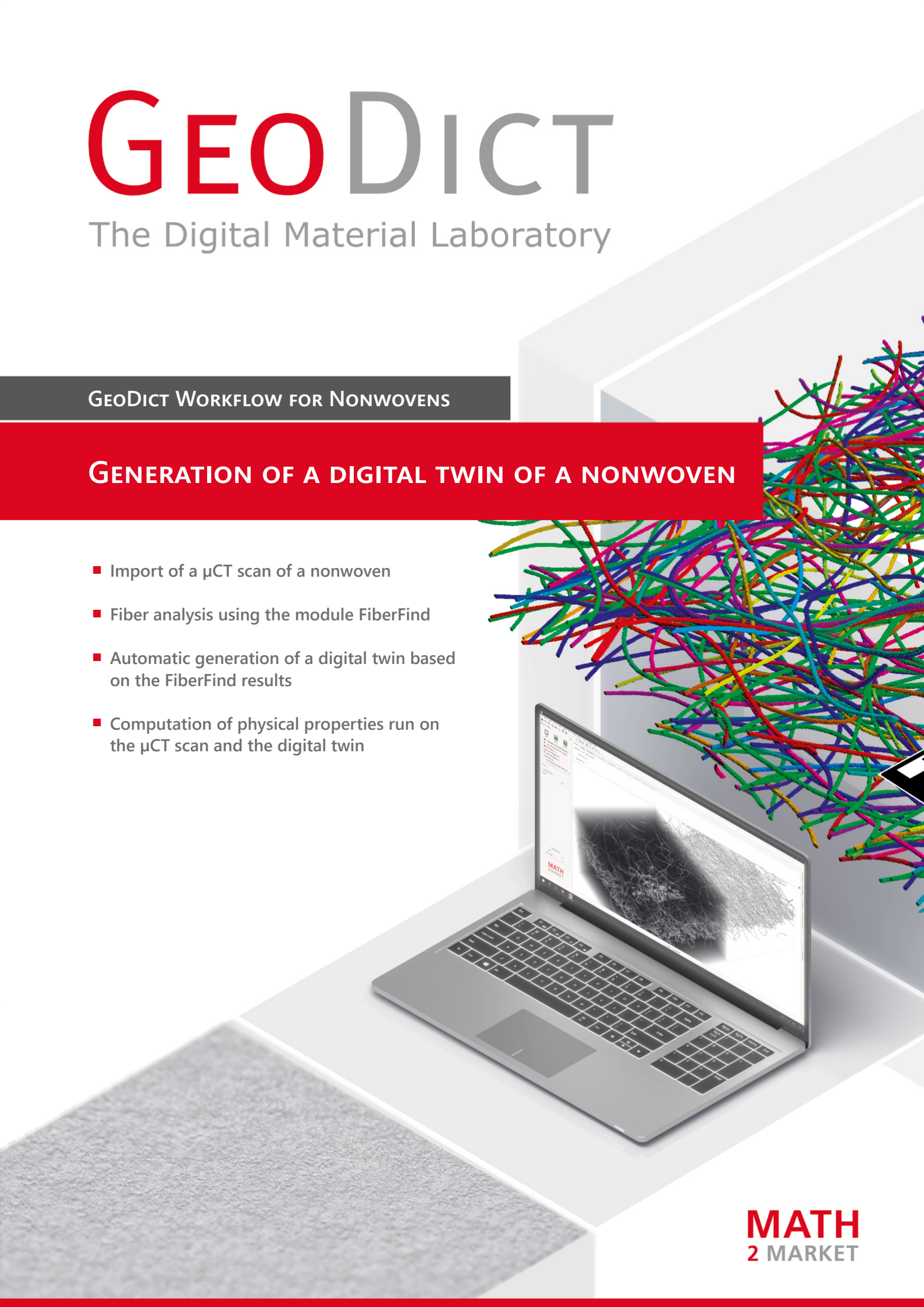
GeoDict

The Digital Material Laboratory

GeoDict Workflow for Nonwovens

Generation of a digital twin of a nonwoven

- Import of a µCT scan of a nonwoven
- Fiber analysis using the module FiberFind
- Automatic generation of a digital twin based on the FiberFind results
- Computation of physical properties run on the µCT scan and the digital twin



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GeoDict Workflow for Digital Nonwoven Development

1 Import and segmentation

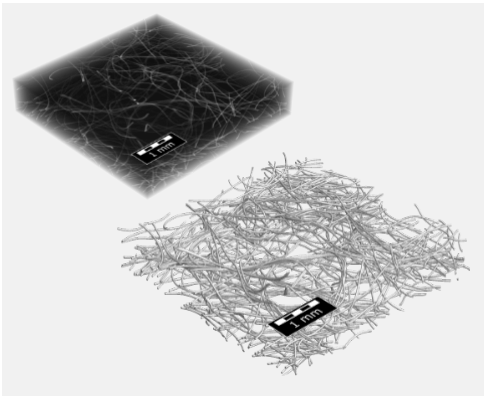
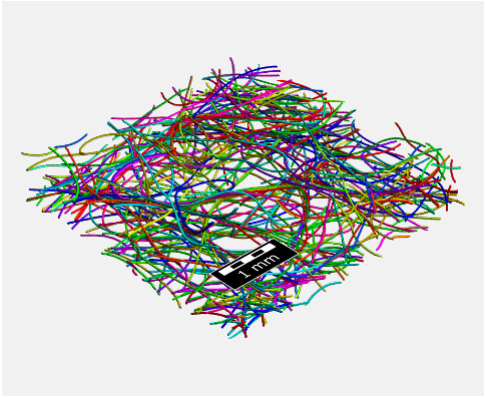


Image processing of the µCT scans of a nonwoven:

- Cutout of a µCT scan of a large nonwoven
- ImportGeo-Vol module of GeoDict was used to import, process, and segment the scanned images
- ImportGeo-Vol offers a complete image processing toolbox including various image filters and AI based segmentation

Result: Digital model of the nonwoven

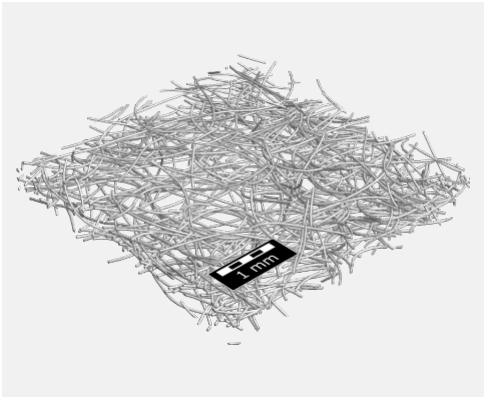
2 Fiber identification



- FiberFind module was used to analyze the digital model and obtain relevant information about fibers
- The information obtained is used to evaluate the sample with regards to geometrical characteristics such as:
  - Fiber diameter
  - Fiber orientation
  - Fiber curvature

Result: Statistical description of fibers

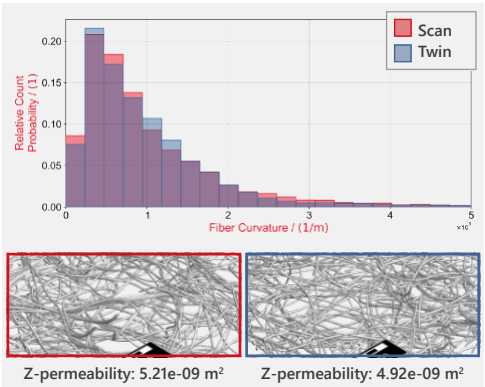
3 Generation of a digital twin



- Generation of a digital twin of the nonwoven using the module FiberGeo
- Automatic optimization of properties, such as:
  - Fiber shape
  - Through-thickness distribution
  - Fiber diameter
  - Fiber orientation
  - Fiber curvature

Result: Digital twin of the nonwoven

4 Comparison of digital twin and scan



- Statistical characterization and evaluation of the digital twin:
  - Comparison between digital twin and scan
  - Analysis of fiber structure
  - Comparison of physical properties - in this case permeability
- The digital twin is a good representation of the statistical properties of the scan

Result: Validated digital twin of the nonwoven

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