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Abstract:Optically pumped THz sources generate power in GaAs semiconductors via photoconductive interaction mechanisms over very large bandwidths. However, they are typically affected by low efficiencies, also because of the poor radiation efficiency of the wide band antennas that are used to radiate the THz power in free space. This paper compares the gain performances of systems based on state of the art linearly polarized lens antennas with the ones, proposed here for the first time, that could be obtained by printing these same antennas on micrometric membranes kept at small distance from the lens. The advantages in terms of efficiency and useful bandwidth (BW) intrinsic in these designs are shown to be important, especially in the higher frequency ranges. Among these enhanced designs, the best performing feed is shown to be the recently introduced leaky lens antenna, which outperforms other geometrical options in terms of pattern symmetry and polarization purity for time domain based THz power generation systems. © 2012 IEEE.
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