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Probing microwave absorption at periodic domain walls induced by domain wall vibration YEN-LIN HUANG, Department of Materials science and Engineering, National Chiao Tung University,, LU ZHENG2, Department of Physics, University of Texas at Austin,, YING-HAO CHU, Department of Materials science and Engineering, National Chiao Tung University,, KEJI LAI, Department of Physics, University of Texas at Austin, — Multiferroic domain walls can serve as the building blocks for new generation electronics due to their novel functionalities and the nature of fine feature and electrically controllable motion. In the last decades, researchers have shown that domain wall can exhibits physical properties that would not be found in its parent domain, such as conductive or superconductive domain walls in insulating materials and ferromagnetic domain walls in antiferromagnets. Here, we demonstrate an extraordinary microwave absorption induced by domain wall vibration at as-grown 1-D array of charge neutral domain walls in $BiFeO_3$ thin film with microwave impedance microscopy. The energy dispassion induced by domain wall vibration has been simulated and supported by finite element analysis. In contrast to the charge neutral domain walls, the microwave absorption observed at charged domain walls is attributed to the enhanced DC conductivity at the walls. Our observation deepens the understanding of microwave absorption behaviors at the domain wall in $BiFeO_3$ under a wide range of microwave frequency and might pave the way to next-generation RF devices.

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