
# Physics colloquium

## Dynamic Collective Behavior of Active Colloids

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Date: **9/14/18**
Time: **10:30 AM**
Location**: COB2 170**

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**ABSTRACT:** Colloidal suspensions are a prototypical example of systems that can be either passive of active. Here, I will demonstrate how various forms of dynamics and different types of interactions result in unexpected and until now largely unexplored aggregation and phase behavior. These observations, obtained through a combination of experiments and computer simulations, reveal striking connections between colloidal self-assembly and collective dynamics, and between dynamic behavior and classical thermodynamics. Moreover, a remarkable variety of collective dynamics can be realized through simple variation of the applied electric fields. These observations provoke new thoughts on the nature of "soft" materials and our ability to manipulate them.

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**BIO:** Professor Erik Luijten studied physics in The Netherlands, where he received his MSc from the Institute for Theoretical Physics at Utrecht University (with Prof. Henk van Beijeren) and his PhD (cum laude) from Delft University of Technology in 1997 (with Prof. Henk Blöte). He has worked as a postdoctoral research associate at the Max Planck Institute for Polymer Research and the University of Mainz, Germany, with Prof. Kurt Binder and at the Institute for Physical Science and Technology of the University of Maryland, with Prof. Michael E. Fisher and Prof. Athanassios Panagiotopoulos. From 2001 to 2008 he was an assistant professor and later associate professor in the Department of Materials Science and Engineering and (by courtesy) the Department of Physics at the University of Illinois at Urbana-Champaign. In January 2009 he joined Northwestern University, with appointments in Materials Science and Engineering and Applied Mathematics. As of September 2016, he is chair of the Department of Materials Science and Engineering.

Professor Luijten's research interests encompass a wide range of topics, with an emphasis on collective behavior in complex fluids and soft condensed-matter systems. Recent work includes colloidal self-assembly, nanoparticles for gene delivery purposes, bacterial self-organization, and data analysis for gravitational-wave detectors. These topics are generally studied via large-scale computer simulations.

Professor Luijten received the 2003 IAPWS Helmholtz Award in recognition of "Fundamental and innovative contributions enhancing the state of the art of computer simulations of theoretical models that are directly relevant to the critical and phase behaviour of aqueous systems." He also received an NSF CAREER Award (2004) and a Xerox Award for Faculty Research (2006). In 2013 he was elected Fellow of the American Physical Society.