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A noncommutative generalization of Witten's conjecture

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The classical Witten conjecture says that the generating series of integrals of monomials in the psi-classes over the moduli spaces of curves is a solution to the KdV hierarchy. Together with Paolo Rossi, we present the following generalization of Witten's conjecture, which remarkably involves a noncommutative integrable system. On one side, let us deform Witten's generating series by inserting in the integrals certain naturally defined cohomology classes, the so-called double ramification cycles. It turns out that the resulting generating series is conjecturally a solution of a noncommutative KdV hierarchy, where one spatial variable is replaced by two spatial variables and the usual multiplication of functions is replaced by the noncommutative Moyal multiplication in the space of functions of two variables.

Primary author: Prof. BURYAK, Alexandr (ETH Zurich)

Presenter: Prof. BURYAK, Alexandr (ETH Zurich)