

Seminar im Rahmen des GRK 2078

Referee: **Dr. Axel Spickenheuer**
Workgroup Complex Structural Components, IPF - Leibniz-Institut für
Polymerforschung Dresden e. V., Germany

Date: Tuesday, December 8, 2020
Time: 14:00 h
Format: IRTG Online-Seminar

Title: **Advances in variable-axial fiber design and the potential for future
lightweight structures**

Abstract

In lightweight fiber-reinforced composite structures, their intrinsic anisotropy needs to be addressed in order to fully take advantage their ability to withstand loading with lower safety factors. Stress adaptive curvilinear, also called variable-axial, fibers paths, lead to significantly increased strength- and stiffness-to-weight ratios when compared, for instance, to classical multi-axial composite laminate. For the production of composite parts based on variable-axial fiber patterns, the Tailored Fiber Placement (TFP) technology was developed at the IPF Dresden in the early 1990s. Since TFP is a technology with many degrees of freedom, generating optimized fiber layouts is particularly challenging.

Within the lecture, the state of the art in extreme lightweight design based on a variable-axial fiber architecture will be shown. Several examples of manufacturing techniques suited for a variable-axial composite manufacturing will be explained and compared to each other. Additionally, a short historical and technical overview of the design of variable-axial composite will be given and present state of the art modelling approached will be explained. Finally, several academic and actually industry related composite parts made by TFP will be presented.

Alle Interessenten sind herzlich eingeladen.

Prof. Dr.-Ing. Thomas Böhlke
(Sprecher des GRK 2078)