

Radio Star Scintillations at 50Mhz. Produced by Electrojet
Irregularities (Poster)

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In connection with the Shoemaker-Levy comet collision with Jupiter, scans of Hydra-A, a radio star, was made with the Jicamarca large antenna array (50 MHz), for calibration purposes. The scans were made during the day when electrojet conditions were present. It was found that the power signature of the star scintillated as much as 40 percent with a time scale of the order of ten seconds. The scintillation is attributed to large scale E-region irregularities in the km length scale drifting at a speed of 136 m/sec. This discovery gives us an additional tool for the study of the important large scale primary irregularities in the electrojet.

Figure Captions

Fig. 1) Records of received power in the two halves of the Jicamarca Antenna during the transient of Hydra A on August 9, 1994. The two halves of the antenna are separated by 150 meters projecting 106 meters in the E-W direction. The length scale on top has been placed a posteriori after evaluating the true drift velocity by a full correlation technique (see Figure 2a).

Fig. 2a) Auto and cross-correlation of the signal powers displayed in Figure 1. The center panel shows the crossing of the two curves. The true velocity is obtained by $v = d/2\tau_c = 106/2 \times 0.4 = 132$ m/sec, where τ_c us the displacement time at the crossing. The small panell shows the autocorrelation at longer delays after weighting it with a gaussian window.

Fig. 2b) Frequency power spectrum of the fluctuations obtained as the transform of the weighted auto-correlation shown in Figure 1. The scale on top has been converted to a wave member scale assuming a drift velocity of 132.6 m/sec obtained from Figure 1a). Note the peak corresponding to length scales in the 1 km range. These length scales have been postulated as the primary (type II) unstable waves which generate secondary unstable waves at smaller length scales. The oscillating dotted line corresponds to a Fresnel filter for $z=100$ km, and the Gaussian doted line to the antenna size filter.

Hydra-A Transit Jicamarca - August 9, 1994

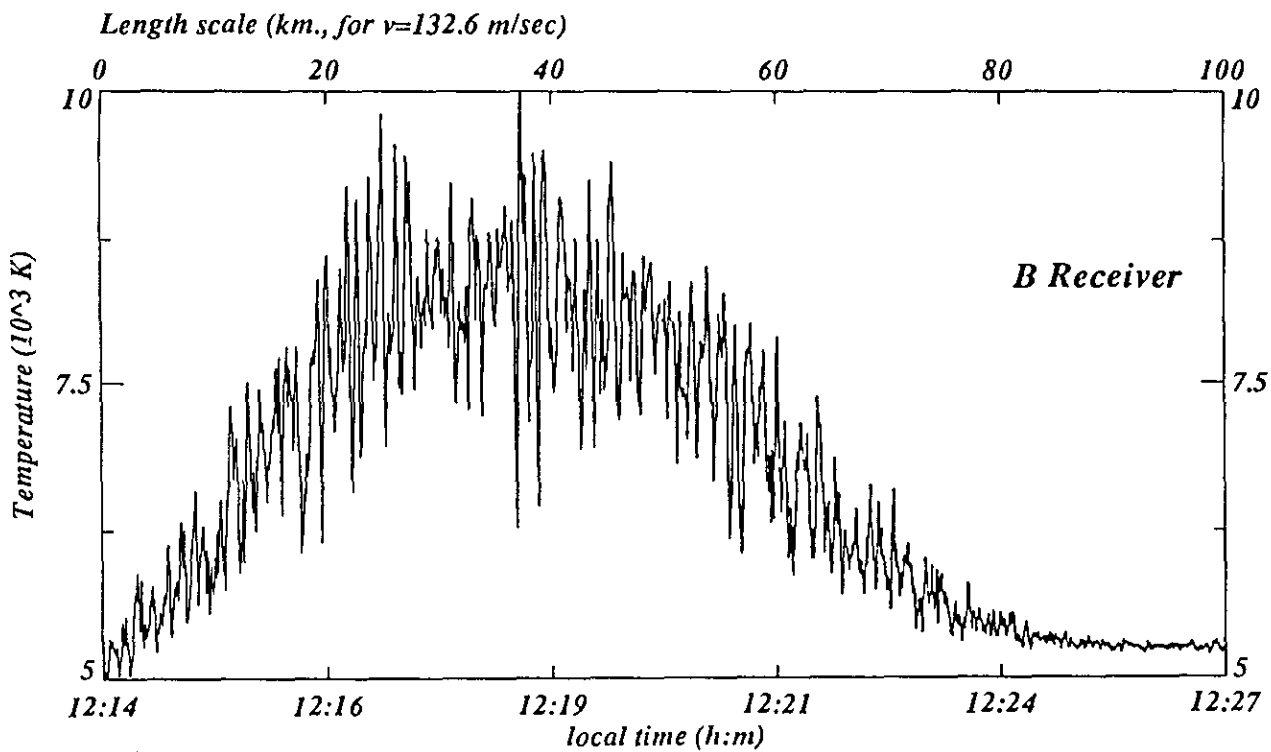
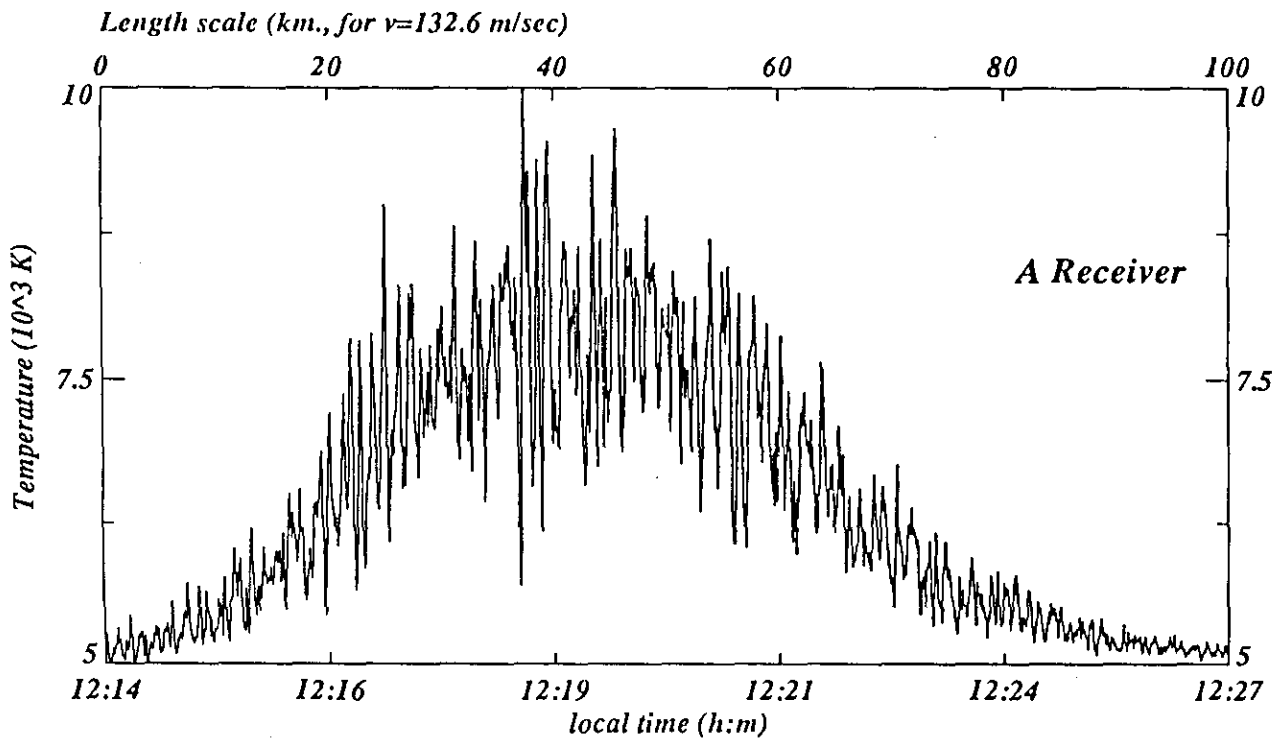
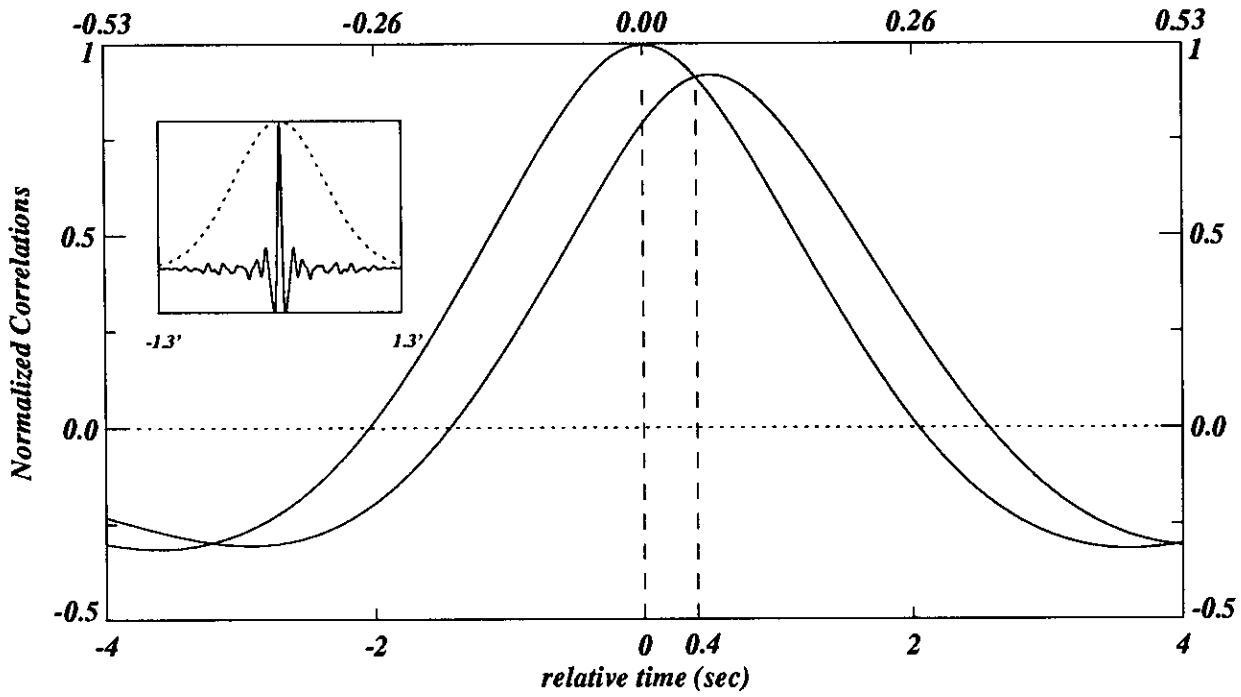


Fig 1

x

Correlation and Crosscorrelation Functions of Scintillating Fluctuations

Length scale (km., for $v=132.6$ m/sec)



Frequency (and wavenumber) Power Spectrum

wavenumber (radians/km., for $v=132.6$ m/sec)

