

State counting in Kitaev quantum double models

Plaquette excitations in 2D lattice gauge theories with a finite gauge group G have been known, since at least the works by Bais and de Wild Propitius in the nineties, to behave as non-Abelian anyons carrying localized generalized magnetic fluxes. These plaquette excitations also form one subset of elementary excitations for the famous Kitaev quantum double (KQD) model based on the group G . The other subset corresponds to localized vertex excitations carrying generalized electric charges. Building on recent works by A. Ritz-Zwilling, S. Simon, J.-N. Fuchs and J. Vidal on the exact computation of the partition function of string net models on a surface of arbitrary genus, I will show how to count the degeneracy of an energy eigenspace for the KQD model based on G , with prescribed types of plaquette and site excitations. This formula has the expected form for an *emerging* topological field theory, based on the modular tensor category obtained by applying the Drinfeld center construction to the category of G -graded vector spaces.

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