

Power spectra of the electron density fluctuation in the solar corona obtained by radio occultation observations

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The Venus orbiter Akatsuki is now in orbit around the Sun. Using Akatsuki, we have conducted radio occultation observations of the solar corona from June 6, 2011 to July 8, 2011. The method utilizes radio waves that are transmitted from the spacecraft and penetrate the solar corona when the spacecraft is occulted by the sun as seen from the Earth. Due to the movement of small-scale density irregularities across the ray path, the frequency (phase) and intensity of the signal received at the ground station change with time. By analyzing these time series we could get information on the power spectrum of the electron density fluctuation. The observations were conducted at solar offset distances of 1.5-20.5 R_s (R_s is solar radius), a region which is not well studied in the previous observations. Coordinated simultaneous observations using the space solar telescope Hinode were also conducted from June 24 to 25 when the ray path from Akatsuki was especially close to the sun.

In this paper we will present the radial variation of the power spectrum of the electron density fluctuation. The spectra show Kolmogorov-like logarithmic slopes at far distances, while knee features are seen at close distances.

Keywords: radio occultation observations, solar corona