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Atle Hahn* (atle.hahn@gmx.de), Department of Mathematics, Louisiana State University, Baton Rouge, LA 70803-4918. *Towards a rigorous path integral derivation of 3-manifold quantum invariants.*

The study of the heuristic Chern-Simons path integral by E. Witten inspired (at least) two general approaches to quantum topology. Firstly, the perturbative approach based on the CS path integral in the Landau gauge and, secondly, the "quantum group approach" by Reshetikhin/Turaev. While for the first approach the relation to the CS path integral is obvious for the second approach it is not. In particular, it is not clear if/how one can derive the relevant R-matrices or quantum 6j-symbols directly from the CS path integral. In my talk, which summarizes the results of a recent preprint (cf. [math-ph/0507040](https://arxiv.org/abs/math-ph/0507040)), I will sketch a strategy that should lead to a clarification of this issue in the special case where the base manifold is of product form. This strategy is based on the "torus gauge fixing" procedure introduced by Blau/Thompson for the study of the partition function of CS models. I will show that the formulas of Blau/Thompson can be generalized to Wilson lines and that the evaluation of the expectation values of these Wilson lines leads to the same state sum expressions in terms of which Turaev's shadow invariant is defined. Finally, I will sketch how one can obtain a rigorous realization of the path integral expressions appearing in this treatment. (Received December 13, 2005)