

A classical theorem of Brauer shows that the representation theory of any finite group can be defined over a cyclotomic field. (The same holds for quantum groups at roots of unity.) Etingof, Nikshych and Ostrik asked if this is true of every fusion category.

Theorem (Morrison-Snyder, Transactions of the AMS '10)

The even parts of the Haagerup and extend Haagerup subfactors cannot be defined over any cyclotomic field.

Proof.

Using the skein theory, we produce a canonical element of the ground field which is not cyclotomic. □