Haag duality for 2D quantum spin systems

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Doplicher–Haag–Roberts (DHR) theory in algebraic quantum field theory allows us to derive a braided C^*-tensor category under the assumption of Haag duality. Recently, DHR theory has been applied to the study of topological phases of matter in two-dimensional quantum spin systems. The strength of DHR theory in this context is that it provides a framework to describe anyons as invariants of topological order. However, Haag duality is a necessary input, and it is not known whether it holds in general. In this talk, I will report on our recent results with David Pérez-García and Alberto Ruiz-de-Alarcón concerning Haag duality in two-dimensional tensor network states based on biconnected C^-weak Hopf algebras.