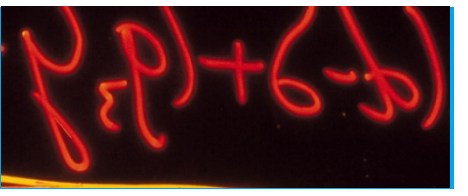
DESY and Universität Hamburg
Quantum Universe Colloquium



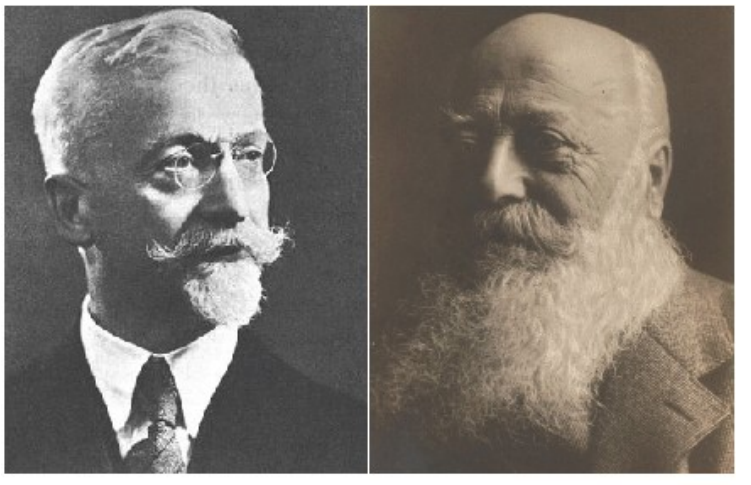
Tuesday, 05 November 2019, DESY Auditorium, 16:45 h

Julian Holstein (UHH): On the Maurer-Cartan Equation.

The innocuous-looking Maurer-Cartan equation

$$d\omega + \frac{1}{2}[\omega, \omega] = 0$$

was discovered as a property of certain forms in differential geometry more than 100 years ago. Today it plays an important role throughout mathematics and in theoretical physics. It describes flat connections, mediates algebraic dualities, characterises deformations in algebra and geometry and appears as the quantum master equation in Lagrangian gauge theory. I will describe how the Maurer-Cartan equation combines homologicaland algebraic structures, and give examples of its use in modern mathematics.



$$\mathrm{d}\omega + \tfrac{1}{2}[\omega, \omega] = 0$$

Oliver Gerberding (UHH): Laser interferometry on ground and in space for gravitational wave astronomy.

The direct detection of gravitational waves opens up a new window to astronomy, cosmology and fundamental physics, giving us means to observe events with energies and masses unreachable in ground-based experiments. Our current understanding of the gravitational wave spectrum gives experimentalists a clear task: We have to develop sensors with lower noise and better sensitivities at lower frequencies. Our most important tool is laser interferometry, the underlying technique of current and planned detectors. To reach the design sensitivities of 3rd generation telescopes, like the Einstein Telescope, and space-based detectors, like the Laser Interferometer Space Antenna (LISA), we have to study and improve laser interferometry and all of its associated aspects and components. The newly established research group for gravitational wave detection at the University of Hamburg studies techniques that make use of advances in digital signal processing and material sciences, for example by using LISA-like multi-fringe interferometry in a compact form as local sensors for future ground-based detectors.

Coffee, tea and cookies will be served at 16.15 h

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