LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

ARNOLD SOMMERFELD CENTER FOR THEORETICAL PHYSICS

Sommerfeld Theory Colloquium

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Space - Time -Matter: Finite Projective Geometry as a Quantum World with Elementary Particles

A unified theory for space-time and matter might be based on finite projective geometries instead of differentiable manifolds and gauge groups. Each point is equipped with a quadratic form over a finite Galois field which define neighbors in the finite set of points. Due to the projective equivalence of all quadratic forms this world is necessarily a 4-dimensional Lorentz-invariant space-time with a gauge symmetry G(3)xG(2)xG(1) for internal points which represent elementary particle degrees of freedom. Matter appears as a geometric distortion by an inhomogeneous field of quadrics and all physical properties (spins, charges) of the standard model seem to follow from its geometric structure in a continuum limit. The finiteness inevitably induces a fermionic quantization of all matter fields and a bosonic for gauge fields. This unity of space-time and matter was already sought 1918 by Hermann Weyl in a gauge theory as an extension of Einstein's general theory of relativity, but not found - probably because of the assumption of a continuous geometry.

Wednesday, 5 December 2018, 16:15h, Room A348/349, Theresienstr. 37/III

Prof. U. Schollwöck