

Abstract Submitted
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A Periodic Dielectric Resonator Structure for Terahertz Wave Amplification OLUTOSIN FAWOLE, MASSOOD TABIB-AZAR, Department of Electrical and Computer Engineering, University of Utah — We present a periodic Slow Wave Structure (SWS) that consists of an arrangement of closely spaced cylindrical resonators with low dielectric constant. In this compact arrangement, coupling between resonators was via evanescent field coupling. This arrangement contrasts earlier infinite high dielectric constant SWSs with widely spaced resonators coupled via magnetic dipole moments. The presented periodic structure is an alternative to the metallic slow wave structures that have been proposed for TWT THz amplifiers. The fabricated low frequency (8 GHz) prototype of our structure consists of an array of cylindrical resonators with dielectric constant 9.2, diameter 12 mm, and height 6.35 mm. Slow waves, which setup a $TE_{01\delta}$ -like electric field mode in each resonator, propagate in the structure when then the structure was excited with a microstrip line. We will present detailed simulation and experimental results of this prototype at the conference. Furthermore, efforts to scale the SWS to THz frequency and to interact the SWS with high-energy particle beams will be presented.

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