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*Weak Hopf Algebras Associated to Tambara-Yamagami Categories*

Tambara and Yamagami have introduced a now well-known family of fusion categories whose fusion rules, involving a single non-invertible simple object, are given in terms of a nondegenerate bicharacter on the, necessarily abelian, group of invertible objects. In some cases, essentially determined by Tambara, these categories are equivalent to module categories of Hopf algebras. In other cases there are obstacles, the most obvious being noninteger dimension of the noninvertible simple object. However, even if this dimension is an integer, quasi-Hopf algebras instead of ordinary Hopf algebras may be needed. A general result of Hayashi guarantees that every fusion category is equivalent to the representation category of a weak Hopf algebra. However, the weak Hopf algebras provided by Hayashi's construction are rather large. Not only is their dimension rather large compared to the dimension of the category. Also the size of the source and target counital subalgebras (which could be seen as measuring the difference between an ordinary and a weak Hopf algebra) is somewhat generous: These semisimple algebras have the same number of simple factors as there are simple objects in the category. We investigate some cases in which Tambara-Yamagami categories cannot be described by ordinary Hopf algebras, but smaller weak Hopf algebras than those given by Hayashi's general procedure can be found; these will be smaller both in dimension (though still larger than the dimension of the category) and in the number of components of the base algebra (though this will still be greater than one).