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Planar Millimeter Wave Notch Filters Based on Magnetostatic Wave Resonance in Barium Hexagonal Ferrite Thin Films LEI LU, YOUNG-YEAL SONG, JOSHUA BEVIVINO, MINGZHONG WU, DEPARTMENT OF PHYSICS, COLORADO STATE UNIVERSITY TEAM — There is a critical need for planar millimeter (mm) wave devices. To meet this need, one important strategy is in the use of high-anisotropy hexagonal ferrite films. The high internal anisotropy field for the hexagonal ferrites can be used to realize low-loss devices in the 30-100 GHz regime without the need for high external magnetic fields. Previous work has demonstrated the use of M-type barium hexagonal ferrite (BaM) films and ferromagnetic resonance therein to make mm-wave notch filters. This presentation reports on a new mm-wave notch filter that uses magnetostatic wave (MSW) resonance in BaM films. The device consists of a BaM film strip positioned on the top of a coplanar waveguide (CPW), with the strip's length along the CPW signal line. The BaM strip was grown by pulsed laser deposition and had uniaxial anisotropy along the strip's length. The device showed a band-stop filtering response centered at 53 GHz in absence of external fields. One can increase this frequency with nonzero external fields. A reduction in the strip's width resulted in an enhancement in peak absorption. This filtering response resulted from MSW resonance across the BaM strip's width. The MSW modes were excited by CPW-produced non-uniform alternating magnetic fields.

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