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THE EMBEDDING THEOREM FOR MODULE CATEGORIES

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**Abstract of Report Talk:** Subfactor theory studies inclusions of Von Neumann algebras which have trivial center. The study of subfactors connects functional analysis, quantum algebra, and category theory, and has applications to other topics, such as knot theory. Vaughan Jones and David Penneys have shown that a finite depth subfactor planar  $*$ -algebra embeds in the bipartite graph planar algebra of its principal graph. By constructing a strongly Markov inclusion of finite von Neumann algebras from a given module, we extend their techniques to the case of cyclic modules over a subfactor planar algebra, relating the calculus of string diagrams in a module category and the canonical planar  $*$ -algebra structure on a Markov inclusion. We generalize their result, showing that a finite depth subfactor  $*$ -planar algebra embeds into the bipartite graph planar algebra of the fusion graph of any of its cyclic modules. This result has applications to the finite index subfactor classification program. Our research was supported by David Penneys' NSF CAREER grant 1654159.

[Joint work with Peter Huston]

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