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***In-situ* broadband microwave calibrations and measurements using cryogenic probe stations** JEFFREY LINDEMUTH, SCOTT YANO, Lake Shore Cryotronics — Until recently, calibration of microwave measurements in cryogenic environments required custom fixtures [1,2]. These fixtures were necessary to accommodate the limited space in typical "down bore" cryostat designs. The typical three measurements (through, short, load, for example) required removing the fixtures from the cryostat three times before loading the sample of interest. We will show that with a 4-probe cryogenic probe station it is possible to simultaneously load a commercially available calibration test strip and the measurement sample. We will demonstrate calibration of the complete S matrix of the microwave network analyzer at each temperature followed by measurement of the sample. In addition, the temperature-dependent effects of the calibration can be determined. We will show short term and long term calibration stability.
[1] Broadband calibration of long lossy microwave transmission lines at cryogenic temperatures using nichrome films, M. L. Stutzman, Mark Lee, and R. F. Bradley, Rev. Sci. Instrum. 71, 4596 (2000)
[2] Broadband microwave spectroscopy in Corbino geometry for temperatures down to 1.7 K

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