Abstracts

Laboratory Demonstration of Electronic Polarization Basis Rotation

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A hardware and software technique for rotation of the polarization basis of a dual orthogonal-linearly polarized radiometer is discussed. The technique requires precise measurement of the two orthogonal-mode antenna temperatures along with cross-correlation of the two mode amplitudes (the first three Stokes parameters). An innovative polarized blackbody load was developed for accurate calibration of the cross-correlating channel. Using 90-GHz near-Brewster angle observations of a polarizing water surface, rotation of the antenna's polarization basis by a matrix transformation was performed. The experimental results demonstrate the viability of Electronic Polarization Basis Rotation (EPBR) and suggest practical calibration schemes for full-polarization radiometers. Applications of EBPR include mechanically-scanned polarization-sensitive imaging radiometers.

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