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Pantographic Metamaterials Show Atypical Poynting Effect Reversal

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## Highlights

- Pantographic lattice structures shown to have highly nonlinear Poynting effect.
- Positive to negative Poynting effect reversal observed during torsion experiments.
- 2<sup>nd</sup> gradient continuum model of pantographic structures predicts the observed Poynting effect.
- Small changes in micro-dimensions/mechanisms shown to greatly alter the overall behavior.

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