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**Acoustic Frequency Splitting in Thermoacoustically Driven Coupled Oscillators with Fibrous Stacks**[1] BONNIE ANDERSEN, JACOB WRIGHT, CORY HEWARD, EMILY JENSEN, JUSTIN BRIDGE, Utah Valley University — Frequency splitting or level repulsion occurs near the point where the two resonant modes coupled oscillators intersect as one parameter is varied that allows the resonance of one to pass through the resonance of the other. A thermacoustic stack, which provides internal self-sustained oscillations, placed inside the neck of a closed bottle-shaped resonator can set up standing waves of the coupled neck-cavity system. A simplified model for using a fibrous stack is presented. A one dimensional wave equation with appropriately applied boundary conditions of the bottle system reveal the mode splitting between the neck and cavity modes. Thermoacoustic engines with bottle-shaped resonators were tested while varying one of three geometric parameters. All exhibit frequency splitting in good agreement with the model. Graphs of the solutions of the wave equation readily illustrate the mode splitting of the coupled oscillator system.

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