

# AVVISO DI SEMINARIO

*Mercoledì 1 Luglio 2015 ore 14:30*

*nell'Aula Seminari del Dipartimento di  
Scienze e Tecnologie Chimiche, il*

*Dr. Peter van Oostrum  
Institute for Theoretical Physics, Technische  
Universität Wien, Austria*

terrà un seminario dal titolo:

*Using light in between real- and reciprocal space to characterize micro-  
and nanoscale materials*

Proponente: *Dr. Federica Valentini*

During my scientific career I have used various types of light microscopy techniques, in particular holographic microscopy and light and x-ray scattering to characterize a broad range of different systems on the nano- and micro-scale. In this talk I will show how holographic microscopy is inspired between direct imaging and scattering techniques that help characterize materials essentially by solving inverse problems [1]. Holography, when using low energy electrons rather than light, can be used to characterize graphene and graphene can be used as almost invisible substrate when imaging molecules. I will in the course of the talk give examples of the systems I have learned to work with to illustrate my approach to visualize the process and the results of self-assembly. Then I will talk in more detail about how I plan to make a model system of colloidal chains that I can visualize in great detail in 3D to mimic and learn about the immensely complex and versatile type of self-organization that is known as protein folding using simple chemistry, microfluidics and external fields [2-4].

#### *References*

- [1] Characterizing and tracking single colloidal particles with video holographic microscopy S.-H. Lee, Y. Roichman, G.-R. Yi, S.-H. Kim, S.-M. Yang, A. van Blaaderen, P. van Oostrum, and D. G. Grier, *Optics Express* 15, 18275 (2007)
- [2] Sequence Controlled Self-Knotting Colloidal Patchy Polymers I. Coluzza, P. D. J. van Oostrum, B. Capone, E. Reimhult, and C. Dellago *Phys. Rev. Lett.* 110, 2013
- [3] Design and folding of colloidal patchy polymers I. Coluzza, P. D. J. van Oostrum, B. Capone, E. Reimhult and C. Dellago *Soft Matter*, 2013,9, 938-944
- [4] Colloidal Analogues of Charged and Uncharged Polymer Chains with Tunable Stiffness H. R. Vutukuri<sup>1</sup>, A. F. Demirörs., B. Peng, P. D. J. van Oostrum., A. Imhof and A. van Blaaderen *Angewandte Chemie International Edition* 51, 45, 2012

#### **Biography**

Peter van Oostrum studied applied physics at the University of Twente (the Netherlands) where he graduated in the group 'Physicy of Fluids' of prof. Detlef Lohse. During an internship at INSEAN in Rome he worked on the reduction of the drag below ships using air bubbles. After his graduation Peter did his PhD in Utrecht (the Netherlands) in the Soft Matter Group of prof. Alfons van Blaaderen. Here he was responsible for the optical microscopy and the optical trapping. In collaboration with the group of prof. David Grier from New-York University he developed a new technique to analyse in-line holograms. After obtaining his PhD Peter went to the new group of prof. Erik Reimhult at the University of Natural Resources and Life Sciences Vienna (Austria).