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## Modulating acoustic Fano resonance of self-collimated sound beams in two dimensional sonic crystals

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Controlling the lineshape of Fano resonance has great potential applications. Here we propose a type of acoustic Fano resonator, which is composed of a multi-layer zigzag line defects (ZLDs) sandwiched by double-layer zigzag steel rods in two-dimensional sonic crystals (SCs). We have theoretically and experimentally observed the asymmetric Fano resonances caused by the interference between the resonant and propagating self-collimated acoustic waves. It is demonstrated that the resonance dip frequency and Fano profile can be modulated by adjusting the structure parameters of the SC-based resonator. Our finding provides an efficient approach to manipulate sound propagation for future acoustic devices.

**Keywords:** Acoustic Fano resonance; Self-collimating effect; Sonic crystals

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