



SLAM Seminar

Taming Entropy in Colloidal Crystallization

Michael Engel

Friedrich-Alexander-Universität Erlangen-Nürnberg

Host: Carl Goodrich

The spontaneous organization of building blocks is extensively used in nature and found at all length scales, from crystallization processes, via composite (nano)materials, to living cells. Understanding the relationship between building blocks, formation pathways and the resulting structure is of fundamental importance as well as for controlling materials properties. Colloidal crystallization is a particularly useful model because it can be controlled and characterized with high resolution and high precision. Significant thermal fluctuations must be present to assemble well, which means entropy plays a central role. This presentation investigates the diversity of entropic effects in colloidal systems. Our tools are computer simulations and advanced statistical sampling to efficiently explore phase space. We start with the hard sphere model system, which goes back to the earliest computer simulations but still has open questions and many relationships to real materials. In particular, we investigate icosahedral local order in size-disperse mixtures as found in alloys, the appearance of magic numbers under the effect of confinement as found in atomic clusters, and complex crystallization processes involving multi-step formation pathways as found in biomineralization. Our results lead to a new interpretation of entropy and help tame entropy in colloid and nanoparticle experiments.

Friday, September 29, 2023 11:00am - 12:00pm

Moonstone Bldg / Ground floor / Seminar Room F



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: <https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.