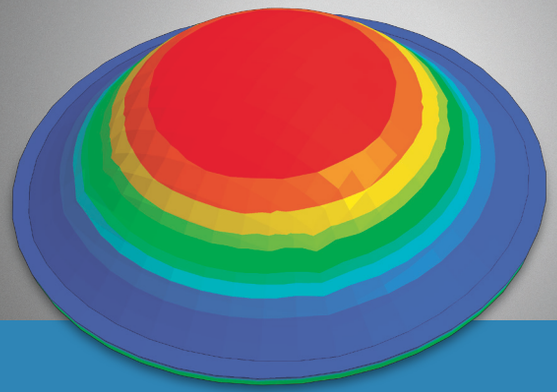

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MULATIONS

Fraunhofer LBF
SYSTEMATIC POLYMER TECHNOLOGY

Fraunhofer
LBF

FRAUNHOFER INSTITUTE FOR STRUCTURAL
DURABILITY AND SYSTEM RELIABILITY LBF

VALIDATED MATERIAL MODELS FOR FE SIMULATIONS

OUR SERVICES

We offer you support in finding the strategy best fitting your material simulation needs. We provide tailored solutions on every simulation level, best suiting your polymer or reinforced polymer application and available resources:

- Basic isotropic approximation of part behaviour
- Advanced phenomenological modelling taking into account main flow orientation (either from injection moulding simulation or from part analysis)
- Elaborate micromechanical approach considering detailed aspects of fibre distribution via fully coupled integrative process between injection moulding simulation and structural simulation

We prepare experimental data and provide the derivation of validated materialcards consistent with the appropriate modelling approach for your simulation application. In conjunction with our additional activities we offer one stop service for your material simulations.

DAkkS
Deutsche
Akkreditierungsstelle

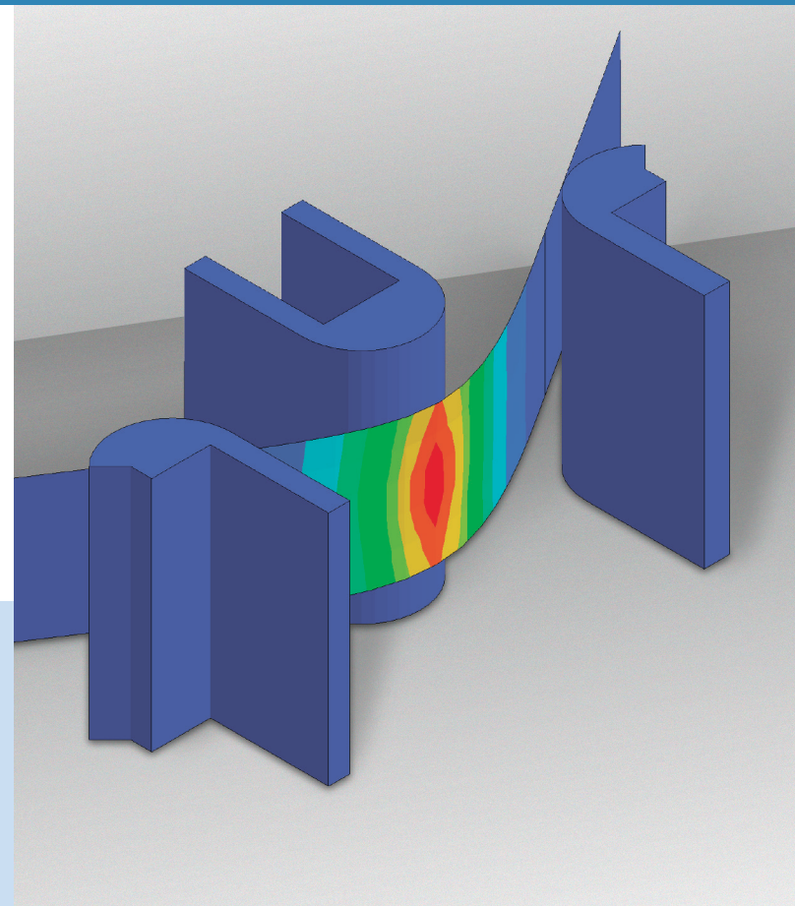
Contact:

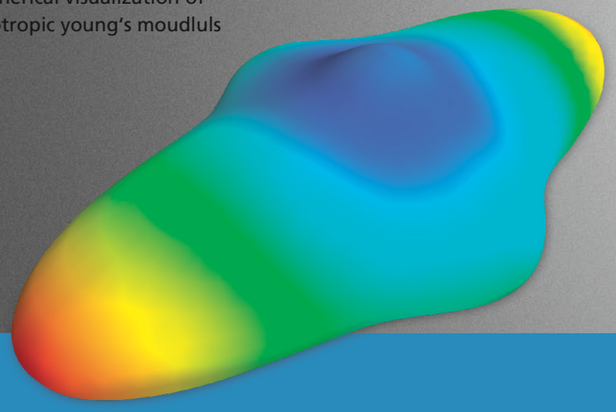
M. Sc. Felix Dillenberger
Phone: +49 6151 705-8753
felix.dillenberger@lbf.fraunhofer.de

M. Eng. Markus Fornoff
Phone +49 6151 705-8019
markus.fornoff@lbf.fraunhofer.de

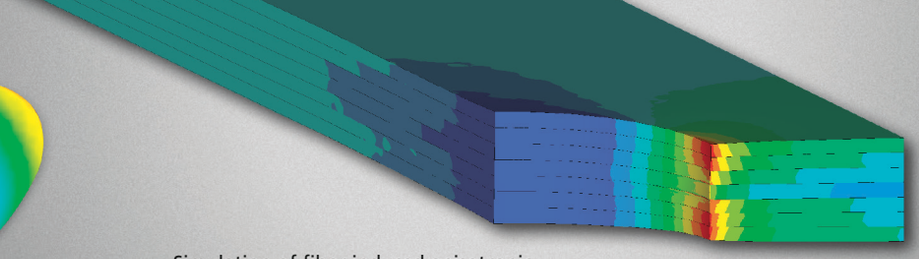
Fraunhofer Institute for Structural Durability
and System Reliability LBF · Division Plastics
Schlossgartenstr. 6 · 64289 Darmstadt · Germany
www.lbf.fraunhofer.de · info@lbf.fraunhofer.de

Fraunhofer LBF's plastics research division, which evolved out of the German Plastics Institute [Deutsches Kunststoff-Institut DKI], supports its customers along the entire value chain. We specialize in the management of complete development processes and advise our customers at all stages of development. As an identified skills center for questions regarding additivation, formulation and hybrids, we offer extensive expertise in analyzing and characterizing plastics and the changes in their properties during processing and in use, and also in developing methods for time-resolved processes.

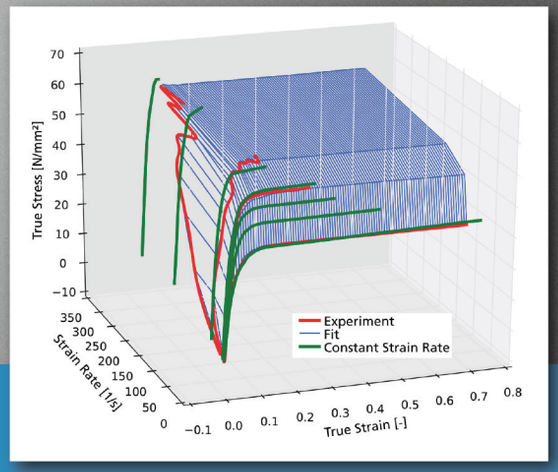




Isospherical visualization of
anisotropic young's moudluls



Simulation of fiber induced anisotropic
strain distribution in tensile sample



VALIDATED MATERIAL MODELS FOR FE SIMULATIONS

TAILORED SOLUTIONS FOR YOUR SIMULATION NEEDS

Thermoplastic polymers have a great significance in light weight applications. In the context of highly stressed structures short fibre reinforced polymers have gained increasing technological importance. Fibre reinforcement leads to anisotropic thermo-mechanical behaviour, influenced by process and geometric parameters. Next to the already complex polymeric behaviour, this fortifies the need for the evaluation of appropriate material models.

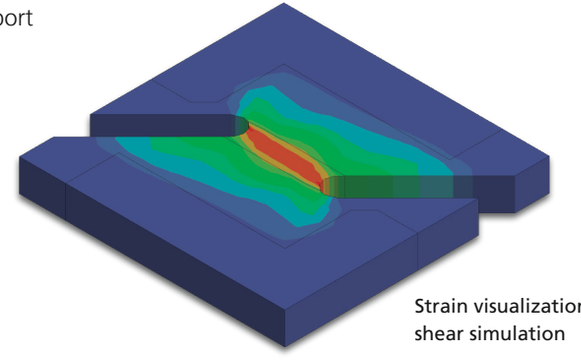
The dimensioning of polymeric parts during virtual product development demands for a strong iterative coupling of experimental characterization and simulation. Validation of modelling strategies and verification of virtual part performance is crucial.

In order to develop a tailored simulation strategy for material behaviour regarding time and cost effort in reference to performance, a detailed analysis of the final part and production process is essential. Multiple simulation strategies are available to handle material behaviour on different levels of detail.

MATERIAL INPUT-DATA FOR YOUR SIMULATION APPLICATIONS

Available services

- Data acquisition and preparation
- Extraction of stress-strain data at constant strain rates
- Derivation of appropriate material input-data for the simulation of polymeric parts
- Extraction of anisotropic stiffness matrices via micromechanical homogenization methods
- Validation of simulation response
- Detailed report



Strain visualization in
shear simulation

APPLICATIONS

- Simulation of polymeric parts from quasi-static to crash applications
- Consideration of anisotropic mechanical behaviour induced by fibre reinforcement
- Mechanical-, thermomechanical stress analysis
- Bulking resp. moisture expansion stress analysis

ADDITIONAL SERVICES

- Analysis of fibre structures
- Mechanical characterization of plastics and adhesives
- Materialdata for injection moulding simulations