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Non-Split Tambara-Yamagami Categories over the Reals

In 1998, Tambara and Yamagami classified all split fusion categories with a certain simple set of fusion rules that occur naturally as categories of complex representations of finite groups. When taking real representations, irreducible representations can be real a.k.a. *split*, or they can be complex or quaternionic, a.k.a. *non-split*. For example, $\mathrm{Rep}_{\mathbb{R}}(Q_8)$ contains a quaternionic irreducible of dimension 4. In a recent paper with J. Plavnik and D. Sconce, we have extended the classification to now include such non-split irreducibles. I will give many examples, and along the way I will discuss some of the complications involved in working with fusion categories over the real numbers.