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Size effects in nonlinear periodic materials exhibiting reversible pattern transformations

M.M. Ameen, O. Rokoš, R.H.J. Peerlings, M.G.D. Geers

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**Highlights**

- Size effects in elastic periodic metamaterials significantly influence overall behaviour.
- Induced size effects cannot be captured by conventional homogenization schemes.
- Deviations of overall solutions from homogenized limits exceed 40% at small scale ratios.
- Relative magnitudes of fluctuations in nominal quantities induced by spatial positioning of a microstructure reach 50%.

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