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**Sarah Trebat-Leder\*** (strebat@emory.edu), **Ken Ono** and **Larry Rolin**. *Connecting Classical and Umbral Moonshine Through Borcherds Products.*

The classical theory of monstrous moonshine describes the unexpected connection between the representation theory of the monster group  $M$ , the largest of the simple sporadic groups, and certain modular functions, called Hauptmoduln. In particular, the Fourier coefficients of Hauptmoduln are graded traces  $T_g$  of  $g \in M$  acting on  $V$ , a special infinite dimensional representation of  $M$ . Similar phenomena have been shown to hold for the Mathieu group  $M_{24}$ , but instead of modular functions, mock-modular forms must be used. This has been conjecturally generalized even further, to umbral moonshine, which associates to each of 23 Niemeier lattices a finite group, infinite dimensional representation, and mock-modular form. We use generalized Borcherds products to relate monstrous moonshine and umbral moonshine. Namely, we use mock-modular forms from umbral moonshine to construct via generalized Borcherds products rational functions of the Hauptmoduln  $T_g$  from monstrous moonshine. This allows us to associate to each pure  $A$ -type Niemeier lattice a conjugacy class  $g$  of the monster group, and gives rise to identities relating dimensions of representations from umbral moonshine to values of  $T_g$ . (Received February 08, 2014)