

Young Mathematicians Conference 2018  
*The Ohio State University, August 10-12*

A SKEIN THEORETIC APPROACH TO THE QUOTIENTS OF  $A_2 * T_2$

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**Abstract of Report Talk:** Skein theory is a powerful tool for construction and classification results in quantum algebra and category theory. We study the unitary quotients of the free product of  $A_2$  and  $T_2$  (the smallest non-trivial unitary fusion categories). Such quotients are classified by a positive number  $n$  and a  $2n - th$  root of unity. Zhengwei Liu showed that there are no such quotients for any  $n \geq 4$ . We are working on fully developing Masaki Izumi, Scott Morrison, and David Penneys' alternate skein theoretic approach to Liu's theorem. Evidence suggests that the diagrams we encounter are enumerated by the Fibonacci numbers, can be understood using a recursive combinatorial argument, and can be identified with patterns in Pascal's triangle. These rich connections to combinatorics will help us better understand Liu's theorem.

This research is supported by David Penneys' NSF CAREER grant 1654159.

[Joint work with Dell, Zachary]

Received: July 18, 2018