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Exploration of intermediate phases of matter on surfaces

As computing power has advanced over the last 20 years, we have been able to use molecular dynamics computer simulations to better understand the phase transitions exhibited by various molecules adsorbed onto surfaces. In particular, great advances have been made in understanding the nematic and smectic crystal phases that exist in between solid and liquid phases of organic layers. The means of characterizing these fascinating phases of matter and the mechanisms that drive associated phase transitions will be discussed, followed by extensions to current work on more complex organic layers. Finally, the current trajectory of large scale computing along with a computational wish list will be discussed. Throughout the talk there will be anecdotes from our research group that will give context to various elements of the work presented here.

Biography

Michael W Roth is a Computational Physicist, Professor and Chair at Northern Kentucky University's Department of Physics, Geology and Engineering Technology. He has numerous publications and presentations in the field of dynamics and surface phase transitions of atomic and molecular systems adsorbed onto graphene and graphite. Other interests include classical astrophysical simulations of planetary formation as well as material point method simulations of impact, and material stress and failure.

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