



MAFIA - the seminar you can't refuse

Knots and links in physics

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Abstract: Dark energy is one of the biggest mysteries in modern cosmology. People found out recently that it is possible to get the value of cosmological constant inside quantum gravity theories. An example could be the causal set approach, loop quantum gravity, or modified string theory. This serves as a motivation for the author to formulate a quantum gravity paradigm, which could have better applications to the solution of the problem of dark energy (ring paradigm). According to this paradigm is not graviton a particle as are other particles of the standard model, but it could be modelled as a phonon on a grid. Because physics is defined on the set of loops, the ring paradigm has nice applications to mathematics, especially knots and links.

We define the Reidemeister moves for knot and link diagrams in the second part of the seminar. We explain what is the bracket polynomial and we give a definition of the Jones polynomial and its generalizations. The connection to von Neumann algebras will be shown at the end.