

Mathematical Physics seminar

Thursday, Sep 30, 2021

10:30 am-11:30 am

on Zoom

<https://purdue-edu.zoom.us/j/>

Meeting ID: 953 1862 5523

Passcode: 184222

Miroslav Rapcak (Physics, UC Berkeley)

Title:

M5-branes in toric 3-folds and vertex operator algebras

M-theory admits six-dimensional objects called M5-branes. Let us place an M5-brane on a product of a Riemann surface with a four-dimensional manifold. The low energy behavior of the M5-brane can be described by a quantum field theory living on its support. Compactifying such a theory on the four-manifold leads to an effective description in terms of a theory on the Riemann surface containing local operators forming a vertex operator algebra. Compactifying on the Riemann surface leads to a description in terms of a 4d theory living on the four-manifold with sectors of different instanton numbers. This physical picture provides an explanation for the famous work of Nakajima, who showed a rather close correspondence between moduli spaces of instantons on four-manifolds and the representation theory of vertex operator algebras. Recently, the correspondence was extensively enlarged by allowing more general configurations of intersecting M5-branes relating spiked instantons of Nekrasov with a larger class of vertex operator algebras introduced in my work with Gaiotto and Prochazka.

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