

# NON-SEMI-SIMPLE QUANTUM INVARIANTS AND TQFTS

CHRISTIAN BLANCHET

A new family of quantum invariants based on nilpotent representations of quantum  $\mathfrak{sl}(2)$  at a root of unity have been constructed by Costantino-Geer-Patureau. We give an overview of the construction and compare with the modular category settings. The new invariants are defined for 3-manifolds with colored graph and certain  $C^*$  flat connections. Comparing with Turaev surgery formula, we show that for a root of unity of order 4, the construction gives a canonical normalisation of Reidemeister torsion. In the general case, we show that the new quantum invariants have graded TQFT extensions and say a few words on the underlying representations of mapping class groups.

IMJ-PRG, UNIV PARIS DIDEROT

*E-mail address:* christian.blanchet@imj-prg.fr