

# Design and Application of Auxetic Meta-Materials

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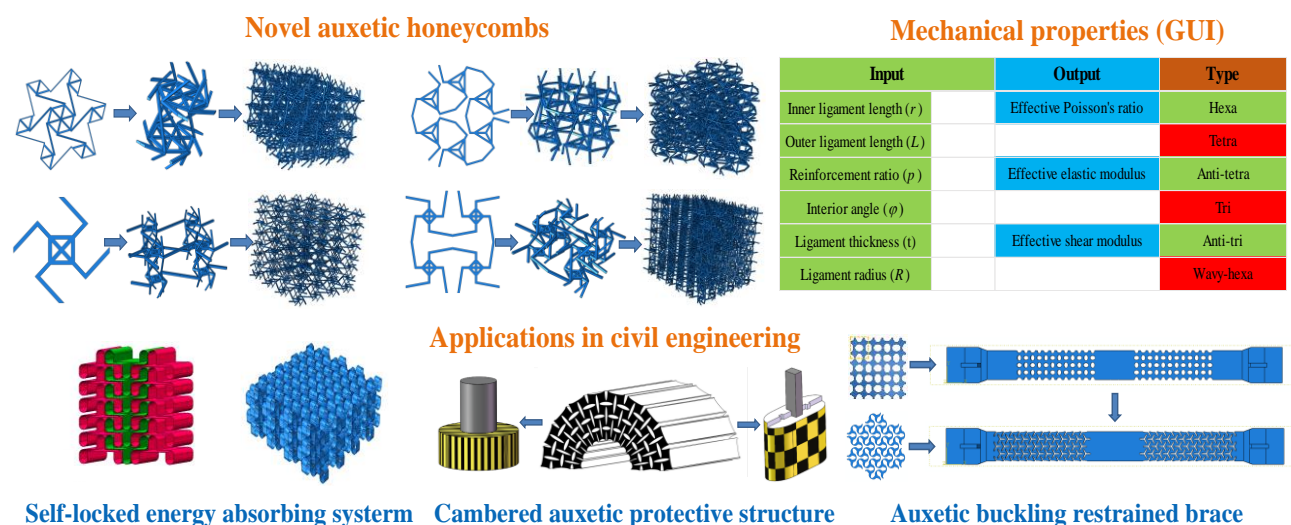
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## Graphical Abstract



## Abstract

As one of the most studied mechanical metamaterials, auxetics with negative Poisson's ratio (NPR) effect are functional structural materials developed rapidly since the 1990s. Due to the NPR effect, auxetics have many unique mechanical properties, such as extraordinary elastic constants and superior indentation resistance, energy absorption capacity, impact resistance, fracture toughness, and fatigue resistance. The advanced mechanical properties make them potential candidates for a broad range of applications, and thus attract extensive attention of scholars. Although great progress has been made in the research of auxetic metamaterials, there are still shortcomings such as complex NPR evolution and expensive material fabrication (most require additive manufacturing). This research is devoted to designing novel structures with tunable constant NPR over a large deformation range, exploring the process of modularized methodology to fabricate complex auxetic structures, and extending their engineering applications.

**Keywords:** Auxetic metamaterials; negative poisson's ratio; mechanical metamaterials; self-locked system.

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## Biography of Presenting Author



**Zhu Yilin**, male, born in March 1988, doctor, associate researcher fellow, master tutor, Postdoctoral research fellow in National University of Singapore, high-level overseas students in Sichuan Province. He has long been committed to the research on multi-field cyclic constitutive theory, as well as the optimal design, basic mechanical properties and application of mechanical meta-materials. In recent years, He has funded by more than 10 research projects and published nearly 30 high-level academic articles.

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