Symposium Hybrid Nanomaterials: From Novel Physics and Multi-Scale Self-Organization to Functional Diversity on the Device Scale (SYHN)

jointly organised by
the Chemical and Polymer Physics Division (CPP),
the Dynamics and Statistical Physics Division (DY),
the Crystalline Solids and their Microstructure Division (KFM), and
the Metal and Material Physics Division (MM)

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The interplay of interfacial determinacy and geometric constraint leads to new, often surprising physicochemical behavior in many nanostructured materials. Particularly in the combination of soft and hard matter, this also results in special functionalities and mechanical properties that have the potential to completely rethink virtually all technological areas, especially energy generation, storage and conversion but also the bio-medical field.
However, the resulting hybrid systems are usually characterized by strong electro-mechanical, chemo-mechanical and thermo-photonic couplings that have so far eluded fundamental understanding. In recent years, nanoscience has also increasingly focused on the question to what extent the combination of soft and hard matter opens up the possibility of using multiscale self-assembly and phase transitions, similar to many biological systems, to transport nanoscale effects from the mesoscale to the macroscale in order to design hybrid structural materials with integrated multifunctionality for robust components.
This interdisciplinary symposium will focus on these issues at the interface between soft matter physics and chemistry and materials science. A special focus will be put on porous hybrid systems but also on multiscale assembly of nano-objects (nanoparticles) with respect to the interplay of mechanics and function. As application fields electro-mechanical sensors/actuators, fluidics and photonics will be in the center.

Overview of Invited Talks and Sessions

(Lecture hall Audimax 1)

Invited Talks

SYHN 1.1	Thu	10:00–10:30	Audimax 1	**Scaling behavior of stiffness and strength of hierarchical network nanomaterials** — •Shan Shi
SYHN 1.2	Thu	10:30–11:00	Audimax 1	**Functional and programmable DNA nanotechnology** — •Laura Na Liu
SYHN 1.3	Thu	11:15–11:45	Audimax 1	**Multivalent nanoparticles for targeted binding** — •Stefano Angioletti-Uberti
SYHN 1.4	Thu	11:45–12:15	Audimax 1	**Programming Nanoscale Self-Assembly** — •Oleg Gang
SYHN 1.5	Thu	12:15–12:45	Audimax 1	**Achieving Global Tunability via Local Programming of a Structure's Composition** — •Jochen Mueller

Sessions

SYHN 1.1–1.5	Thu	10:00–12:45	Audimax 1	**Hybrid Nanomaterials: From Novel Physics and Multi-Scale Self-Organization to Functional Diversity on the Device Scale**