

Faraday Wave Patterns of Granular Particles with Active Living Forces

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- Approximately 108 billion lbs. of food is wasted each year

Solving Method

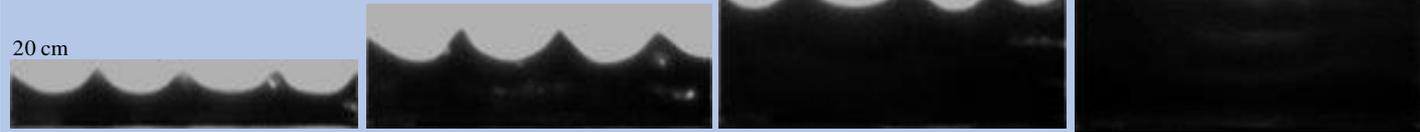


- Feeding the food waste to the larvae is promising to resolving the problem
- Using air fluidization allows us to raise Black Soldier Fly Larvae in denser aggregations
- Structured Faraday waves allows the process to be more controlled
- This study allows us to investigate the effects of active living forces on Faraday wave patterns

Structured Faraday Waves: Experiments

- Here are structured Faraday waves in granular particles using both gas flow and vibration

20 cm



Structured Faraday Waves: Simulations



Mechanism

Velocity : $1.2 U_{mf}$

Frequency: 10 Hz

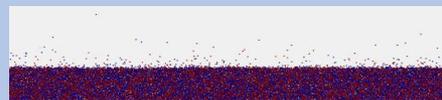
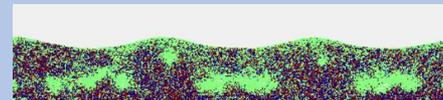
Amplitude: 2 mm

Std_ $F_1 = 1 \times 10^{-5} N$

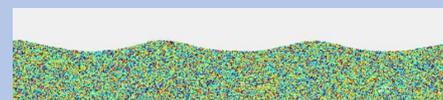
Std_ $F_1 = 1 \times 10^{-7} N$



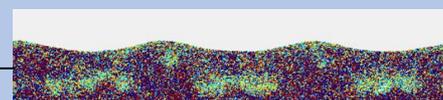
$$\frac{F_c}{mg}$$



$$\frac{F_1}{mg}$$



$$\frac{F_c + F_1}{mg}$$



- If the magnitude of the active forces are **NOT** dominate over the contact forces, then Faraday waves **CAN** be recreated.

- But if the magnitude of the active forces **ARE** dominate over the contact forces, then faraday waves **CANNOT** be recreated