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S E M I N A R
aus
Halbleiterphysik und Nanotechnologie

Di, 15.12.2015, 11:00 Uhr, Hörsaal für Physik

"Phototactic structuring of polysaccharide biotemplates by micro-algae"

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Algea are used in many industrial processes and applications such as energy production, as food additives, as raw materials for the production of chemicals or as additives for cosmetica. They are typically cultured in reactors, with the aim of obtaining the highest amounts of their main metabolic product, the exo-polysaccharides (EPS). However, due to their phototactic response, it is also possible to light-guide micro-algea. The secreted EPS then form fibrillar structures in the algaes' paths. With our experimental setup, we are able to guide and track the movements of groups of algae. This enables us to create polysaccharide structures, which can be used as structural templates for a contactless, computer-controlled and algae-assisted printing approach. Engineering materials are obtained by chemical conversion of the resulting fabric. Regioselective deposition of metal salts and organometallic compounds on the anionic exopolysaccharides is used for the formation of inorganic materials. Finally, the organic polysaccharide template is removed by calcination, resulting in a ceramic replica. By exploring the experimental parameters, we aim at further improving control over the structure formation, in particular with regard to minimizing the EPS track sizes and achieving three-dimensional structuring.