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**Department of Theoretical Physics**

# THE QUANTUM SPACETIME SEMINAR SERIES

**Adiabatic continuity, anomaly preserving compactifications, and calculable confinement**
**(Zoom Seminar)**

## Mithat Unsal
**(North Carolina State University)**

**Date:** October 31, 2022

**Time: 9**.00 **A**M IST

Zoom link shall be shared separately

I will describe the idea of adiabatic continuity which can be used to continuously connect strongly coupled gauge theories on R^4 to compactified gauge theories on R^2 x T^2 by using 't Hooft flux background. In this process, I will describe how to perform semi-classical fractional instanton analysis in the 't Hooft flux background in a general class of theories. In the weak coupling (small T^2) regime, properties such as confinement, chiral symmetry breaking, and multi-branch structure as a function of theta angle are semi-classically calculable. As opposed to common beliefs emanating from the 70s, which emphasize that these are necessarily strong coupling phenomena, all of them can be realized in weak coupling regime. I will mention the roles of fractional instantons, resurgence, and TQFT couplings, and state some open problems.

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