THE ANDERSEN-KASHAEV TQFT

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In the 1989 work "Quantum Field Theories and Jones Polynomial" E. Witten showed how the Quantum Field Theories formalism with the Chern-Simons action and compact gauge group can produce important invariants in low dimensional topology like the Jones polynomial. A combinatorial, formally correct, model for such theories was constructed right afterwards by Reshetikhin and Turaev. In order to be able to define quantum Chern-Simons theory with non-compact gauge group, we will introduce a combinatorial model for a TQFT coming from the quantization of the Teichmuller Space, as described by J.E. Andersen and R.M. Kashaev. This will permit us to define a new quantum invariant for triangulated 3-manifolds, conjecturally related to the hyperbolic volume. On the way we will need to introduce the Penner coordinates for the decorated Teichmuller space, and angle structures on triangulated pseudo 3-manifolds. If the time permits I will explain how this quantization program can be extended to the case when these coordinates are complex.