Acoustic Demultiplexer Mediated by Stub-Loaded Waveguides: Computational Simulation[1] JENNIFER LOPEZ, Grinnell College, ALEXANDER LAVERDE, University of Alabama Tuscaloosa , CARINA VAZQUEZ, WILLIAM ROBERTSON, Middle Tennessee State University — Previous studies of stub-loaded waveguides have used resonant structures such as Helmholtz resonators, closed- ended and open-ended stubs, and loop filters to research Fano and electromagnetically induced transparency (EIT) resonances. As a result of constructive and destructive interference, Fano resonances arise. Based on acoustically induced transparency (AIT) and Fano resonances, the cross-shaped acoustic demultiplexer is the center of our study. This work describes an acoustic wave demultiplexer based on the use of stub-loaded waveguides containing one input line on top of two output lines. A demultiplexer selectively transmits specific frequencies from an input signal while reflecting all the rest. The results of theory, simulation, and experiment are compared in this study. Using Python, we were able to model the transmission along each output in a Y-shaped waveguide based on a theoretical model. Using COMSOL Multiphysics, we simulated the same cross-shaped structure showing that it replicates the theoretical curve as given by our Python program. Finally, the system was characterized experimentally using the same parameters.

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