Abstracts

Helical Coupler from Rectangular-to-Circular Waveguide

C.R. Predmore. "Helical Coupler from Rectangular-to-Circular Waveguide." 1976 Transactions on Microwave Theory and Techniques 24.11 (Nov. 1976 [T-MTT] (Special Issue on Millimeter Waves: Circuits, Components, and Systems)): 847-852.

The very-large-array (VLA) radio telescope utilizes a low-loss TE/sub 01/ circular waveguide transmission system. During the design of this system a coupler was developed which couples directly from a standard millimeter rectangular waveguide to the TE/sub 01/mode in highly over-moded circular waveguide. In contrast to previous couplers which used periodically spaced groups of coupling holes, this design wraps the rectangular waveguide in a helix around the circular waveguide to give a continuous array of coupling apertures for maximum coupling and a compact mechanical configuration. The helix angle is chosen to match the phase velocities of the rectangular and circular waveguide modes at a given frequency. In particular, couplers have been designed and fabricated which couple from WR-28 (26.540-GHz) and WR-22 (33-50-GHz) rectangular waveguides to the TE/sub 01/ mode in 20- and 60-mm-diam circular waveguide.

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