

Poster

A Study of Al-Mn TES Engineering for Stability with Frequency Domain Multiplexing

Elizabeth George (UC Berkeley)

Co-Authors: E. M. George, P. Ade, K. A. Aird, J. E. Austermann, J. A. Beall, D. Becker, A. Bender, B. A. Benson, L. E. Bleem, J. Britton, J. E. Carlstrom, C. L. Chang, H. C. Chiang, H-M. Cho, T. M. Crawford, A. T. Crites, A. Datesman, T. de Haan, M. A. Dobbs, W. Everett, A. Ewall-Wice, N. W. Halverson, N. Harrington, J. W. Henning, G. C. Hilton, W. L. Holzapfel, S. Hoover, N. Huang, J. Hubmayr, K. D. Irwin, M. Karfunkle, R. Keisler, J. Kennedy, A. T. Lee, E. Leitch, D. Li, M. Lueker, D. P. Marrone, J. J. McMahon, J. Mehl, S. S. Meyer, J. Montgomery, T. E. Montroy, J. Nagy, T. Natoli, J. P. Nibarger, M. D. Niemack, V. Novosad, S. Padin, C. Pryke, C. L. Reichardt, J. E. Ruhl, B. R. Saliwanchik, J. T. Sayre, K. K. Schaffer, E. Shirokoff, K. Story, C. Tucker, K. Vanderlinde, J. D. Vieira, G. Wang, R. Williamson, V. Yefremenko, K. W. Yoon, E. Young

We developed 84-pixel arrays of 150 GHz Al-Mn transition edge sensor (TES) polarimeters for the South Pole Telescope polarimeter (SPTpol), which was deployed in January 2012. The devices use Al-Mn TESes, tuned for use with frequency domain multiplexing (fMUX) readout. Using the fMUX readout, initial detector prototypes exhibited instability consistent with a compound TES model when operated deep in the superconducting transition. This issue was addressed with a study of 80 different devices with combinations of various heat capacities, couplings of the heat capacity to the TES, and engineered TES transitions. We present measurements of the different TES designs studied, and conclude with the results of our study: the design and performance of the fielded SPTpol TES detectors.