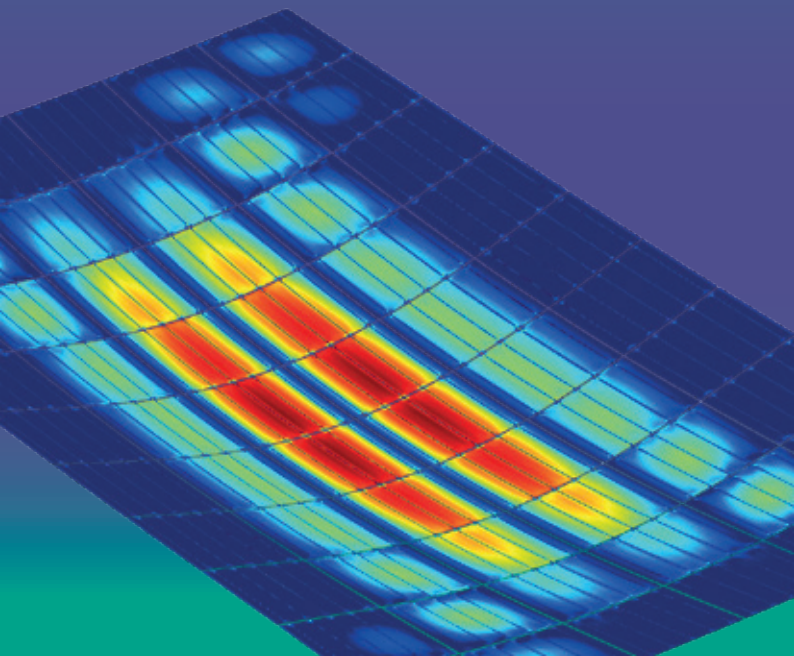
Fraunhofer ISE

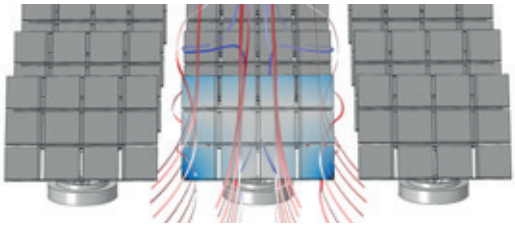
FRAUNHOFER INSTITUTE FOR SOLAR ENERGY SYSTEMS ISE

FINITE ELEMENT METHOD – DESIGN OPTIMIZATION AND FAILURE ANALYSIS

Efficient module development with FEM simulations:

- virtual optimization
- virtual product development
- fast technology benchmarking
- less need for test sample manufacturing
- defect diagnostics





Wind load on 2-axis tracker and resulting deformation of PV modules.

By simulating the physical product behaviour, optimization potentials regarding PV module design and the interaction of materials can be identified in short time. Test sample construction is significantly reduced as a result. In addition, the root causes of damage that occurs during operation can be analyzed. We use the finite element method (FEM) to examine a wide range of physical effects on the module and its components. For example, we simulate the thermomechanical stresses during production, in tests according to the IEC 61215 standard and in operation.

With FEM, PV modules can be developed and optimized widely computer-based. We calculate complex FEM models on a High Performance Computing Cluster (HPC cluster).

Services in FEM Modelling

- multiphysical simulation in the fields of: Mechanics, thermics, wind, electrics, acoustics
- virtual product development and material qualification
- experimental validation and material characterisation
- failure and root cause analysis

More information on our website:
https://www.ise.fraunhofer.de/module-fem

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