

### Supplementary Information:

The leaf-like GRIN PCL consisting of 15 leaf-like unit cells with a line source-excited along the  $\Gamma X$  direction is shown in Fig. S1.1, where the dimension of the plate is  $360 \times 190 \times 3$  mm. The leftmost unit cell is 100 mm away from the left edge of the plate. A line source in the form of five-cycle tone burst is excited and the transient displacement field is obtained in the central point of the 6th leaf-like unit cell. The considered GRIN PCL has a boundary condition that fixed at the upper and lower edges and free at the left and right edges.

Figure S1.2 shows the photo of the fabricated leaf-like GRIN PCL with 15 leaf-like unit cells on each side of an aluminum plate.

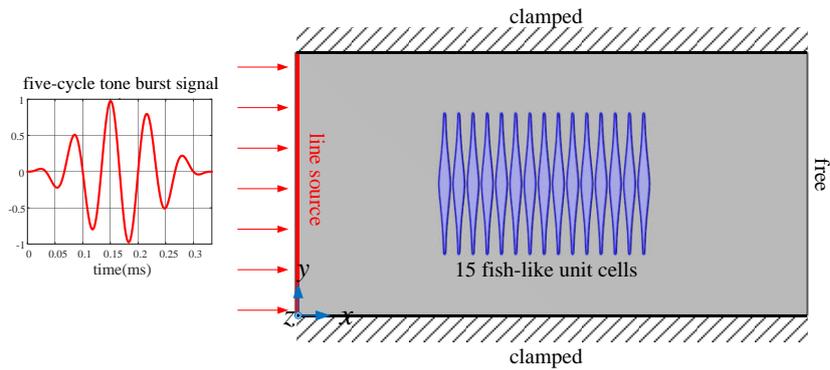


Figure S1.1. The CFCF plate with leaf-like GRIN PCL model, composed of 15 leaf-like unit cells.

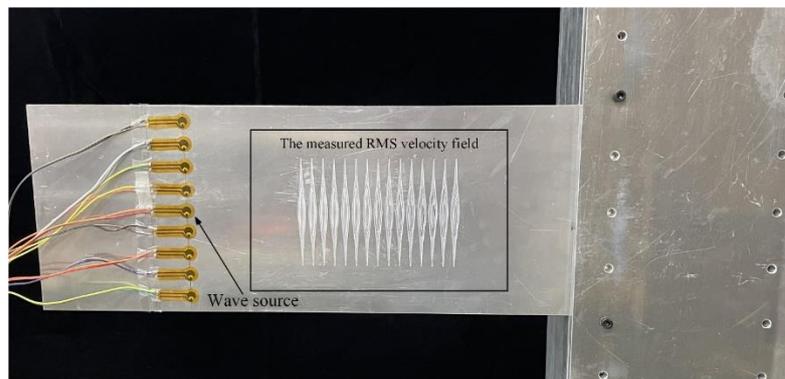


Figure S1.2. The experimental setup of a cantilever plate with the proposed leaf-like GRIN PCL.