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Experimental observation of strong microwave-induced force in parallel-plate metallic cavity Z. MARCET, University of Florida, Hong Kong University of Science and Technology, Z.H. HANG, S.B. WANG, C.T. CHAN, H.B. CHAN, Hong Kong University of Science and Technology — It has long been known that light induced forces have an impact on matter. These forces, albeit small, have found various applications in physics, chemisty and biology. The magnitude of this induced force is directly related to the momentum carried by light. With a much longer wavelength than visible light, microwave rediation is commonly regarded to having negligible mechanical impact on macroscopic objects. Here we present the first experimental demonstration of a strong repulsive force induced by incident microwave radiation in parallel centimeter-sized metallic plates. We found that the microwave radiation induced force can be significantly stronger than the usual photon pressure exerted by the incident beam when the cavity is excited at resonance, as strong electromagnetic energy is trapped inside the cavity walls. There is good agreement between experimental measurement and calculations using a boundary element method and the Maxwell stress tensor formalism. Our effort may bring new applications of microwave manipulations in the microwave and metamaterial communities.

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[X] Prefer Oral Session
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