

## Quasi-Periodic Lattices: pattern matters too

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Two kinds of behavior are commonly distinguished among porous architected materials: stretching-dominated and bending-dominated ones. Each is favored depending on the mechanical application [1]: stiffness/integrity for stretching-dominated and energy dissipation for bending-dominated. Random foams and periodic lattices has been widely studied but not quasi-periodic ones, while they combine the advantages of both structure types : highly deterministic with long-range order but also locally disorganized. mechanical behavior. They can also exhibit a global isotropic behaviour and a better failure resistance [2]. Few studies have investigated their mechanical behavior, and the impact of the elementary pattern shape has never been considered [3]. In the present study, we propose a classification of quasi-periodic structures depending on their dominance type by analyzing the bending-to-stretching elastic energy ratio via numerical simulations on mesoscopic models. Three different dominance behaviors are observed, depending mainly on the elementary pattern shape: completely stretching or bending dominated and varying dominance. So does the overall mechanical behavior.

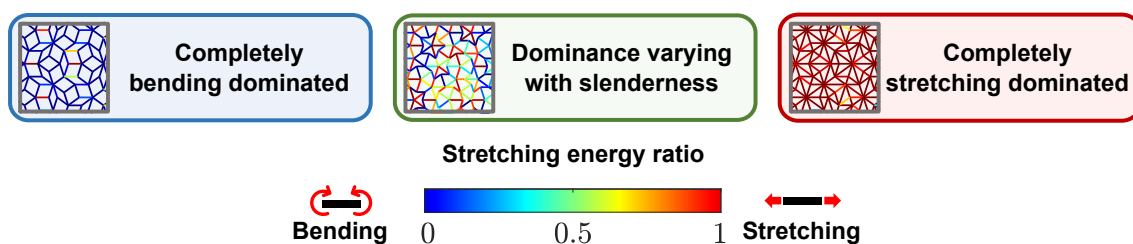


Figure 1: Example of the distribution of the stretch energy ratio for different patterns.

## REFERENCES

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