CBI ERLANGEN

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# Thermal Transport in Colloidal Crystals and Assemblies

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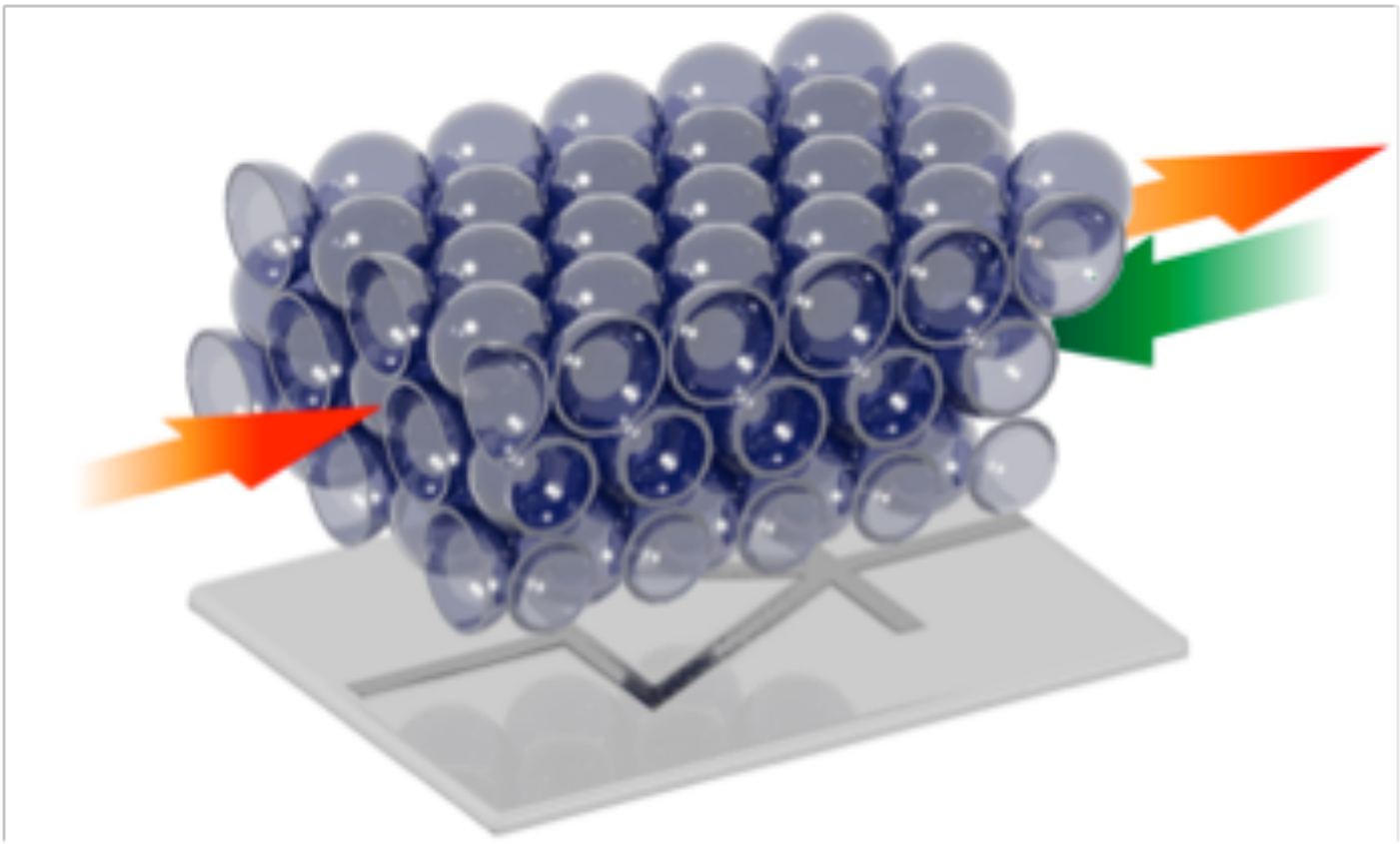

In the light of the increasing demands on efficiently using our limited energy resources, new concepts are necessary to effectively manage heat and waste heat. The long-term goal is to obtain a similar level of control over the flow of heat as it is already achieved over the flow of electrons or light.
The emerging field of phononics investigates the interaction between nano- and mesostructured materials and the propagation of mechanical waves through them. Since heat is transported by phonons of very high frequencies the corresponding nanostructure also has to be realized on a few nanometer length scale. Concomitantly, the presence of interfaces and phase transitions plays a paramount role.
I will present our latest results on thermal transport phenomena in colloidal materials, which are structured on length scales that bridge 10 nm up to 1 µm. I will particularly introduce two examples of so-called colloidal crystals, which comprise either monodisperse polystyrene particles or hollow silica capsules. Such systems are well suited to investigate fundamental structural changes on an individual particle level and their influence on the effective thermal conductivity of the colloidal superstructure.

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