Mathematics Department Colloquium

Organizer: Nicolai Reshetikhin

Thursday, 4:10–5:00pm, 60 Evans

Nov. 1 **Jorgen Anderson**, University of Aahus, Denmark
Hitchin Connection, Toeplitz Operators, and Reshetikhin–Turaev TQFT

In this talk I will explain the gauge theoretical approach to the Reshetikhin–Turaev TQFT's. The vector space these TQFT associated to a closed oriented surface is given as the space of covariantly constant sections of Hitchin's connection in a certain vector bundle over Teichmuller space of the surface. This vector bundle is constructed by applying geometric quantization to the moduli space of flat connections for some compact simple Lie group, e.g. $SU(n)$.

As we will see the parallel transport of the Hitchin connection is a Toeplitz operator. This has a number of corollaries. One is of them is an integral formula for the Reshetikhin–Turaev quantum invariant of any closed 3-manifold. Applying standard asymptotic analysis techniques from the theory of Toeplitz operators to this formula we establish Witten's asymptotic expansion for these invariants.

If time permits it, we will discuss other applications of this theory.