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Effect of Cross-Sectional Geometry on Magnetic Actuation of Lamellar Structures from Magnetoactive Elastomers

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Magnetic elastomer (MAE) surfaces can be patterned into lamellar microstructures by laser machining. A uniform magnetic field can actively manipulate these structures. Our minimal hybrid model captures the lamellae deflection process and can explain the observed structural frustration in terms of dipolar magnetic interactions between neighboring lamellae and the random distribution of magnetic particles within each lamella[1]. Laser machining enables the fabrication of highly versatile lamella cross-sectional geometries, offering substantial design freedom in tailoring the microstructure morphology. Building on our model, we systematically investigate how engineered asymmetries in these microstructures influence and enhance the degree of controllable deflection under uniform magnetic fields and compare our results to experimental observations.

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References

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