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Modeling the acoustic excitation of a resonator SHREYAS MAN-DRE, LAKSHMINARAYANAN MAHADEVAN, Harvard University — The sounding of a beverage bottle when blown on is a familiar but very little understood phenomenon. A very similar mechanism is used by musical wind instruments, like organ pipes and flutes, for sound production. This phenomenon falls under the general umbrella of flow induced oscillations and is representative of a more generic mechanism. The modeling of this phenomenon essentially involves two components. The first is the resonator, which bears the oscillations and this component is very well understood. The resonator, however, needs an external energy input to sustain the oscillations, which is provided by the jet of air blown. The dynamics of the jet and its interaction with the resonator is the primary focus of this talk. In particular, we provide a linearized model based on first principles to explain the feedback of energy from the jet to the resonator and compare the predictions with experimental results.

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