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aXb=c in 2+ID TQFTS

Abstract

I will discuss fusion rules of the form aXb=c in 2+1D topological quantum field theories. Here a, b, and c are simple objects of the associated modular tensor categories (MTC). As I will explain, when a and b have categorical dimension larger than one, such fusion rules imply interesting global constraints on the MTC. The simplest possibility is that the MTC factorizes, but there are other, more interesting, possibilities as well. Some of these latter possibilities may potentially be relevant for understanding various problems in mathematical physics that I will describe.