SEMINAR ZAVODA ZA TEORIJSKU FIZIKU

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Emergent Gauge Theory and Gravity from Yang-Mills Matrix Models

Harold Steinacker

University of Vienna

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Sažetak:

A introductory review to noncommutative gauge theory and emergent noncommutative gravity within Yang-Mills Matrix models is presented. Space-time is described as a noncommutative brane solution of the matrix model, i.e. as submanifold of R^D. Fields and matter on the brane arise as fluctuations of the bosonic resp. fermionic matrices around such a background, and couple to an effective metric interpreted in terms of gravity. The relation to noncommutative gauge theory and the role of UV/IR mixing is explained. Suitable tools are provided for the description of the effective geometry in the semi-classical limit, using basic Poisson geometry. We discuss how generic geometries can be realized in the matrix model framework, illustrated by simply fuzzy geometries. The IKKT model with D=10 and close relatives are singled out due to maximal supersymmetry. This provides a new approach to the problem of finding a consistent framework containing both gravity and quantum mechanics.

Voditelj seminara: Dr. Hrvoje Nikolić
⟨*hrvoje@thphys.irb.hr*⟩