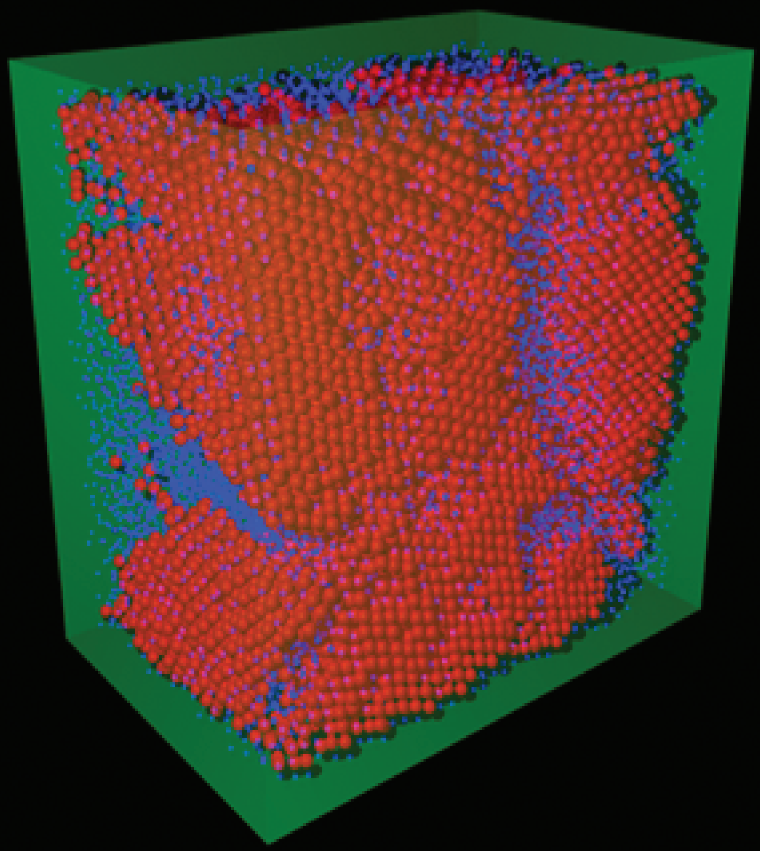
David Weitz

"Fast Crystals and Strong Glasses"



David Weitz received his Ph.D. from Harvard University. He worked at Exxon Research and Engineering as a research physicist for nearly 18 years, and then became a Professor of Physics at the University of Pennsylvania. He moved to Harvard about 10 years ago, and is currently Professor of Physics and Applied Physics. He is also the director of Harvard's Materials Research Science and Engineering Center and co-director of Harvard's Kavli Institute for Bionano Science and Technology. He helped arrange the establishment of the BASF Advance Research Initiative at Harvard, which he co-directs.

This talk will describe new results on model colloid systems that provide insight into the behavior of fundamental problems in colloid physics, and more generally, for other materials as well. By visualizing the nucleation and growth of colloid crystals, we find that the incipient crystallites are much more disordered than expected, leading to a larger diversity of crystal morphologies. When the entropic contribution of these diverse morphologies is included in the free energy, we are able to describe the behavior very well, and can predict the nucleation rate surprisingly accurately. The talk will also describe the glass transition in deformable colloidal particles, and will show that when the internal elasticity of the particles is included, the colloidal glass transition mimics that of molecular glass formers much more completely. These results also suggest that the elasticity at the scale of the fundamental unit, either colloid particle or molecule, determines the nature of the glass transition, as described by the "fragility."

Wednesday, November 4, 2009

3:00 p.m.

Bldg. 402 • APS Auditorium
Argonne National Laboratory

APS Colloquium