

## GR 20: Quantengravitation und Quantenkosmologie II

Zeit: Freitag 14:00–14:15

Raum: HS 6

GR 20.1 Fr 14:00 HS 6

**Quantum Gravity: Cosmology and Its Relations to Particle Physics** — •CLAUS BIRKHOLZ — Seydelstr. 7, D-10117 Berlin

In QG, elementary particles and our universe are subject to identical equations. Motion in bent space-time is uniquely determined by Casimir operators - geodesics and the variation principle are dispensable.

Irreducibility is slicing our world into bent universes orthogonal to each other. Dark Energy reveals as a quantum effect on cosmic scale; it is the agent of physics to execute the "background independence" of mathematics. As one of its immediately related properties, the quark

confinement of particle physics had been shown to result. The cosmological "constant" reveals to be an inverse particle propagator.

"Cosmic master equations" (allowing to calculate the interior of black holes) show the "big bang" not to be the start of our universe; its radius is given by Dark Energy reproducing cosmic inflation. Tiny Dark Matter masses execute gravity, but, due to the non-compactness of space-time, they are not well localizable - in accord with experiment.

Unsaturated "valence" quanta act as condensation germs binding saturated quantum pairs out of Dark Matter as their non-valence parts: massive elementary particles, then, are precipitating as droplets out of Dark Matter.