Abstracts

Investigation of Active Antenna Arrays at 60 GHz

A. Rosen, R. Amantea, P.J. Stabile, A.E. Fathy, D.B. Gilbert, D.W. Bechtle, W.M. Jantom, F.J. McGinty, J.K. Butler and G.A. Evans. "Investigation of Active Antenna Arrays at 60 GHz." 1995 Transactions on Microwave Theory and Techniques 43.9 (Sep. 1995, Part I [T-MTT]): 2117-2125.

There has been a significant effort to develop millimeter-wave active-array antennas for communications and radar applications. A dielectric waveguide is a promising medium for this application. However, the integration of active devices, transmission media, and antennas has been difficult to achieve. This paper presents the first successful demonstration of a phase locked array of millimeter wave grating surface emitters (MMWGSE). We discuss three aspects of MMWGSE: 1) The achievement of an optically steered millimeter wave grating surface emitter. 2) The demonstration of a frequency locked array of millimeter wave grating surface emitters. 3) Rigorous analytical studies of efficiently coupling power from a millimeter wave semiconductor device, to a waveguide which incorporates grating surface emitters. This work leads to a full monolithic array using pseudomorphic high electron mobility transistor (PHEMT)-devices.

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