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A Microwave Trap for Atoms and Molecules SID WRIGHT, THOMAS WALL, MICHAEL TARBUTT, Imperial College London — We demonstrate a trap that confines polarizable particles around the antinode of a standing-wave microwave field. The trap relies only on the polarizability of the particles far from any resonances, so can trap a wide variety of atoms and molecules in a wide range of internal states, including the ground state. The trap has a volume of about 10 cm^3, and a depth approaching 1 K for many polar molecules. We measure the trap properties using ^{7}Li atoms, showing that when the input microwave power is 610 W, the atoms remain trapped with a $1/e$ lifetime of 1.76 (12) s, oscillating with an axial frequency of 28.55(5)Hz and a radial frequency of 8.81 (8) Hz. The trap could be loaded with slow molecules from a range of available sources, and is particularly well suited to sympathetic cooling and evaporative cooling of molecules.

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