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Title: Orthogonal Quantum Group Invariants of Links

Abstract: The colored HOMFLY polynomial is a quantum invariant of oriented links in S^3 associated with a collection of irreducible representations of each quantum group Uq(slN) for each component of the link. We will discuss in detail how to construct these polynomials and their general structure. Then we will discuss the new progress, Labastida-Marino-Ooguri-Vafa conjecture. The LMOV conjecture also gives the application of Lickorish-Millet type formula for links. The corresponding theory of colored Kauffman polynomial and orthogonal LMOV conjecture could also be developed in a similar fashion by using more complicated algebra structures. We prove several cases of this new conjecture. This is a joint work with Lin Chen.