Solar Active Region Emission Study Using Spatio-Spectral Maximum Entropy Method

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Quiescent solar radiation, at microwave spectral regime, is dominated by gyroresonant and thermal Bremsstrahlung radiations from hot electrons residing in solar active region corona. These radiations are known to provide excellent diagnostics on the coronal temperature, density, and magnetic field, when spatially resolved spectra are determined from observations. In this paper we present an imaging spectroscopy implemented for a bipolar active region, AR 7912, using the multifrequency interferometric data from the Owens Valley Solar Array (OVSA). The data are processed with a new imaging technique, so-called Spatio-Spectral Maximum Entropy Method (SSMEM). From the microwave maps at 26 frequencies in the range of 1.2--12.4 GHz at both right- and left-circular polarizations, we construct spatially resolved brightness spectra in every reconstructed pixel of about 2 arcsec interval. From these spectra we determine 2-D distribution of electron temperature, magnetic field of coronal base, and emission measure at the coronal base above the active region. We briefly compare the present result with existing studies of the coronal active regions.