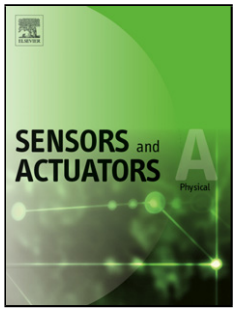

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A method of broadening the bandwidth by tuning the proof mass in a piezoelectric energy harvesting cantilever

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Abstract

We propose and demonstrate a new method for broadening the bandwidth of a piezoelectric energy harvesting cantilever by tuning a proof mass. Our approach is to make the bandwidth broad by decreasing the difference between two consecutive flexural resonance frequencies of the cantilever. The prototype broadband energy harvesting device consists of a cantilever with double piezoelectric patch and a tuned proof mass, which is composed of two different materials: aluminium and brass. We tuned resonance frequencies of the device based on the optimal design framework. In order to prove the effectiveness of the proposed device, prototypes of two cantilevers, one with a tuned proof mass and the other with a conventional proof mass, were manufactured and the same bimorph cantilever were used in prototypes. Per-

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