

Meeting PRIN "String Theory as a bridge between Gauge Theories and Quantum Gravity"



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Open-Closed Duality in String Field Theory

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We approach the problem of open-closed duality through the complete perspective of string field theory (SFT) and we provide a description of the backreaction of a large N stack of D-branes as a new closed string background without D-branes. To achieve this, we first of all give a new convenient formulation of open-closed SFT based on a single open-closed nilpotent structure which captures the consistency of the theory. Then we perform the 't Hooft large N limit, obtaining at the leading order a classical closed SFT plus a quantum but planar open SFT. We then proceed to integrate out the open string sector applying the so-called homotopy transfer to our new nilpotent structure and we end up with a purely classical closed SFT. The obtained closed string theory however have tadpoles, whose strength is controlled by the 't Hooft coupling. To get rid of the tadpoles we finally perform a vacuum shift, which describes closed strings in the backreacted new background, without D-branes. We test this construction in minimal string theory where, following well-known results by Gaiotto and Rastelli, we show how we can move in the space of $(2, p)$ closed strings by computing the backreaction of a large number of FZZT branes in the $(2, 1)$ background. This talk is based on 2305.02843, 2305.02844 and work in progress.

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