



## **An Octave Band Dual Polarized Crossed Sleeve Dipole with a Corrugated Conical Reflector for a Parabolic Dish Antenna a Prime Focus Feed.**

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The Giant Metrewave Radio Telescope (GMRT) is an international facility for Radio Astronomy, operational since 2002. It consists of 30 fully steerable parabolic antennas, each of 45 m diameter, spread over an area with an effective radius of nearly 15 km, and covering frequencies in the range of 150 MHz to 1450 MHz with prime focus feeds at bands: 120-240 MHz (Band-02), 250-500 MHz (Band-03) and 550-850 MHz (Band-04). This paper highlights the design for 1000-1500 MHz (Band-05). The existing horn feed for L band is with a BW ratio of 1:1.8 for a return-loss of <-10dB and the edge-taper varying from -14 to -19 dB throughout the band but do not illuminate the entire parabolic dish to reduce spill over and mesh leakage. To improve the sensitivity of the antenna the paper proposes a crossed dipole with corrugated conical reflector with optimized edge-taper performance to reduce the spill over and better illumination of the parabolic dish antenna. The edge-taper was optimized with various cone angle but they limit other performances of the feed. The design uses a corrugation in the conical reflector structure to improve its edge-taper values from -11 dB to -17 dB there by optimizing the parabolic dish illumination and improving the spill over performance. A feed with plain conical reflector has been designed using WIPL-D 3D EM solver and tested on an antenna test range followed by tests on the GMRT antenna. The results show good BW ratio of 1:1.8 for a return-loss of -10dB or less, with the edge-taper varying from -11 to -12 dB. The paper presents the improved cross dipole feed with corrugated conical reflector design and methods adopted to reduce edge-taper from -11 dB to -17 dB for better sensitivity.

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