVIEW D*
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- **Measurements of the E-mode polarization and temperature-E-mode correlation of the CMB from SPT-3G 2018 data** *PHYSICAL REVIEW D*
Dutcher, D., Balkenhol, L., Ade, P. R., Ahmed, Z., Anderes, E., Anderson, A. J., Archipley, M., Avva, J. S., Aylor, K., Barry, P. S., Thakur, R., Benabed, K., Bender, et al
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- **BICEP/Keck XII: Constraints on axionlike polarization oscillations in the cosmic microwave background** *PHYSICAL REVIEW D*
Ade, P. R., Ahmed, Z., Amiri, M., Barkats, D., Thakur, R., Bischoff, C. A., Bock, J. J., Boenish, H., Bullock, E., Buza, Cheshire, J. R., Connors, J., Cornelison, J., et al
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- **An Improved Measurement of the Secondary Cosmic Microwave Background Anisotropies from the SPT-SZ plus SPTpol Surveys** *ASTROPHYSICAL JOURNAL*
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- **The Atacama Cosmology Telescope: DR4 maps and cosmological parameters** *JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS*
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- **SQUIDS and Transition-Edge Sensors** *JOURNAL OF SUPERCONDUCTIVITY AND NOVEL MAGNETISM*
Irwin, K. D.
2020
- **Searching for anisotropic cosmic birefringence with polarization data from SPTpol** *PHYSICAL REVIEW D*
Bianchini, F., Wu, W. K., Ade, P. R., Anderson, A. J., Austermann, J. E., Avva, J. S., Balkenhol, L., Baxter, E., Beall, J. A., Bender, A. N., Benson, B. A., Bleem, L. E., Carlstrom, et al
2020; 102 (8)
- **Measurements of B-mode polarization of the cosmic microwave background from 500 square degrees of SPTpol data** *PHYSICAL REVIEW D*
Sayre, J. T., Reichardt, C. L., Henning, J. W., Ade, P. R., Anderson, A. J., Austermann, J. E., Avva, J. S., Beall, J. A., Bender, A. N., Benson, B. A., Bianchini, F., Bleem, L. E., Carlstrom, et al
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- **Chemical control of competing electron transfer pathways in iron tetracyano-polypyridyl photosensitizers** *CHEMICAL SCIENCE*
Kunnus, K., Li, L., Titus, C., Lee, S., Reinhard, M. E., Koroidov, S., Kjaer, K. S., Hong, K., Ledbetter, K., Doriese, W. B., O'Neil, G. C., Swetz, D. S., Ullom, et al
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- **Particle Response of Antenna-Coupled TES Arrays: Results from SPIDER and the Laboratory** *JOURNAL OF LOW TEMPERATURE PHYSICS*
Osherson, B., Filippini, J. P., Fu, J., Gramillano, R., Gualtieri, R., Shaw, E. C., Ade, P. R., Amiri, M., Benton, S. J., Bock, J. J., Bond, J. R., Bryan, S. A., Chiang, et al
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- **Microwave Multiplexing on the Keck Array** *JOURNAL OF LOW TEMPERATURE PHYSICS*

- Cukierman, A., Ahmed, Z., Henderson, S., Young, E., Yu, C., Barkats, D., Brown, D., Chaudhuri, S., Cornelison, J., D'Ewart, J. M., Dierickx, M., Dober, B. J., Dusatko, et al
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- **Chemical control of competing electron transfer pathways in iron tetracyano-polypyridyl photosensitizers.** *Chemical science*
Kunnus, K., Li, L., Titus, C. J., Lee, S. J., Reinhard, M. E., Koroidov, S., Kjær, K. S., Hong, K., Ledbetter, K., Doriese, W. B., O'Neil, G. C., Swetz, D. S., Ullom, et al
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 - **Performance of Al-Mn Transition-Edge Sensor Bolometers in SPT-3G**
Anderson, A. J., Ade, P. R., Ahmed, Z., Avva, J. S., Barry, P. S., Thakur, R., Bender, A. N., Benson, B. A., Bryant, L., Byrum, K., Carlstrom, J. E., Carter, F. W., Cecil, et al
SPRINGER/PLENUM PUBLISHERS.2020: 320–29
 - **Broadband, millimeter-wave antireflection coatings for large-format, cryogenic aluminum oxide optics** *APPLIED OPTICS*
Nadolski, A., Vieira, J. D., Sobrin, J. A., Kofman, A. M., Ade, P. R., Ahmed, Z., Anderson, A. J., Avva, J. S., Thakur, R., Bender, A. N., Benson, B. A., Bryant, L., Carlstrom, et al
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 - **On-Sky Performance of the SPT-3G Frequency-Domain Multiplexed Readout**
Bender, A. N., Anderson, A. J., Avva, J. S., Ade, P. R., Ahmed, Z., Barry, P. S., Thakur, R., Benson, B. A., Bryant, L., Byrum, K., Carlstrom, J. E., Carter, F. W., Cecil, et al
SPRINGER/PLENUM PUBLISHERS.2020: 182–91
 - **Planar Self-similar Antennas for Broadband Millimeter-Wave Measurements** *JOURNAL OF LOW TEMPERATURE PHYSICS*
Meinke, J., Mauskopf, P., Johnson, B. R., Flanigan, D., Irwin, K., Li, D., Cho, H., Day, P., McMahon, J., Doyle, S., Ade, P. R.
2020
 - **Galaxy Clusters Selected via the Sunyaev-Zel'dovich Effect in the SPTpol 100-square-degree Survey** *ASTRONOMICAL JOURNAL*
Huang, N., Bleem, L. E., Stalder, B., Ade, P. R., Allen, S. W., Anderson, A. J., Austermann, J. E., Avva, J. S., Beall, J. A., Bender, A. N., Benson, B. A., Bianchini, F., Bocquet, et al
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 - **The SPTpol Extended Cluster Survey** *ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES*
Bleem, L. E., Bocquet, S., Stalder, B., Gladders, M. D., Ade, P. R., Allen, S. W., Anderson, A. J., Annis, J., Ashby, M. N., Austermann, J. E., Avila, S., Avva, J. S., Bayliss, et al
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 - **Characterizing the Sensitivity of 40 GHz TES Bolometers for BICEP Array** *JOURNAL OF LOW TEMPERATURE PHYSICS*
Zhang, C., Ade, P. R., Ahmed, Z., Amiri, M., Barkats, D., Thakur, R., Bischoff, C. A., Bock, J. J., Boenish, H., Bullock, E., Buza, Cheshire, J., Connors, J., et al
2020
 - **Optical Design and Characterization of 40-GHz Detector and Module for the BICEP Array** *JOURNAL OF LOW TEMPERATURE PHYSICS*
Soliman, A., Ade, P. R., Ahmed, Z., Amiri, M., Barkats, D., Thakur, R., Bischoff, C. A., Bock, J. J., Boenish, H., Bullock, E., Buza, Cheshire, J., Connors, J., et al
2020
 - **Optical Characterization of the Keck Array and BICEP3 CMB Polarimeters from 2016 to 2019** *JOURNAL OF LOW TEMPERATURE PHYSICS*
St Germaine, T., Ade, P. R., Ahmed, Z., Amiri, M., Barkats, D., Thakur, R., Bischoff, C. A., Bock, J. J., Boenish, H., Bullock, E., Buza, Cheshire, J., Connors, J., et al
2020
 - **Count Rate Optimizations for TES Detectors at a Femtosecond X-ray Laser** *JOURNAL OF LOW TEMPERATURE PHYSICS*
Titus, C. J., Li, D., Alpert, B. K., Cho, H., Fowler, J. W., Lee, S., Morgan, K. M., Swetz, D. S., Ullom, J. N., Wessels, A., Irwin, K. D.
2020
 - **Design and Performance of the First BICEP Array Receiver** *JOURNAL OF LOW TEMPERATURE PHYSICS*
Schillaci, A., Ade, P. R., Ahmed, Z., Amiri, M., Barkats, D., Thakur, R., Bischoff, C. A., Bock, J. J., Boenish, H., Bullock, E., Buza, Cheshire, J., Connors, J., et al
2020
 - **Constraints on Cosmological Parameters from the 500 deg² SPTPOL Lensing Power Spectrum** *ASTROPHYSICAL JOURNAL*

- Bianchini, F., Wu, W. K., Ade, P. R., Anderson, A. J., Austermann, J. E., Avva, J. S., Beall, J. A., Bender, A. N., Benson, B. A., Bleem, L. E., Carlstrom, J. E., Chang, C. L., Chaubal, et al
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- **Fractional polarization of extragalactic sources in the 500 deg(2) SPTpol survey** *MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY*
Gupta, N., Reichardt, C. L., Ade, P. R., Anderson, A. J., Archipley, M., Austermann, J. E., Avva, J. S., Beall, J. A., Bender, A. N., Benson, B. A., Bianchini, F., Bleem, L. E., Carlstrom, et al
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 - **Detection of CMB-Cluster Lensing using Polarization Data from SPTpol** *PHYSICAL REVIEW LETTERS*
Raghunathan, S., Patil, S., Baxter, E., Benson, B. A., Bleem, L. E., Crawford, T. M., Holder, G. P., McClintock, T., Reichardt, C. L., Varga, T. N., Whitehorn, N., Ade, P. R., Allam, et al
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 - **BICEP2/Keck Array XI: Beam Characterization and Temperature-to-Polarization Leakage in the BK15 Data Set** *ASTROPHYSICAL JOURNAL*
Ade, P. R., Ahmed, Z., Aikin, R. W., Barkats, D., Benton, S. J., Bischoff, C. A., Bock, J. J., Bowens-Rubin, R., Brevik, J. A., Buder, I., Bullock, E., Buza, V., Connors, et al
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 - **A Measurement of the Cosmic Microwave Background Lensing Potential and Power Spectrum from 500 deg(2) of SPTpol Temperature and Polarization Data** *ASTROPHYSICAL JOURNAL*
Wu, W. K., Mocuano, L. M., Ade, P. R., Anderson, A. J., Austermann, J. E., Avva, J. S., Beall, J. A., Bender, A. N., Benson, B. A., Bianchini, F., Bleem, L. E., Carlstrom, J. E., Chang, et al
2019; 884 (1)
 - **Synthesis of a copper-supported triplet nitrene complex pertinent to copper-catalyzed amination.** *Science (New York, N.Y.)*
Carsch, K. M., DiMucci, I. M., Iovan, D. A., Li, A., Zheng, S., Titus, C. J., Lee, S. J., Irwin, K. D., Nordlund, D., Lancaster, K. M., Betley, T. A.
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 - **Sub-Kelvin cooling for two kilopixel bolometer arrays in the PIPER receiver.** *The Review of scientific instruments*
Switzer, E. R., Ade, P. A., Baildon, T., Benford, D., Bennett, C. L., Chuss, D. T., Datta, R., Eimer, J. R., Fixsen, D. J., Gandilo, N. N., Essinger-Hileman, T. M., Halpern, M., Hilton, et al
2019; 90 (9): 095104
 - **Optimization of Time- and Code-Division-Multiplexed Readout for Athena X-IFU** *IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY*
Dorise, W., Bandler, S. R., Chaudhuri, S., Dawson, C. S., Denison, E., Duff, S. M., Durkin, M., FitzGerald, C. T., Fowler, J. W., Gard, J. D., Hilton, G. C., Irwin, K. D., Joe, et al
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 - **Two-Level Switches for Advanced Time-Division Multiplexing** *IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY*
Dawson, C. S., Chaudhuri, S., Titus, C. J., Cho, H., Denison, E., Dorise, W., Durkin, M., FitzGerald, C. T., Hilton, G. C., Irwin, K. D., Li, D., O'Neil, G. C., Reintsema, et al
2019; 29 (5)
 - **Demonstration of Athena X-IFU Compatible 40-Row Time-Division-Multiplexed Readout** *IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY*
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 - **Use of Transition Models to Design High Performance TESs for the LCLS-II Soft X-Ray Spectrometer** *IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY*
Morgan, K. M., Becker, D. T., Bennett, D., Dorise, W. B., Gard, J. D., Irwin, K. D., Lee, S., Li, D., Mates, J. B., Pappas, C. G., Schmidt, D. R., Titus, C. J., Van Winkle, et al
2019; 29 (5)
 - **High-Throughput, DC-Parametric Evaluation of Flux-Activated-Switch-Based TDM and CDM SQUID Multiplexers** *IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY*
Reintsema, C. D., Bennett, D. A., Denison, E., Durkin, M., Dorise, W. B., Fowler, J. W., Gard, J. D., Grigorian, A., Hilton, G. C., Hubmayr, J., O'Neil, G. C., Mates, J. B., Morgan, et al
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- **Comparison of NIST SA13a and SA4b SQUID Array Amplifiers (vol 193, pg 600, 2019)** *JOURNAL OF LOW TEMPERATURE PHYSICS*
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2019; 5 (2): 021017
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Bennett, D. A., Mates, J. B., Bandler, S. R., Becker, D. T., Fowler, J. W., Gard, J. D., Hilton, G. C., Irwin, K. D., Morgan, K. M., Reintsema, C. D., Sakai, K., Schmidt, D. R., Smith, et al
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Bandler, S. R., Chervenak, J. A., Datesman, A. M., Devasia, A. M., DiPirro, M., Sakai, K., Smith, S. J., Stevenson, T. R., Yoon, W., Bennett, D., Mates, B., Swetz, D., Ullom, et al
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Sakai, K., Adams, J. S., Bandler, S. R., Bennett, D. A., Irwin, K. D., Mate, J. B.
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