

## FEEDS FOR THE EXPANDED VERY LARGE ARRAY TELESCOPE

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The Very Large Array (VLA) synthesis telescope is currently undergoing a major upgrade to improve its scientific capabilities by an order of magnitude in all key observational parameters. As a part of Phase I of the Expanded VLA (EVLA) project, the array will be outfitted with wideband receiver systems at the secondary focus, a state-of-the-art correlator, a fiber optic data transmission system and a new on-line control system. This paper discusses the feeds aspect of the expansion project. The VLA antenna has a 25-m diameter, shaped primary reflector. The secondary focus receivers are mounted on a circle, with a radius of 97.5 cm, around the reflector axis. An asymmetric shaped subreflector focuses the radiation into one of the six (L, C, X, Ku, K and Q) receivers. These receivers have narrow bandwidths of the order of less than 1.3:1. The lowest frequency of operation at the secondary focus is 1.3 GHz.

The EVLA will have eight wideband receivers providing continuous frequency coverage from 1.0 GHz to 50 GHz. In addition to increasing the bandwidth of the existing bands, two new bands (S and Ka) will be added. Gain/System temperature analysis was carried out at three frequencies (3, 10 and 30 GHz) in order to determine the feed taper at the edge of the subreflector for various bands. Limited space in the feed circle led to the selection of a smaller-than-required L-band feed, resulting in compromised performance at the low end of the band. Feeds for the L, C and S bands are compact, corrugated horns with 2:1 bandwidth ratio. The other bands will have linear-taper, corrugated feed horns. All the feeds use ring-loaded corrugations in the mode-converter section and have four corrugations per wavelength in order to keep the cost of machining at a minimum. Various manufacturing techniques will be used for the feeds, depending on the frequency. Comparison of performance between the new L-band feed and the existing feed will be presented.