



# INVITATION

as part of the Mathematical Physics Theory Seminar

to the talk by

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on

***“Surface observables in 4D BF and Yang–Mills theories”***

**Abstract:**

Abelian Yang–Mills theory possesses an interesting gauge-invariant observable defined as (the exponential of) the Hodge dual of the curvature integrated on a surface  $\Sigma$  (this can be interpreted as the magnetic flux through  $\Sigma$ ). As emphasized by 't Hooft, a nonabelian version would be of significant interest. In this talk, I will first show how to obtain a surface observable for BF theory with cosmological constant. This is a topological field theory, and an AKSZ model, whose fields are a connection and a 2-form  $B$ , with equations of motions simply stating that  $B$  is proportional, by the “cosmological constant,” to the curvature. This is a nontrivial task which can be achieved through the BV formalism defining a second field theory on  $\Sigma$  coupled to the ambient fields of BF theory. (As the previously known version for zero cosmological constant, the expectation value of this observable should yield invariants of 2-knots in 4 dimensions.) Subsequently, thanks to a result with F. Bonechi and M. Zabzine, we can recover Yang–Mills theory (plus quantum corrections) from this BF theory via averaging on certain fields (BV pushforward in the terminology developed with P. Mnev and N. Reshetikhin). This procedure also produces a surface observable for Yang–Mills theory which, in the classical limit, corresponds to the nonabelian magnetic flux.

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**Time: Tuesday, 28 April 2026, 2:00 p.m.**

**Location: Erwin-Schrödinger Lecture Hall, 1090 Vienna, Boltzmannngasse 5, 5<sup>th</sup> floor**