

Description of Additional Supplementary Files

Supplementary Movie 1

Description:

Section 1:

The external excitations applied as source 1 with 10KHz;
The external excitations applied as source 2 with 10KHz;
The external excitations applied as source 1 with 23.5KHz;
The external excitations applied as source 2 with 23.5KHz.

Section 2:

Model i under source 1 with 0.002m/s compression speed;
Model ii under source 1 with 2m/s compression speed;
Model iii under source 1 with 2m/s stretching speed;
Experimental tests of model I under source 1 with 0.002m/s and 2m/s compression speed;
Model I under source 2 with 0.002m/s or 2m/s compression speed (identical response);
Metamaterials (2×2 model i units) under source 1 with 2m/s compression speed.

Section 3:

Satellite docking process with an initial speed of 0.3m/s;
Satellite docking process with an initial speed of 1.5m/s.