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Harnessing geometric and magnetic nonlinearities in phononic meta-plates OSAMA BILAL, ANDRE FOEHR, CHIARA DARAIO, Department of Mechanical and Process Engineering, ETH-Zurich — Owing to their physical realization, locally resonant metamaterials retain narrow subwavelength band gaps. Moreover, the fixed geometry and dimensions of the unit cell set a hardbound on the central frequency of the operational bandwidth. Real-time tunable metamaterials extend the range of applications and further enable the realization of new sensors, filters, and switches. Our work harnesses the interaction between geometric nonlinearity and nonlinear magnetic potentials to engineer frequency-agile subwavelength band gaps. The concept is general and applicable to various metamaterials systems. Both numerical simulations and experimental realization of the proposed concept will be presented.

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