

DISSERTATION
DEFENSE

Connections between Classical and Umbral Moonshine

Sarah Trebat-Leder
Emory University

Abstract: Both results of this dissertation involve finding unexpected connections between the classical theory of monstrous moonshine and the newer umbral moonshine. In our first result, we use generalized Borcherds products to associate to each pure A-type Niemeier lattice a conjugacy class g of the monster group and give rise to identities relating dimensions of representations from umbral moonshine to values of McKay-Thompson series. Our second result focuses on the Mathieu group M_{23} . While it inherits a moonshine from being a subgroup of M_{24} , we find a new and simpler moonshine for M_{23} such that the graded traces are, up to constant terms, identical to the monstrous moonshine Hauptmoduln.

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Advisor: Ken Ono

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