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USING A REDUCED SET OF FOURIER MODES IN TERMS OF A FFT-BASED MICROSTRUCTURE SIMULATION

Christian Gierden[1,*], Johanna Waimann[1] , Bob Svendsen[2,3] and Stefanie Reese[1]

[1] Institute of Applied Mechanics, RWTH Aachen University, Mies-van-der-Rohe-Straße 1, D-52074 Aachen, Germany,
{christian.gierden, johanna.waimann, stefanie.reese}@rwth-aachen.de
[2] Material Mechanics, RWTH Aachen University, Schinkelstraße 2, D-52062 Aachen
[3] Microstructure Physics and Alloy Design, Max-Planck-Institut für Eisenforschung GmbH, Max-Planck-Straße 1, D-40237 Düsseldorf, Germany, b.svendsen@mpie.de

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Given a heterogeneous material, the mechanical behavior of its microstructure can be investigated by an algorithm that uses the Fourier representation of the Lippmann-Schwinger equation [1]. Incorporating a model order reduction technique based on calculations with a reduced set of Fourier modes, the computational cost of this algorithm can be decreased [2]. It was shown that the accuracy of this model order reduction technique strongly depends on the choice of Fourier modes [3] by considering a geometrically adapted rather than a fixed sampling pattern to define the reduced set of Fourier modes. Since it is difficult to define a geometrically adapted sampling pattern for complex microstructures, we additionally introduced a strain-based sampling pattern [4]. The accuracy and adaptability of this strain-based reduced set of Fourier modes is shown by incorporating composite and polycrystalline microstructures, respectively.

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