Traveling thermoacoustic waves in solids

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Project Description

- To show the existence of traveling thermoacoustic (TA) waves in solid media and the energy conversion process.
- Traveling TA wave has significantly larger growth rate than its standing wave counter part for the same wavelength.

Approach

- The existence of traveling TA waves is validated by a quasi-1D eigenvalue model numerically.
- Developed a perturbation energy budget analytically to analyze the energy conversion process.

Discussion

- Heat-induced traveling wave is found in solids numerically.
- TA instability is stronger in traveling wave modes than standing wave ones at the same wavelength.
- Traveling wave solid-state TA engine is more efficient.

Results

This study provokes new generations of solid-state engines!