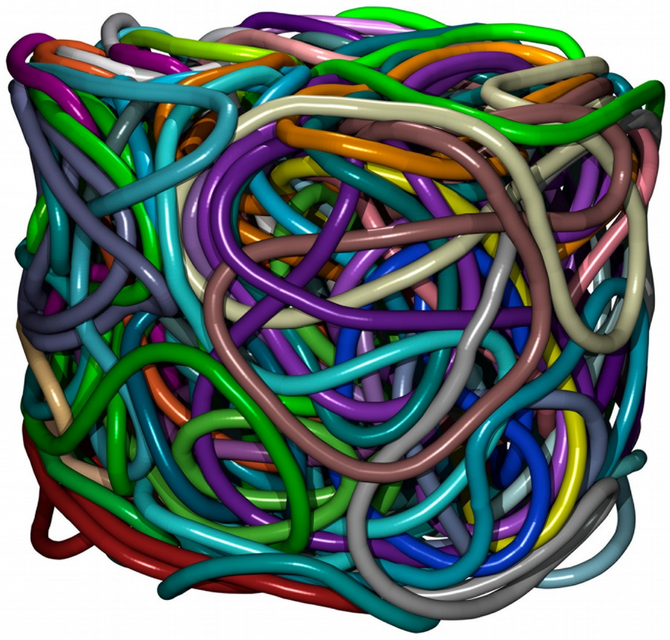
134th MSS-Seminar
Friday, December 6th,
10:15 hrs, Seminarraum (00.156),
Cauerstraße 3, Erlangen.

Packing Structure of Entangled Filamentous Matter

Dr. Leopoldo R. Gómez,
Universidad Nacioanl del Sur - CONICET , Argentina



Resolving the packing structure of dense assemblies of semiflexible rings is not only fundamental for the dynamical description of polymer rings, but also key to understand biopackaging, such as observed in circular DNA of viruses or genome folding. In this talk we present results where we use X-ray tomography to study the geometrical and topological features of disordered packings of rubber bands. By using a new image analysis approach, combining the watershed and the skeleton transforms, we determine the individual configurations of bands in the assembly, allowing the detailed characterization of the structure. Assemblies of short bands assume a liquid-like disordered structure, with short-range orientational order and reveal only minor influence of the container. In the case of longer bands, the confinement causes folded configurations and the bands interpenetrate and entangle. Most of the systems are found to display a threading network which percolates the system. Surprisingly, for long bands whose diameter doubles the diameter of the container, we found that all bands interpenetrate each other, in a complex fully-entangled structure. We end the talk by discussing extensions of this work to other filamentous systems, with applications in several branches of polymer physics.