Size effects in nonlinear periodic materials exhibiting reversible pattern transformations

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

PII: S0167-6636(17)30715-9
DOI: 10.1016/j.mechmat.2018.05.011
Reference: MECMAT 2885

To appear in: *Mechanics of Materials*

Received date: 12 October 2017
Revised date: 31 May 2018
Accepted date: 31 May 2018

Please cite this article as: M.M. Ameen, O. Rokoš, R.H.J. Peerlings, M.G.D. Geers, Size effects in non-linear periodic materials exhibiting reversible pattern transformations, *Mechanics of Materials* (2018), doi: 10.1016/j.mechmat.2018.05.011

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 %.