



ICTS String Seminar

Title : A String Theory for Two-Dimensional Yang-Mills Theory

Speaker : Suman Kundu (Weizmann Institute of Science, Israel)

Date : Wednesday, 09 October 2024

Time : 3:30 PM (IST)

Abstract : Two-dimensional gauge theories with charged matter fields are useful toy models for studying gauge theory dynamics, particularly for examining the duality of large N gauge theories to perturbative string theories. A useful starting point for such studies is pure Yang-Mills theory, which is exactly solvable. Its $1/N$ expansion was interpreted as a string theory by Gross and Taylor, but they did not provide a worldsheet action for this string theory, and such an action is useful for coupling it to matter fields. The chiral sector of the Yang-Mills theory can be written as a sum over holomorphic maps and has useful worldsheet descriptions, but the full theory includes more general extremal-area maps; a formal worldsheet action including all these maps in a “topological rigid string theory” was written by Hořava many years ago, but various subtleties arise when trying to use it for computations. In this talk, we will construct a Polyakov-like generalization of Hořava’s worldsheet action that is well-defined, and we will show how it reproduces the free limit of the Yang-Mills theory, both by formal arguments and by explicitly computing its partition function in several cases. We will also discuss the generalization of this string theory with boundaries, corresponding to Wilson loops, and we will mention possible ways to generalize for the finite-coupling gauge theory.

Venue : Madhava Lecture Hall

Zoom Link: <https://icts-res-in.zoom.us/j/88092766911?pwd=R3ZrVk9yeW96ZmQ4ZG9KRzVhenRKZz09>

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