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**2D Plasma Photonic Crystals in resonantly pumped Cesium Vapor** FABIO RIGHETTI, MARK CAPPELLI, Stanford University — Plasma photonic crystals (PCs) afford the opportunity for dynamic reconfigurability. In this presentation we describe the conditions required for constructing an all-plasma PC that can interact with sub mm-wavelength radiation. Conditions required for this interaction are high plasma densities ($>10^{14}$ cm$^{-3}$) and small lattice constant ($<1$ mm). We describe the construction of a two-dimensional photonic crystal composed of several sub-millimeter plasma filaments in a 1 Torr heated cesium vapor cell. The cesium is ionized by 1 W continuous-wave laser excitation with the wavelength centered around the 852 nm resonance line. The filaments are produced by focusing the laser through a microlens array with a 500 m pitch. Small departures from line center are found to produce a strong variation in the plasma filament structure and density. Stark broadening measurements of the cesium 9F-5D transition at 647.4 nm yield plasma density. We present preliminary terahertz transmission spectrum of the two-dimensional plasma photonic crystal structure. Experimental results are compared to numerical simulations which predict the presence of bandgaps in regions of both negative and positive plasma dielectric constant.

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