Abstracts

Calibration and Applications of Polarization-Correlating Radiometers

A.J. Gasiewski and D.B. Kunkee. "Calibration and Applications of Polarization-Correlating Radiometers." 1993 Transactions on Microwave Theory and Techniques 41.5 (May 1993 [T-MTT]): 767-773.

Hardware and associated software for non-mechanical rotation of the polarization basis of a dual linearly-polarized cross-correlating radiometer are demonstrated. The technique requires precise measurement of two orthogonal-mode antenna temperatures along with cross-correlation of the two orthogonal-mode field amplitudes. Collectively, these are the first three Stokes parameters. A polarized blackbody load was developed for accurate calibration of the orthogonal-mode and cross correlating channels. Using the hardware, rotation of the radiometer antenna's polarization basis by a matrix transformation was demonstrated by 91.65-GHz near-Brewster angle scans of a polarizing water surface. The experimental results demonstrate the viability of the rotation technique and suggest practical calibration schemes for airborne and spaceborne polarimetric radiometers. Application of the rotation technique in mechanically-scanned polarization-sensitive imaging radiometers will eliminate polarization coupling inherent in conventional fixed-feed dual-polarization scanner designs.

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