

**International Graduate Research Training Group I524  
– SSNI –  
Self-Assembled Soft-Matter Nanostructures at Interfaces**



**Tuesday, November 28<sup>th</sup>, 2017, 17.15h**

**Technische Universität Berlin  
C-Building, Room C 074 (!)  
Strasse des 17. Juni 115, 10623 Berlin**

**Dr. Paweł Karbowniczek**  
*Institute of Physics – Cracow University of Technology – Crakow, Poland*

**„Role of excluded-volume interactions in formation of liquid crystalline structures in two-dimensional systems composed of bent-core particles“**

In the presentation, I will show results of the studies concerning the role of excluded-volume interactions for the stabilization of different liquid crystalline structures in two-dimensional systems composed of hard bent-core particles of different shapes. In the first part, I will talk about particles built of two arms and analyze how their details affect the stability of different phases. By the use of Onsager's DFT and MC simulations I will show that their phase diagrams are dominated by the antiferroelectric smectic. For very thick particles, however, two different smectics are possible: the ordinary A-type and the ferroelectric one. Furthermore, the nematic splay-bend phase turned out to be the most stable structure for particles with large opening angles and thin arms. In the second part of the presentation, I will discuss generalizations of the previous model. I will analyze, for example, systems of particles composed of three arms with conformational degrees of freedom. Such particles can dynamically adopt two states: a chiral and an achiral one. Interestingly, the average fractions of conformers are equally probable in the isotropic phase, chiral particles dominate the smectic phase, and achiral ones prevail in the nematic splay-bend.

We cordially invite everybody who is interested.

**Prof. Dr. Martin Schoen**  
IRTG I524 Chairman  
<http://www.ssni.tu-berlin.de>

Contact Person  
[martin.schoen@tu-berlin.de](mailto:martin.schoen@tu-berlin.de)



TRIANGLE  
MRSEC

Materials Research Science  
and Engineering Center

**NC STATE UNIVERSITY**



THE UNIVERSITY  
of NORTH CAROLINA  
at CHAPEL HILL



**Penn**  
UNIVERSITY of PENNSYLVANIA