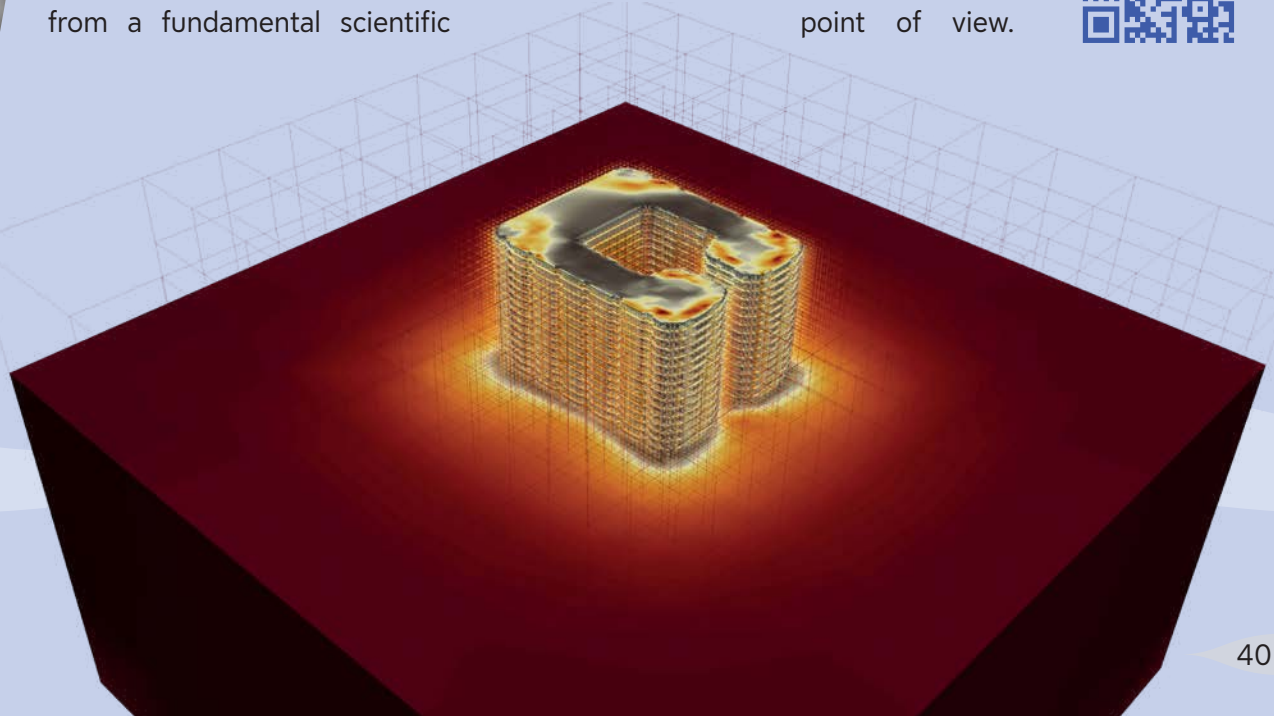
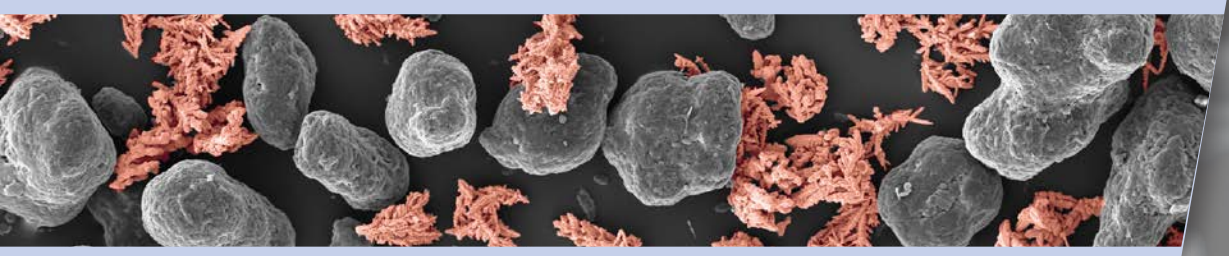
# CRC 814 – Additive Manufacturing

– by Andreas Jaksch –

In recent years, powder- and beam-based additive manufacturing processes have successfully established in the fabrication of **highly individualized, geometrically complex components**. Generating functional components for series production places the highest demands on the robustness of the processes, the feasibility and reproducibility of the component properties, and the degree of automation. These challenges are within the focus of the Collaborative Research Center 814. CRC 814 focuses on additive manufacturing processes that **apply powder layer by layer** and melt it selectively via a laser or electron beam. This beam melting, applied to metals and polymers, is investigated from a fundamental scientific point of view.



The goal of CRC 814 is the production of multifunctional components from one or more materials with both **locally and globally defined reproducible properties**. Before the start of the first funding period in 2011, powder- and beam-based additive manufacturing processes could be assigned to prototype construction or to produce components with a quantity of „one“ on a material-specific basis. In order to advance these technologies, a **fundamental understanding of the processes** was created in the first funding period of the CRC 814. Thereby, decisive requirements and influences on the material systems, processes, and components were identified.



In the second funding period, the CRC 814 scientists worked on the **optimization of the process control**, i.e., the adaptation and expansion of the available material systems to the requirements defined in the first funding period. Further points of focus lied in process control and monitoring in order to identify influences on the reproducibility of component properties, as well as increasing the robustness of the process with respect to disturbance variables. These findings were evaluated in terms of the resulting component properties and used to validate the simulation tools.

Today, **30 scientists work on 15 interdisciplinary subprojects** on powder, material, process, and part properties. Furthermore, in three transfer projects, results achieved in the CRC 814 are tested in industrial conditions.