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Wide-Bandwidth Polarimetry with the Allen Telescope Array

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New kinds of feed design and signal processing are opening new domains in wide-bandwidth polarimetry. Wide, continuous bandwidths are particularly powerful when applied to the study of rotation measure. Mixed emitting and Faraday-rotating media can create complex frequency structure in the polarization properties of radio sources; such complexities can confuse narrow-bandwidth observations. We test and demonstrate the polarimetry capabilities of the Allen Telescope Array, a 42-element radio interferometer located in northern California. We show results from a rotation measure study of roughly 40 compact, bright polarized sources throughout the sky from 1.0 to 2.0 GHz. We establish a calibration procedure and measure the ATA's systematic polarization properties. While most rotation measures correlate well with narrow-band observations, there are a few noteworthy outliers.

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