

## EINLADUNG

zum Vortrag von  
**Prof. Dr. Achille Giacometti**

Università Ca' Foscari Venezia, Department of Molecular Sciences and  
Nanosystems, Italy

### The physics of the protein folding problem: a possible new perspective?

**am Dienstag, 16. Mai 2017, um 17:30 Uhr**

Ort: Lise-Meitner-Hörsaal, Fakultät für Physik, Universität Wien,  
1090 Wien, Strudlhofgasse 4 / Boltzmannngasse 5, 1. Stock

*Barrierefreier Zugang: Boltzmannngasse 5, Lift, 1. Stock rechts über den Gang zum Hintereingang des Hörsaals*

#### **Abstract:**

Homopolymers are known to form a high temperature swollen (coil) phase and a low temperature phase globular phase. The glassy nature of their ground state stems from the inability of homopolymers to reduce their entropy as temperature is decreased. This, in turn, can be traced back to the spherical symmetry, as well as to the non-specificity, of the interactions that are unable to provide a sufficient number of constraints for the removal of the degeneracy in the ground state.

In this talk, I will discuss recent attempts to introduce additional ingredients allowing both the removal of this glassy ground state and the onset of secondary structures, such as alpha-helices and beta-sheets, characteristic of proteins.

I will show how a simple coarse-grained model with two-beads model, one for the backbone and one for the side-chains, where an entropic stiffness competes with a short-range non-specific attraction, is sufficient to observe the formation of secondary structures. The full phase diagram is shown to display a very rich polymorphism where, remarkably, a combination of alpha-helices and beta-strands are observed within the same structure, with structural parameters essentially identical to those of real proteins.

I will then discuss the physical origin of this entropic stiffness and the differences with conventional energetic stiffness characteristic of semi-flexible polymers and frequently used in the framework of protein folding and DNA condensation.

---

#### **CHEMISCH-PHYSIKALISCHE GESELLSCHAFT**

c/o Universität Wien, Fakultät für Physik, 1090 Wien, Strudlhofgasse 4/Boltzmannngasse 5, Austria

Generalsekretär: Christl Langstadlinger

Tel.: +43-(0)1-4277/51108 - Mobil: 0664-60277 51108 - E-Mail: [Christl.Langstadlinger@univie.ac.at](mailto:Christl.Langstadlinger@univie.ac.at)

ZVR-Zahl: 513907440 - <http://www.cpg.univie.ac.at>

Konto: Bank Austria - IBAN: AT22 1100 0086 4440 8000 - BIC: BKAUATWW