Abstract Submitted
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Student Excellence Award Finalist: Three Dimensional Microplasma/Metal/Dieletric Photonic Crystal : Dynamic Bandstop Filters[1] PETER P. SUN, WENYUAN CHEN, RUNYU ZHANG, Univ of Illinois - Urbana, ZHIHU LIANG, Xian Jiaotong University, PAUL BRAUN, J.GARY EDEN, Univ of Illinois - Urbana — We demonstrate dynamic bandstop filters in the 120 – 170 GHz region based on 3D photonic crystals microcolumn plasmas in metal/dielectric scaffold. Comprising 200 - 400 micrometer diameter columns of low temperature plasma, these photonic crystals have functional structures with staggered geometries capable of being reconfigured electronically. The Blue shifts of specific attenuation peaks by more than 2 GHz has been demonstrated through one 3D dielectric plasma photonic crystal design. Narrow band (<1GHz) attenuation over 18 dB is demonstrated at 138 GHz through 3D metallic plasma photonic crystals. The presence of plasma also increases the Q of several resonances to >2000. The ability to control three-dimensional arrays of microplasma columns in compact (˜100 mm^3) polymer structures offers enormous versatility for microwave devices and communications systems.

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Peter P Sun
Univ of Illinois - Urbana

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