SFB-Seminar

ZEIT:
15.6.2010, 16:00 Uhr - 19:00 Uhr

ORT:
Konrad-Zuse-Zentrum für Informationstechnik Berlin
Takustrasse 7
14195 Berlin-Dahlem

PROGRAMM:

16:00 - 17:00 **Prof. Dr. Günter M. Ziegler**

On triangulated 3-spheres

The unsolved question whether there are only exponentially-many combinatorial types of simplicial 3-spheres is crucial for the convergence of models for 3D quantum gravity. Working towards this question, Durhuus and Jonsson (1995) introduced the restriction to "locally constructible" (LC) 3-spheres, and showed that there are only exponentially-many LC 3-spheres.
We characterize the LC property for d-spheres ("the sphere minus a facet collapses to a (d-2)-complex") and for d-balls. In particular, we link the LC-property on the one hand to Knot Theory, on the other hand to Combinatorial Topology concepts such as collapsibility, shellability, and constructibility. Thus we obtain strict hierarchies of such properties for simplicial
balls and spheres.

Two main corollaries from this study are:

- Not all simplicial 3-spheres are locally constructible.
  (This solves a problem by Durhuus and Jonsson.)

- There are only exponentially many shellable simplicial 3-spheres with given number of facets.
  (This answers a question by Kalai.)

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- All simplicial constructible 3-balls are collapsible.
  (This answers a question by Hachimori.)

(Joint work with Bruno Benedetti)

17:00 - 17:30 Kaffeepause

17:30 - 18:30 **Prof. Dr. Jan Ambjørn**

Non-perturbative quantum gravity seen from the lattice
I will report on an attempt to define non-perturbatively a theory of quantum gravity. The existence of such a theory has been linked to the "asymptotic safety" scenario first discussed by S. Weinberg. The present attempt to define the quantum gravity constructively from a lattice regularized path integral, (denoted "causal dynamical triangulation") should be seen in that context. I will decribe how we seemingly see the emergence of a 4d world, not really put in by hand, and how the approach might be connected to the so-called Lifshitz gravity, introduced recently by P. Horava.

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