



Kolloquium über Reine Mathematik

Einladung zu einem Vortrag

Dienstag, 16. Januar 2018

17 Uhr s.t., Geom H4

Prof. Dr. Stefan Wolf
(USI Lugano)

Causality - Consistency - Complexity

Abstract:

Quantum theory predicts correlations that question fundamental space-time causality. Dropping the latter, while still maintaining logical consistency, has dramatic consequences for the power of communication and computation. Such reasoning is in the spirit of Landauer's famous slogan "Information is Physical." A variant of its paradigmatic rival, Wheeler's "It from Bit," is the Church-Turing hypothesis: All physical processes can be simulated on a universal Turing machine. We use the tension between the two viewpoints to look for a purely intrinsic randomness notion and find one around the second law of thermodynamics. Quantum correlations, combined with Kolmogorov complexity as randomness, reveal an all-or-nothing nature of the Church-Turing hypothesis: Either non-Turing computations are physically impossible, or they can be carried out by "devices" as simple as individual photons.

Vor dem Vortrag (ab 16.30 Uhr) stehen im Raum 327 Kaffee und Tee bereit.